GeoPro Consulting Limited

Geotechnical-Hydrogeology-Environmental-Materials-Inspection

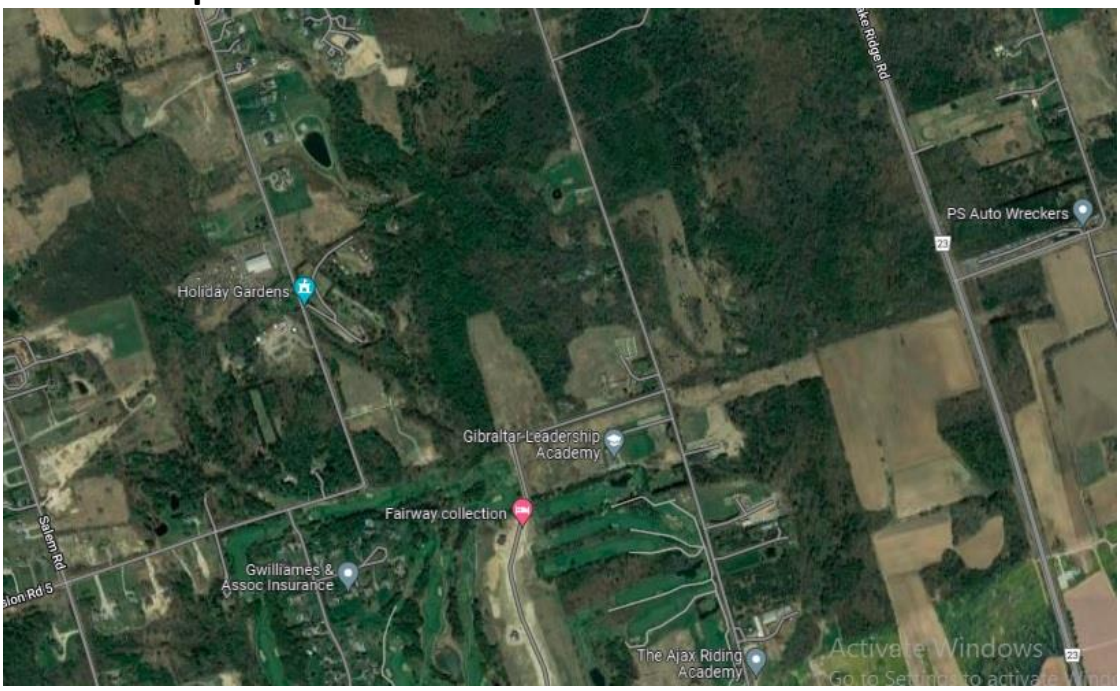
Preliminary Hydrogeological Assessment

Proposed Residential Development

Part of Lot 3 and 4, Concession 5, Pickering, Ontario

Prepared For:

JFC Developments Ltd.



GeoPro Project No.: 17-1780H3

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GeoPro CONSULTING LIMITED

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Limitations to the Report

1.0 INTRODUCTION

GeoPro Consulting Limited ("GeoPro") was retained by JFC Developments Ltd. (the "Client") to conduct a preliminary hydrogeological assessment for the proposed residential development at part of lot 3 and 4, Concession 5, Pickering, Ontario (the "Site"). The approximate site location is shown on Drawing No. 1.

It should be noted that the hydrogeological report was prepared based on the preliminary design information provided at the time of preparing the report. In the event the design information is modified or updated, this report should be reviewed by GeoPro and further recommendations will be provided as needed.

1.1 Purposes

The purposes of this preliminary hydrogeological assessment are to characterize the subsurface soil and groundwater conditions in the limited number of boreholes at the Site and to assess temporary dewatering and groundwater control needs (if any) in order to facilitate the design of the Project.

It should be noted that the preliminary hydrogeological assessment was completed concurrently with a geotechnical investigation carried out by GeoPro at the Site. The results of the geotechnical investigation were summarized in a separate report.

1.2 Scope of Work

In conjunction with the geotechnical investigation, the preliminary hydrogeological assessment comprised the following tasks:

1) Conducting a search and review of the available geology and hydrogeology data resources, including Ministry of the Environment, Conservation and Parks ("MECP") Water Well Records ("WWR"), Ontario Geological Survey ("OGS") and Ontario Source Water Protection Program;
2) Conducting a site visit to observe the site features and potential source(s) of contamination;
3) Completing groundwater monitoring and testing; and
4) Completing data processing, interpretation and report preparation.

This report has been prepared for the Client. Third party use of this report without GeoPro's consent is prohibited. The limitation conditions presented in this report form an integral part of the report and they must be considered in conjunction with this report.

1.3 Previous and Concurrent Investigations and Reports

1.3.1 Investigations by Other Consultants

A test pit investigation was previously conducted at the Site by V.A. Wood Associates Limited ("V.A. Wood"). The report entitled *"Test Pit Investigation, Proposed Subdivision, Fifth Concession and Balsam*

Road, Pickering, Ontario", dated October 2016 prepared by V.A. Wood was provided by the Client to GeoPro for review. A summary is made as follows.

A total of six (6) test pits were advanced at the Site to the depths ranging from about 3.0 m below ground surface ("mBGS") to 3.3 mBGS. At the eastern parcel, the typical stratigraphic sequence of native deposits is topsoil underlain by silty sand till and then by sandy silt till; at the western parcel, the typical stratigraphic sequence of native deposits is topsoil underlain by sand and then by silty sand. No seepage was encountered in all of the test pits during the excavation, and the groundwater table was considered to be below 2.4 mBGS based on the examination of the retrieved soil samples.

The grain size analyses were carried out on soil samples taken at the depths between 1.5 mBGS and 2.2 mBGS. Based on the grain size analyses, the estimated permeability values ranged from 10^{-5} cm/s to 10^{-4} cm/s, and the estimated percolation rate (T-time) ranged from 12 min/cm to 20 min/cm.

The information or data obtained from V.A. Wood's test pit investigation has been referenced in this preliminary hydrogeological site assessment report. A copy of the related extracted report is included in Appendix A. We assume that the information provided from the previous report mentioned above is factual and accurate and GeoPro has not independently confirmed any such information. We accept no responsibility for any deficiency, misstatements or inaccuracies contained in this report as a result of omissions, misinterpretations or fraudulent acts of any kinds from the previous report.

1.3.2 Geotechnical Investigations by GeoPro

Geotechnical investigations were carried out by GeoPro, which consisted of advancement of thirteen (13) boreholes (BH1 to BH7, BH101 to BH106) drilled to the depths ranging from 5.0 to 29.6 mBGS, and installation of seven (7) monitoring wells in each of the advanced boreholes.

The information and data obtained from GeoPro's reports had been incorporated in this preliminary hydrogeological assessment report. The approximate borehole and monitoring well locations are shown on Drawing No. 2, and the Borehole Logs are included in Appendix A.

2.0 SITE CONDITIONS

2.1 Site Feature Observations

A site visit was conducted on April 26, 2017 to observe the general site features and sources of potential contamination and/or environmental concern.

The Site is located in a suburban area on the north side of Dexshrine Drive between Sideline 4 and Audley Road and generally surrounding by residential, institutional and commercial properties.

No dry cleaners, gas station and auto garage (auto service shop) were noted in the area within a 500 m radius from the Site based on Google Maps. However, there may potentially be other potentially contamination activities (PCAs). at the Site, which would not be revealed by the visual observations.

2.2 Physiography and Drainage

The Site is located within the Iroquois Plain and South Slope physiographical region in an area comprised of Sand Plains, Beaches, Clay Plains and Drumlinize Till Plains according to the "Physiography Map of South Central Portion of Southern Ontario" prepared by the Ontario Department of Mines and Northern Affairs, and based on the Ontario Geological Survey ("OGS") database.

The Site is located at the Caruthers Creek Subwatershed, part of the Carruthers Creek Watershed, under the jurisdiction of the Toronto and Region Conservation Authority ("TRCA"). The Carruthers creek, flow across the Site, which flows southerly, drains into Lake Ontario approximately 11 km south of the Site.

2.3 Geology

2.3.1 Bedrock Geology

The bedrock beneath the Site consists of Upper Ordovician of shale, limestone, dolostone and siltstone, at the depths ranging from approximately 26 to 32 mBGS, according to the "Bedrock Geology of Southern Ontario" prepared by the Ontario Ministry of Northern Development and Mines and based on the OGS database.

2.3.2 Surficial Geology

As shown on Drawing No. 3, the Site and its surrounding area are located in an area covered with modern alluvial deposits, sandy silt to silty sand textured till, and coarse-textured glaciolacustrine deposits, according to the "Surficial Geology of Southern Ontario" database maintained by the OGS.

2.3.3 Site Stratigraphy

As indicated in the appended Borehole Logs the soil stratigraphy at the Site generally consists of fill materials below topsoil, underlain by cohesionless silty/sandy/gravelly soils, till deposits and cohesive clayey soils. Probable weathered shale was encountered at the depth of 28.4 mBGS.

Detailed descriptions of soil strata encountered in the boreholes drilled at the Site are provided on the Borehole Logs in Appendix A.

2.4 Hydrogeology

The hydrogeological conditions at the Site were evaluated based on the information obtained from the Ministry of Natural Resources and Forestry and the Ontario Source Protection Information Atlas, the water well data collected from the MECP database, the information obtained during the geotechnical investigation, and the data collected from the additional work conducted at the Site.

2.4.1 Highly Vulnerable Aquifer ("HVA")

Based on the Ontario Source Protection Information Atlas, the Site is located in an area with a Highly Vulnerable Aquifer ("HVA"). HVAs are delineated according to Technical Rules under the Clean Water Act.

In general, an HVA will consist of source granular aquifer materials or fractured rock that have a high permeability and are exposed near the ground surface with a relatively shallow water table.

An aquifer is indicated as vulnerable if possible contaminants could quickly flow into it and impact water quality. In addition, a plume of the possible contaminants would migrate quickly in an HVA.

2.4.2 MECP WWR

A search of the MECP WWR database was conducted focusing on a 500 m radius from the Site. The locations of the MECP water wells are shown on Drawing No. 4. A summary of water well records is included in Appendix B and presented in the following table.

Types of Well Record	Number of Records
Commercial	1
Domestic	19
Industrial	1
Irrigation	1
Livestock	2
Municipal	1
Public	1
Monitoring	7
Not Used	1
Unknown	3
Total	**37**

Twenty-six (26) well records are identified in the MECP WWR database as water supply wells. Bedrock was encountered at the depth ranging from 26.8 to 30.2 mBGS, and water was reported at recorded depths ranging from 1.2 to 32.3 mBGS in overburden deposits and bedrock.

The locations and types of wells in close proximity to the Site were not verified by a well survey and should be considered as reference only. If a more accurate assessment of the local wells is required, a door-to-door well survey may be considered.

2.4.3 Wellhead Protection Area ("WHPA")

Based on the Ontario Source Protection Information Atlas, the Site and its neighboring properties are not located within a municipal Wellhead Protection Area.

2.4.4 Intake Protection Zone ("IPZ")

Based on the information obtained from the Ontario Source Protection Information Atlas, the Site and its neighboring properties are not located within a municipal surface water intake protection zone ("IPZ").

2.4.5 Significant Groundwater Recharge Areas ("SGRA")

Based on the Ontario Source Water Protection Map, the surrounding area of the Site is located within an area defined as Significant Groundwater Recharge Areas ("SGRA"). These are areas with porous soils such as sand or gravel that have higher than average infiltration rates, which help maintain water levels in drinking water supply aquifers.

2.4.6 Groundwater Levels

Groundwater conditions were observed in the advanced boreholes during and immediately upon completion of drilling. The observations are included on the Borehole Logs in Appendix A.

Groundwater levels were measured in all existing monitoring wells (BH1 to BH7) on April 28, 2017 to December 7, 2021. The monitoring well construction details and the measured groundwater levels are recorded on the appended Borehole Logs and summarized in the table in Appendix G.

As shown in the above table, groundwater levels ranged from -0.67 to 2.55 mBGS during the monitoring period.

It should be noted that Carruthers Creek divides the shallow groundwater into two (2) separate groundwater flow regimes. Based on the obtained groundwater level elevations, the local groundwater flow directions were interpreted to be in a general direction of southeast in the West Portion of the Site and in a general direction of southwest in the East Portion of the Site; however, the extensive underground infrastructure in this urban setting may influence local groundwater flow patterns.

It should be noted that the groundwater levels can be expected to vary over time and are subject to seasonal fluctuations.

2.4.7 Groundwater Quality

Groundwater sampling was conducted on April 20, 2017 by GeoPro from Monitoring Wells BH2 and BH6. The groundwater samples were collected in appropriate laboratory-supplied containers, placed in a cooler, and submitted to ALS Environmental ("ALS") in Waterloo, Ontario for analysis of selected physical and chemical parameters as specified in the Durham Region Combined Sewer-Bylaw ("the Local Sewer-Bylaw") for BH2, and groundwater samples collected from BH6 were analyzed for metals specified in Provincial Water Quality Objectives ("PWQO"). In addition, filtered samples were analyzed for metals. The analytical results are provided in Appendix C.

The results were compared with the respective criteria specified in the Local Sewer Bylaw. Based on the comparison, exceedances of the sanitary criteria were measured for Total Suspended Solids ("TSS"), in the analyzed groundwater samples. Exceedances of storm criteria were measured for TSS, manganese in the analyzed groundwater samples. Exceedances of PWQO were measured for phosphorus, aluminum, cobalt, copper, lead, phenols and iron. A summary of the exceedances is presented in the following table.

Sample ID	Parameter	Concentration (mg/L)	Durham Sanitary (mg/L)	Durham Storm (mg/L)	PWQO (mg/L)
BH2	TSS	2,450	350	15	-
	Phosphorus	0.222	10	0.4	0.01
	Phosphorus (dissolved)	< 0.050	10	0.4	0.01
	Aluminum	1.26	50	-	0.015
	Aluminum (dissolved)	0.0067	50	-	0.015
	Cobalt	0.00191	5	-	0.0009
	Cobalt (dissolved)	0.00103	5	-	0.0009
	Copper	0.0025	3	0.05	0.001
	Copper (dissolved)	0.00082	3	0.05	0.001
	Lead	0.00137	1	0.12	0.001
	Lead (dissolved)	<0.000050	1	0.12	0.001
	Manganese	0.868	5	0.15	-
	Manganese (dissolved)	0.755			
	Phenols	0.0017	1	0.008	0.001
BH6	TSS	107	350	15	-
	Aluminum	1.08	50	-	0.015
	Aluminum (dissolved)	0.0059	50	-	0.015
	Copper	0.0024	3	0.05	0.001
	Iron	1.80	-	-	0.3
	Lead	0.00198	1	0.12	0.001

Note: 15 = underlined standard value exceeded by the sample concentration

3.0 ESTIMATED HYDRAULIC CONDUCTIVITY

Hydraulic conductivity (K-value) of the soils was estimated based on the results obtained from grain size analyses of selected soil samples and from single well response tests (slug tests).

3.1 Grain Size Distribution Method

Grain size analysis (sieve and hydrometer) was conducted on eleven (11) soil samples collected from the boreholes BH1 and BH7 and ten (10) soil samples collected from ten (10) shollow test pits (TP-1 to TP10, 0.5m deep) The grain size analysis results are presented in Figure No. 1 and 9.

In addition, grain size analysis was conducted in the previous test pit investigation carried out by W. A. Wood, and three (3) soil samples (TP1 to TP3) taken from East Portion of the Site and three (3) soil samples (TP4 to TP6) taken from West Portion of the Site were analyzed for grain size distribution. The results are included in Appendix A.

It should be noted that where effective particle size was not observed during grain size analysis testing, the value was approximated for the empirical hydraulic conductivity calculation.

The hydraulic conductivity of the selected soil samples was estimated using applicable empirical equations based on the particle size gradations. As shown in the table below, the estimated K values for the tested soil ranged from 8.8×10^{-7} to 2.3×10^{-3} cm/s.

Borehole ID	Sample #	Soil sample Depth (mBGS)	Soil Type	K Value (cm/s)
BH1	SS4	2.3 – 2.8	Fine Sand and Silt to Fine Sandy Silt	4.1×10^{-4}
BH2	SS3	1.5 – 2.0	Fine Sand and Silt	2.4×10^{-4}
BH2	SS8	7.6 – 8.1	Clayey Silt	1.5×10^{-6}
BH3	SS3	1.5 – 2.0	Fine Sand and Silt to Fine Sandy Silt	5.6×10^{-4}
BH4	SS3	1.5 – 1.8	Sandy Silt Till to Sand and Silt Till	5.9×10^{-6}
BH4	SS8	7.6 – 7.8	Clayey Silt	8.8×10^{-7}
BH5	SS3	1.5 – 2.0	Sandy Silt Till	4.2×10^{-6}
BH5	SS5	3.1 – 3.3	Fine Sandy Silt	1.1×10^{-6}
BH6	SS2	0.8 – 1.2	Sandy Silt Till	2.7×10^{-5}
BH7	SS5	3.1 – 3.5	Fine Sand and Silt	5.3×10^{-4}
BH7	SS15	18.3 – 18.7	Clayey Silt Till	3.2×10^{-6}
TP-1		0.0 – 0.5	Silty Sand	2.3×10^{-3}
TP-2		0.0 – 0.5	Silty Sand	7.7×10^{-4}
TP-3		0.0 – 0.5	Silty Sand	1.8×10^{-4}
TP-4		0.0 – 0.5	Silt and Sand	3.0×10^{-4}
TP-5		0.0 – 0.5	Silt and Sand	7.1×10^{-5}
TP-6		0.0 – 0.5	Silt and Sand	1.5×10^{-5}
TP-7		0.0 – 0.5	Silty Sand	8.2×10^{-5}
TP-8		0.0 – 0.5	Silt and Sand	1.3×10^{-4}
TP-9		0.0 – 0.5	Silty Sand	5.8×10^{-5}
TP-10		0.0 – 0.5	Silt and Sand	8.0×10^{-5}
TP1		1.5 – 1.8	Sand	1.3×10^{-3}
TP2		1.5 – 1.8	Silty Sand	2.9×10^{-4}
TP3		1.5 – 1.8	Silty Sand	2.2×10^{-5}
TP4		2 – 2.3	Fine Sand	7.3×10^{-4}
TP5		2 – 2.3	Silty Fine Sand	4.1×10^{-4}
TP6		2 – 2.3	Sand and Silt	9.7×10^{-4}

3.2 Single Well Response Test (Slug Test) Method

Single well response testing (slug testing) was conducted in seven (7) monitoring wells BH1 to BH7. Prior to the slug testing, initial water level in each well was measured manually using a water level tape, and the monitoring wells were purged using Waterra inertial pumps (tubing and footvalves) to remove the sediments settled in the wells and in the sand pack around the well screens.

The field slug tests were completed either using a rising head method in which a known volume of groundwater was removed from the tested monitoring well or using a falling head method in which a known volume of potable water was added into the tested monitoring well. Before removing or introducing the water, a datalogger was placed in the monitoring well to record the change in water level

(head) versus time throughout the test. The retrieved water level data was plotted on a semi-logarithmic scale using Hvorslev's method to estimate the hydraulic conductivity values.

Slug Test analysis graphs and calculations are included in Appendix D. A summary of K values estimated from the slug tests is shown in the following table.

Monitoring Well No.	Screen Depth (mBGS)	Soil Type	Estimated K-Value (cm/s)
BH1	5.2 – 6.7	Fine Sand and Silt to Fine Sandy Silt	4.3×10^{-5}
BH2	2.2 – 3.7	Fine Sand and Silt	2.1×10^{-5}
BH3	1.2 – 2.7	Silty Fine Sand to Fine Sand and Silt	2.1×10^{-4}
BH4	3.1 – 6.1	Sandy Silt Till to Sand and Silt Till; Silty Sand; Clayey Silt Till	1.5×10^{-4}
BH5	3.1 – 6.1	Fine Sandy Silt; Clayey Silt Till; Sandy Silt Till	2.5×10^{-6}
BH6	3.1 – 6.1	Sandy Silt Till / Silty Sand Till	1.1×10^{-5}
BH7	28.1 – 29.6	Sandy Silt Till / Weathered	3.2×10^{-4}

Based on the slug test results, the estimated hydraulic conductivity value of the screened soils ranged from 2.5×10^{-6} cm/s to 3.2×10^{-4} cm/s.

3.3 Soil Percolation Time and Infiltration Rate

The percolation times and soil infiltration rates for the shallow soils (< 3.7 m at depth) were evaluated using the obtained hydraulic conductivity values as per the methods described in Supplementary Standards SB-6, issued by Ministry of Municipal Affairs and Housing (2006), and in TRCA's Stormwater Management Criteria (SWMC), Version 1.0, dated August 2012, and modified based on our experience.

The estimated soil percolation times and infiltration rates are presented in the following table.

Location	Depth (mBGS)	Test Location	Tested Soil Depth	Primary Soil (Tested)	Hydraulic Conductivity (cm/s)	Percolation Time or T-time, (min/cm)	Infiltration Rate 1/T, (mm/hr)
West Portion	0.0~0.5	TP-1	0.0 – 0.5	Silty Sand	2.3×10^{-3}	12	50
		TP-2	0.0 – 0.5	Silty Sand	7.4×10^{-4}	17	35
		TP-3	0.0 – 0.5	Silty Sand	1.3×10^{-4}	23	26
		TP-4	0.0 – 0.5	Silt and Sand	2.6×10^{-4}	24	25
		TP-5	0.0 – 0.5	Silty Sand	4.6×10^{-5}	31	19
	1.5~2.0	BH2 SS3	1.5 – 2.0	Fine Sand and Silt	2.2×10^{-4}	23	26
		BH3 SS3	1.5 – 2.0	Fine Sand and Silt	5.3×10^{-4}	19	32
	> 2.0	TP4	2.0 – 2.3	Fine Sand	6.0×10^{-4}	18	33
		TP5	2.0 – 2.3	Silty fine Sand	2.2×10^{-4}	23	26

Location	Depth (mBGS)	Test Location	Tested Soil Depth	Primary Soil (Tested)	Hydraulic Conductivity (cm/s)	Percolation Time or T-time, (min/cm)	Infiltration Rate 1/T, (mm/hr)
		TP6	2.0 – 2.3	Sand and Silt	9.2×10^{-4}	14	43
		BH3 (Well)	1.2 – 2.7	Silty Fine Sand to Fine Sand and Silt	2.1×10^{-4}	23	26
		BH1 SS4	2.3 – 2.8	Fine Sandy Silt	2.3×10^{-5}	34	18
		BH2 (Well)	2.2 – 3.7	Fine Sand and Silt	2.1×10^{-5}	35	17
		BH7 SS5	3.1 – 3.5	Fine Sand and Silt	4.3×10^{-5}	31	19
East Portion	0.0~0.5	TP-6	0.0 – 0.5	Silt and Sand	1.5×10^{-5}	37	16
		TP-7	0.0 – 0.5	Silty Sand	8.2×10^{-5}	26	23
		TP-8	0.0 – 0.5	Silt and Sand	1.2×10^{-6}	49	12
		TP-9	0.0 – 0.5	Silty Sand	2.2×10^{-5}	34	18
		TP-10	0.0 – 0.5	Silt and Sand	3.4×10^{-5}	32	19
	0.8~1.2	BH6 SS2	0.8 – 1.2	Sand and Silt (Till)	5.0×10^{-6}	42	14
	1.5~2.0	TP1	1.5 – 1.8	Sand	6.7×10^{-4}	18	33
		TP2	1.5 – 1.8	Silty Sand	1.9×10^{-5}	35	17
		TP3	1.5 – 1.8	Silty Sand	2.2×10^{-5}	34	18
		BH4 SS3	1.5 – 1.8	Sandy Silt (Till)	7.5×10^{-7}	>50	<12
		BH5 SS3	1.5 – 2.0	Sandy Silt (Till)	4.6×10^{-7}	>50	<12
	> 2.0	BH5 SS5	3.1 – 3.3	Fine Sandy Silt	1.1×10^{-6}	49	12

As shown in the above table, the estimated percolation times for the shallow soils in the West Portion of the Site range from 12 min/cm to 35 min/cm, while the infiltration rates range from 17 mm/hour to 50 mm/hour. The estimated percolation times for the shallow soils in the East Portion of the Site range from 18 min/cm to greater than 50 min/cm, while the infiltration rates range from less than 12 mm/hour to 33 mm/hour.

3.4 Preliminary Study for Potable Well

3.4.1 Preliminary Single Well Pumping Tests

Preliminary single well pumping tests including step-drawdown test and combined pumping and recovery test were conducted in Monitoring Well BH7 on May 8 and 9, 2017, respectively.

A submersible pump (Monsoon Pump) was used for the preliminary pumping tests with the pump head set at about 23.5 mBGS. The pumping rate was measured manually using a stopwatch and bucket. Dataloggers were used to record the water levels during the preliminary pumping and recovery processes. In addition, manual measurements of the water levels were conducted to monitor the progress of the pumping.

Preliminary Step-drawdown Tests

The preliminary step-drawdown tests were conducted at four (4) different pumping rates. When the water level was observed to reach an equilibrium stage (no change with time), the pumping rate was then increased for the next drawdown test. Records of the preliminary step-down pumping test data are presented in Appendix E. A summary of the pumping rates and formed drawdowns is presented in the following table.

Step No.	Q (L/min)	Drawdown (m)
1	0.48	0.27
2	1.50	0.97
3	3.18	2.26
4	7.80	14.18

A polynomial relationship between the pumping rate (Q in L/min) and the drawdown (s in m), which incorporates the factors of aquifer loss and well loss, could be established as follows:

Polynomial equation ($R^2 = 0.9983$) $s = 0.2211 \times Q^2 + 0.0892 \times Q$

As shown on Chart F-6 in Appendix E, the drawdown increases with the increasing pumping rates, and the difference between the theoretical drawdown and the measured drawdown increases for each step.

As shown on Chart F-7 in Appendix E, the well efficiency decreases with the increasing pumping rates. The well efficiency for the first, second, third and fourth step is 46%, 21%, 11% and 5%, respectively. It is known that a water supply well running with a well efficiency of less than 65% is usually not acceptable because of its low efficiency. However, it should be noted that BH7 was installed as a 51 mm diameter monitoring well, and the cause of the noted low well efficiency is uncertain but may likely be related to the well construction details such as well size, screen slot size, and packing sand, etc.

Specific capacity, referring to whether the well will provide an adequate water supply, is an important parameter for determining supply pumping rate and pump setting. As shown on Chart F-8 in Appendix E, the specific capacity suggests that the tested well is able to provide a higher discharge rate than the highest pumping rate (7.8 L/min) conducted in the preliminary step-drawdown test.

Preliminary Combined Pumping and Recovery Test

A preliminary combined pumping and recovery test or preliminary constant rate pumping test was conducted on May 9, 2017 for a duration of about 55 minutes with pumped water of about 316 L or at the rate of about 5.75 L/min. When the pumping was finished, an equilibrium was achieved at a drawdown of about 11.8 m. Records of the preliminary combined pumping and recovery test are presented in Appendix E.

3.4.2 Aquifer Characteristics

Based on the results of preliminary combined pumping and recovery test, preliminary aquifer characteristics including Transmissivity (T) and storativity (S) were evaluated.

As shown on Chart F-9 in Appendix E, the drawdown curve matches the theoretical curve for a confined aquifer, and the Cooper-Jacob (Time-Drawdown) analysis method could be used to estimate T and S.

Based on the preliminary single well constant rate combined pumping and recovery test data, T is estimated to be 1.2 x 10^{-6} m^2/s to 3.7 x 10^{-6} m^2/s, and S was 0.024. T indicates how much water will move through the aquifer formation, which varies with aquifer hydraulic conductivity and thickness. It should be noted that Cooper-Jacob (Time-Drawdown) analysis method is suitable for use in a pumping test from a fully penetrating well. Monitoring well BH7 used in this preliminary constant rate pumping test could be considered as a fully penetrating well which penetrates the aquifer consisting of the interface of overburden and inferred shale bedrock or an interface aquifer. In this case, the hydraulic conductivity could be estimated based on the T value, with the aquifer thickness as the screen length of this monitoring well. The hydraulic conductivity was estimated to be in the order of 10^{-4} cm/s, which is similar to the hydraulic conductivity estimated by a slug test carried out in this monitoring well (BH7).

3.4.3 Groundwater Potability

One (1) groundwater sample collected from monitoring well BH7 was analyzed for physical, chemical and bacteriological parameters referred in D-5-5 Private Wells: Water Supply Assessment (August 1996 Version), a guideline which describes the position of MOECC regarding the assessment of water supplies for developments on individual private wells. The analytical results are presented in Appendix C.

The analytical results were compared with the respective criteria specified in Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines (Revised 2006) ("ODWS"). Exceedances or elevated concentrations were found for the parameters including hardness, total coliform and sodium, which are presented in the following table.

Sample ID	Parameter	Unit	Concentration (mg/L)	ODWS Standards (mg/L)	ODWS Objectives /Guidelines (mg/L)
BH7	Hardness (as CaCO3)	mg/L	140	-	80 ~ 100
	Total Coliform	CFU/100 mL	30	0	-
	Sodium	mg/L	27.6	20	200

Based on the analytical results, the water quality of the analyzed raw water sample did not meet the ODWS for total coliform, sodium and hardness.

It should be noted that when the sodium concentration exceeds 20 mg/L the local Medical Officer of Health should be notified so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.

The source of elevated concentration of total coliform is not known. However, unlike water supply wells, the monitoring well to be sampled was not disinfected after the well installation. An appropriate disinfection of the constructed water supply well may remove the total coliform in the well water.

4.0 TEMPORARY DEWATERING REQUIREMENTS

Temporary dewatering is intended to lower the groundwater table within the excavation area in order to provide a "dry" working condition during excavation and installation operations.

The temporary dewatering flow rate generally depends on the design specifications of the proposed structures (such as invert elevation, length, depth, size, etc.), the site hydrogeological conditions (such as existing groundwater levels and flow regime), and the drawdown levels required for maintaining dry working conditions and stable excavation bases and slopes.

4.1 The Project Concept

Based on the design drawing dated July 11, 2023 provided by the Client, the proposed development consists of 13 lots of residential units. No detail design of the residential units was available when preparing this report, the proposed area and excavation depth was assumed and summarized in the following table.

Type	Estimated Width (m)	Estimated Length (m)	Estimated Depth (mBGS)
Each Lot	20	30	3

A copy of the preliminary design drawings is provided in Appendix F.

4.2 Excavation and Temporary Dewatering Requirements

Groundwater levels measured in the on-site monitoring wells range from -0.67 to 2.55 mBGS during the monitoring period. Considering seasonal fluctuations and confined conditions, the initial water level for dewatering is assumed to be 1 m higher than the highest measured groundwater level (e.g., -1.67 mBGS). As a result, the excavations for the project are anticipated to occur below the groundwater table, and temporary dewatering or groundwater control is anticipated to lower the water level to at least 1 m below the excavation base to achieve dry work conditions for the excavation and installation.

Dewatering involves controlling groundwater by pumping, to locally lower groundwater levels in the vicinity of the excavation. Sump pumping is the simplest form of dewatering, by which groundwater is allowed to enter the excavation, and is then collected in a sump and pumped away by robust solids-handling pumps. Sump pumping can be effective in many circumstances, but continual seepage into the excavation may create the risk of instability and other problems.

To prevent significant groundwater seepage into the excavation and ensure stability of the excavation base and side slopes, it may be necessary to lower groundwater levels prior to excavation, which is known as 'pre-drainage'. The pre-drainage methods may include deep wells, wellpoints, eductors (ejectors), vacuum wells, horizontal wells, etc.

Excavations for the Project are anticipated to cut through fill materials, then cohesionless silty/sandy/gravelly soils, till deposits and cohesive clayey soils. Considering the relatively moderate

hydraulic conductivity in the cohesionless silty/sandy/gravelly soils, pre-drainage groundwater control measures by deep wells/wellpoints should be required in conjunction with conventional sump pumping. Additionally, based on water level measurements, a confined aquifer exists beneath the Site which may result in high pore pressure and groundwater upwelling into the trench bottom. Should pressurized groundwater conditions of excavation bottom cause heaving to occur, pre-drainage groundwater control measures such as a relief well installed in the confined aquifer may be necessary.

4.3 Temporary Dewatering Estimation

The following assumptions are considered in estimating the temporary dewatering requirements:

- An initial groundwater level at -1.67 mBGS;
- A target water level 1 m below the excavation bottom;
- Excavation width for each lot to be 20 m;
- Excavation length for each lot to be 30 m;
- The highest hydraulic conductivity obtained from slug tests (3.2×10^{-4} cm/s or 3.2×10^{-6} m/s) was used for the dewatering rate estimation, which was assumed for all water bearing soils encountered by the excavation.

The following Dupuit-Thiem equation was used to calculate radial flow to an open excavation from an unconfined aquifer under steady-state condition:

$$Q = [\pi \times K \times (H^2 - h_W^2)]/Ln(R_o/r_e)$$

Where:

Q = Flow Rate [m^3/s]

H = Initial Water Level [m]

h_w = Target water Level [m]

K = Hydraulic Conductivity [m/s]

r_e = effective radius [m], r_e = (excavation area/ $\pi)^{0.5}$ [m]

$R_o = 3000*(H-h_w)*K^{1/2}$ [m]

Based on the calculations shown above, the estimated radius of influence and the estimated steady-state groundwater inflow rate for the Project are summarized in the following table:

Type	Steady-State Dewatering Rate (L/day)
Each Lot	280,015

It should be noted that the dewatering requirement is expected to be highest at the beginning of the dewatering process, when the volume of groundwater stored within the pore space of the soil matrix must be removed. The additional pumping rates to be considered to allow removal of the overburden storage within 30 days for the Project are summarized in the following table:

Type	Removal of Overburden Storage (L/day)
Each Lot	118,947

Based on the conservative assumptions described above, a total maximum daily dewatering flow rates for the Project were summarized in the following table:

Type	Estimated Total Dewatering Rate (L/day)
Each Lot	398,962

Based on the conservative assumptions described above, the total maximum daily dewatering flow rate for the Project would be less than 400,000 L/day, with consideration of removal of the aquifer storage within a 30-day period. The maximum estimated zone of influence for dewatering the entire site area would be 30 m from the edge of the excavation.

Please note that this dewatering estimation is specific to the taking of ground water and does not include storm water contribution. It is the responsibility of the contractor to ensure the occurrence of any precipitation events on the construction site are recorded and that pumping rates during and after a storm event are maintained within the permitted limit.

It should be noted that the assumed excavation depths and areas for the dewatering volume estimation are based on our understanding of the proposed development and the preliminary information provided by the Client. Should there be any modifications of the design or the assumed depths and areas, or if dewatering of the project is proposed to take place in phases, this office should be further consulted and the dewatering estimation will need to be revised accordingly.

It is known that the subsurface soil conditions may change significantly between and beyond the on-site boreholes. As the information obtained and assumptions made in this investigation report are based on the results obtained from a limited number of investigated locations, unexpected water bearing zones with a hydraulic conductivity higher than that used in these calculations may be present. In addition, the above estimated dewatering volumes are based on the estimated hydraulic conductivities (K-value) from grain size analyses from limited soil samples and in-situ slug tests.

Please note that it is the responsibility of the contractor to ensure dry conditions are maintained within the excavation at all time and at all costs.

4.4 Preliminary Long-term Dewatering or Under-slab Drainage

Considering the high groundwater levels relative to the proposed basement level, unless all foundations are designed to be waterproof and resist hydrostatic uplift a sub-slab drainage system or foundation drainage/weeping tile system in conjunction with a perimeter drainage system should be installed for long-term control of the groundwater level to avoid wet conditions in the basement. The drainage system should be connected to a storm sewer system to provide a positive drainage, or alternatively, the water seepage collected from the drainage system can be discharged to a LID facility installed at the Site.

The basement slab elevations are not known at the time of preparing this preliminary hydrogeological assessment report. However, the proposed basement level may be anticipated at, below or slightly above the prevailing ground water tables at the Site. As such, a long-term ground water table monitoring should be considered to facilitate the future design and estimation of the groundwater seepage into the drainage system.

4.5 Permit-to-Take-Water/Regulatory Registration

According to O. Reg. 387/04, any water taking over 50,000 litres per day requires a Permit to Take Water ("PTTW"), which shall be obtained in accordance with the MECP's PTTW Manual, dated April 2005.

According to O. Reg. 63/16, a PTTW will not be required for temporary dewatering at a construction site in an amount less than 400,000 L/day. However, the dewatering at a construction site in an amount between 50,000 L/day and 400,000 L/day shall be registered through the Environmental Activity and Sector Registry ("EASR").

According to the dewatering rate estimations, if the excavation were to be conducted in stages and sections, the daily temporary dewatering rate for a given section could be controlled within 400,000 L/day. Should this be the method selected, an EASR posting per O.Reg. 63/16 would be considered. However, considering the high dewatering rate near 400,000 L/day it may be prudent to apply for a Category 3 PTTW in case a greater amount of seepage is encountered.

The basement slab elevations and long term stable groundwater tables are not known at the time of preparing this preliminary hydrogeological assessment report. However, subject to the final designed basement slab and the stable groundwater tables, the long-term drainage rate may exceed the limit of 50,000 L/day; should this be the case, a long term PTTW will be required for the permanent drainage.

5.0 POTENTIAL TEMPORARY DEWATERING IMPACTS

5.1 Potential Sources of Contamination

A Phase One Environmental Site Assessment ("ESA") was conducted by GeoPro concurrently with the preliminary hydrogeological assessment; based on the findings of the Phase One ESA, Potentially Contaminating Activities (PCAs) have been evaluated on the Phase One Property and on the properties within the Phase One Study Area. No environmental concerns were identified associated with the PCAs.

5.2 Highly Vulnerable Aquifer ("HVA")

As discussed previously, the Site is located in an area with a HVA present beneath the Site, which indicates that contaminants could potentially affect the aquifer if contamination occurs at the Site.

Any drinking water quality threat activities may pose a risk to a municipal or domestic drinking water supplies. Frequent monitoring of the excavation and installation activities should be carried out during the project. Any products considered flammable, corrosive, hazardous, or which may contain chemicals that could contaminate a drinking water source should be stored, used, and disposed of properly following a Spill Management Plan for the project. Waste which contains pathogens that can run into storm sewers during a rain storm should be properly managed and disposed of following a Spill Management Plan for the project. Preventative measures (such as the implementation of safe equipment fueling practices) should be in place during excavation and installation, and spill management equipment should be readily available on-site during the project.

5.3 Intake Protection Zone

As discussed previously, the Site and its neighboring properties are not located within an Intake Protection Zone. Therefore, impact on a surface water intake source due to the temporary dewatering activities should not be anticipated.

5.4 Water Supply Wells near the Site Area

Based on the MECP water well records, water supply wells are located within the estimated zone of influence. Therefore, the impact on the water supply wells due to the temporary dewatering activities should be anticipated, and a door-to-door well survey should be considered.

5.5 Wellhead Protection Sensitivity Area

As discussed previously, the Site and its neighboring properties are not located within a wellhead protection area. Therefore, impact on the municipal supply wells due to the temporary dewatering activities should not be anticipated.

5.6 Significant Groundwater Recharge Areas ("SGRA")

As discussed, the Site and its neighboring properties are located within a Significant Groundwater Recharge Area~~s~~ ("SGRA"). Therefore, impact on sensitive groundwater system due to the temporary and long-term dewatering activities should be anticipated.

5.7 Surface Water

As discussed previously, Carruthers Creek flow beneath the Site. Therefore, impact on Carruthers Creek due to the temporary dewatering activities should be anticipated.

5.8 Ground Subsidence in Adjacent Structures

Under certain conditions, dewatering activities can cause ground settlement or subsidence. When groundwater levels are lowered in the soil deposits, effective stresses will be increased and consolidation and subsequent settlement may occur.

During the site visit, catch basins, manholes, and residential and commercial properties were noted along the roadways on or near the Site within the preliminarily calculated radius of influence of dewatering. Therefore, potential impacts associated with the temporary dewatering should be considered for the buildings, structures, roadways, and underground utilities which are located within the estimated zone of influence.

6.0 RECOMMENDATIONS

6.1 Registration on EASR

- Considering that an application to obtain a PTTW typically takes several months to prepare, submit, and receive approval; and
- the temporary dewatering may be controlled within 400,000 L/day if the Project were to be conducted in sections and stages, an EASR posting would be considered.
- The contractor shall prepare the dewatering and discharge plan according the O. Reg. 63/16 for GeoPro review in supporting the EASR posting.
- The EASR posting should be registered in accordance with O. Reg. 63/16 and may take a few days depending on the availability of the owner's MECP Account.

6.2 Point of Discharge

As discussed above, Carruthers Creek flow beneath the Site. Therefore, discharge to the ground surface and allowing the water to infiltrate into the ground and/or flow towards the Creek may be considered.

Based on the chemical analysis of groundwater samples obtained during this assessment, exceedances of PWQO criteria limits were measured. Prior to start-up of dewatering operations, samples of groundwater shall be obtained from the dewatering system and submitted for analysis of general chemistry parameters (based on the analyses conducted for this investigation) with comparison to PWQO criteria limits. It should be noted that filtration and/or settlement of the pumped water prior to discharge would be expected improve the water quality, and will be required to bring discharge into compliance with the PWQO.

Installation of an appropriate water filtration/treatment system designed to address any measured exceedances would be necessary prior to start-up of dewatering. Should the treated water meet the PWQO standards, the treated water may be discharged to ground surface as discussed above. In addition, during discharge, the water quality must remain in compliance with the requirements outlined in the PWQO.

Or alternatively, should the treated water meet the PWQO standards, the water generated may be discharged to the Creek provided a permit from the local conservation authority is obtained. In addition,

during discharge, the water quality must remain in compliance with the requirements outlined in the PWQO.

As an option, the water generated could be hauled and disposed off-site in a licensed water treatment facility; however, a cost analysis would need to be performed to compare treatment and discharge costs to haulage costs.

6.3 Discharge Permit

Should the treated water meet the PWQO standards and the discharge into the creek be selected, a permit from the local conservation authority shall be obtained prior to discharging.

It should be noted that in support of applying for a discharge permit, a temporary dewatering plan and other requirements such as additional testing may be required by the local municipality.

6.4 Temporary Dewatering Plan

Prior to the dewatering activities and/or EASR posting, a temporary dewatering and discharge plan shall be prepared by the selected contractor for GeoPro's review.

It should be noted that the design and installation of a temporary dewatering system is the responsibility of the construction contractor, including selection of a sump pump, wellpoint system or well system. The extent and details of the dewatering scheme (well size, spacing, pump level, screen size, wick gradation, etc.) are left solely to the contractor's discretion to achieve the performance objectives for stable slopes and dry conditions and will be based on their own interpretation and analysis of the site conditions, equipment, experience and system efficiency.

Once the pumping system, header pipes and a decanter tank/holding tank are installed, a trial dewatering for a short period of time should be conducted to obtain a representative groundwater sample from the decanting tank for chemical analysis to confirm the water quality.

6.5 Building/Structure Settlement Monitoring

As discussed above, structures located within the zone of influence may be susceptible to potential settlement or subsidence due to the temporary dewatering. Therefore, the following monitoring and mitigative measures are recommended to be carried out before and during the temporary dewatering:

- Complete a pre-excavation condition survey, and install settlement monitoring monuments for the existing buildings and roadways within the estimated zone of influence.

- The settlement monitoring monuments should be surveyed prior to the dewatering to establish a baseline, and surveyed on a daily basis during the dewatering. The survey results will be provided to the geotechnical engineer of GeoPro for evaluation. The estimated potential and actual settlements should also be reviewed by a structural engineer to assess the potential damage to the existing structures.

- If the settlement monitoring indicates an undesirable deformation, the dewatering will have to be reduced to a lower rate or ceased temporarily, and alternative measures may be considered for the excavation, which should be approved by the geotechnical engineer and project team.

6.6 Water Well Survey and Water Level Monitoring

As discussed above, some water supply wells may be located within or close to the preliminarily estimated zone of influence. The temporary dewatering may influence the use of the existing water wells because of the lowering of the water levels.

It is recommended to conduct a door-to-door water well survey for the properties located adjacent to the construction site and/or within the estimated zone of influence to establish baseline information of the water well(s) near the construction site. If agreed on with the well owners, a well water monitoring program (including water level and water quality) could be conducted on the accessible water well(s) during the construction dewatering program.

In addition, the construction site contact information shall be given to the identified well owners for emergency purposes, and temporary provision of potable water would be made available in the unlikely event that dewatering causes the malfunction of the water wells near the Site.

6.7 Groundwater Monitoring and Contingency/Mitigation Measures for Temporary Dewatering

Prior to commencement of the temporary dewatering, water level measurements shall be obtained from all on-site monitoring wells to verify the assumed water levels used in the calculations. If significant variation occurs, the dewatering volume calculations may be reviewed and updated.

6.7.1 Total Dewatering Volume

- The pumping rate and discharged volume shall be measured daily using a flow measuring device to ensure that the dewatering rate/volume does not exceed the approved or accepted limits.

- If the measured daily volume exceeds the approved limit, either the dewatering methodology or the construction methodology will need to be altered to ensure the maximum permitted rate is not exceeded.

- The contractor on behalf of the Client shall maintain a record of all water takings, including the dates and durations of water takings, and the rates and total measured volumes of water pumped per day for each day that water is taken under the permit.

6.7.2 Water Quality

Depending on the selected point of discharge, water quality should be regularly monitored during the temporary dewatering to ensure that discharge meets the relevant Local Sewer Use By-Law or PWQO quality criteria.

As TSS is an important parameter which may directly reflect the water quality, a treatment facility should be considered to reduce the concentration of suspended solids in the pumped water.

Prior to discharge of the treated water, a representative water sample should be collected and analyzed for the parameters specified in the applicable standards or criteria. During the temporary dewatering, daily field monitoring of the TSS and turbidity in the water to be discharged should be carried out at the first week of dewatering to establish the approximately correlation of the TSS and turbidity, which can be used for daily monitoring; a confirmatory testing of TSS should be considered on a weekly basis if required.

In addition, groundwater quality shall be monitored via chemical testing for parameters as specified in the local Sewer Use By-Law or PWQO weekly for the first month. If the results demonstrate that groundwater quality consistently meets the applicable standards, the monitoring frequency can be reduced to once each month afterwards.

6.8 Surface Water Monitoring and Contingency/Mitigation Measures

As discussed above, Carruthers Creek may be impacted due to the temporary dewatering activities because of their proximity from the excavation site. The following recommendations are provided for the assessment of potential impacts to the creek, river and its tributaries.

6.8.1 Baseline Study

A baseline study of the Creek within the estimated zone of influence should be conducted to establish the pre-dewatering water level, baseflow and water quality conditions, which may include chemical testing of surface water samples for general metals and inorganics or other parameters per recommendations from the local Conservation Authority.

6.8.2 Surface Water Level and Baseflow Monitoring

Visual observation of the Creek water levels should be conducted daily at a selected location upstream and downstream of the Site during the temporary dewatering. Should adverse impact be observed during the dewatering, the dewatering volume should be reviewed and modified appropriately. If required, water with acceptable water quality may be introduced to the Creek to maintain the baseflow in the Creek.

6.8.3 Surface Water Quality Monitoring

As the pumped water is not expected to be discharged to the Creek, the surface water quality impacts are not anticipated. However, if significant water level changes occur during temporary dewatering, water sampling and chemical testing may be required to assess any change in surface water quality. Should adverse impacts be observed during the temporary dewatering, the dewatering volume may need to be modified. If required, water with acceptable water quality may be introduced to the Creek to maintain the baseflow in the Creek.

6.9 Erosion Control/Sedimentation Mitigation Plan

It should be noted that the pumped water generated from the temporary dewatering cannot be discharged to the natural environment unless it meets PWQO criteria. If the pre-construction chemistry samples show exceedances of PWQO criteria, appropriate treatment methods will need to be implemented prior to start-up construction dewatering. When the treatment including filtration or decanting is carried out appropriately, sedimentation should not be an issue.

However, the dewatering discharge may result in the erosions on land surface and/or in the creek channel depending on the selected discharge points. Therefore, erosion control may have to be considered, which is discussed in the following table.

Period	Monitoring Location	Monitoring Frequency	Method	Triggers for Mitigation	Mitigation/ Contingency
Pre-dewatering	Water discharge points (swale, ditch, creek or overland locations)	Prior to discharge	Visual observation	None	All erosion and sediment controls should be in place prior to commencing discharge activities. The water should be dispersed through straw bales or Filtrexx Silt Soxx, when necessary combined with rock check dam.
During - dewatering	Water discharge points (swale, ditch, creek or overland locations)	Daily	Visual observation	Noted erosion	Disperse the discharge to the watercourse using overland flow. Reduce the flow/runoff velocity to a minimum. Select and apply optimal alternatives of erosion control methods.

6.10 Groundwater Monitoring and Contingency/Mitigation Measures for Long-Term Drainage

If proposed structure are not designed to be waterproof and resist hydrostatic uplift, and long-term under slab drainage is used to control groundwater levels beneath the foundations, long-term monitoring and mitigation measures may need to be implemented as part of a long-term Sewer Use agreement with the local municipality. Consultation with the local municipality may be required to understand the scope of the required monitoring and mitigation program.

6.11 Monitoring Well Decommissioning

According to Ontario Regulation 903 ("O. Reg. 903"), when the monitoring wells are no longer used, they should be decommissioned by a licensed water well contractor.

7.0 CLOSURE

We trust that the information contained in this report is complete within our terms of reference. If you have any questions or require further information, please do not hesitate to contact our office.

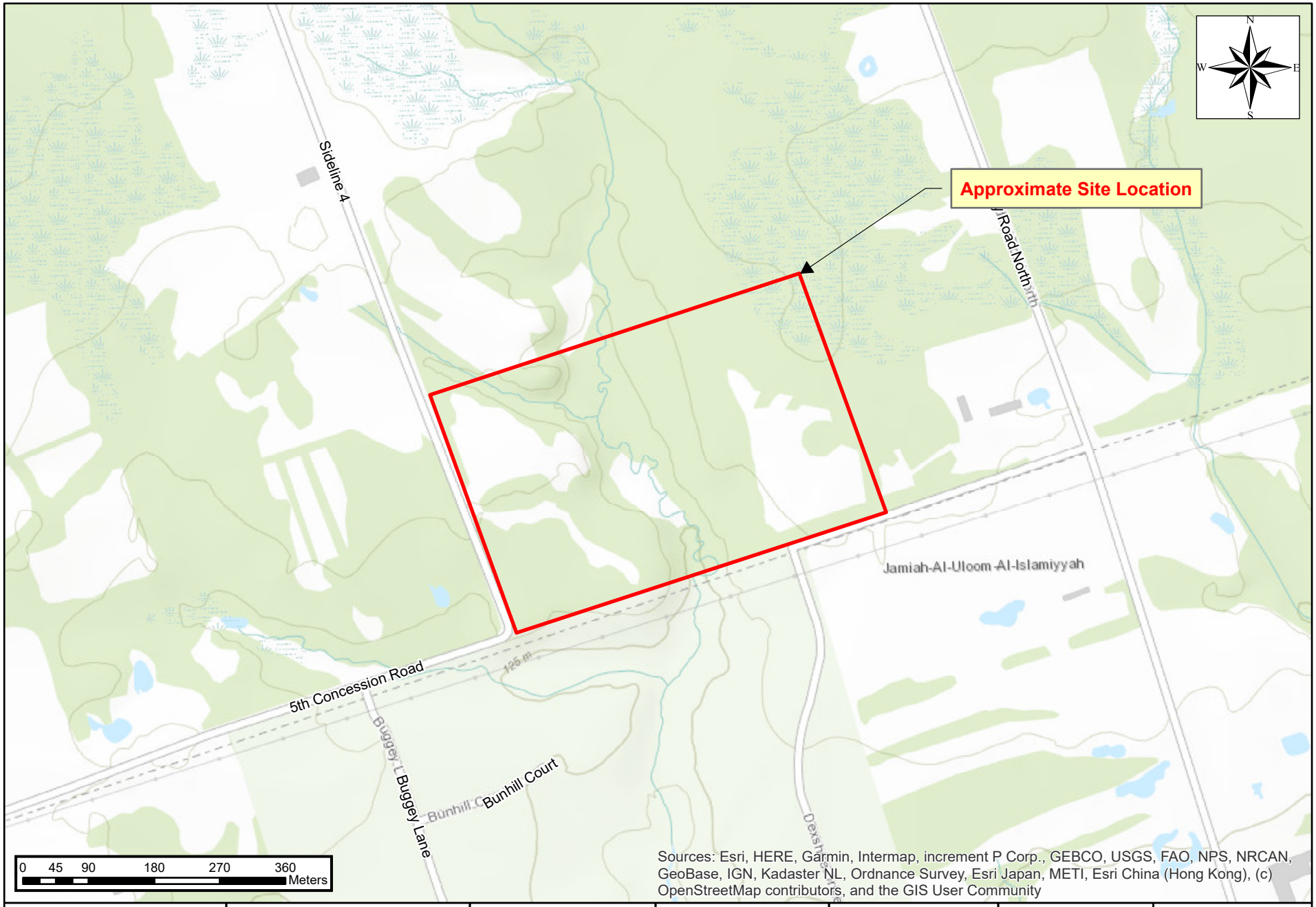
Sincerely,

GeoPro Consulting Limited
Geotechnical - Hydrogeology - Environmental - Materials Testing - Inspection

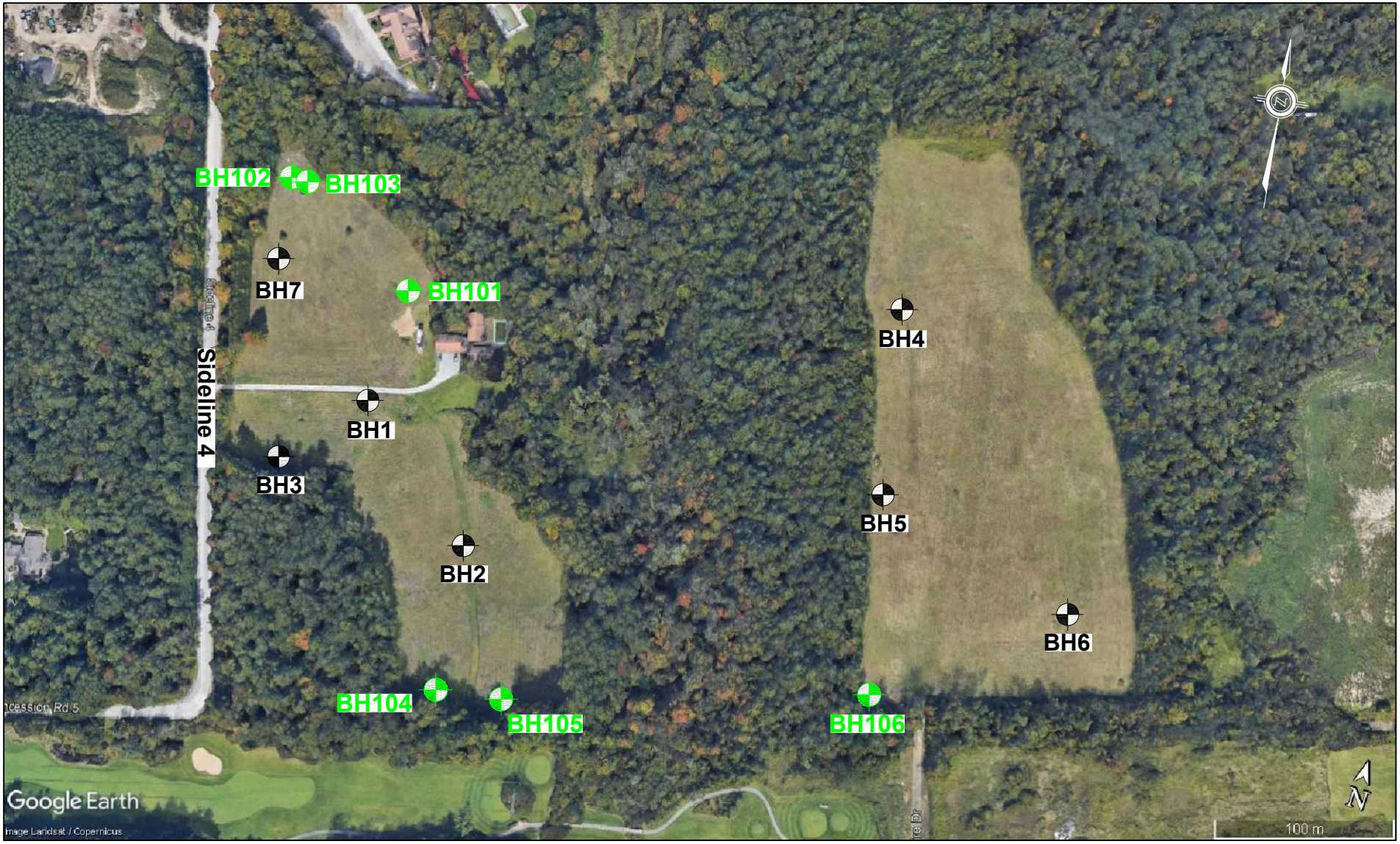
Nick Lan

David B. Liu, P.Eng., Principal

DRAWINGS



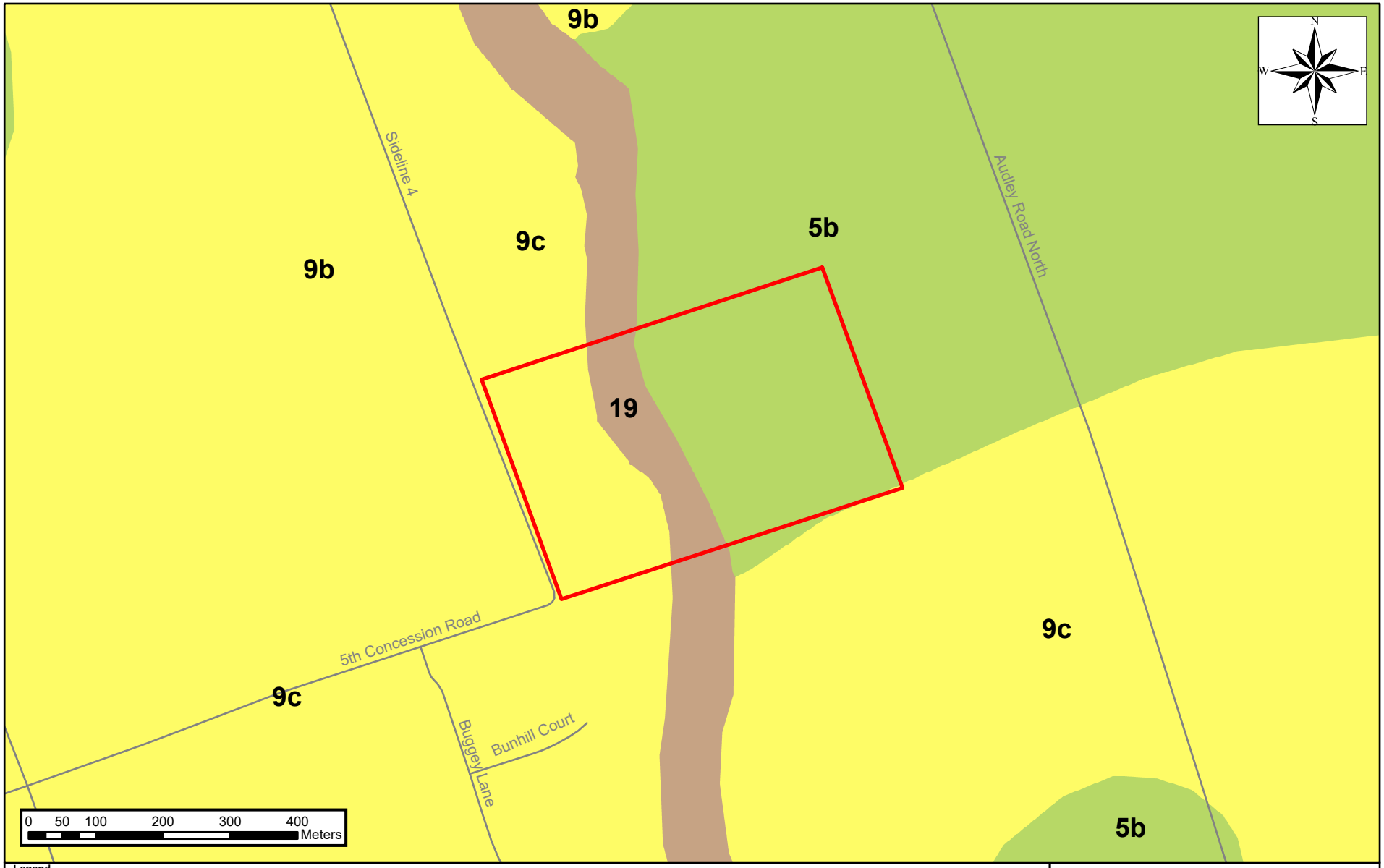
Prepared by: BN	Rev: NL	Approved: DL	Scale: As Shown	Project No.: 17-1780H3	Drawing No.: 1	Original Size: Letter
Date: November 2022	Client: 869547 Ontario Inc.	Title: Site Location Plan	Project: Preliminary Hydrogeological Assessmentt Proposed Residential Development at Part of Lot 3& 4 Concession Road 5, Pickering, Ontario		GeoPro Consulting Limited	



Legend:

- Borehole Location
- Previous Borehole Location

Client:	869547 Ontario Inc.			Project No.: 17-1780GHE3	Drawing No.: 2
Drawn: RF		Approved: DL		Title: Borehole Location Plan	
Date: Nov. 2022		Scale: N.T.S		Project: Geotechnical Investigation for Proposed Residential Development Parts of Lots 3 and 4, Pickering, Ontario	
Original Size: Letter		Rev: DX		GeoPro Consulting Limited	



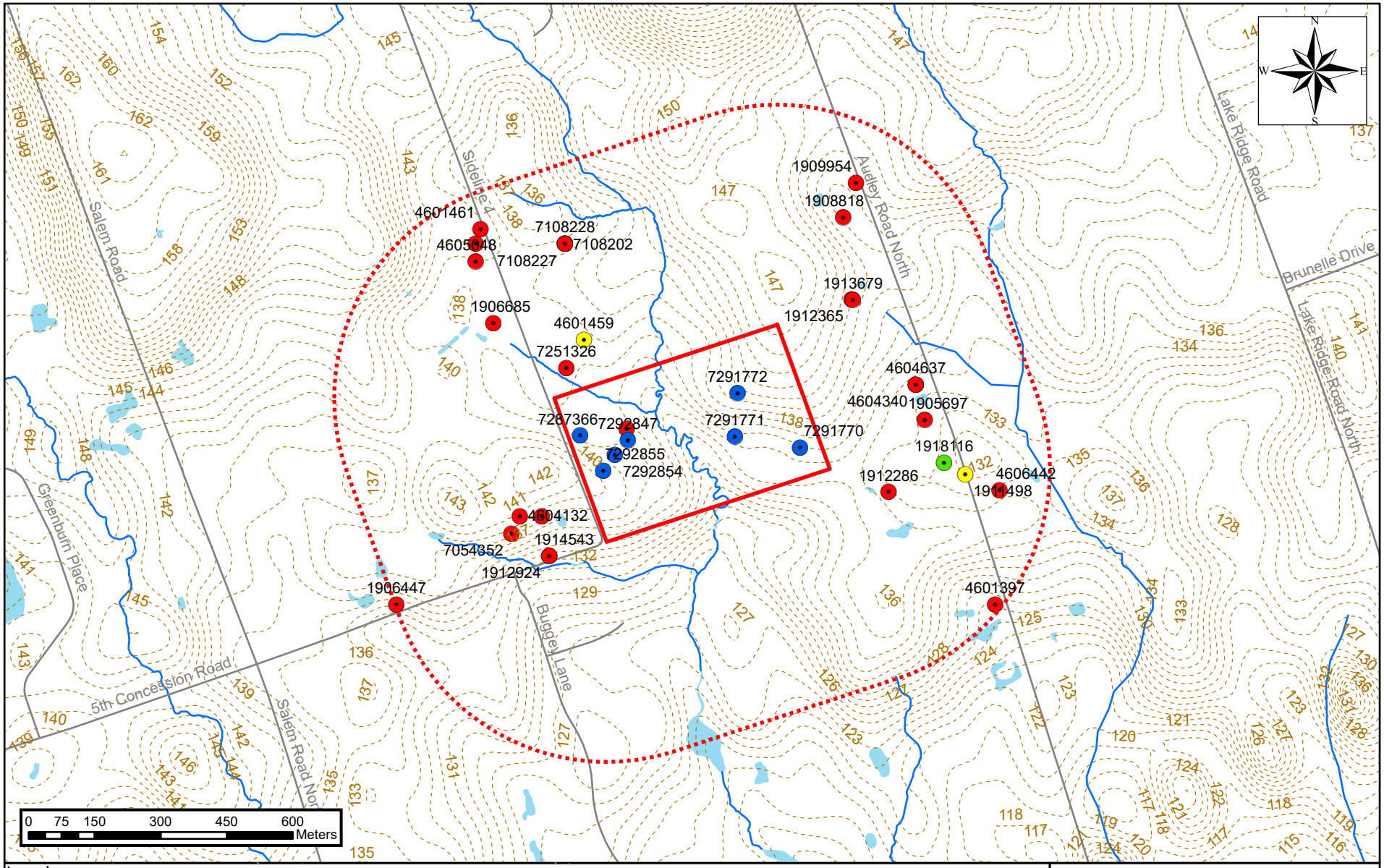
Legend

- Site Location
- 19: Modern alluvial deposits: clay, silt, sand, gravel, may contain organic remains
- 5b: Stone-poor,sandy silt to silty sand-textured till on Paleozoic terrain
- 9b: Course-textured glaciolacustrine depsits: sand , gravel, minor silt and clay, littoral deposits
- 9c: Course-textured glaciolacustrine depsits: sand , gravel, minor silt and clay, foreshore and basinal deposits

Map Sources:

1. Surficial Geology of Southern Ontario
2. Natural Resources Canada

Prepared by: BN	Rev: NL	Approved: DL	Scale: As Shown	Project No.: 17-1780H3	Drawing No.: 3	Original Size: Letter
Date: November 2022	Client: 869547 Ontario Inc.	Title: Surficial Geology	Project: Preliminary Hydrogeological Assessment Proposed Residential Development at Part of Lot 3 & 4 Concession Road 5, Pickering, Ontario		GeoPro Consulting Limited	



Legend

- Site Location
- 500m Radius from the Site
- Waterbody
- Surface Contour
- Road
- Watercourse
- Commercial / Domestic / Industrial / Irrigation / Livestock
- Not Used / Unknown
- Municipal / Public
- Monitoring

Map Sources:
1. Altas Canada - Toporama
2. MECP Water Well Database
3. Resources Canada

Prepared by: BN	Rev: NL	Approved: DL	Scale: As Shown	Project No.: 17-1780H3	Drawing No.: 4	Original Size: Letter
Date: November 2022	Client: 869547 Ontario Inc.	Title: MECP Well Location Plan	Project: Preliminary Hydrogeological Assessmentt Proposed Residential Development at Part of Lot 3 & 4 Concession Road 5, Pickering, Ontario		GeoPro Consulting Limited	

Note: the MECP WWR coordinate data may not be accurate based on our previous experiences, as such, the wells plotted on the drawing should be considered as reference only.
If more accurate information of the wells is required, a door-to-door well survey should be considered.

FIGURES

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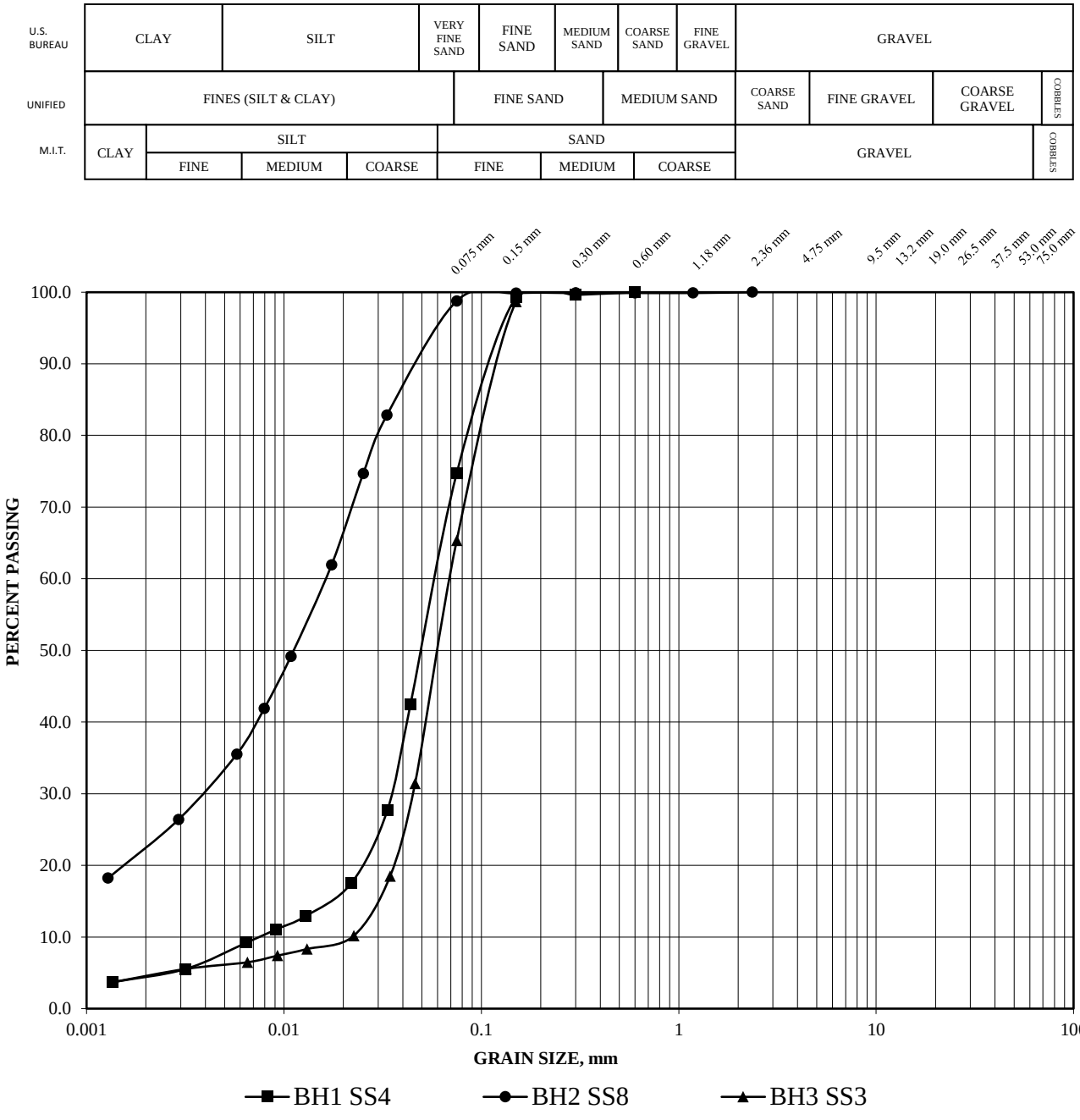
Geotechnical-Hydrogeology-Environmental-Materials-Inspection

Figure 1

GRAIN SIZE DISTRIBUTION



Project No.	17-1780GHE
Project Name	Geotechnical Investigation for Proposed Residential Development, Pickering, Ontario

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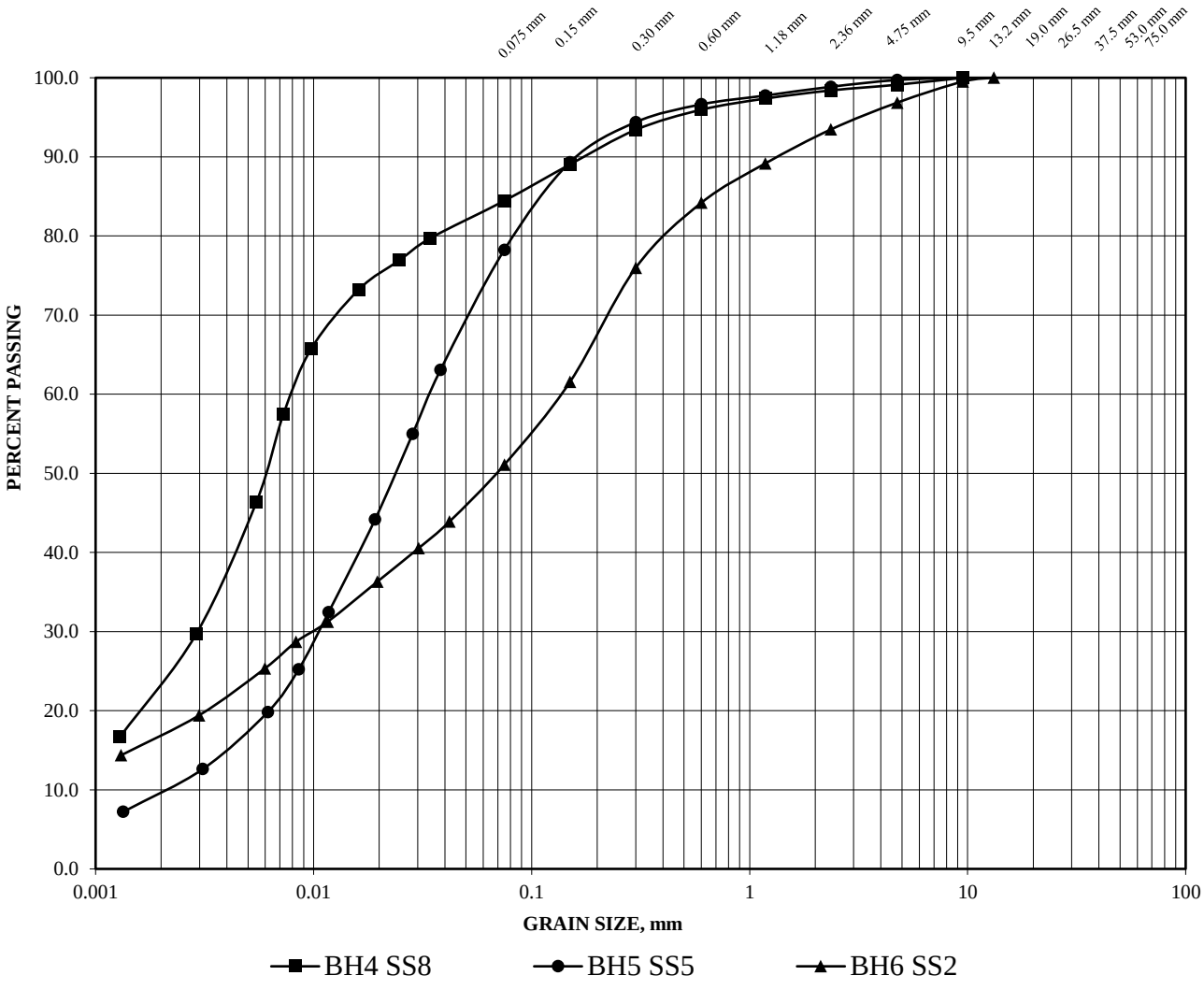
Figure 2

GRAIN SIZE DISTRIBUTION

U.S. BUREAU	CLAY	SILT		VERY FINE SAND	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	GRAVEL		
UNIFIED	FINES (SILT & CLAY)				FINE SAND	MEDIUM SAND		COARSE SAND	FINE GRAVEL	COARSE GRAVEL	COBBLES
M.I.T.	CLAY	SILT			SAND			GRAVEL			COBBLES
		FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE				



Project No.	17-1780GHE
Project Name	Geotechnical Investigation for Proposed Residential Development, Pickering, Ontario

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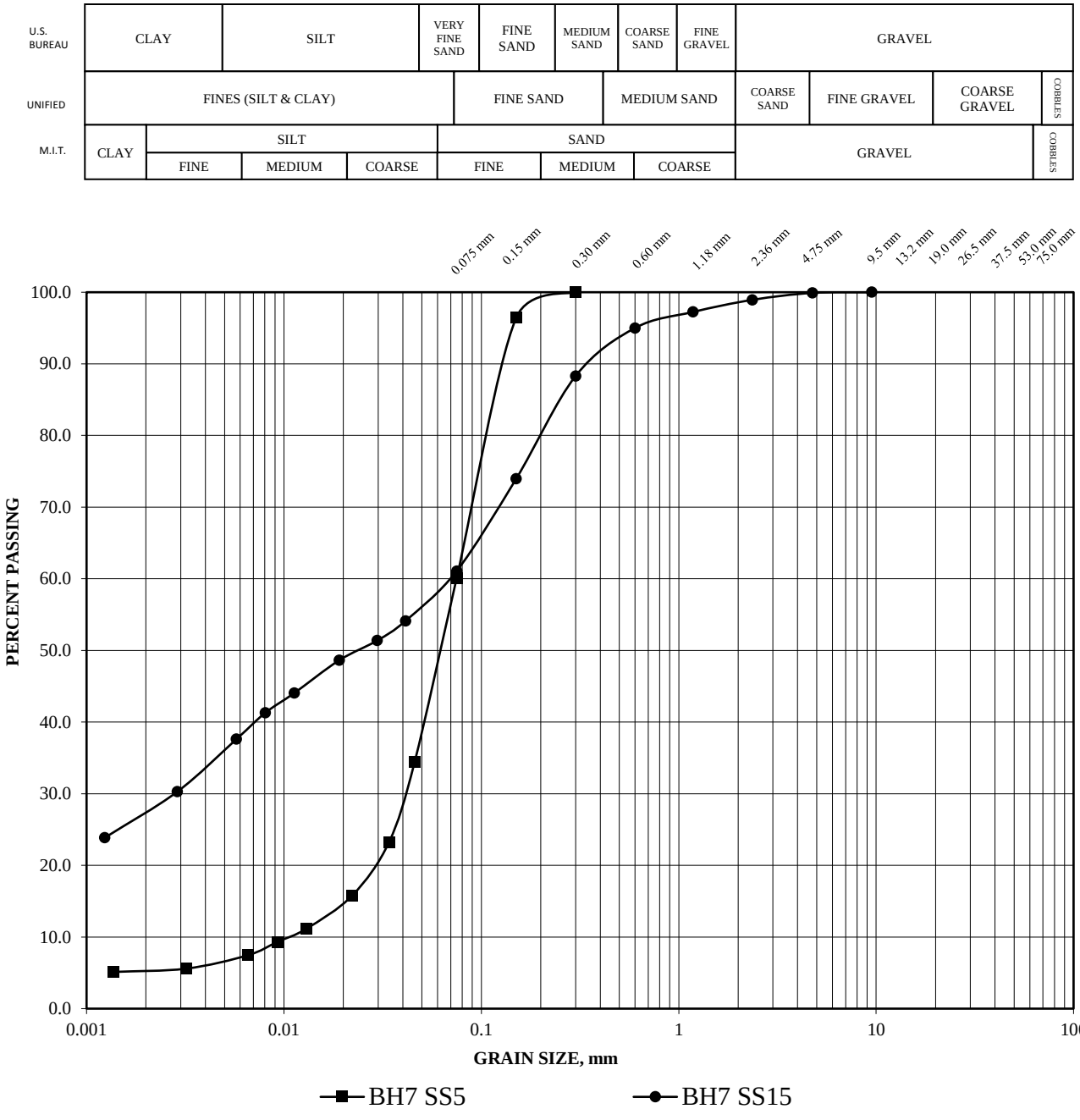
Figure 3

GRAIN SIZE DISTRIBUTION



Project No.	17-1780GHE
Project Name	Geotechnical Investigation for Proposed Residential Development, Pickering, Ontario

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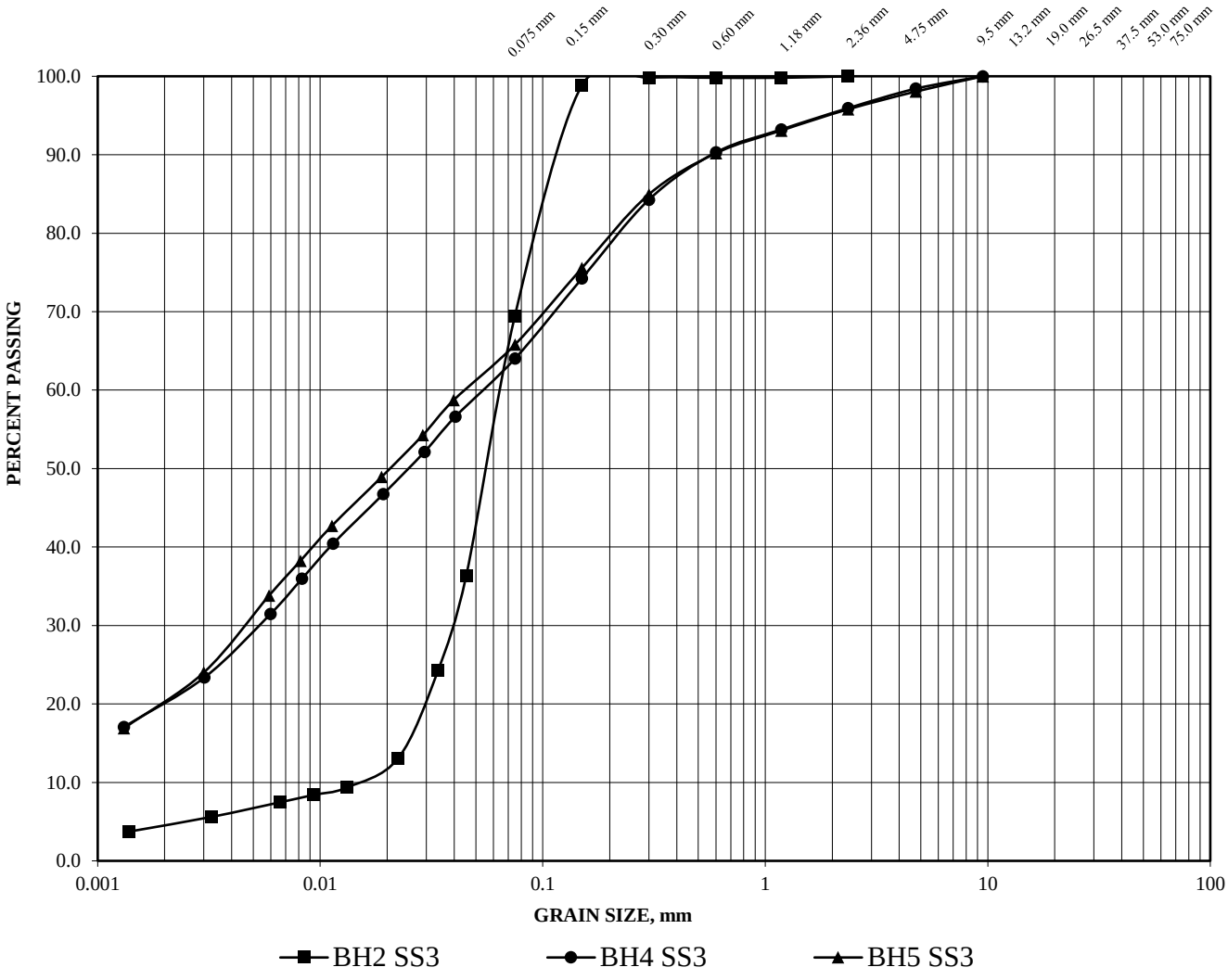
Figure 4

GRAIN SIZE DISTRIBUTION

U.S. BUREAU	CLAY	SILT		VERY FINE SAND	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	GRAVEL			
UNIFIED	FINES (SILT & CLAY)			FINE SAND		MEDIUM SAND		COARSE SAND	FINE GRAVEL	COARSE GRAVEL		COBBLES
M.I.T.	CLAY	SILT			SAND			GRAVEL				COBBLES
		FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE					



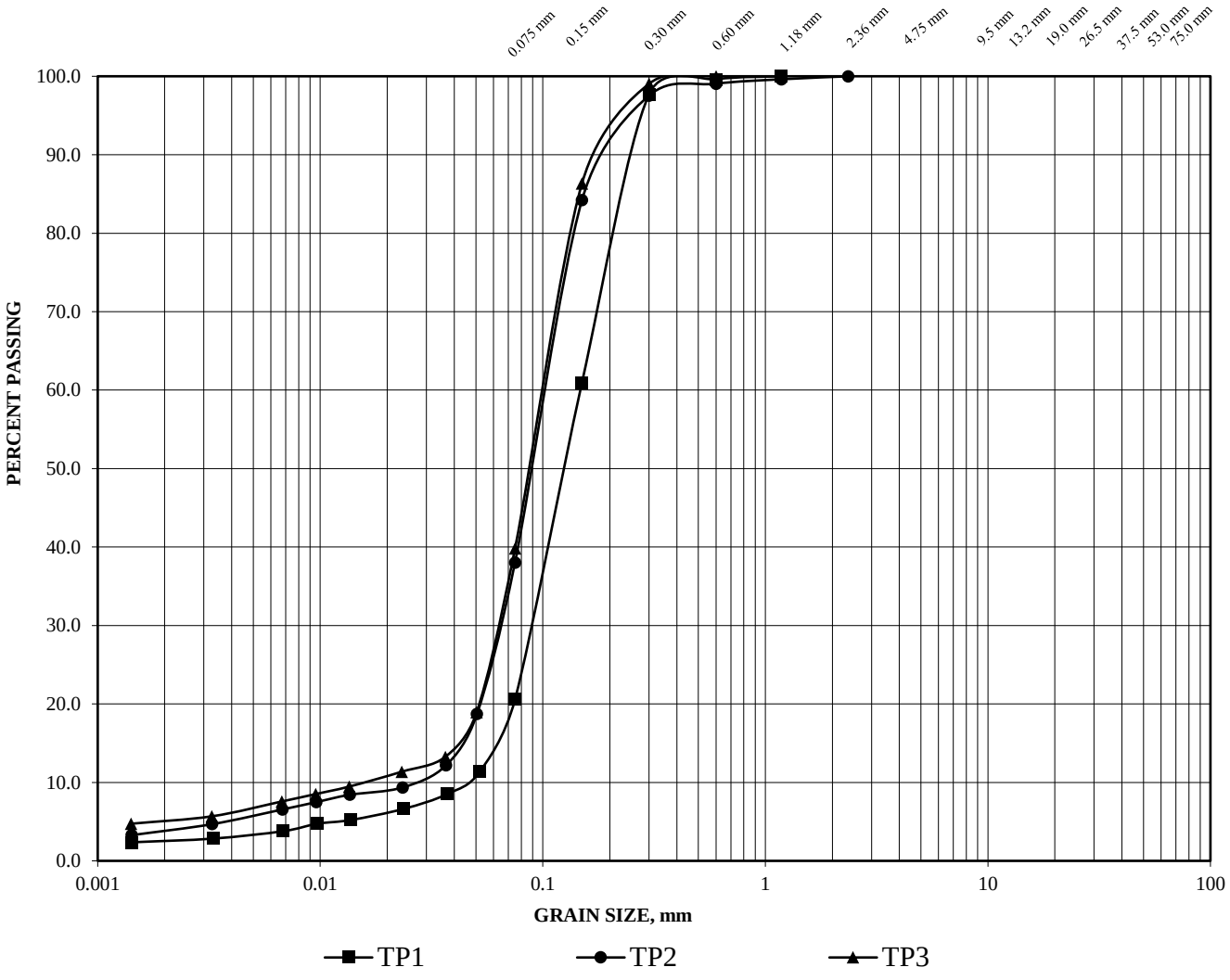
Project No.	17-1780GHE
Project Name	Geotechnical Investigation for Proposed Residential Development, Pickering, Ontario

GeoPro Consulting Limited
Geotechnical-Hydrogeology-Environmental-Materials-Inspection

Figure 5

GRAIN SIZE DISTRIBUTION

U.S. BUREAU	CLAY	SILT		VERY FINE SAND	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	GRAVEL			
UNIFIED	FINES (SILT & CLAY)			FINE SAND		MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL	COBBLES		
M.I.T.	CLAY	SILT			SAND			GRAVEL			COBBLES	
		FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE					



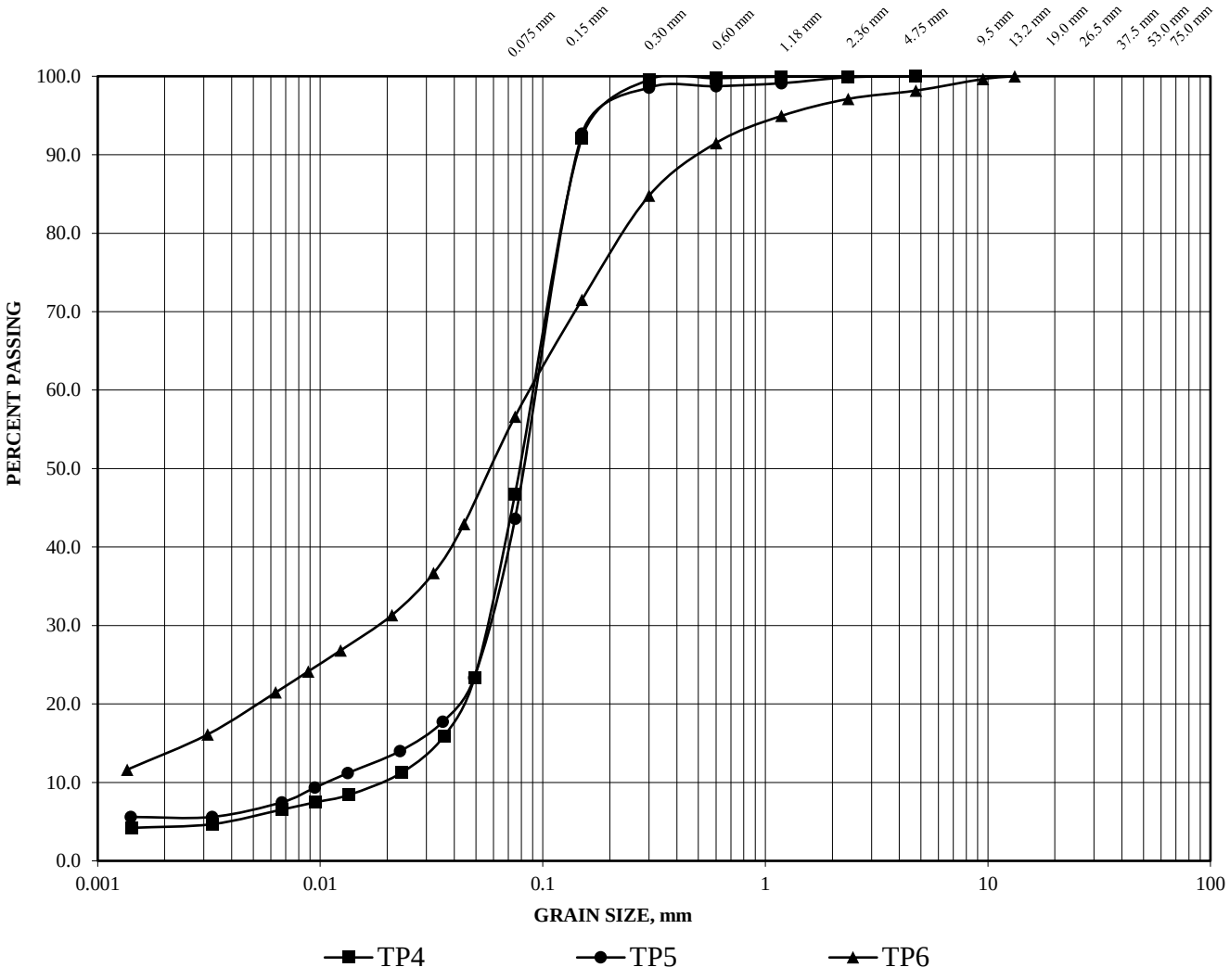
Project No.	17-1780GHE
Project Name	Geotechnical Investigation for Proposed Residential Development, Pickering, Ontario

GeoPro Consulting Limited
Geotechnical-Hydrogeology-Environmental-Materials-Inspection

Figure 6

GRAIN SIZE DISTRIBUTION

U.S. BUREAU	CLAY	SILT			VERY FINE SAND	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	GRAVEL		
UNIFIED	FINES (SILT & CLAY)					FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	COARSE GRAVEL	COBBLES	
M.I.T.	CLAY	SILT			SAND			GRAVEL			COBBLES	
		FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE					



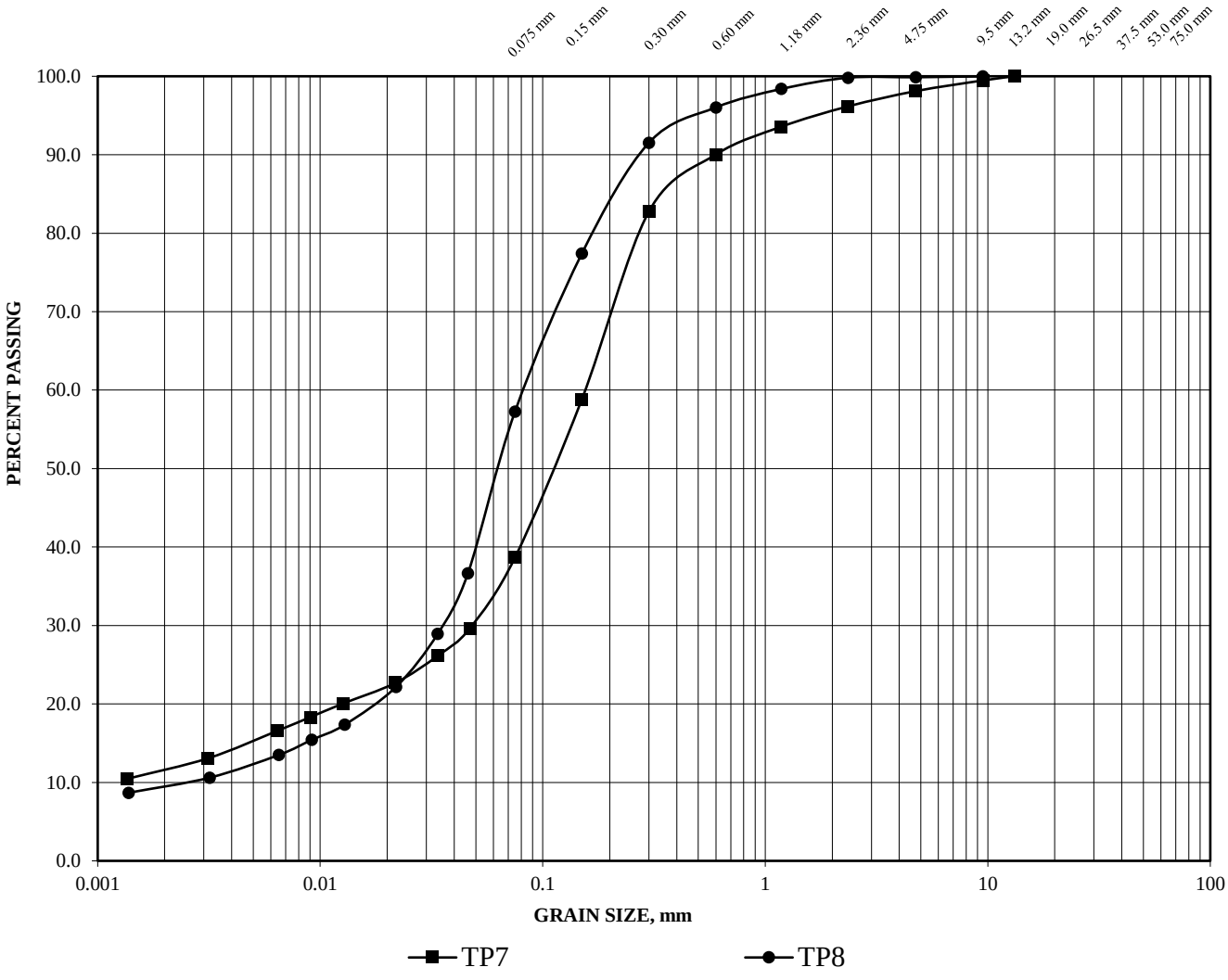
Project No.	17-1780GHE
Project Name	Geotechnical Investigation for Proposed Residential Development, Pickering, Ontario

GeoPro Consulting Limited
Geotechnical-Hydrogeology-Environmental-Materials-Inspection

Figure 7

GRAIN SIZE DISTRIBUTION

U.S. BUREAU	CLAY	SILT		VERY FINE SAND	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	GRAVEL			
UNIFIED	FINES (SILT & CLAY)			FINE SAND		MEDIUM SAND		COARSE SAND	FINE GRAVEL	COARSE GRAVEL		COBBLES
M.I.T.	CLAY	SILT			SAND			GRAVEL				COBBLES
		FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE					



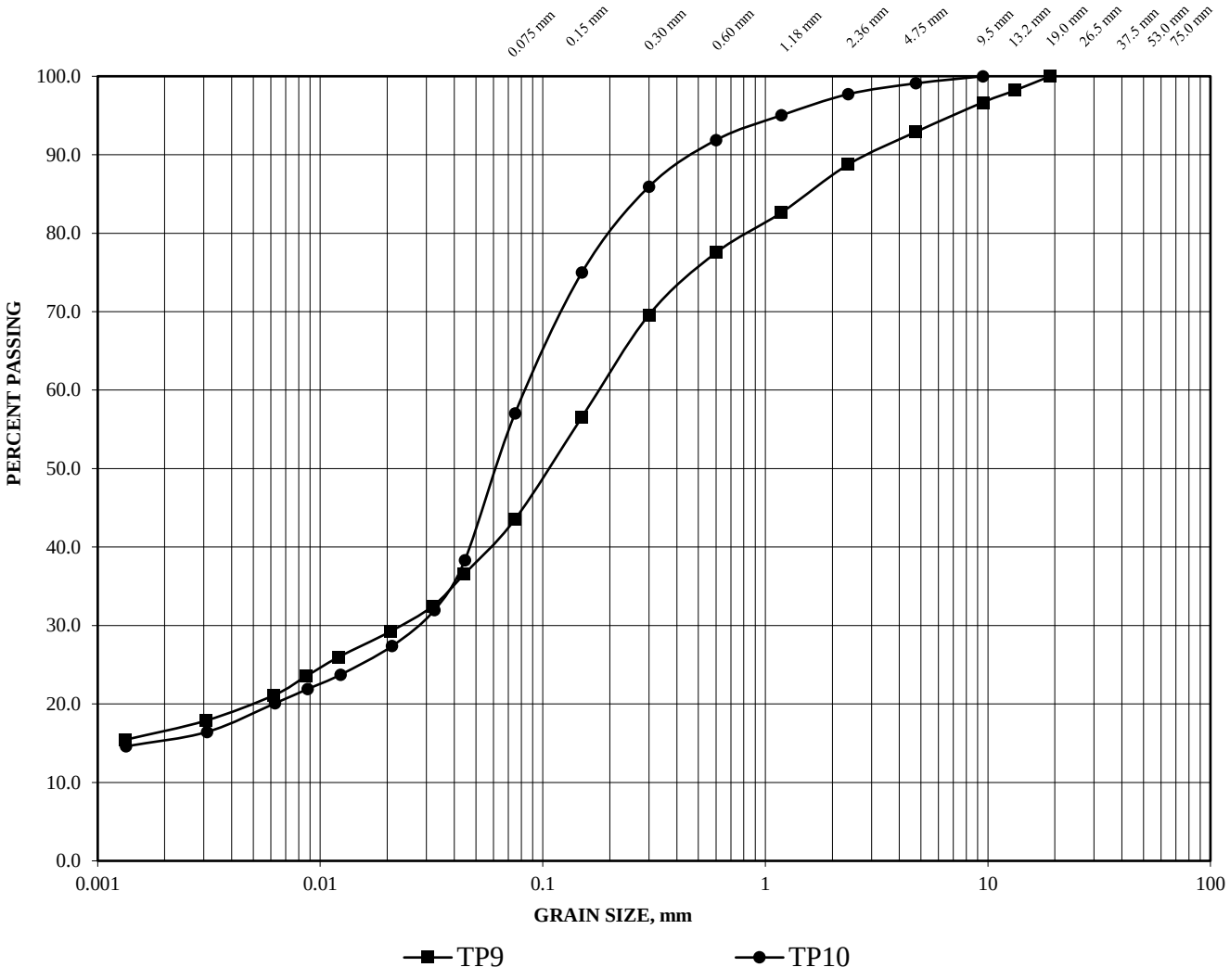
Project No.	17-1780GHE
Project Name	Geotechnical Investigation for Proposed Residential Development, Pickering, Ontario

GeoPro Consulting Limited
Geotechnical-Hydrogeology-Environmental-Materials-Inspection

Figure 8

GRAIN SIZE DISTRIBUTION

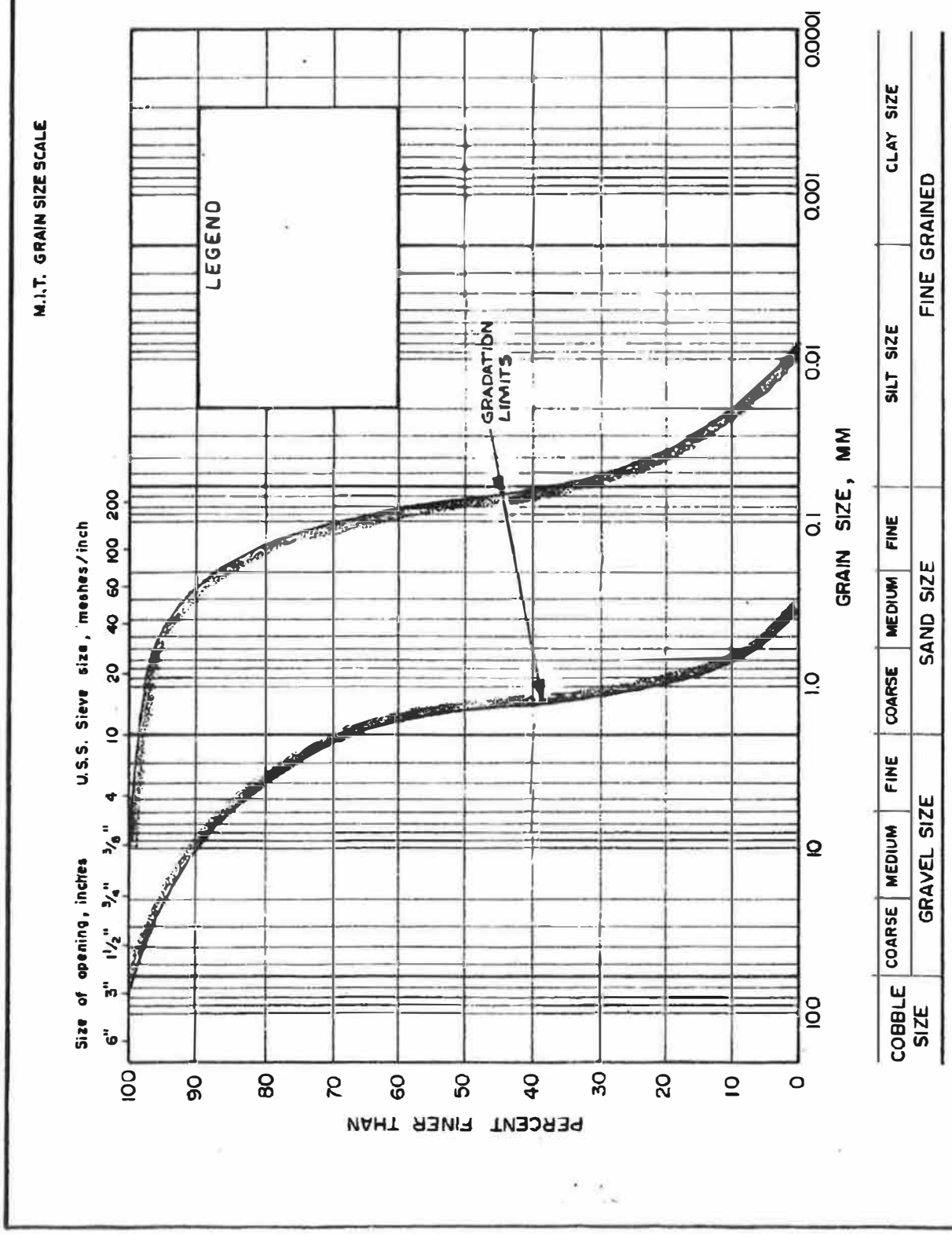
U.S. BUREAU	CLAY	SILT		VERY FINE SAND	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	GRAVEL			
UNIFIED	FINES (SILT & CLAY)			FINE SAND		MEDIUM SAND		COARSE SAND	FINE GRAVEL	COARSE GRAVEL	COBBLES	
M.I.T.	CLAY	SILT			SAND			GRAVEL				COBBLES
		FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE					



Project No.	17-1780GHE
Project Name	Geotechnical Investigation, Proposed Residential Development, Pickering, Ontario

GRAIN SIZE DISTRIBUTION
SELECT SAND FILL

FIGURE 9



APPENDIX A

V. A. WOOD ASSOCIATES LIMITED

CONSULTING GEOTECHNICAL ENGINEERS

1080 TAPSCOTT ROAD, UNIT 24, SCARBOROUGH, ONTARIO M1X 1E7

TELEPHONE: (416) 292-2868 • FAX No: (416) 292-5375

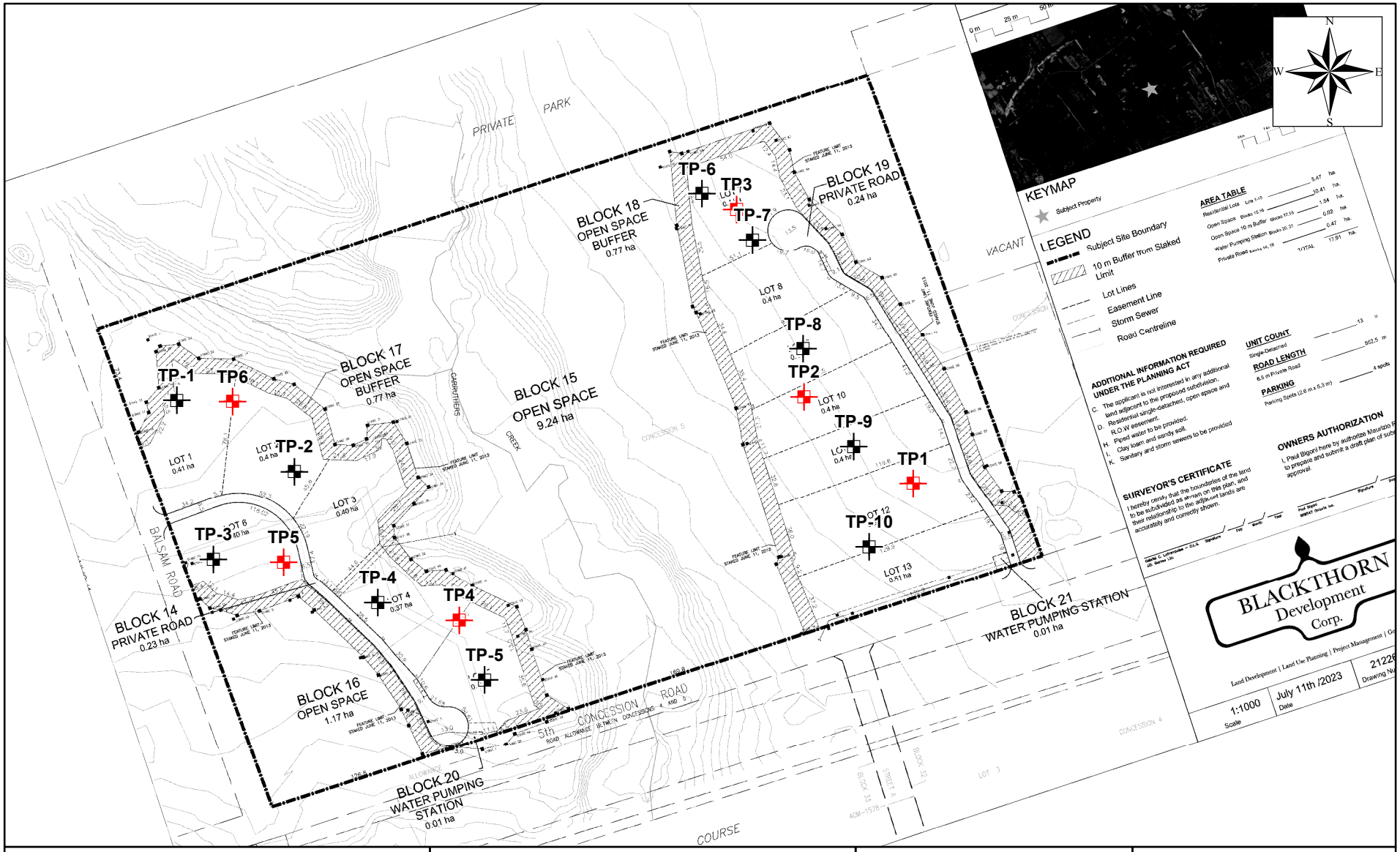
TEST PIT INVESTIGATION
PROPOSED SUBDIVISION
FIFTH CONCESSION AND BALSAM ROAD
PICKERING, ONTARIO

Ref. No. 6999-16-9

October 2016

Prepared for:

JFC Developments Ltd.
25 Buggey Lane
Ajax, Ontario
L1S 4S7



Legend

- Test Pit Location (by V.A Wood)
- Test Pit Location (by GeoPro)

Client: **JFC Developments Ltd.**		Project No.: **17-1780H3**	Drawing No.: **N/A**
Prepared by: **NL**	Approved: **DL**	Title: **Test Pit Location Plan**	
Date: **Nov 2023**	Scale: **N.T.S**	Project: **Preliminary Hydrogeological Assessment Proposed Residential Development Part of Lot 3 and 4, Concession 5, Pickering, Ontario**	
Original Size: **Letter**	Rev: **RT**	GeoPro Consulting Limited	

Reference No : 6999-16-9

Test Pit No : 1

Enclosure No : 2

Client : JFC Developments Ltd.

Project : Proposed Estate Subdivision

Method : Backhoe

Location : Fifth Concession/Balsam Road, Pickering

Diameter :

Datum Elevation :

Date : October 25, 2016

SUBSURFACE PROFILE					SAMPLE					
Elevation m	Depth m	Description	Symbol	Water	Number	Type	N-value	Standard Penetration Test blows/300mm (20 40 60 80)	Moisture Content, % (10 30)	Remarks
0	0	Ground Surface								
-0.3		*TOPSOIL*								Test pit was dry
		SILTY SAND TILL Loose to medium compact, some gravel and cobbles, brown, moist			1	Bulk				
-0.9	1			D R Y	2	Bulk				
		SANDY SILT TILL Compact to dense, some gravel, brown, grey at 2.7m, moist brown / grey			3	Bulk				
-3	3	End of Borehole								
	4									
	5									

V.A. WOOD ASSOCIATES LIMITED

Disk :

Sheet : 1 of 1

Reference No : 6999-16-9

Test Pit No : 2

Enclosure No : 3

Client : JFC Developments Ltd.

Project : Proposed Estate Subdivision

Method : Backhoe

Location : Fifth Concession/Balsam Road, Pickering

Diameter :

Datum Elevation :

Date : October 25, 2016

SUBSURFACE PROFILE					SAMPLE					
Elevation m	Depth m	Description	Symbol	Water	Number	Type	N-value	Standard Penetration Test blows/300mm (20 40 60 80)	Moisture Content, % (10 30)	Remarks
0	0	Ground Surface								
-0.3		*TOPSOIL*								Test pit was dry
		SILTY SAND TILL Loose to medium compact, some gravel and cobbles, brown, moist			1	Bulk			•	
-1.2	1			D R Y						
		SANDY SILT TILL Compact to dense, some gravel, brown, grey at 2.4m, moist			2	Bulk			•	
	2	brown / grey								
-3					3	Bulk			•	
	3	End of Borehole								
	4									
	5									

V.A. WOOD ASSOCIATES LIMITED

Disk :

Sheet : 1 of 1

Reference No : 6999-16-9

Test Pit No : 3

Enclosure No : 4

Client : JFC Developments Ltd.

Project : Proposed Estate Subdivision

Method : Backhoe

Location : Fifth Concession/Balsam Road, Pickering

Diameter :

Datum Elevation :

Date : October 25, 2016

SUBSURFACE PROFILE					SAMPLE					
Elevation m	Depth m	Description	Symbol	Water	Number	Type	N-value	Standard Penetration Test blows/300mm (20 40 60 80)	Moisture Content, % (10 30)	Remarks
0	0	Ground Surface								
-0.3		*TOPSOIL*								Test pit was dry
		SILTY SAND TILL Loose to medium compact, some gravel and cobbles, brown, moist			1	Bulk			●	
-1.2	1			D R Y	2	Bulk			●	
	2	*SANDY SILT TILL* Compact to dense, some gravel, brown, grey at 2.7m, moist brown / grey			3	Bulk			●	
-3	3	End of Borehole								
	4									
	5									

V.A. WOOD ASSOCIATES LIMITED

Disk :

Sheet : 1 of 1

Reference No : 6999-16-9

Test Pit No : 4

Enclosure No : 5

Client : JFC Developments Ltd.

Project : Proposed Estate Subdivision

Method : Backhoe

Location : Fifth Concession/Balsam Road, Pickering

Diameter :

Datum Elevation :

Date : October 25, 2016

SUBSURFACE PROFILE					SAMPLE					
Elevation m	Depth m	Description	Symbol	Water	Number	Type	N-value	Standard Penetration Test blows/300mm (20 40 60 80)	Moisture Content, % (10 30)	Remarks
0	0	Ground Surface								
-0.3		***TOPSOIL***								Test pit was dry
	1	***SAND*** Loose, fine sand, yellowish brown, moist		D R Y	1	Bulk			•	
-1.8	2	***SILTY SAND*** Compact to dense, fine sand, some silt, brown, grey at 2.7 m, moist brown / grey			2	Bulk			•	
-3	3	End of Borehole			3	Bulk			•	
	4									
	5									

V.A. WOOD ASSOCIATES LIMITED

Disk :

Sheet : 1 of 1

Reference No : 6999-16-9

Test Pit No : 5

Enclosure No : 6

Client : JFC Developments Ltd.

Project : Proposed Estate Subdivision

Method : Backhoe

Location : Fifth Concession/Balsam Road, Pickering

Diameter :

Datum Elevation :

Date : October 25, 2016

Elevation m	Depth m	Description	Symbol	Water	Sample Number	Sample Type	N-value	Standard Penetration Test blows/300mm (20 40 60 80)	Moisture Content, % (10 30)	Remarks
0	0	Ground Surface								
-0.3		***TOPSOIL***								Test pit was dry
	1	***SAND*** Loose, fine sand, yellowish brown, damp to moist		DRY	1	Bulk				
-1.8	2	***SILTY SAND*** Compact to dense, fine sand, some silt, brown, grey at 2.7 m, moist brown / grey			2	Bulk				
-3	3	End of Borehole			3	Bulk				
	4									
	5									

V.A. WOOD ASSOCIATES LIMITED

Disk :

Sheet : 1 of 1

Reference No : 6999-16-9

Test Pit No : 6

Enclosure No : 7

Client : JFC Developments Ltd.

Project : Proposed Estate Subdivision

Method : Backhoe

Location : Fifth Concession/Balsam Road, Pickering

Diameter :

Datum Elevation :

Date : October 25, 2016

Elevation m	Depth m	Description	Symbol	Water	Sample Number	Sample Type	N-value	Standard Penetration Test blows/300mm (20 40 60 80)	Moisture Content, % (10 30)	Remarks
0	0	Ground Surface								
-0.3		***TOPSOIL***								Test pit was dry
		SAND Loose, fine sand, yellowish brown, damp to moist			1	Bulk			●	
-1.2	1			D R Y						
		SILTY SAND Compact to dense, fine sand, some silt, brown, grey at 2.7 m, moist			2	Bulk			●	
	2	brown / grey								
-3.3	3				3	Bulk			●	
		End of Borehole								
	4									
	5									

SUBSURFACE PROFILE | SAMPLE

V.A. WOOD ASSOCIATES LIMITED

Disk :

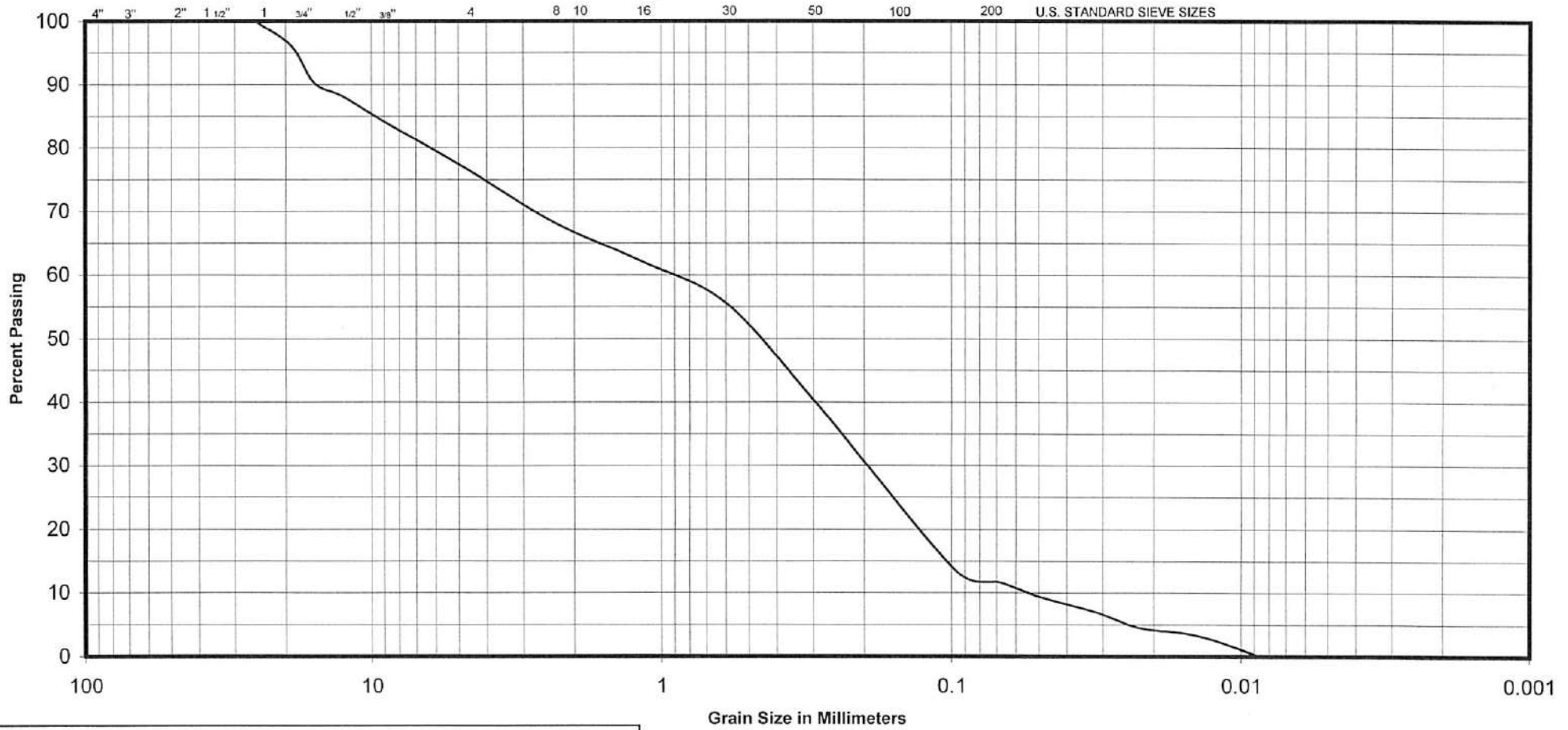
Sheet : 1 of 1

GRAIN SIZE DISTRIBUTION

OUR REFERENCE No.: 6999-16-9

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

UNIFIED SOIL CLASSIFICATION SYSTEM



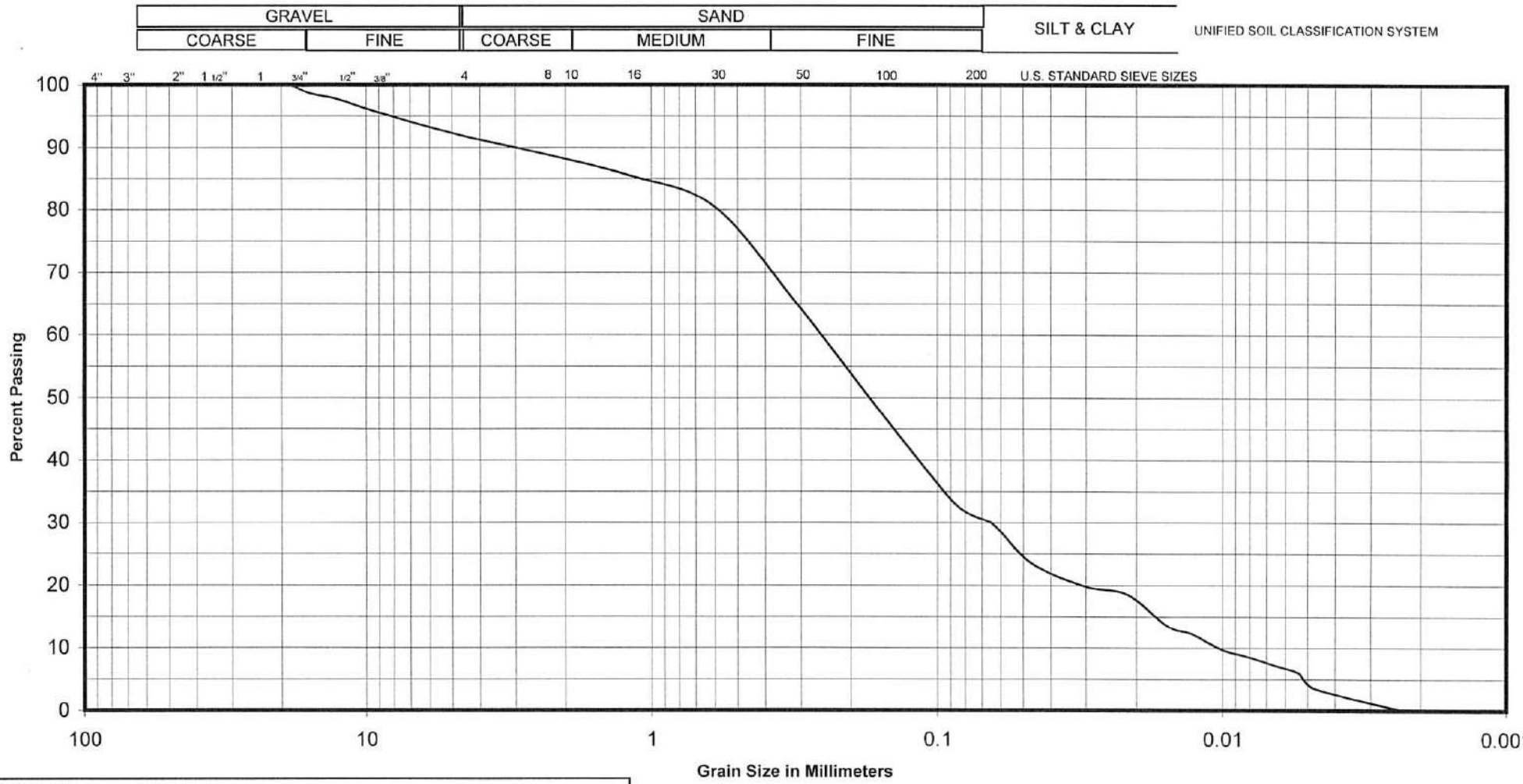
PROJECT: Proposed Subdivision
LOCATION: Fifth Concession, Pickering, ON
TEST PIT NO.: 1
SAMPLE NO.: 2
DEPTH :
DATE: October 2016

Well Graded SAND, some gravel, some silt (SW)

ENCLOSURE No.: 8

GRAIN SIZE DISTRIBUTION

OUR REFERENCE No.: 6999-16-9



PROJECT: Proposed Subdivision
LOCATION: Fifth Concession, Pickering, ON
TEST PIT NO.: 2
SAMPLE NO.: 2
DEPTH :
DATE: October 2016

Silty SAND, some gravel (SM)

ENCLOSURE No.: 9

GRAIN SIZE DISTRIBUTION

OUR REFERENCE No.: 6999-16-9

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

UNIFIED SOIL CLASSIFICATION SYSTEM

PROJECT: Proposed Subdivision
LOCATION: Fifth Concession, Pickering, ON
TEST PIT NO.: 3
SAMPLE NO.: 2
DEPTH :
DATE: October 2016

Silty SAND, some gravel, some clay (SM)

ENCLOSURE No.: 10

GRAIN SIZE DISTRIBUTION

OUR REFERENCE No.: 6999-16-9

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

UNIFIED SOIL CLASSIFICATION SYSTEM

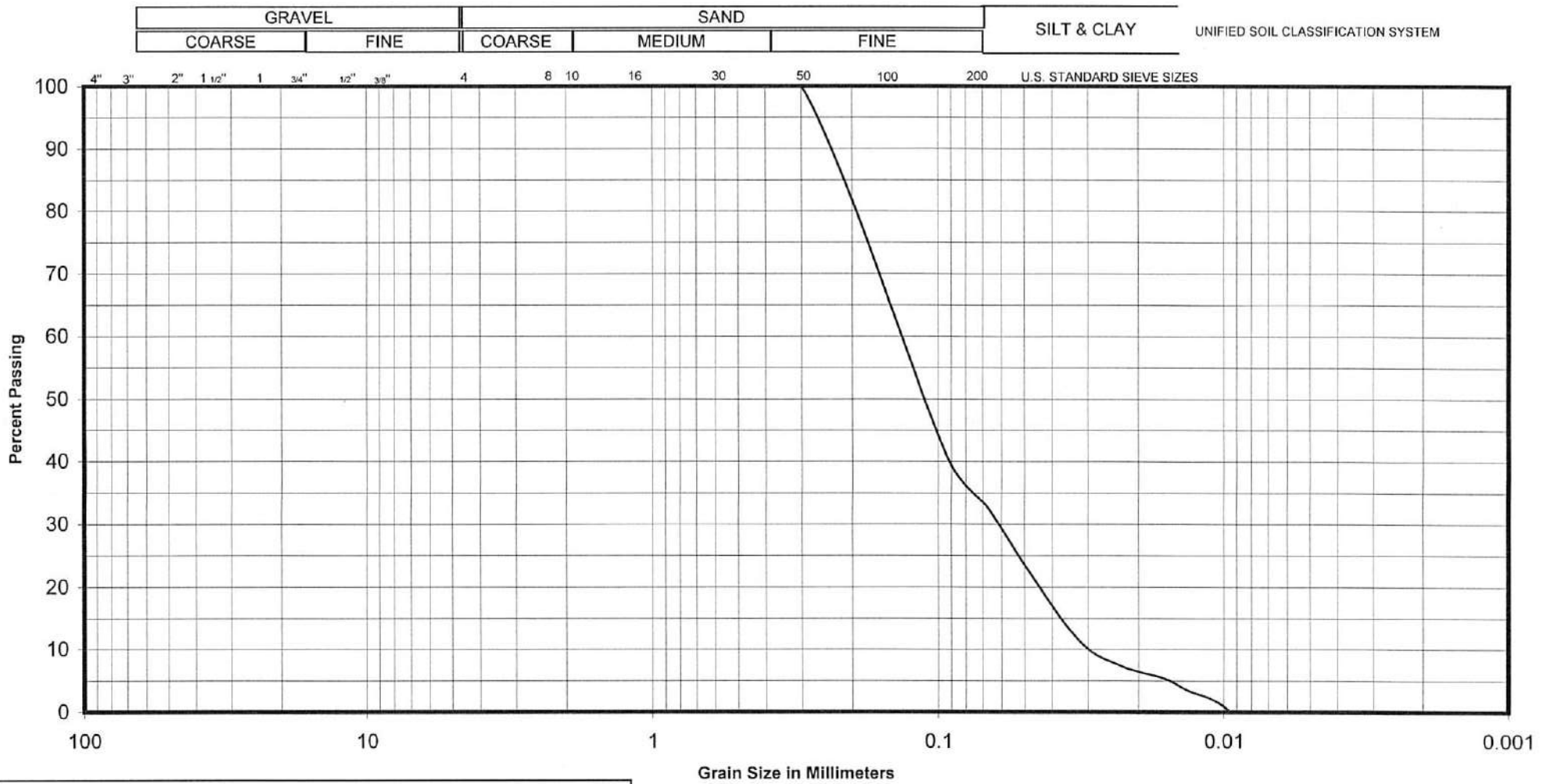
PROJECT: Proposed Subdivision
LOCATION: Balsam Road, Pickering, ON
TEST PIT NO.: 4
SAMPLE NO.: 2
DEPTH :
DATE: October 2016

Fine SAND, some silt (SM)

ENCLOSURE No.: 11

GRAIN SIZE DISTRIBUTION

OUR REFERENCE No.: 6999-16-9



PROJECT: Proposed Subdivision
LOCATION: Balsam Road, Pickering, ON
TEST PIT NO.: 5
SAMPLE NO.: 2
DEPTH :
DATE: October 2016

Fine SAND, some silt (SM)

ENCLOSURE No.: 12

GRAIN SIZE DISTRIBUTION

OUR REFERENCE No.: 6999-16-9

GRAVEL		SAND			SILT & CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

UNIFIED SOIL CLASSIFICATION SYSTEM

PROJECT: Proposed Subdivision
LOCATION: Balsam Road, Pickering, ON
TEST PIT NO.: 6
SAMPLE NO.: 2
DEPTH :
DATE: October 2016

Silty Fine SAND (SM)

ENCLOSURE No.: 13

GeoPro Consulting Limited

Geotechnical-Hydrogeology-Environmental-Materials-Inspection

Supplementary Geotechnical Investigation

Proposed Residential Development

Parts of Lots 3 and 4, Concession 5, Pickering, Ontario

Prepared For:

869547 Ontario Inc.

GeoPro Project No.: 17-1780GHE3
Report Date: December 5, 2022

ENCLOSURES

Enclosure 1A: Notes on Sample Descriptions

1. Each soil stratum is described according to the *Modified Unified Soil Classification System*. The compactness condition of cohesionless soils (SPT) and the consistency of cohesive soils (undrained shear strength) are defined according to Canadian Foundation Engineering Manual, 4th Edition. Different soil classification systems may be used by others. Please note that a description of the soil stratums is based on visual and tactile examination of the samples augmented with field and laboratory test results, such as a grain size analysis and/or Atterberg Limits testing. Visual classification is not sufficiently accurate to provide exact grain sizing or precise differentiation between size classification systems.

2. Fill: Where fill is designated on the borehole log it is defined as indicated by the sample recovered during the boring process. The reader is cautioned that fills are heterogeneous in nature and variable in density or degree of compaction. The borehole description may therefore not be applicable as a general description of site fill materials. All fills should be expected to contain obstruction such as wood, large concrete pieces or subsurface basements, floors, tanks, etc., none of these may have been encountered in the boreholes. Since boreholes cannot accurately define the contents of the fill, test pits are recommended to provide supplementary information. Despite the use of test pits, the heterogeneous nature of fill will leave some ambiguity as to the exact composition of the fill. Most fills contain pockets, seams, or layers of organically contaminated soil. This organic material can result in the generation of methane gas and/or significant ongoing and future settlements. Fill at this site may have been monitored for the presence of methane gas and, if so, the results are given on the borehole logs. The monitoring process does not indicate the volume of gas that can be potentially generated nor does it pinpoint the source of the gas. These readings are to advise of the presence of gas only, and a detailed study is recommended for sites where any explosive gas/methane is detected. Some fill material may be contaminated by toxic/hazardous waste that renders it unacceptable for deposition in any but designated land fill sites; unless specifically stated the fill on this site has not been tested for contaminants that may be considered toxic or hazardous. This testing and a potential hazard study can be undertaken if requested. In most residential/commercial areas undergoing reconstruction, buried oil tanks are common and are generally not detected in a conventional preliminary geotechnical site investigation.

3. Till: The term till on the borehole logs indicates that the material originates from a geological process associated with glaciation. Because of this geological process the till must be considered heterogeneous in composition and as such may contain pockets and/or seams of material such as sand, gravel, silt or clay. Till often contains cobbles (75 to 300 mm) or boulders (over 300 mm). Contractors may therefore encounter cobbles and boulders during excavation, even if they are not indicated by the borings. It should be appreciated that normal sampling equipment cannot differentiate the size or type of any obstruction. Because of the horizontal and vertical variability of till, the sample description may be applicable to a very limited zone; caution is therefore essential when dealing with sensitive excavations or dewatering programs in till materials.

Enclosure 1B: Explanation of Terms Used in the Record of Boreholes

Sample Type

AS	Auger sample
BS	Block sample
CS	Chunk sample
DO	Drive open
DS	Dimension type sample
FS	Foil sample
NR	No recovery
RC	Rock core
SC	Soil core
SS	Spoon sample
SH	Shelby tube Sample
ST	Slotted tube
TO	Thin-walled, open
TP	Thin-walled, piston
WS	Wash sample

Penetration Resistance

Standard Penetration Resistance (SPT), N:

The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in) required to drive a 50 mm (2 in) drive open sampler for a distance of 300 mm (12 in).

PM – Samples advanced by manual pressure
WR – Samples advanced by weight of sampler and rod
WH – Samples advanced by static weight of hammer

Dynamic Cone Penetration Resistance, N_d:

The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in) to drive uncased a 50 mm (2 in) diameter, 60° cone attached to "A" size drill rods for a distance of 300 mm (12 in).

Piezo-Cone Penetration Test (CPT):

An electronic cone penetrometer with a 60 degree conical tip and a projected end area of 10 cm² pushed through ground at a penetration rate of 2 cm/s. Measurement of tip resistance (Q_t), porewater pressure (PWP) and friction along a sleeve are recorded electronically at 25 mm penetration intervals.

Textural Classification of Soils (ASTM D2487)

Classification	Particle Size
Boulders	> 300 mm
Cobbles	75 mm - 300 mm
Gravel	4.75 mm - 75 mm
Sand	0.075 mm – 4.75 mm
Silt	0.002 mm-0.075 mm
Clay	<0.002 mm(*)

(*) Canadian Foundation Engineering Manual (4th Edition)

Coarse Grain Soil Description (50% greater than 0.075 mm)

Terminology	Proportion
Trace	0-10%
Some	10-20%
Adjective (e.g. silty or sandy)	20-35%
And (e.g. sand and gravel)	> 35%

Soil Description

a) Cohesive Soils (*)

Consistency	Undrained Shear Strength (kPa)	SPT "N" Value
Very soft	<12	<2
Soft	12-25	2-4
Firm	25-50	4-8
Stiff	50-100	8-15
Very stiff	100-200	15-30
Hard	>200	>30

(*) Hierarchy of Shear Strength prediction

1. Lab triaxial test
2. Field vane shear test
3. Lab. vane shear test
4. SPT "N" value
5. Pocket penetrometer

b) Cohesionless Soils (*)

Compactness Condition (Formerly Relative Density)	SPT "N" Value
Very loose	0-4
Loose	4-10
Compact	10-30
Dense	30-50
Very dense	>50

Soil Tests

w	Water content
w_p	Plastic limit
w_l	Liquid limit
C	Consolidation (oedometer) test
CID	Consolidated isotropically drained triaxial test
CIU	consolidated isotropically undrained triaxial test with porewater pressure measurement
D_R	Relative density (specific gravity, Gs)
DS	Direct shear test
ENV	Environmental/ chemical analysis
M	Sieve analysis for particle size
MH	Combined sieve and hydrometer (H) analysis
MPC	Modified proctor compaction test
SPC	Standard proctor compaction test
OC	Organic content test
U	Unconsolidated Undrained Triaxial Test
V	Field vane (LV-laboratory vane test)
γ	Unit weight

LOG OF BOREHOLE BH101

PROJECT: Supplementray Geotechnical Investigation for Proposed Residential Development

CLIENT: 869547 Ontario Inc.

PROJECT LOCATION: Parts of Lots 3 and 4, Concession 5, Pickering, ON

DATUM: N/A

BH LOCATION: See Borehole Plan Location

DRILLING DATA

METHOD: Continuous Flight Auger - Auto Hammer | DIAMETER: 155 mm

FIELD ENGINEER: JF | DATE: 2021-08-27

SAMPLE REVIEW: CL | REF. NO.: 17-1780GHE3

CHECKED: DX | ENCL. NO.: 2

ELEV DEPTH (m)	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	"N" BLOWS/0.3m	GROUND WATER ELEVATION
0.0	**TOPSOIL:** (120 mm)					
0.1	**FILL:** silty fine sand, organic inclusions, rootlet inclusions, brown, moist, compact		1	SS	11	
0.7	**PROBABLE FILL:** silty fine sand, brown, moist, loose		2	SS	6	
			3	SS	6	
2.1	**FINE SANDY SILT:** trace clay, containing cobbles and boulders, brown, moist to wet, very dense		4	SS	65	
	--- auger grinding		5	SS	70	
4.0	**SILTY FINE SAND:** grey, wet, dense		6	SS	43	
5.0	**END OF BOREHOLE**					

Notes:

1) Water encountered at a depth of 3.0 m below ground surface (mBGS) during drilling.
2) Water was at a depth of 3.2 mBGS upon completion of drilling.
3) Borehole caved at a depth of 4.2 mBGS upon completion of drilling.

DYNAMIC PENETRATION TEST
○ SPT ~ Cone blows/0.3m
20 40 60 80

SHEAR STRENGTH (kPa)
● Unconfined ✕ Field Vane & Sensitivity
▲ Quick Triaxial ⊠ Penetrometer + Lab Vane
20 40 60 80

Plastic Limit | Natural Moisture Content | Liquid Limit
w_P w w_L
WATER CONTENT (%)
10 20 30 40

UNIT WT (kN/m³)

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

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
▲ε=3% Strain at Failure

01 - GEOPRO SOIL LOG GEOPRO 17-1780GHE3 BH LOG 20211118 - NT - NG - DX.GPJ 2022-11-18 10:34

LOG OF BOREHOLE BH102

PROJECT: Supplementray Geotechnical Investigation for Proposed Residential Development

CLIENT: 869547 Ontario Inc.

PROJECT LOCATION: Parts of Lots 3 and 4, Concession 5, Pickering, ON

DATUM: N/A

BH LOCATION: See Borehole Plan Location

DRILLING DATA

METHOD: Continuous Flight Auger - Auto Hammer | DIAMETER: 155 mm

FIELD ENGINEER: JF | DATE: 2021-08-29

SAMPLE REVIEW: CL | REF. NO.: 17-1780GHE3

CHECKED: DX | ENCL. NO.: 3

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	"N" BLOWS/0.3m
0.0	**TOPSOIL:** (300 mm)			
0.3	**REWORKED SILTY FINE SAND:** rootlet inclusions, brown, moist, very loose to loose	1	SS	4
1		2A	SS	4
		2B	SS	
1.1	**SILTY FINE SAND:** pockets of sandy silt, brown, moist, very loose to dense	3	SS	21
2		4	SS	45
3	--- layers of fine sandy silt	5	SS	46
4.0	**SILTY SAND:** brown, wet, compact	6	SS	28
5				
5.0	**END OF BOREHOLE**			

Notes:

1) Water encountered at a depth of 4.6 m below ground surface (mBGS) during drilling.
2) Water was at a depth of 4.4 mBGS upon completion of drilling.
3) Borehole caved at a depth of 4.6 mBGS upon completion of drilling.

GROUND WATER ELEVATION

DYNAMIC PENETRATION TEST
○ SPT ≈ Cone blows/0.3m
20 40 60 80

SHEAR STRENGTH (kPa)
● Unconfined ✕ Field Vane & Sensitivity
▲ Quick Triaxial ⊠ Penetrometer + Lab Vane
20 40 60 80

Plastic Limit | Natural Moisture Content | Liquid Limit
w_P w w_L
WATER CONTENT (%)
10 20 30 40

UNIT WT (kN/m³)

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

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
▲ ε=3% Strain at Failure

LOG OF BOREHOLE BH103

PROJECT: Supplementray Geotechnical Investigation for Proposed Residential Development

CLIENT: 869547 Ontario Inc.

PROJECT LOCATION: Parts of Lots 3 and 4, Concession 5, Pickering, ON

DATUM: N/A

BH LOCATION: See Borehole Plan Location

DRILLING DATA

METHOD: Continuous Flight Auger - Auto Hammer | DIAMETER: 155 mm

FIELD ENGINEER: JF | DATE: 2021-08-27

SAMPLE REVIEW: CL | REF. NO.: 17-1780GHE3

CHECKED: DX | ENCL. NO.: 4

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	"N" BLOWS/0.3m
0.0	**TOPSOIL:** (300 mm)			
0.3	**REWORKED SILTY FINE SAND:** organic inclusions, rootlet inclusions, brown, moist, very loose	1	SS	2
1		2A	SS	2
		2B	SS	
1.1	**SILTY FINE SAND:** containing cobbles and boulders, brown, moist, very loose to dense	3	SS	11
2	--- auger grinding	4	SS	32
2.9	**FINE SAND AND SILT TO FINE SANDY SILT:** layers of silt, layers of silty sand, brown, moist to wet, compact	5	SS	25
4				
4.0	**SILTY SAND:** trace gravel, layers of sandy silt, brown, wet, compact	6	SS	27
5				
5.0	**END OF BOREHOLE**			

Notes:

1) Water encountered at a depth of 3.0 m below ground surface (mBGS) during drilling.
2) Water was at a depth of 3.2 mBGS upon completion of drilling.
3) Borehole caved at a depth of 4.3 mBGS upon completion of drilling.

DYNAMIC PENETRATION TEST: ○ SPT, ≈ Cone, blows/0.3m; 20 40 60 80

SHEAR STRENGTH (kPa): ● Unconfined, ▲ Quick Triaxial, × Field Vane & Sensitivity, ⊠ Penetrometer, + Lab Vane; 20 40 60 80

Plastic Limit (w_P) | Natural Moisture Content (w) | Liquid Limit (w_L)

WATER CONTENT (%): 10 20 30 40

UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%): GR SA SI CL

GROUNDWATER ELEVATIONS

Measurement: 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: + 3, × 3: Numbers refer to Sensitivity; ▲ ε=3% Strain at Failure

LOG OF BOREHOLE BH104

PROJECT: Supplementray Geotechnical Investigation for Proposed Residential Development

CLIENT: 869547 Ontario Inc.

PROJECT LOCATION: Parts of Lots 3 and 4, Concession 5, Pickering, ON

DATUM: N/A

BH LOCATION: See Borehole Plan Location

DRILLING DATA

METHOD: Continuous Flight Auger - Auto Hammer | DIAMETER: 155 mm

FIELD ENGINEER: JF | DATE: 2021-08-27

SAMPLE REVIEW: CL | REF. NO.: 17-1780GHE3

CHECKED: DX | ENCL. NO.: 5

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	"N" BLOWS/0.3m
0.0	**TOPSOIL:** (250 mm)			
0.3	**REWORKED SILTY FINE SAND:** some silt, organic inclusions, rootlet inclusions, brown, moist, loose	1	SS	7
		2A	SS	5
		2B	SS	
1.1	**SILTY FINE SAND:** brown, moist to wet, loose to compact	3	SS	20
2.1	**FINE SANDY SILT:** trace clay, grey, moist to wet, dense	4	SS	31
2.9	**SILT:** trace clay, some sand, grey, wet, dense	5	SS	43
4.0	**FINE SANDY SILT:** some clay, grey, wet, very dense	6	SS	58
5.0	**END OF BOREHOLE**			

Notes:

1) Water encountered at a depth of 1.4 m below ground surface (mBGS) during drilling.
2) Water was at a depth of 2.0 mBGS upon completion of drilling.
3) Borehole caved at a depth of 3.2 mBGS upon completion of drilling.

DYNAMIC PENETRATION TEST: ○ SPT, ≈ Cone, blows/0.3m; 20 40 60 80

SHEAR STRENGTH (kPa): ● Unconfined, ▲ Quick Triaxial, ✕ Field Vane & Sensitivity, ⊠ Penetrometer, + Lab Vane; 20 40 60 80

Plastic Limit (w_P) | Natural Moisture Content (w) | Liquid Limit (w_L)

WATER CONTENT (%): 10 20 30 40

UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%): GR SA SI CL

GROUNDWATER ELEVATIONS

Measurement: 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: + 3, × 3: Numbers refer to Sensitivity; ▲ ε=3% Strain at Failure

01 - GEOPRO SOIL LOG GEOPRO 17-1780GHE3 BH LOG 20211118 - NT - NG - DX.GPJ 2022-11-18 10:34

LOG OF BOREHOLE BH105

PROJECT: Supplementray Geotechnical Investigation for Proposed Residential Development

CLIENT: 869547 Ontario Inc.

PROJECT LOCATION: Parts of Lots 3 and 4, Concession 5, Pickering, ON

DATUM: N/A

BH LOCATION: See Borehole Plan Location

DRILLING DATA

METHOD: Continuous Flight Auger - Auto Hammer | DIAMETER: 155 mm

FIELD ENGINEER: JF | DATE: 2021-08-27

SAMPLE REVIEW: CL | REF. NO.: 17-1780GHE3

CHECKED: DX | ENCL. NO.: 6

ELEV DEPTH (m)	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	"N" BLOWS/0.3m	GROUND WATER ELEVATION
0.0	**TOPSOIL:** (250 mm)					
0.3	**FILL:** silty fine sand, trace gravel, organic inclusions, rootlet inclusions, containing rock fragments, brown, moist, loose to compact		1	SS	13	
			2	SS	6	
			3A	SS	5	
			3B	SS		
1.8	**SILTY FINE SAND:** layers of silt, containing cobbles and boulders, brown, wet, loose to compact --- auger grinding		4	SS	26	
2.9	**FINE SAND AND SILT TO SILTY FINE SAND:** grey, moist to wet, dense		5	SS	43	
4.0	**SILT:** trace to some clay, trace sand, interlayers of clayey silt, grey, moist to wet, dense		6	SS	33	
5.0	**END OF BOREHOLE** Notes: 1) Water encountered at a depth of 1.8 m below ground surface (mBGS) during drilling. 2) Water was at a depth of 2.2 mBGS upon completion of drilling. 3) Borehole caved at a depth of 3.4 mBGS upon completion of drilling.					

DYNAMIC PENETRATION TEST
○ SPT ≈ Cone blows/0.3m
20 40 60 80

SHEAR STRENGTH (kPa)
● Unconfined ✕ Field Vane & Sensitivity
▲ Quick Triaxial ⊠ Penetrometer + Lab Vane
20 40 60 80

Plastic Limit | Natural Moisture Content | Liquid Limit
w_P w w_L
WATER CONTENT (%)
10 20 30 40

UNIT WT (kN/m³)

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

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
▲ ε=3% Strain at Failure

LOG OF BOREHOLE BH106

PROJECT: Supplementray Geotechnical Investigation for Proposed Residential Development

CLIENT: 869547 Ontario Inc.

PROJECT LOCATION: Parts of Lots 3 and 4, Concession 5, Pickering, ON

DATUM: N/A

BH LOCATION: See Borehole Plan Location

DRILLING DATA

METHOD: Continuous Flight Auger - Auto Hammer | DIAMETER: 155 mm

FIELD ENGINEER: JF | DATE: 2021-08-27

SAMPLE REVIEW: CL | REF. NO.: 17-1780GHE3

CHECKED: DX | ENCL. NO.: 7

ELEV / DEPTH (m)	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	"N" BLOWS/0.3m	GROUND WATER ELEVATION
0.0	**TOPSOIL:** (350 mm)		1	SS	3	
0.4	**FILL:** silty fine sand, organic matters, rootlet inclusions, dark brown, moist, very loose					
0.7	**CLAYEY SILT:** some sand, trace gravel, interlayers of silt, layers of fine sand and silt, seams of sand, brown, moist, very stiff		2	SS	22	
1.4	**SANDY SILT:** some clay, trace gravel, layers of clayey silt, brown, moist, compact		3	SS	22	
			4	SS	20	
2.9	**SANDY SILT TILL:** some clay, trace gravel, layers of sandy silt, containing cobbles and boulders, grey, moist, dense		5	SS	33	
	--- auger grinding					
			6	SS	50	
5.0	**END OF BOREHOLE**					

Note:

1) Borehole caved at a depth of 4.5 m below ground surface (mBGS) upon completion of drilling.

DYNAMIC PENETRATION TEST
○ SPT ≈ Cone blows/0.3m
20 40 60 80

SHEAR STRENGTH (kPa)
● Unconfined ✕ Field Vane & Sensitivity
▲ Quick Triaxial ⊠ Penetrometer + Lab Vane
20 40 60 80

Plastic Limit | Natural Moisture Content | Liquid Limit
w_P | w | w_L
WATER CONTENT (%)
10 20 30 40

UNIT WT (kN/m³)

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

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
▲ ε=3% Strain at Failure

01 - GEOPRO SOIL LOG GEOPRO 17-1780GHE3 BH LOG 20211118 - NT - NG - DX.GPJ 2022-11-18 10:34

LOG OF BOREHOLE BH1

PROJECT: Geotechnical Investigation for Proposed Residential Development

CLIENT: JFC Developments Ltd.

PROJECT LOCATION: Parts of Lots 3 and 4, Concession 5, Pickering, Ontario

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan

DRILLING DATA

Method: Continuous Flight Auger- Auto Hammer

Diameter: 155/205 mm

Date: Apr/10/2017

REF. NO.: 17-1780GHE

ENCL NO.: 2

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION
135.3							
135.0 / 0.0	**TOPSOIL:** (180 mm)					Concrete	135
0.2	**REWORKED SILTY FINE SAND:** trace organics, trace rootlets, brown, moist, loose		1	SS	4		
134.2			2	SS	4		134
1.1	**SILTY FINE SAND:** trace organics, trace rootlets, brown, wet, loose to compact		3	SS	23	W. L. 133.9 m May 09, 2017 W. L. 133.6 m Apr 28, 2017	
133.2							133
2.1	**FINE SAND AND SILT TO FINE SANDY SILT:** trace clay, brown to grey, wet, dense to very dense		4	SS	37	Bentonite	
			5	SS	55		132
	--- grey		6	SS	82		131
							130
						Sand	
						Screen	
			7	SS	50 / 150 mm		129
						Natural Pack	
127.4			8	SS	50 / 150 mm		
7.9	**END OF BOREHOLE**						

Notes:
1) Water encountered at a depth of 1.5 m below ground surface (mBGS) during drilling.
2) Water was at a depth of 3.0 mBGS upon completion of drilling.
3) Borehole caved at a depth of 3.0 mBGS upon completion of drilling.
4) 51 mm dia. Monitoring Well was installed in borehole upon completion of drilling.

Water Level Reading

Date	W.L. Depth (mBGS)
April 28, 2017	1.72
May 9, 2017	1.35

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

LOG OF BOREHOLE BH2

PROJECT: Geotechnical Investigation for Proposed Residential Development

CLIENT: JFC Developments Ltd.

PROJECT LOCATION: Parts of Lots 3 and 4, Concession 5, Pickering, Ontario

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan

DRILLING DATA

Method: Continuous Flight Auger- Auto Hammer

Diameter: 155/205 mm

Date: Apr/10/2017

REF. NO.: 17-1780GHE

ENCL NO.: 3

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION
133.0							
0.0 / 132.7	**TOPSOIL:** (250 mm)		1	SS	5	Concrete	
0.3 / 132.3	**REWORKED SILTY FINE SAND:** trace clay, trace organics, trace rootlets, brown, moist, loose						
0.7 / 131.6	**NO RECOVERY:** likely silty fine sand, loose		2	NR	6	W. L. 132.3 m May 09, 2017 W. L. 131.9 m Apr 28, 2017	
1.4	**FINE SAND AND SILT:** trace clay, trace organics, seams of clayey silt, brown to grey, wet, compact to very dense		3	SS	18		131
	--- grey		4	SS	30	Sand Screen	
			5	SS	32		
			6	SS	46		129
			7	SS	53		128
125.9							127
7.1	**CLAYEY SILT:** some fine sand, seams of sand, grey, wet, stiff		8	SS	10		126
124.3							125
8.6	**CLAYEY SILT (TILL LIKE):** trace to some sand, trace gravel, containing cobbles and boulders, grey, wet, stiff					Natural Pack	
			9	SS	10		124
122.8							123
10.1	**CLAYEY SILT TILL TO SILTY CLAY TILL:** trace sand, trace gravel, containing cobbles and boulders, grey, moist, hard		10	SS	80		122

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)

SHEAR STRENGTH (kPa) (20 40 60 80 100)
○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%) (10 20 30)

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

Continued Next Page

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ ε=3% Strain at Failure

LOG OF BOREHOLE BH2

PROJECT: Geotechnical Investigation for Proposed Residential Development

CLIENT: JFC Developments Ltd.

PROJECT LOCATION: Parts of Lots 3 and 4, Concession 5, Pickering, Ontario

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan

DRILLING DATA

Method: Continuous Flight Auger- Auto Hammer

Diameter: 155/205 mm

Date: Apr/10/2017

REF. NO.: 17-1780GHE

ENCL NO.: 3

SOIL PROFILE (m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 10 20 30	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
120.3			11	SS	90/280 mm				○		
12.6	**END OF BOREHOLE** Notes: 1) Water encountered at a depth of 1.5 m below ground surface (mBGS) during drilling. 2) Water was at a depth of 2.1 mBGS upon completion of drilling. 3) Borehole caved at a depth of 2.1 mBGS upon completion of drilling. 4) 51 mm dia. Monitoring Well was installed in borehole upon completion of drilling. Water Level Reading Date W.L. Depth (mBGS) April 28, 2017 1.05 May 9, 2017 0.70										

GROUNDWATER ELEVATIONS

Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES + 3, × 3: Numbers refer to Sensitivity ○ ε=3% Strain at Failure

GeoPro CONSULTING LIMITED

LOG OF BOREHOLE BH3

PROJECT: Geotechnical Investigation for Proposed Residential Development

CLIENT: JFC Developments Ltd.

PROJECT LOCATION: Parts of Lots 3 and 4, Concession 5, Pickering, Ontario

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan

DRILLING DATA

Method: Continuous Flight Auger- Auto Hammer

Diameter: 155/205 mm

Date: Apr/10/2017

REF. NO.: 17-1780GHE

ENCL NO.: 4

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION
133.6							
133.4 0.2	**TOPSOIL:** (180 mm) **REWORKED SILTY FINE SAND:** trace organics, trace rootlets, dark brown to brown, wet, loose to compact		1	SS	4	Concrete Bentonite	
132.5 1.1			2	SS	23	W. L. 133.0 m W. L. 132.8 m Apr 28, 2017	
132.2 1.4	**SILTY FINE SAND:** trace clay, trace rootlets, brown, wet, compact						
2	**FINE SAND AND SILT TO FINE SANDY SILT:** trace clay, brown to grey, wet, compact to dense		3	SS	26	Sand Screen	132
			4	SS	48		131
3	--- grey		5	SS	43		
129.5 4.0	**SILT:** some fine sand, trace clay, layers of fine sand and silt, grey, wet, dense						130
5			6	SS	39		129
128.0 5.6	**FINE SAND AND SILT:** trace clay, grey, wet, very dense					Natural Pack	128
6			7	SS	50/ 150 mm		
126.6 7.0	**SILT:** some fine sand, trace to some clay, seams of fine sand, grey, wet, compact						127
8			8	SS	30		126
125.5 8.1	**END OF BOREHOLE**						

Notes:
1) Water encountered at a depth of 0.8 m below ground surface (mBGS) during drilling.
2) Borehole caved at a depth of 1.8 mBGS upon completion of drilling.
3) 51 mm dia. Monitoring Well was installed in borehole upon completion of drilling.

Water Level Reading

Date W.L.	Depth (mBGS)
April 28, 2017	0.76
May 9, 2017	0.57

DYNAMIC CONE PENETRATION RESISTANCE PLOT — 20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L

WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
$+^3$, $\times^3$: Numbers refer to Sensitivity
○ $^{\varepsilon}$=3% Strain at Failure

LOG OF BOREHOLE BH4

PROJECT: Geotechnical Investigation for Proposed Residential Development

CLIENT: JFC Developments Ltd.

PROJECT LOCATION: Parts of Lots 3 and 4, Concession 5, Pickering, Ontario

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan

DRILLING DATA

Method: Continuous Flight Auger- Auto Hammer

Diameter: 155/205 mm

Date: Apr/05/2017

REF. NO.: 17-1780GHE

ENCL NO.: 5

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"
136.1 / 0.0	**TOPSOIL:** (200 mm)			
0.2	**REWORKED SAND AND SILT:** some clay, some gravel, trace organics, trace rootlets, brown, wet, very loose to dense	1	SS	3
135.0 / 1.1	**SANDY SILT TILL TO SAND AND SILT TILL:** some clay, trace gravel, layers of silty sand, containing cobbles and boulders, brown to grey, moist to wet, dense to very dense ---cobbles and boulders --- grey	2	SS	40
		3	SS	50/ 150 mm
		4	SS	67
		5	SS	73
132.1 / 4.0	**SILTY SAND:** some gravel, containing cobbles and boulders, grey, wet, very dense	6	SS	68
130.5 / 5.6	**CLAYEY SILT TILL:** some sand to sandy, trace gravel, containing cobbles and boulders, grey, moist, hard	7	SS	50 / 150 mm
129.1 / 7.0	**CLAYEY SILT:** trace sand, trace gravel, grey, moist, hard	8	SS	50 / 130 mm
128.3 / 7.8	**END OF BOREHOLE**			

Notes:
1) Water encountered at a depth of 1.8 m below ground surface (mBGS) during drilling.
2) Water was at a depth of 1.5 mBGS upon completion of drilling.
3) 51 mm dia. Monitoring Well was installed in borehole upon completion of drilling.

Water Level Reading

Date	W.L. Depth (mBGS)
April 28, 2017	0.39
May 9, 2017	0.27

Concrete

W. L. 135.8 m
W. L. 135.7 m
Apr 28, 2017

Bentonite

Sand

Screen

Natural Pack

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH (kPa): ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE; 20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%): 10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%) — GR SA SI CL

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ε_f=3% Strain at Failure

LOG OF BOREHOLE BH5

PROJECT: Geotechnical Investigation for Proposed Residential Development

CLIENT: JFC Developments Ltd.

PROJECT LOCATION: Parts of Lots 3 and 4, Concession 5, Pickering, Ontario

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan

DRILLING DATA

Method: Continuous Flight Auger- Auto Hammer

Diameter: 155/205 mm

Date: Apr/05/2017

REF. NO.: 17-1780GHE

ENCL NO.: 6

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION
135.5						
135.3 0.0	**TOPSOIL:** (200 mm)					
0.2 134.8	**FILL:** silty fine sand, trace organics, trace rootlets, dark brown to brown, wet, loose	1	SS	4		
0.7	**SANDY SILT TILL:** trace to some clay, trace gravel, pockets of sand, containing cobbles and boulders, brown to grey, moist, very dense	2	SS	76 / 280 mm		
		3	SS	87		
	--- grey	4	SS	94		
132.6						
2.9	**FINE SANDY SILT:** trace clay, trace gravel, grey, wet, very dense	5	SS	50 / 80 mm		
131.6						
3.9	**CLAYEY SILT TILL:** some sand to sandy, trace gravel, containing cobbles and boulders, grey, moist, hard	6	SS	50 / 130 mm		
130.0						
5.5	**SANDY SILT TILL:** trace to some clay, trace gravel, containing cobbles and boulders, grey, moist, very dense	7	SS	50 / 80 mm		
	---cobbles and boulders					
128.6						
6.9	**GRAVELLY SAND:** trace silt, pockets of silt, containing cobbles and boulders, grey, wet, very dense	8	SS	59		
127.4						
8.1	**END OF BOREHOLE**					

Notes:
1) Water encountered at a depth of 0.8 m below ground surface (mBGS) during drilling.
2) Water was at a depth of 0.3 mBGS upon completion of drilling.
3) Borehole caved at a depth of 6.7 mBGS upon completion of drilling.
4) 51 mm dia. Monitoring Well was installed in borehole upon completion of drilling.

Water Level Reading

Date	W.L. Depth (mBGS)
April 28, 2017	0.76
May 9, 2017	0.49

Concrete

W. L. 135.0 m May 09, 2017

W. L. 134.7 m Apr 28, 2017

Bentonite

Sand

Screen

Natural Pack

DYNAMIC CONE PENETRATION RESISTANCE PLOT — 20 40 60 80 100

SHEAR STRENGTH (kPa) — ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE — 20 40 60 80 100

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L

WATER CONTENT (%) — 10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%) — GR SA SI CL

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH6

PROJECT: Geotechnical Investigation for Proposed Residential Development

CLIENT: JFC Developments Ltd.

PROJECT LOCATION: Parts of Lots 3 and 4, Concession 5, Pickering, Ontario

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan

DRILLING DATA

Method: Continuous Flight Auger- Auto Hammer

Diameter: 155/205 mm

Date: Apr/05/2017

REF. NO.: 17-1780GHE

ENCL NO.: 7

(m) ELEV / DEPTH	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"	ELEVATION
136.7					
0.0 / 136.1	**TOPSOIL:** (530 mm)	1	SS	4	Concrete
136.0	**REWORKED SAND AND SILT:**				
0.7	trace to some clay, trace organics, trace rootlets, dark brown, wet, very loose	2	SS	14	136
1	**SANDY SILT TILL:** trace clay, trace gravel, pockets of sand, layers of silty sand, containing cobbles and boulders, brown to grey, moist to wet, compact to very dense				W. L. 135.4 m May 09, 2017
		3	SS	44	W. L. 135.0 m Apr 28, 2017
2		4	SS	68	134
3	--- grey	5	SS	45	133
4					Sand
	--- containing shale fragments				Screen
		6	SS	45	132
5					
131.1					131
5.6 / 130.1	**SILTY SAND TILL:** some gravel, trace clay, layers of silty sand, containing cobbles and boulders, grey, moist to wet, very dense	7	SS	91/ 280 mm	Natural Pack
6.5	**END OF BOREHOLE**				

Notes:
1) Water encountered at a depth of 1.5 m below ground surface (mBGS) during drilling.
2) 51 mm dia. Monitoring Well was installed in borehole upon completion of drilling.

Water Level Reading

Date	W.L. Depth (mBGS)
April 28, 2017	1.62
May 9, 2017	1.31

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH (kPa): ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE; 20 40 60 80 100

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L

WATER CONTENT (%): 10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

GROUNDWATER ELEVATIONS

Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: + 3, × 3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

LOG OF BOREHOLE BH7

PROJECT: Geotechnical Investigation for Proposed Residential Development

CLIENT: JFC Developments Ltd.

PROJECT LOCATION: Parts of Lots 3 and 4, Concession 5, Pickering, Ontario

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan

DRILLING DATA

Method: Continuous Flight Auger- Auto Hammer

Diameter: 155/205 mm

Date: Apr/13/2017

REF. NO.: 17-1780GHE

ENCL NO.: 8

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUNDWATER CONDITIONS	ELEVATION
136.1							
135.9 0.0	**TOPSOIL:** (220 mm)						Concrete
0.2	**REWORKED SILTY FINE SAND:** trace organics, trace rootlets, brown, moist, very loose		1	SS	2		
135.1			2	SS	3		135
1.1	**SILTY FINE SAND:** trace organics, trace rootlets, brown, moist to wet, very loose to dense		3	SS	14		
133.4			4	SS	40		134
2.7	**FINE SAND AND SILT:** trace clay, grey, wet to saturated, very dense		5	SS	52		133
132.1							
4.0	**SILTY FINE SAND:** trace clay, grey, wet to saturated, dense		6	SS	46		132
130.6							
5.6	**FINE SAND AND SILT:** trace clay, layers of silty fine sand, seams of clayey silt, grey, wet, very dense		7	SS	55		131
129.0							
7.1	**SILTY FINE SAND:** trace clay, grey, wet, very dense		8	SS	50 / 100 mm		130
127.5							
8.6	**SILT TO FINE SANDY SILT:** trace to some clay, grey, wet, compact		9	SS	12		129
124.5			10	SS	28		128
11.7							127
							126
							125

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)

SHEAR STRENGTH (kPa) (20 40 60 80 100)

W. L. 136.8 m Apr 28, 2017

UNCONFINED + FIELD VANE & Sensitivity

QUICK TRIAXIAL × LAB VANE

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%) (10 20 30)

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

Continued Next Page

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ ε=3% Strain at Failure

LOG OF BOREHOLE BH7

PROJECT: Geotechnical Investigation for Proposed Residential Development

CLIENT: JFC Developments Ltd.

PROJECT LOCATION: Parts of Lots 3 and 4, Concession 5, Pickering, Ontario

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan

DRILLING DATA

Method: Continuous Flight Auger- Auto Hammer

Diameter: 155/205 mm

Date: Apr/13/2017

REF. NO.: 17-1780GHE

ENCL NO.: 8

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION
	SILTY CLAY TILL: trace to some sand, trace gravel, grey, moist to wet, very stiff(Continued)		11	SS	20		124
13 122.9							
13.2	**SANDY SILT TILL:** trace clay, trace gravel, containing cobbles and boulders, grey, moist to wet, very dense						123
122.3			12	SS	50 / 80 mm		
14 13.9	---cobbles and boulders					Bentonite	
	SAND AND SILT TILL: some clay, trace to some gravel, zones of silty sand, containing cobbles and boulders, grey, wet, dense to very dense						122
15	--- auger grinding						
			13	SS	50		121
16							
							120
	---cobbles and boulders		14	SS	50/ 100 mm		
17							119
118.4							
17.8	**CLAYEY SILT TILL:** some sand to sandy, trace gravel, grey, moist, hard						118
18			15	SS	100 / 250 mm		
19							117
20			16	SS	78		
115.3							116
20.8	**SANDY SILT TILL:** trace to some clay, trace gravel, grey, moist to wet, very dense						
21							115
			17	SS	71		
22							114
23			18	SS	61		
							113
24							

SAMPLES

DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100)

SHEAR STRENGTH (kPa) (20 40 60 80 100)
○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L

WATER CONTENT (%) (10 20 30)

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

Continued Next Page

GROUNDWATER ELEVATIONS

Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ ε=3% Strain at Failure

LOG OF BOREHOLE BH7

PROJECT: Geotechnical Investigation for Proposed Residential Development

CLIENT: JFC Developments Ltd.

PROJECT LOCATION: Parts of Lots 3 and 4, Concession 5, Pickering, Ontario

DATUM: Geodetic

BH LOCATION: See Borehole Location Plan

DRILLING DATA

Method: Continuous Flight Auger- Auto Hammer

Diameter: 155/205 mm

Date: Apr/13/2017

REF. NO.: 17-1780GHE

ENCL NO.: 8

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
	SANDY SILT TILL: trace to some clay, trace gravel, grey, moist to wet, very dense(Continued)						112					
			19	SS	66				○			
25							111					
26			20	SS	58		110		○			
27							109					
28			21	SS	53		108		○			
107.8												
28.4	**PROBABLE WEATHERED SHALE:** grey, moist						Sand					
29			22	SS	50/ 100 mm		Screen 107		○			
106.6												
29.6	**END OF BOREHOLE**											

Notes:
1) Water encountered at a depth of 1.5 m below ground surface (mBGS) during drilling.
2) 51 mm dia. Monitoring Well was installed in borehole upon completion of drilling.

Water Level Reading

Date W.L.	Depth (mBGS)
April 28, 2017	-0.65
May 9, 2017	-0.63

GROUNDWATER ELEVATIONS

Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ ε=3% Strain at Failure

APPENDIX B

Water Well Records

November 20, 2022

11:14:55 PM

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
AJAX TOWN	17 658610 4865004 W	2017-04 7360	2	UT 0005		MO	0010 10	7291772 (Z265888) A224740	BRWN FILL SOFT 0005 GREY SILT SAND HARD 0020
AJAX TOWN	17 658604 4864905 W	2017-04 7360	2	UT 0004		MO	0010 10	7291771 (Z265890) A224693	BRWN FILL SOFT 0005 GREY SILT SAND HARD 0020
AJAX TOWN	17 658752 4864880 W	2017-04 7360	2	UT 0004		MO	0010 10	7291770 (Z265889) A224690	BRWN FILL SOFT 0005 GREY SILT SAND HARD 0020
AJAX TOWN CON 02 003	17 658953 4864779 W	1994-12 5459	6	UK 0090	/90/8/3:0	DO	0090 3	1912286 (141574)	BRWN CLAY STNS 0023 GREY CLAY STNS 0089 GREY SAND STNS 0093 BLCK SHLE 0095
AJAX TOWN CON 04 002	17 659205 4864783 W	1976-02 1413	6	SU 0098	///:	DO		4606442 ()	BRWN SAND CLAY LOOS 0007 BRWN CLAY DNSE 0015 GREY SAND CLAY CMTD 0025 GREY CLAY STNS HARD 0090 BLCK SHLE DNSE 0094 BLCK SHLE FOSS 0098 BLCK SHLE DNSE 0100
AJAX TOWN CON 04 003	17 659127 4864819 W	1992-06 2104	6	FR 0100	0/90/6/3:15	MN	0092 1	1911498 (118309)	BRWN LOAM 0002 GREY SAND LOOS 0050 GREY CLAY 0090 BRWN SAND 0099 BLCK LMSN 0100
AJAX TOWN CON 04 003	17 659195 4864523 W	1964-11 5412	30	FR 0007	5//0/:	DO		4601397 ()	LOAM 0001 FSND 0012 BLUE CLAY 0025
AJAX TOWN CON 04 003	17 659079 4864845 W	2006-02 5459	30					1918116 (Z35832) A032825 A	
BOWMANVILLE TOWN 05 012	17 658218 4865343 W	2008-05 5459	2.35			NU		7108227 (Z75693) A064993 A	
NEWCASTLE TOWN (DARL 05 014	17 658218 4865343 W	2008-06 5459						7107163 (Z75690) A064963 A	
PICKERING TOWN	17 658252 4864907 W	2017-04 7472	2			MO	0092 5	7287366 (Z259465) A222970	BLUE CLAY SAND LOOS 0030 BLUE CLAY GRVL PCKD 0040 GREY CLAY SAND GRVL 0079 GREY SAND DNSE 0097
PICKERING TOWN 04 017	17 658206 4864623 W	2009-09 7407	2.35			DO		7130718 (Z52956) A	
PICKERING TOWN 05 004	17 658218 4865343 W	2008-06 5459	6	FR 0095	6/7/7/1:0	DO		7108228 (Z75689) A063158	GREY CLAY FILL SOFT 0060 BLDR GREY SLTY SOFT 0070 GREY CLAY SOFT 0080 BRWN SAND LOOS 0095
PICKERING TOWN 05 007	17 658096 4864684 W	2007-10 5459	6.61	FR 0106	1/41/5/1:0	DO		7054352 (Z61055) A061114	BRWN SAND SOFT 0020 GREY CLAY SOFT 0052 BRWN SAND SILT SOFT 0065 GREY CLAY TILL DNSE 0088 BRWN SHLE SOFT 0106

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
PICKERING TOWN CON 03 020	17 658869 4865217 W	1993-06 1673	6	FR 0097	2/23/20/2:0	DO	0094 3	1912365 (104032)	LOAM 0002 CLAY GRVL 0085 SAND GRVL 0097
PICKERING TOWN CON 05 003	17 659035 4864943 W	1979-07 2651	6	FR 0106	//25/2:30	ST DO		1905697 ()	BRWN CLAY SAND 0019 GREY CLAY SOFT 0042 GREY CLAY GRVL PCKD 0088 BRWN SAND 0096 BLCK SHLE 0110
PICKERING TOWN CON 05 003	17 658872 4865216 W	1998-05 2662	6	GS 0084	2/25/10/1:0	CO	0077 4	1913679 (188177)	BLCK LOAM 0001 BRWN CLAY STNS WBRG 0012 GREY CLAY STNS HARD 0080 GREY SILT CLAY SNDY 0083 GREY SAND WBRG 0088
PICKERING TOWN CON 05 003	17 658850 4865403 W	1987-09 2214	30	FR 0008	8/20/6/1:0	DO		1908818 (NA)	LOAM 0001 BRWN CLAY PCKD 0008 GREY CLAY SAND LYRD 0023
PICKERING TOWN CON 05 003	17 659015 4865023 W	1970-09 4713	6	FR 0081	/0/45/2:30	DO		4604637 ()	PRDG 0045 BLUE CLAY STNS 0075 BRWN MSND SILT 0080 BLUE GRVL MSND 0081
PICKERING TOWN CON 05 003	17 658879 4865481 W	1989-07 5459	6	FR 0091	1//20/3:0	DO	0094 2	1909954 (58284)	FILL CLAY 0002 BRWN SAND 0007 GREY CLAY 0011 GREY CLAY SNDY 0020 GREY CLAY HARD 0043 GREY CLAY STNY 0070 GREY CLAY HARD 0091 SAND FSND 0101
PICKERING TOWN CON 05 003	17 659015 4865023 W	1969-10 5420	34	FR 0012	12///:	DO		4604340 ()	LOAM 0001 BRWN MSND STNS 0008 BRWN CLAY STNS 0012 BLUE CLAY STNS 0040
PICKERING TOWN CON 05 004	17 658221 4865061 W	2015-10 5459	6	0095	-2//10/1:0	DO	0084 11	7251326 (Z210517) A102850	BRWN SAND SOFT 0030 GREY CLAY LYRD SOFT 0081 BRWN SAND STNS LOOS 0095
PICKERING TOWN CON 05 004	17 658331 4864863 W	2017-04 7360	2	UT 0007		MO	0018 5	7292854 (Z265886) A224705	LOAM 0002 BRWN SAND 0007 SAND WBRG 0025
PICKERING TOWN CON 05 004	17 658358 4864922 W	1967-09 1413	5	FR 0096	///:	DO		4601460 ()	MSND 0020 CLAY GRVL BLDR 0096
PICKERING TOWN CON 05 004	17 658261 4865125 W	1965-08 2306	6	FR 0071	///:	PS		4601459 ()	PRDG 0015 BLUE CLAY 0025 CLAY 0060 CLAY MSND GRVL 0071
PICKERING TOWN CON 05 004	17 658361 4864897 W	2017-04 7360	2	UT 0005		MO	0010 5	7292847 (Z265884) A203304	LOAM 0002 SAND 0010
PICKERING TOWN CON 05 004	17 658305 4864827 W	2017-04 7360	2	UT 0007		MO	0005 5	7292855 (Z265885) A203302	LOAM 0002 BRWN SAND 0007 SAND 0025
PICKERING TOWN CON 05 005	17 658165 4864723 W	1978-08 4743	6	FR 0079	/40/10/1:0	DO		1905108 ()	BLUE CLAY 0030 BLUE CLAY GRVL 0040 BLUE CLAY SAND 0079 BLCK SHLE 0080
PICKERING TOWN CON 05 005	17 658055 4865163 W	1983-07 4743	6	FR 0093	/20/20/2:0	DO	0095 3	1906685 ()	YLLW CLAY SAND LOOS 0030 BLUE CLAY STKY 0075 GREY TILL CLAY 0093 GREY SAND CLN 0098
PICKERING TOWN CON 05 005	17 658015 4865343 W	1984-12 2214	30	FR 0009 FR 0045	45/50/5/0:30	ST		1907228 ()	BLCK LOAM 0001 BRWN SAND PCKD 0009 BRWN SAND DKCL 0010 BLUE CLAY STNS CMTD 0015 BLUE CLAY SAND LYRD 0017 BLUE CLAY STNS CMTD 0045 BLUE SAND LOOS 0047 BLUE CLAY STNS CMTD 0054

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
PICKERING TOWN CON 05 005	17 658182 4864634 W	2000-05 1413	6	FR 0097	/70/20/1:	IR		1914543 (214730)	BRWN SAND PCKD 0017 GREY CLAY SOFT 0037 GREY CLAY STNS SOFT 0077 BLCK SHLE PORS FOSS 0097
PICKERING TOWN CON 05 005	17 658015 4865303 W	1971-10 2214	30	FR 0010	10/17/5/1:0	IN		4605048 ()	BRWN MSND 0015 BLUE CLAY STNS 0018
PICKERING TOWN CON 05 005	17 658026 4865376 W	1963-07 5412	30	FR 0011	7//5/:	DO		4601461 ()	BRWN CLAY STNS 0001 GRVL 0008 CSND 0011 FSND 0015 CSND 0020 BRWN CLAY 0021 BLUE CLAY 0022
PICKERING TOWN CON 05 005	17 658115 4864723 W	1969-07 3102	30	FR 0010	10/18//1:0	DO		4604132 ()	LOAM 0001 MSND 0028
PICKERING TOWN CON 05 006	17 657835 4864523 W	1982-05 5459	6	FR 0081	/81/65/1:0	DO	0081 3	1906447 ()	BRWN CLAY SNDY 0014 BRWN SAND STNS 0018 BLUE CLAY STNS 0080 GREY SAND STNS 0089 BLCK SHLE 0095
PICKERING TOWN CON 05 006	17 658182 4864634 W	1996-07 6874	30	FR	5/24/20/1:30	DO		1912924 (165215)	
UXBRIDGE TOWN 06 030	17 658218 4865343 W	2008-06 5459						7108202 (Z75694) A063105 A	

TOWNSHIP CON LOT | UTM | DATE CNTR | CASING DIA | WATER | PUMP TEST | WELL USE | SCREEN | WELL | FORMATION

Notes:
UTM: UTM in Zone, Easting, Northing and Datum is NAD83; L: UTM estimated from Centroid of Lot; W: UTM not from Lot Centroid
DATE CNTR: Date Work Completedand Well Contractor Licence Number
CASING DIA: .Casing diameter in inches
WATER: Unit of Depth in Fee. See Table 4 for Meaning of Code
PUMP TEST: Static Water Level in Feet / Water Level After Pumping in Feet / Pump Test Rate in GPM / Pump Test Duration in Hour : Minutes
WELL USE: See Table 3 for Meaning of Code
SCREEN: Screen Depth and Length in feet
WELL: WEL (AUDIT #) Well Tag . A: Abandonment; P: Partial Data Entry Only
FORMATION: See Table 1 and 2 for Meaning of Code

1. Core Material and Descriptive terms

Code	Description	Code	Description	Code	Description	Code	Description	Code	Description
BLDR	BOULDERS	FCRD	FRACTURED	IRFM	IRON FORMATION	PORS	POROUS	SOFT	SOFT
BSLT	BASALT	FGRD	FINE-GRAINED	LIMY	LIMY	PRDG	PREVIOUSLY DUG	SPST	SOAPSTONE
CGRD	COARSE-GRAINED	FGVL	FINE GRAVEL	LMSN	LIMESTONE	PRDR	PREV. DRILLED	STKY	STICKY
CGVL	COARSE GRAVEL	FILL	FILL	LOAM	TOPSOIL	QRTZ	QUARTZITE	STNS	STONES
CHRT	CHERT	FLDS	FELDSPAR	LOOS	LOOSE	QSND	QUICKSAND	STNY	STONEY
CLAY	CLAY	FLNT	FLINT	LTCL	LIGHT-COLOURED	QTZ	QUARTZ	THIK	THICK
CLN	CLEAN	FOSS	FOSILIFEROUS	LYRD	LAYERED	ROCK	ROCK	THIN	THIN
CLYY	CLAYEY	FSND	FINE SAND	MARL	MARL	SAND	SAND	TILL	TILL
CMTD	CEMENTED	GNIS	GNEISS	MGRD	MEDIUM-GRAINED	SHLE	SHALE	UNKN	UNKNOWN TYPE
CONG	CONGLOMERATE	GRNT	GRANITE	MGVL	MEDIUM GRAVEL	SHLY	SHALY	VERY	VERY
CRYS	CRYSTALLINE	GRSN	GREENSTONE	MRBL	MARBLE	SHRP	SHARP	WBRG	WATER-BEARING
CSND	COARSE SAND	GRVL	GRAVEL	MSND	MEDIUM SAND	SHST	SCHIST	WDFR	WOOD FRAGMENTS
DKCL	DARK-COLOURED	GRWK	GREYWACKE	MUCK	MUCK	SILT	SILT	WTHD	WEATHERED
DLMT	DOLOMITE	GVLY	GRAVELLY	OBDN	OVERBURDEN	SLTE	SLATE		
DNSE	DENSE	GYPS	GYPSUM	PCKD	PACKED	SLTY	SILTY		
DRTY	DIRTY	HARD	HARD	PEAT	PEAT	SNDS	SANDSTONE		
DRY	DRY	HPAN	HARDPAN	PGVL	PEA GRAVEL	SNDY	SANDYOAPSTONE		

2. Core Color

Code	Description
WHIT	WHITE
GREY	GREY
BLUE	BLUE
GREN	GREEN
YLLW	YELLOW
BRWN	BROWN
RED	RED
BLCK	BLACK
BLGY	BLUE-GREY

3. Well Use

Code	Description	Code	Description
DO	Domestic	OT	Other
ST	Livestock	TH	Test Hole
IR	Irrigation	DE	Dewatering
IN	Industrial	MO	Monitoring
CO	Commercial	MT	Monitoring TestHole
MN	Municipal		
PS	Public		
AC	Cooling And A/C		
NU	Not Used		

4. Water Detail

Code	Description	Code	Description
FR	Fresh	GS	Gas
SA	Salty	IR	Iron
SU	Sulphur		
MN	Mineral		
UK	Unknown		

17-1780H3

Well ID	East	North	Use Type
1913679	658872	4865216	Commercial
Total: 1			
1905108	658164.8	4864723	Domestic
1906447	657834.8	4864523	Domestic
1906685	658054.8	4865163	Domestic
1908818	658849.8	4865403	Domestic
1909954	658878.8	4865481	Domestic
1912286	658953	4864779	Domestic
1912365	658869	4865217	Domestic
1912924	658182	4864634	Domestic
4601397	659194.8	4864523	Domestic
4601460	658357.8	4864922	Domestic
4601461	658025.8	4865376	Domestic
4604132	658114.8	4864723	Domestic
4604340	659014.8	4865023	Domestic
4604637	659014.8	4865023	Domestic
4606442	659204.8	4864783	Domestic
7054352	658096	4864684	Domestic
7108228	658218	4865343	Domestic
7130718	658205.7	4864623	Domestic
7251326	658221	4865061	Domestic
Total: 19			
4605048	658014.8	4865303	Industrial
Total: 1			
1914543	658182	4864634	Irrigation
Total: 1			
1905697	659034.8	4864943	Livestock
1907228	658014.8	4865343	Livestock
Total: 2			
1911498	659126.8	4864819	Municipal
Total: 1			
4601459	658261	4865125	Public
Total: 1			
7287366	658252	4864907	Monitoring
7291770	658752	4864880	Monitoring
7291771	658604	4864905	Monitoring
7291772	658610	4865004	Monitoring
7292847	658361	4864897	Monitoring
7292854	658331	4864863	Monitoring
7292855	658305	4864827	Monitoring
Total: 7			
7108227	658218	4865343	Not Used
Total: 1			
1918116	659079	4864845	Unknown

7107163	658218	4865343	Unknown
7108202	658218	4865343	Unknown
Total: 3			

Summary of Well Types within 500 m Radius from the Site			
Well Types	Number of Record		Total
Commercial	1	24	37
Domestic	19		
Industrial	1		
Irrigation	1		
Livestock	2		
Municipal	1	2	
Public	1		
Monitoring	7	7	
Not Used	1	4	
Unknown	3		

APPENDIX C

GeoPro Consulting Limited (Richmond Hill)
ATTN: BuJing Guan
40 Vogell Road
Unit 22
Richmond Hill ON L4B 3N6

Date Received: 27-APR-17
Report Date: 08-MAY-17 15:19 (MT)
Version: FINAL

Client Phone: 905-237-8336

Certificate of Analysis

Lab Work Order #: L1918496

Project P.O. #: NOT SUBMITTED
Job Reference: 17-1780G
C of C Numbers: 15-574389
Legal Site Desc:

Comments: Durham Region Sanitary and Storm Sewer By-law guideline report guideline report

Emerson Perez, B.S.E
Account Manager

Summary of Guideline Exceedances

ALS ID	Client ID	Grouping	Analyte	Result	Guideline Limit	Unit
Guideline						
Ontario Sewer Use Bylaws - Durham Sanitary Sewer (55-2013)						
L1918496-1	BH2	Physical Tests	Total Suspended Solids	2450	350	mg/L
Ontario Sewer Use Bylaws - Durham Storm Sewer - (55-2013)						
L1918496-1	BH2	Physical Tests	Total Suspended Solids	2450	15	mg/L
		Total Metals	Manganese (Mn)-Total	0.868	0.15	mg/L
L1918496-2	BH6	Physical Tests	Total Suspended Solids	107	15	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: L1918496-1 Sample Date: 26-APR-17 Sample ID: BH2	Lab ID: L1918496-2 Sample Date: 26-APR-17 Sample ID: BH6
Hardness (as CaCO3)	mg/L	-	-		313
pH	pH units	6.00-10.5	6.0-9.0	7.88	
Total Suspended Solids	mg/L	350	15	2450 DLHC	107

Guide Limit #1: Durham Sanitary Sewer (55-2013)
Guide Limit #2: Durham Storm Sewer - (55-2013)

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

			Lab ID	L1918496-1
			Sample Date	26-APR-17
			Sample ID	BH2
		Guide Limits		
Analyte	Unit	#1	#2	
Fluoride (F)	mg/L	10	-	0.038
Total Kjeldahl Nitrogen	mg/L	100	1	0.36
Phosphorus, Total	mg/L	10	0.4	0.222
Sulfate (SO4)	mg/L	1500	-	7.70

Guide Limit #1: Durham Sanitary Sewer (55-2013)
Guide Limit #2: Durham Storm Sewer - (55-2013)

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.

ANALYTICAL REPORT

Cyanides - WATER

			Lab ID	L1918496-1
			Sample Date	26-APR-17
			Sample ID	BH2
		Guide Limits		
Analyte	Unit	#1	#2	
Cyanide, Total	mg/L	2	0.02	<0.0020

Guide Limit #1: Durham Sanitary Sewer (55-2013)
Guide Limit #2: Durham Storm Sewer - (55-2013)

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

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID: L1918496-1 Sample Date: 26-APR-17 Sample ID: BH2
E. Coli	CFU/100mL	-	200	0

Guide Limit #1: Durham Sanitary Sewer (55-2013)
Guide Limit #2: Durham Storm Sewer - (55-2013)

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

		Guide Limits			
Lab ID				L1918496-1	L1918496-2
Sample Date				26-APR-17	26-APR-17
Sample ID				BH2	BH6
Analyte	**Unit**	**#1**	**#2**		
Aluminum (Al)-Total	mg/L	50	-	1.26	1.08
Antimony (Sb)-Total	mg/L	5	-	0.00024	0.00016
Arsenic (As)-Total	mg/L	1	0.02	0.00154	0.00117
Beryllium (Be)-Total	mg/L	-	-		<0.00010
Boron (B)-Total	mg/L	-	-		0.015
Cadmium (Cd)-Total	mg/L	0.7	0.008	0.000034	0.000024
Chromium (Cr)-Total	mg/L	2	0.08	0.00183	0.00190
Cobalt (Co)-Total	mg/L	5	-	0.00191	0.00088
Copper (Cu)-Total	mg/L	3	0.05	0.0025	0.0024
Iron (Fe)-Total	mg/L	-	-		1.80
Lead (Pb)-Total	mg/L	1	0.12	0.00137	0.00198
Manganese (Mn)-Total	mg/L	5	0.15	0.868	
Mercury (Hg)-Total	mg/L	0.01	0.0004	<0.000010	
Molybdenum (Mo)-Total	mg/L	5	-	0.00298	0.00388
Nickel (Ni)-Total	mg/L	2	0.08	0.00220	0.00202
Selenium (Se)-Total	mg/L	1	0.02	0.000368	0.000290
Silver (Ag)-Total	mg/L	5	0.12	<0.000050	<0.000050
Thallium (Tl)-Total	mg/L	-	-		0.000021
Tin (Sn)-Total	mg/L	5	-	0.00329	
Titanium (Ti)-Total	mg/L	5	-	0.0526	
Tungsten (W)-Total	mg/L	-	-		<0.00010
Uranium (U)-Total	mg/L	-	-		0.00151
Vanadium (V)-Total	mg/L	-	-		0.00265
Zinc (Zn)-Total	mg/L	2	0.04	0.0067	0.0062
Zirconium (Zr)-Total	mg/L	-	-		<0.00030

Guide Limit #1: Durham Sanitary Sewer (55-2013)
Guide Limit #2: Durham Storm Sewer - (55-2013)

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.

Dissolved Metals - WATER

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID: L1918496-1 Sample Date: 26-APR-17 Sample ID: BH2	Lab ID: L1918496-2 Sample Date: 26-APR-17 Sample ID: BH6
Dissolved Metals Filtration Location		-	-	LAB	LAB
Aluminum (Al)-Dissolved	mg/L	-	-	0.0067	0.0059
Antimony (Sb)-Dissolved	mg/L	-	-	0.00022	
Arsenic (As)-Dissolved	mg/L	-	-	0.00112	
Barium (Ba)-Dissolved	mg/L	-	-	0.0492	
Beryllium (Be)-Dissolved	mg/L	-	-	<0.00010	
Bismuth (Bi)-Dissolved	mg/L	-	-	<0.000050	
Boron (B)-Dissolved	mg/L	-	-	0.022	
Cadmium (Cd)-Dissolved	mg/L	-	-	0.000011	
Calcium (Ca)-Dissolved	mg/L	-	-	109	85.3
Cesium (Cs)-Dissolved	mg/L	-	-	<0.000010	
Chromium (Cr)-Dissolved	mg/L	-	-	<0.00050	
Cobalt (Co)-Dissolved	mg/L	-	-	0.00103	
Copper (Cu)-Dissolved	mg/L	-	-	0.00082	
Iron (Fe)-Dissolved	mg/L	-	-	<0.010	
Lead (Pb)-Dissolved	mg/L	-	-	<0.000050	
Lithium (Li)-Dissolved	mg/L	-	-	<0.0010	
Magnesium (Mg)-Dissolved	mg/L	-	-	9.15	24.2
Manganese (Mn)-Dissolved	mg/L	-	-	0.755	
Molybdenum (Mo)-Dissolved	mg/L	-	-	0.00316	
Nickel (Ni)-Dissolved	mg/L	-	-	0.00085	
Phosphorus (P)-Dissolved	mg/L	10	0.4	<0.050	
Potassium (K)-Dissolved	mg/L	-	-	1.22	
Rubidium (Rb)-Dissolved	mg/L	-	-	0.00104	
Selenium (Se)-Dissolved	mg/L	-	-	0.000352	
Silicon (Si)-Dissolved	mg/L	-	-	4.24	
Silver (Ag)-Dissolved	mg/L	-	-	<0.000050	
Sodium (Na)-Dissolved	mg/L	-	-	9.17	
Strontium (Sr)-Dissolved	mg/L	-	-	0.291	
Sulfur (S)-Dissolved	mg/L	-	-	2.84	

Guide Limit #1: Durham Sanitary Sewer (55-2013)
Guide Limit #2: Durham Storm Sewer - (55-2013)

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

Dissolved Metals - WATER

				Lab ID	L1918496-1	L1918496-2
				Sample Date	26-APR-17	26-APR-17
				Sample ID	BH2	BH6
		Guide Limits				
Analyte	Unit	#1	#2			
Tellurium (Te)-Dissolved	mg/L	-	-		<0.00020	
Thallium (Tl)-Dissolved	mg/L	-	-		<0.000010	
Thorium (Th)-Dissolved	mg/L	-	-		<0.00010	
Tin (Sn)-Dissolved	mg/L	5	-		0.00150	
Titanium (Ti)-Dissolved	mg/L	-	-		<0.00030	
Tungsten (W)-Dissolved	mg/L	-	-		<0.00010	
Uranium (U)-Dissolved	mg/L	-	-		0.000309	
Vanadium (V)-Dissolved	mg/L	-	-		0.00057	
Zinc (Zn)-Dissolved	mg/L	-	-		0.0013	
Zirconium (Zr)-Dissolved	mg/L	-	-		<0.00030	

Guide Limit #1: Durham Sanitary Sewer (55-2013)
Guide Limit #2: Durham Storm Sewer - (55-2013)

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.

ANALYTICAL REPORT

Speciated Metals - WATER

			Lab ID	L1918496-2
			Sample Date	26-APR-17
			Sample ID	BH6
		Guide Limits		
Analyte	Unit	#1	#2	
Chromium, Hexavalent	ug/L	-	-	<1.0

Guide Limit #1: Durham Sanitary Sewer (55-2013)
Guide Limit #2: Durham Storm Sewer - (55-2013)

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.

Aggregate Organics - WATER

		Lab ID		L1918496-1
		Sample Date		26-APR-17
		Sample ID		BH2
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
BOD	mg/L	300	15	<2.0
Oil and Grease, Total	mg/L	-	-	<2.0
Animal/Veg Oil & Grease	mg/L	150	-	<2.0
Mineral Oil and Grease	mg/L	15	-	<1.0
Phenols (4AAP)	mg/L	1	0.008	0.0017

Guide Limit #1: Durham Sanitary Sewer (55-2013)
Guide Limit #2: Durham Storm Sewer - (55-2013)

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.

Volatile Organic Compounds - WATER

		Lab ID		L1918496-1
		Sample Date		26-APR-17
		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	5.6	<0.50
Ethylbenzene	ug/L	160	2	<0.50
Methyl Ethyl Ketone	ug/L	8000	-	<20
Styrene	ug/L	200	-	<0.50
1,1,2,2-Tetrachloroethane	ug/L	1400	17	<0.50
Tetrachloroethylene	ug/L	1000	4.4	<0.50
Toluene	ug/L	270	2	<0.50
Trichloroethylene	ug/L	400	8	<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	%	-	-	101.1
Surrogate: 1,4-Difluorobenzene	%	-	-	101.6

Guide Limit #1: Durham Sanitary Sewer (55-2013)
Guide Limit #2: Durham Storm Sewer - (55-2013)

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.

Phthalate Esters - WATER

			Lab ID	L1918496-1
			Sample Date	26-APR-17
			Sample ID	BH2
		Guide Limits		
Analyte	Unit	#1	#2	
Bis(2-ethylhexyl)phthalate	ug/L	12	8.8	<2.0
Surrogate: 2-fluorobiphenyl	%	-	-	97.5
Surrogate: p-Terphenyl d14	%	-	-	87.4

Guide Limit #1: Durham Sanitary Sewer (55-2013)
Guide Limit #2: Durham Storm Sewer - (55-2013)

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.

Semi-Volatile Organics - WATER

			Lab ID	L1918496-1
			Sample Date	26-APR-17
			Sample ID	BH2
		Guide Limits		
Analyte	Unit	#1	#2	
Di-n-butylphthalate	ug/L	80	15	<1.0
Surrogate: 2-Fluorobiphenyl	%	-	-	97.5
Surrogate: p-Terphenyl d14	%	-	-	87.4

Guide Limit #1: Durham Sanitary Sewer (55-2013)
Guide Limit #2: Durham Storm Sewer - (55-2013)

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.

ANALYTICAL REPORT

Polychlorinated Biphenyls - WATER

			Lab ID	L1918496-1
			Sample Date	26-APR-17
			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
Total PCBs	ug/L	1	0.4	<0.040
Surrogate: d14-Terphenyl	%	-	-	90.3

Guide Limit #1: Durham Sanitary Sewer (55-2013)
Guide Limit #2: Durham Storm Sewer - (55-2013)

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

Organic Parameters - WATER

			Lab ID	L1918496-1
			Sample Date	26-APR-17
			Sample ID	BH2
		Guide Limits		
Analyte	Unit	#1	#2	
Nonylphenol	ug/L	20	-	<1.0
Total Nonylphenol Ethoxylates	ug/L	200	-	<2.0

Guide Limit #1: Durham Sanitary Sewer (55-2013)
Guide Limit #2: Durham Storm Sewer - (55-2013)

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
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-BIS-2-PHTH-WT	Water	Bis(2-ethylhexyl)phthalate	SW846 8270
Aqueous samples are extracted and extracts are analyzed on GC/MSD.			
625-DNB-PHTH-WT	Water	Di-n-Butyl Phthalate	SW846 8270
Aqueous samples are extracted and extracts are analyzed on GC/MSD.			
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-PWQO-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-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.			
HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)
Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.			
MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**

Water samples are filtered (0.45 um), preserved with nitric acid, 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).

MET-T-CCMS-WT Water Total Metals 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 sample are filtered with direct injection and analyzed by LCMS/MS.

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.

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.

SO4-IC-N-WT Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

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

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.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-N

Sample is digested to convert the TKN to ammonium sulphate. The ammonia ions are heated to produce a colour complex. The absorbance measured by the instrument is proportional to the concentration of ammonium sulphate in the sample and is reported as TKN.

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:

15-574389

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.

Quality Control Report

Workorder: L1918496 Report Date: 10-MAY-17

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-BIS-2-PHTH-WT	**Water**							
Batch R3710716								
WG2518493-2 LCS								
Bis(2-ethylhexyl)phthalate			89.4		%		50-140	01-MAY-17
WG2518493-3 LCSD		**WG2518493-2**						
Bis(2-ethylhexyl)phthalate		89.4	94.7		%	5.8	50	01-MAY-17
WG2518493-1 MB								
Bis(2-ethylhexyl)phthalate			<2.0		ug/L		2	01-MAY-17
Surrogate: 2-fluorobiphenyl			84.2		%		40-130	01-MAY-17
Surrogate: p-Terphenyl d14			100.1		%		40-130	01-MAY-17
625-DNB-PHTH-WT	**Water**							
Batch R3710716								
WG2518493-2 LCS								
Di-n-butylphthalate			97.3		%		50-150	01-MAY-17
WG2518493-3 LCSD		**WG2518493-2**						
Di-n-butylphthalate		97.3	97.9		%	0.6	50	01-MAY-17
WG2518493-1 MB								
Di-n-butylphthalate			<1.0		ug/L		1	01-MAY-17
Surrogate: 2-Fluorobiphenyl			84.2		%		40-130	01-MAY-17
Surrogate: p-Terphenyl d14			100.1		%		40-130	01-MAY-17
BOD-WT	**Water**							
Batch R3713854								
WG2518693-6 DUP		**L1918037-2**						
BOD		2.5	2.5		mg/L	0.0	20	03-MAY-17
WG2518693-7 LCS								
BOD			109.1		%		85-115	03-MAY-17
WG2518693-5 MB								
BOD			<2.0		mg/L		2	03-MAY-17
CN-TOT-WT	**Water**							
Batch R3714898								
WG2521556-3 DUP		**L1918564-2**						
Cyanide, Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-MAY-17
WG2521556-2 LCS								
Cyanide, Total			88.9		%		80-120	03-MAY-17
WG2521556-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	03-MAY-17
WG2521556-4 MS		**L1918564-2**						
Cyanide, Total			90.5		%		70-130	03-MAY-17
CR-CR6-PWQO-IC-WT	**Water**							

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CR-CR6-PWQO-IC-WT	**Water**							
Batch R3710596								
WG2518720-4 DUP		**WG2518720-3**						
Chromium, Hexavalent		<1.0	<1.0	RPD-NA	ug/L	N/A	20	28-APR-17
WG2518720-2 LCS								
Chromium, Hexavalent			99.4		%		80-120	28-APR-17
WG2518720-1 MB								
Chromium, Hexavalent			<1.0		ug/L		1	28-APR-17
WG2518720-5 MS		**WG2518720-3**						
Chromium, Hexavalent			98.8		%		70-130	28-APR-17
EC-WW-MF-WT	**Water**							
Batch R3710246								
WG2518677-3 DUP		**WG2518677-5**						
E. Coli		0	0		CFU/100mL	0.0	50	29-APR-17
WG2518677-1 MB								
E. Coli			0		CFU/100mL		1	29-APR-17
WG2518677-2 MB								
E. Coli			0		CFU/100mL		1	29-APR-17
F-IC-N-WT	**Water**							
Batch R3710968								
WG2518726-19 DUP		**WG2518726-20**						
Fluoride (F)		0.163	0.165		mg/L	1.2	20	28-APR-17
WG2518726-17 LCS								
Fluoride (F)			102.7		%		90-110	28-APR-17
WG2518726-16 MB								
Fluoride (F)			<0.020		mg/L		0.02	28-APR-17
WG2518726-18 MS		**WG2518726-20**						
Fluoride (F)			99.9		%		75-125	28-APR-17
HG-T-CVAA-WT	**Water**							
Batch R3709734								
WG2518613-3 DUP		**L1918539-1**						
Mercury (Hg)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	28-APR-17
WG2518613-2 LCS								
Mercury (Hg)-Total			97.7		%		80-120	28-APR-17
WG2518613-1 MB								
Mercury (Hg)-Total			<0.000010		mg/L		0.00001	28-APR-17
WG2518613-4 MS		**L1918495-1**						
Mercury (Hg)-Total			86.5		%		70-130	28-APR-17
MET-D-CCMS-WT	**Water**							

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R3709741								
WG2518509-4 DUP		**WG2518509-3**						
Aluminum (Al)-Dissolved		0.0067	0.0057		mg/L	15	20	28-APR-17
Antimony (Sb)-Dissolved		0.00022	0.00022		mg/L	0.3	20	28-APR-17
Arsenic (As)-Dissolved		0.00112	0.00111		mg/L	0.7	20	28-APR-17
Barium (Ba)-Dissolved		0.0492	0.0494		mg/L	0.4	20	28-APR-17
Beryllium (Be)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-APR-17
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	28-APR-17
Boron (B)-Dissolved		0.022	0.022		mg/L	0.9	20	28-APR-17
Cadmium (Cd)-Dissolved		0.000011	0.000015	J	mg/L	0.000003	0.00002	28-APR-17
Calcium (Ca)-Dissolved		109	106		mg/L	2.3	20	28-APR-17
Cesium (Cs)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	28-APR-17
Chromium (Cr)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	28-APR-17
Cobalt (Co)-Dissolved		0.00103	0.00104		mg/L	0.2	20	28-APR-17
Copper (Cu)-Dissolved		0.00082	0.00083		mg/L	1.2	20	03-MAY-17
Iron (Fe)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	28-APR-17
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	28-APR-17
Lithium (Li)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	28-APR-17
Magnesium (Mg)-Dissolved		9.15	9.27		mg/L	1.3	20	28-APR-17
Manganese (Mn)-Dissolved		0.755	0.752		mg/L	0.3	20	28-APR-17
Molybdenum (Mo)-Dissolved		0.00316	0.00323		mg/L	2.2	20	28-APR-17
Nickel (Ni)-Dissolved		0.00085	0.00074		mg/L	14	20	28-APR-17
Phosphorus (P)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	28-APR-17
Potassium (K)-Dissolved		1.22	1.24		mg/L	1.6	20	28-APR-17
Rubidium (Rb)-Dissolved		0.00104	0.00107		mg/L	3.0	20	28-APR-17
Selenium (Se)-Dissolved		0.000352	0.000343		mg/L	2.5	20	28-APR-17
Silicon (Si)-Dissolved		4.24	4.19		mg/L	1.2	20	28-APR-17
Silver (Ag)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	28-APR-17
Sodium (Na)-Dissolved		9.17	9.00		mg/L	1.9	20	28-APR-17
Strontium (Sr)-Dissolved		0.291	0.291		mg/L	0.3	20	28-APR-17
Sulfur (S)-Dissolved		2.84	2.90		mg/L	2.0	20	28-APR-17
Tellurium (Te)-Dissolved		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	28-APR-17
Thallium (Tl)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	28-APR-17
Thorium (Th)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-APR-17
Tin (Sn)-Dissolved		0.00150	0.00148		mg/L			28-APR-17

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R3709741								
WG2518509-4 DUP		**WG2518509-3**						
Tin (Sn)-Dissolved		0.00150	0.00148		mg/L	1.2	20	28-APR-17
Titanium (Ti)-Dissolved		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	28-APR-17
Tungsten (W)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-APR-17
Uranium (U)-Dissolved		0.000309	0.000306		mg/L	0.8	20	28-APR-17
Vanadium (V)-Dissolved		0.00057	0.00058		mg/L	1.4	20	28-APR-17
Zinc (Zn)-Dissolved		0.0013	0.0010	J	mg/L	0.0003	0.002	28-APR-17
Zirconium (Zr)-Dissolved		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	28-APR-17
WG2518509-2 LCS								
Aluminum (Al)-Dissolved			98.9		%		80-120	28-APR-17
Antimony (Sb)-Dissolved			99.3		%		80-120	28-APR-17
Arsenic (As)-Dissolved			98.1		%		80-120	28-APR-17
Barium (Ba)-Dissolved			99.8		%		80-120	28-APR-17
Beryllium (Be)-Dissolved			97.5		%		80-120	28-APR-17
Bismuth (Bi)-Dissolved			100.9		%		80-120	28-APR-17
Boron (B)-Dissolved			97.6		%		80-120	28-APR-17
Cadmium (Cd)-Dissolved			100.0		%		80-120	28-APR-17
Calcium (Ca)-Dissolved			99.5		%		80-120	28-APR-17
Cesium (Cs)-Dissolved			99.5		%		80-120	28-APR-17
Chromium (Cr)-Dissolved			98.6		%		80-120	28-APR-17
Cobalt (Co)-Dissolved			98.4		%		80-120	28-APR-17
Copper (Cu)-Dissolved			97.1		%		80-120	03-MAY-17
Iron (Fe)-Dissolved			93.5		%		80-120	28-APR-17
Lead (Pb)-Dissolved			105.5		%		80-120	28-APR-17
Lithium (Li)-Dissolved			97.3		%		80-120	28-APR-17
Magnesium (Mg)-Dissolved			97.8		%		80-120	28-APR-17
Manganese (Mn)-Dissolved			98.8		%		80-120	28-APR-17
Molybdenum (Mo)-Dissolved			98.3		%		80-120	28-APR-17
Nickel (Ni)-Dissolved			97.4		%		80-120	28-APR-17
Phosphorus (P)-Dissolved			94.8		%		80-120	28-APR-17
Potassium (K)-Dissolved			101.3		%		80-120	28-APR-17
Rubidium (Rb)-Dissolved			101.9		%		80-120	28-APR-17
Selenium (Se)-Dissolved			96.2		%		80-120	28-APR-17
Silicon (Si)-Dissolved			105.5		%		80-120	28-APR-17

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R3709741								
WG2518509-2 LCS								
Silver (Ag)-Dissolved			100.6		%		80-120	28-APR-17
Sodium (Na)-Dissolved			98.1		%		80-120	28-APR-17
Strontium (Sr)-Dissolved			99.6		%		80-120	28-APR-17
Sulfur (S)-Dissolved			97.4		%		80-120	28-APR-17
Tellurium (Te)-Dissolved			95.0		%		80-120	28-APR-17
Thallium (Tl)-Dissolved			100.7		%		80-120	28-APR-17
Thorium (Th)-Dissolved			104.4		%		80-120	28-APR-17
Tin (Sn)-Dissolved			97.7		%		80-120	28-APR-17
Titanium (Ti)-Dissolved			96.8		%		80-120	28-APR-17
Tungsten (W)-Dissolved			106.8		%		80-120	28-APR-17
Uranium (U)-Dissolved			104.9		%		80-120	28-APR-17
Vanadium (V)-Dissolved			98.2		%		80-120	28-APR-17
Zinc (Zn)-Dissolved			93.0		%		80-120	28-APR-17
Zirconium (Zr)-Dissolved			96.1		%		80-120	28-APR-17
WG2518509-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	28-APR-17
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	28-APR-17
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	28-APR-17
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	28-APR-17
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	28-APR-17
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	28-APR-17
Boron (B)-Dissolved			<0.010		mg/L		0.01	28-APR-17
Cadmium (Cd)-Dissolved			<0.000010		mg/L		0.00001	28-APR-17
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	28-APR-17
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	28-APR-17
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	28-APR-17
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	28-APR-17
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	03-MAY-17
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	28-APR-17
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	28-APR-17
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	28-APR-17
Magnesium (Mg)-Dissolved			<0.050		mg/L		0.05	28-APR-17
Manganese (Mn)-Dissolved			<0.00050		mg/L		0.0005	28-APR-17
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	28-APR-17

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R3709741								
WG2518509-1 MB								
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	28-APR-17
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	28-APR-17
Potassium (K)-Dissolved			<0.050		mg/L		0.05	28-APR-17
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	28-APR-17
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	28-APR-17
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	28-APR-17
Silver (Ag)-Dissolved			<0.000050		mg/L		0.00005	28-APR-17
Sodium (Na)-Dissolved			<0.50		mg/L		0.5	28-APR-17
Strontium (Sr)-Dissolved			<0.0010		mg/L		0.001	28-APR-17
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	28-APR-17
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	28-APR-17
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	28-APR-17
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	28-APR-17
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	28-APR-17
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	28-APR-17
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	28-APR-17
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	28-APR-17
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	28-APR-17
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	28-APR-17
Zirconium (Zr)-Dissolved			<0.00030		mg/L		0.0003	28-APR-17
WG2518509-5 MS		**WG2518509-3**						
Aluminum (Al)-Dissolved			99.5		%		70-130	28-APR-17
Antimony (Sb)-Dissolved			100.5		%		70-130	28-APR-17
Arsenic (As)-Dissolved			102.8		%		70-130	28-APR-17
Barium (Ba)-Dissolved			N/A	MS-B	%		-	28-APR-17
Beryllium (Be)-Dissolved			97.3		%		70-130	28-APR-17
Bismuth (Bi)-Dissolved			95.8		%		70-130	28-APR-17
Boron (B)-Dissolved			92.9		%		70-130	28-APR-17
Cadmium (Cd)-Dissolved			101.3		%		70-130	28-APR-17
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	28-APR-17
Cesium (Cs)-Dissolved			102.0		%		70-130	28-APR-17
Chromium (Cr)-Dissolved			100.8		%		70-130	28-APR-17
Cobalt (Co)-Dissolved			97.8		%		70-130	28-APR-17
Copper (Cu)-Dissolved			94.2		%		70-130	03-MAY-17

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R3709741								
WG2518509-5 MS		**WG2518509-3**						
Iron (Fe)-Dissolved			94.2		%		70-130	28-APR-17
Lead (Pb)-Dissolved			100.1		%		70-130	28-APR-17
Lithium (Li)-Dissolved			95.2		%		70-130	28-APR-17
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	28-APR-17
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	28-APR-17
Molybdenum (Mo)-Dissolved			95.3		%		70-130	28-APR-17
Nickel (Ni)-Dissolved			95.6		%		70-130	28-APR-17
Phosphorus (P)-Dissolved			99.4		%		70-130	28-APR-17
Potassium (K)-Dissolved			103.8		%		70-130	28-APR-17
Rubidium (Rb)-Dissolved			101.0		%		70-130	28-APR-17
Selenium (Se)-Dissolved			103.0		%		70-130	28-APR-17
Silicon (Si)-Dissolved			N/A	MS-B	%		-	28-APR-17
Silver (Ag)-Dissolved			79.0		%		70-130	03-MAY-17
Sodium (Na)-Dissolved			N/A	MS-B	%		-	28-APR-17
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	28-APR-17
Sulfur (S)-Dissolved			N/A	MS-B	%		-	28-APR-17
Tellurium (Te)-Dissolved			99.2		%		70-130	28-APR-17
Thallium (Tl)-Dissolved			97.2		%		70-130	28-APR-17
Thorium (Th)-Dissolved			100.3		%		70-130	28-APR-17
Tin (Sn)-Dissolved			99.7		%		70-130	28-APR-17
Titanium (Ti)-Dissolved			99.5		%		70-130	28-APR-17
Tungsten (W)-Dissolved			104.5		%		70-130	28-APR-17
Uranium (U)-Dissolved			N/A	MS-B	%		-	28-APR-17
Vanadium (V)-Dissolved			102.8		%		70-130	28-APR-17
Zinc (Zn)-Dissolved			96.2		%		70-130	28-APR-17
Zirconium (Zr)-Dissolved			94.6		%		70-130	28-APR-17
MET-T-CCMS-WT	**Water**							
Batch R3709606								
WG2518495-4 DUP		**WG2518495-3**						
Aluminum (Al)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	28-APR-17
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-APR-17
Arsenic (As)-Total		0.00015	0.00013		mg/L	14	20	28-APR-17
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-APR-17

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R3709606								
WG2518495-4 DUP		**WG2518495-3**						
Boron (B)-Total		0.024	0.024		mg/L	2.0	20	28-APR-17
Cadmium (Cd)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	28-APR-17
Chromium (Cr)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	28-APR-17
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-APR-17
Copper (Cu)-Total		0.0013	0.0012		mg/L	1.0	20	28-APR-17
Iron (Fe)-Total		0.948	0.963		mg/L	1.6	20	28-APR-17
Lead (Pb)-Total		0.000363	0.000360		mg/L	0.8	20	28-APR-17
Manganese (Mn)-Total		0.0427	0.0427		mg/L	0.1	20	28-APR-17
Molybdenum (Mo)-Total		0.00352	0.00366		mg/L	3.9	20	28-APR-17
Nickel (Ni)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	28-APR-17
Selenium (Se)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	28-APR-17
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	28-APR-17
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	28-APR-17
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-APR-17
Titanium (Ti)-Total		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	28-APR-17
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-APR-17
Uranium (U)-Total		0.000080	0.000078		mg/L	1.5	20	28-APR-17
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	28-APR-17
Zinc (Zn)-Total		0.0416	0.0411		mg/L	1.3	20	28-APR-17
Zirconium (Zr)-Total		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	28-APR-17
WG2518495-2 LCS								
Aluminum (Al)-Total			98.4		%		80-120	28-APR-17
Antimony (Sb)-Total			101.7		%		80-120	28-APR-17
Arsenic (As)-Total			98.3		%		80-120	28-APR-17
Beryllium (Be)-Total			92.4		%		80-120	28-APR-17
Boron (B)-Total			94.1		%		80-120	28-APR-17
Cadmium (Cd)-Total			99.3		%		80-120	28-APR-17
Chromium (Cr)-Total			95.1		%		80-120	28-APR-17
Cobalt (Co)-Total			98.1		%		80-120	28-APR-17
Copper (Cu)-Total			96.9		%		80-120	28-APR-17
Iron (Fe)-Total			98.2		%		80-120	28-APR-17
Lead (Pb)-Total			104.7		%		80-120	28-APR-17
Manganese (Mn)-Total			99.7		%		80-120	28-APR-17

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R3709606								
WG2518495-2 LCS								
Molybdenum (Mo)-Total			94.3		%		80-120	28-APR-17
Nickel (Ni)-Total			96.9		%		80-120	28-APR-17
Selenium (Se)-Total			98.0		%		80-120	28-APR-17
Silver (Ag)-Total			99.8		%		80-120	28-APR-17
Thallium (Tl)-Total			100.0		%		80-120	28-APR-17
Tin (Sn)-Total			97.9		%		80-120	28-APR-17
Titanium (Ti)-Total			97.1		%		80-120	28-APR-17
Tungsten (W)-Total			98.7		%		80-120	28-APR-17
Uranium (U)-Total			107.1		%		80-120	28-APR-17
Vanadium (V)-Total			98.3		%		80-120	28-APR-17
Zinc (Zn)-Total			90.7		%		80-120	28-APR-17
Zirconium (Zr)-Total			100.6		%		80-120	28-APR-17
WG2518495-1 MB								
Aluminum (Al)-Total			<0.010		mg/L		0.01	28-APR-17
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	28-APR-17
Arsenic (As)-Total			<0.00010		mg/L		0.0001	28-APR-17
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	28-APR-17
Boron (B)-Total			<0.010		mg/L		0.01	28-APR-17
Cadmium (Cd)-Total			<0.000010		mg/L		0.00001	28-APR-17
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	28-APR-17
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	28-APR-17
Copper (Cu)-Total			<0.0010		mg/L		0.001	28-APR-17
Iron (Fe)-Total			<0.050		mg/L		0.05	28-APR-17
Lead (Pb)-Total			<0.000050		mg/L		0.00005	28-APR-17
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	28-APR-17
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	28-APR-17
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	28-APR-17
Selenium (Se)-Total			<0.000050		mg/L		0.00005	28-APR-17
Silver (Ag)-Total			<0.000050		mg/L		0.00005	28-APR-17
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	28-APR-17
Tin (Sn)-Total			<0.00010		mg/L		0.0001	28-APR-17
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	28-APR-17
Tungsten (W)-Total			<0.00010		mg/L		0.0001	28-APR-17
Uranium (U)-Total			<0.000010		mg/L		0.00001	28-APR-17

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R3709606								
WG2518495-1 MB								
Vanadium (V)-Total			<0.00050		mg/L		0.0005	28-APR-17
Zinc (Zn)-Total			<0.0030		mg/L		0.003	28-APR-17
Zirconium (Zr)-Total			<0.00030		mg/L		0.0003	28-APR-17
WG2518495-5 MS		**WG2518495-3**						
Aluminum (Al)-Total			104.6		%		70-130	28-APR-17
Antimony (Sb)-Total			106.5		%		70-130	28-APR-17
Arsenic (As)-Total			102.9		%		70-130	28-APR-17
Beryllium (Be)-Total			93.4		%		70-130	28-APR-17
Boron (B)-Total			91.6		%		70-130	28-APR-17
Cadmium (Cd)-Total			101.9		%		70-130	28-APR-17
Chromium (Cr)-Total			101.0		%		70-130	28-APR-17
Cobalt (Co)-Total			99.7		%		70-130	28-APR-17
Copper (Cu)-Total			95.5		%		70-130	28-APR-17
Iron (Fe)-Total			N/A	MS-B	%		-	28-APR-17
Lead (Pb)-Total			94.8		%		70-130	28-APR-17
Manganese (Mn)-Total			N/A	MS-B	%		-	28-APR-17
Molybdenum (Mo)-Total			94.2		%		70-130	28-APR-17
Nickel (Ni)-Total			94.0		%		70-130	28-APR-17
Selenium (Se)-Total			102.4		%		70-130	28-APR-17
Silver (Ag)-Total			97.2		%		70-130	28-APR-17
Thallium (Tl)-Total			92.3		%		70-130	28-APR-17
Tin (Sn)-Total			103.8		%		70-130	28-APR-17
Titanium (Ti)-Total			105.2		%		70-130	28-APR-17
Tungsten (W)-Total			101.1		%		70-130	28-APR-17
Uranium (U)-Total			104.8		%		70-130	28-APR-17
Vanadium (V)-Total			106.6		%		70-130	28-APR-17
Zinc (Zn)-Total			N/A	MS-B	%		-	28-APR-17
Zirconium (Zr)-Total			101.6		%		70-130	28-APR-17
NP,NPE-LCMS-WT	**Water**							
Batch R3710655								
WG2518917-3 DUP		**L1918508-1**						
Nonylphenol		<1.0	<1.0	RPD-NA	ug/L	N/A	30	28-APR-17
Total Nonylphenol Ethoxylates		<2.0	<2.0	RPD-NA	ug/L	N/A	50	28-APR-17
WG2518917-2 LCS								

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NP,NPE-LCMS-WT	**Water**							
Batch R3710655								
WG2518917-2 LCS								
Nonylphenol			98.0		%		75-125	28-APR-17
WG2518917-1 MB								
Nonylphenol			<1.0		ug/L		1	28-APR-17
Total Nonylphenol Ethoxylates			<2.0		ug/L		2	28-APR-17
WG2518917-4 MS		**L1918508-1**						
Nonylphenol			89.7		%		50-150	28-APR-17
OGG-SPEC-WT	**Water**							
Batch R3713686								
WG2520698-2 LCS								
Oil and Grease, Total			94.5		%		70-130	02-MAY-17
Mineral Oil and Grease			90.2		%		70-130	02-MAY-17
WG2520698-3 LCSD		**WG2520698-2**						
Oil and Grease, Total		94.5	96.5		%	2.1	40	02-MAY-17
Mineral Oil and Grease		90.2	92.4		%	2.4	40	02-MAY-17
WG2520698-1 MB								
Oil and Grease, Total			<2.0		mg/L		2	02-MAY-17
Mineral Oil and Grease			<1.0		mg/L		1	02-MAY-17
P-T-COL-WT	**Water**							
Batch R3713513								
WG2521026-3 DUP		**L1918519-2**						
Phosphorus, Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	02-MAY-17
WG2521026-2 LCS								
Phosphorus, Total			98.3		%		80-120	02-MAY-17
WG2521026-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	03-MAY-17
WG2521026-4 MS		**L1918519-2**						
Phosphorus, Total			92.7		%		70-130	02-MAY-17
PCB-WT	**Water**							
Batch R3712243								
WG2518573-2 LCS								
Aroclor 1242			101.3		%		65-130	02-MAY-17
Aroclor 1248			82.6		%		65-130	02-MAY-17
Aroclor 1254			93.0		%		65-130	02-MAY-17
Aroclor 1260			89.0		%		65-130	02-MAY-17
WG2518573-3 LCSD		**WG2518573-2**						
Aroclor 1242		101.3	99.1					

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-WT	**Water**							
Batch R3712243								
WG2518573-3 LCSD		**WG2518573-2**						
Aroclor 1242		101.3	99.1		%	2.3	50	02-MAY-17
Aroclor 1248		82.6	82.6		%	0.0	50	02-MAY-17
Aroclor 1254		93.0	96.4		%	3.5	50	02-MAY-17
Aroclor 1260		89.0	87.4		%	1.8	50	02-MAY-17
WG2518573-1 MB								
Aroclor 1242			<0.020		ug/L		0.02	02-MAY-17
Aroclor 1248			<0.020		ug/L		0.02	02-MAY-17
Aroclor 1254			<0.020		ug/L		0.02	02-MAY-17
Aroclor 1260			<0.020		ug/L		0.02	02-MAY-17
Surrogate: d14-Terphenyl			92.0		%		50-150	02-MAY-17
PH-WT	**Water**							
Batch R3709892								
WG2518661-12 DUP		**WG2518661-11**						
pH		8.02	8.03	J	pH units	0.00	0.2	28-APR-17
WG2518661-9 LCS								
pH			6.98		pH units		6.9-7.1	28-APR-17
PHENOLS-4AAP-WT	**Water**							
Batch R3715420								
WG2522838-12 DUP		**L1918496-1**						
Phenols (4AAP)		0.0017	0.0014	J	mg/L	0.0003	0.002	05-MAY-17
WG2522838-10 LCS								
Phenols (4AAP)			105.7		%		85-115	05-MAY-17
WG2522838-9 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	05-MAY-17
WG2522838-11 MS		**L1918496-1**						
Phenols (4AAP)			102.3		%		75-125	05-MAY-17
SO4-IC-N-WT	**Water**							
Batch R3710968								
WG2518726-19 DUP		**WG2518726-20**						
Sulfate (SO4)		63.4	64.5		mg/L	1.8	20	28-APR-17
WG2518726-17 LCS								
Sulfate (SO4)			106.1		%		90-110	28-APR-17
WG2518726-16 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	28-APR-17
WG2518726-18 MS		**WG2518726-20**						

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-WT	**Water**							
Batch R3710968								
WG2518726-18 MS		**WG2518726-20**						
Sulfate (SO4)			100.5		%		75-125	28-APR-17
SOLIDS-TSS-WT	**Water**							
Batch R3715052								
WG2521207-3 DUP		**L1918875-2**						
Total Suspended Solids		350	349		mg/L	0.3	20	04-MAY-17
WG2521207-2 LCS								
Total Suspended Solids			98.0		%		85-115	04-MAY-17
WG2521207-1 MB								
Total Suspended Solids			<2.0		mg/L		2	04-MAY-17
TKN-WT	**Water**							
Batch R3714811								
WG2521180-3 DUP		**L1918508-1**						
Total Kjeldahl Nitrogen		<0.15	<0.15	RPD-NA	mg/L	N/A	20	03-MAY-17
WG2521180-2 LCS								
Total Kjeldahl Nitrogen			88.8		%		75-125	03-MAY-17
WG2521180-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	03-MAY-17
WG2521180-4 MS		**L1918508-1**						
Total Kjeldahl Nitrogen			102.8		%		70-130	03-MAY-17
VOC-ROU-HS-WT	**Water**							
Batch R3710761								
WG2513095-4 DUP		**WG2513095-3**						
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	01-MAY-17
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17
Dichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	01-MAY-17
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17
m+p-Xylenes		<1.0	<1.0	RPD-NA	ug/L	N/A	30	01-MAY-17
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	01-MAY-17
o-Xylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ROU-HS-WT	**Water**							
Batch R3710761								
WG2513095-4 DUP		**WG2513095-3**						
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17
trans-1,3-Dichloropropene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17
WG2513095-1 LCS								
1,1,2,2-Tetrachloroethane			98.4		%		70-130	01-MAY-17
1,2-Dichlorobenzene			98.8		%		70-130	01-MAY-17
1,4-Dichlorobenzene			98.7		%		70-130	01-MAY-17
Benzene			107.6		%		70-130	01-MAY-17
Chloroform			106.2		%		70-130	01-MAY-17
cis-1,2-Dichloroethylene			105.9		%		70-130	01-MAY-17
Dichloromethane			108.3		%		70-130	01-MAY-17
Ethylbenzene			96.9		%		70-130	01-MAY-17
m+p-Xylenes			98.0		%		70-130	01-MAY-17
Methyl Ethyl Ketone			108.8		%		60-140	01-MAY-17
o-Xylene			98.3		%		70-130	01-MAY-17
Styrene			96.0		%		70-130	01-MAY-17
Tetrachloroethylene			97.3		%		70-130	01-MAY-17
Toluene			98.8		%		70-130	01-MAY-17
trans-1,3-Dichloropropene			94.1		%		70-130	01-MAY-17
Trichloroethylene			103.7		%		70-130	01-MAY-17
WG2513095-2 MB								
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	01-MAY-17
1,2-Dichlorobenzene			<0.50		ug/L		0.5	01-MAY-17
1,4-Dichlorobenzene			<0.50		ug/L		0.5	01-MAY-17
Benzene			<0.50		ug/L		0.5	01-MAY-17
Chloroform			<1.0		ug/L		1	01-MAY-17
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	01-MAY-17
Dichloromethane			<2.0		ug/L		2	01-MAY-17
Ethylbenzene			<0.50		ug/L		0.5	01-MAY-17
m+p-Xylenes			<1.0		ug/L		1	01-MAY-17
Methyl Ethyl Ketone			<20		ug/L		20	01-MAY-17
o-Xylene			<0.50		ug/L		0.5	01-MAY-17
Styrene			<0.50		ug/L		0.5	01-MAY-17

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ROU-HS-WT	**Water**							
Batch R3710761								
WG2513095-2 MB								
Tetrachloroethylene			<0.50		ug/L		0.5	01-MAY-17
Toluene			<0.50		ug/L		0.5	01-MAY-17
trans-1,3-Dichloropropene			<0.50		ug/L		0.5	01-MAY-17
Trichloroethylene			<0.50		ug/L		0.5	01-MAY-17
Surrogate: 1,4-Difluorobenzene			102.6		%		70-130	01-MAY-17
Surrogate: 4-Bromofluorobenzene			101.0		%		70-130	01-MAY-17

Quality Control Report

Workorder: L1918496 Report Date: 10-MAY-17

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

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.

Quality Control Report

Workorder: L1918496 Report Date: 10-MAY-17

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Bacteriological Tests							
E. Coli							
	1	26-APR-17 11:00	28-APR-17 14:45	48	52	hours	EHTL

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L1918496 were received on 27-APR-17 18:45.

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.

GeoPro Consulting Limited (Richmond Hill)
ATTN: BuJing Guan
40 Vogell Road
Unit 22
Richmond Hill ON L4B 3N6

Date Received: 27-APR-17
Report Date: 08-MAY-17 15:19 (MT)
Version: FINAL

Client Phone: 905-237-8336

Certificate of Analysis

Lab Work Order #: L1918496

Project P.O. #: NOT SUBMITTED
Job Reference: 17-1780G
C of C Numbers: 15-574389
Legal Site Desc:

Comments: PWQO guideline report

Emerson Perez, B.S.E
Account Manager

Summary of Guideline Exceedances

Guideline ALS ID	Client ID	Grouping	Analyte	Result	Guideline Limit	Unit
Ontario Provincial Water Quality Objectives (JULY, 1994) - Surface Water PWQO						
L1918496-1	BH2	Anions and Nutrients	Phosphorus, Total	0.222	0.01	mg/L
		Total Metals	Aluminum (Al)-Total	1.26	0.015	mg/L
			Cobalt (Co)-Total	0.00191	0.0009	mg/L
			Copper (Cu)-Total	0.0025	0.001	mg/L
			Lead (Pb)-Total	0.00137	0.001	mg/L
		Dissolved Metals	Cobalt (Co)-Dissolved	0.00103	0.0009	mg/L
			Phosphorus (P)-Dissolved	<0.050	0.01	mg/L
		Aggregate Organics	Phenols (4AAP)	0.0017	0.001	mg/L
		Phthalate Esters	Bis(2-ethylhexyl)phthalate	<2.0	0.6	ug/L
		Polychlorinated Biphenyls	Total PCBs	<0.040	0.001	ug/L
L1918496-2	BH6	Total Metals	Aluminum (Al)-Total	1.08	0.015	mg/L
			Copper (Cu)-Total	0.0024	0.001	mg/L
			Iron (Fe)-Total	1.80	0.3	mg/L
			Lead (Pb)-Total	0.00198	0.001	mg/L

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

Physical Tests - WATER

			Lab ID	L1918496-1	L1918496-2
			Sample Date	26-APR-17	26-APR-17
			Sample ID	BH2	BH6
Analyte	**Unit**	**Guide Limits #1**	**#2**		
Hardness (as CaCO3)	mg/L	-	-		313
pH	pH units	6.5-8.5	-	7.88	
Total Suspended Solids	mg/L	-	-	2450 DLHC	107

Guide Limit #1: Surface Water PWQO

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

			Lab ID	L1918496-1
			Sample Date	26-APR-17
			Sample ID	BH2
		Guide Limits		
Analyte	Unit	#1	#2	
Fluoride (F)	mg/L	-	-	0.038
Total Kjeldahl Nitrogen	mg/L	-	-	0.36
Phosphorus, Total	mg/L	0.01	-	0.222
Sulfate (SO4)	mg/L	-	-	7.70

Guide Limit #1: Surface Water PWQO

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

			Lab ID	L1918496-1
			Sample Date	26-APR-17
			Sample ID	BH2
		Guide Limits		
Analyte	Unit	#1	#2	
Cyanide, Total	mg/L	0.0050	-	<0.0020

Guide Limit #1: Surface Water PWQO

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	L1918496-1
			Sample Date	26-APR-17
			Sample ID	BH2
		Guide Limits		
Analyte	Unit	#1	#2	
E. Coli	CFU/100mL	100	-	0

Guide Limit #1: Surface Water PWQO

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 / Sample Date / Sample ID: L1918496-1, 26-APR-17, BH2	Lab ID / Sample Date / Sample ID: L1918496-2, 26-APR-17, BH6
Aluminum (Al)-Total	mg/L	0.015	-	1.26	1.08
Antimony (Sb)-Total	mg/L	0.02	-	0.00024	0.00016
Arsenic (As)-Total	mg/L	0.005	-	0.00154	0.00117
Beryllium (Be)-Total	mg/L	0.011	-		<0.00010
Boron (B)-Total	mg/L	0.2	-		0.015
Cadmium (Cd)-Total	mg/L	0.0001	-	0.000034	0.000024
Chromium (Cr)-Total	mg/L	-	-	0.00183	0.00190
Cobalt (Co)-Total	mg/L	0.0009	-	0.00191	0.00088
Copper (Cu)-Total	mg/L	0.001	-	0.0025	0.0024
Iron (Fe)-Total	mg/L	0.3	-		1.80
Lead (Pb)-Total	mg/L	0.001	-	0.00137	0.00198
Manganese (Mn)-Total	mg/L	-	-	0.868	
Mercury (Hg)-Total	mg/L	0.0002	-	<0.000010	
Molybdenum (Mo)-Total	mg/L	0.04	-	0.00298	0.00388
Nickel (Ni)-Total	mg/L	0.025	-	0.00220	0.00202
Selenium (Se)-Total	mg/L	0.1	-	0.000368	0.000290
Silver (Ag)-Total	mg/L	0.0001	-	<0.000050	<0.000050
Thallium (Tl)-Total	mg/L	0.0003	-		0.000021
Tin (Sn)-Total	mg/L	-	-	0.00329	
Titanium (Ti)-Total	mg/L	-	-	0.0526	
Tungsten (W)-Total	mg/L	0.03	-		<0.00010
Uranium (U)-Total	mg/L	0.005	-		0.00151
Vanadium (V)-Total	mg/L	0.006	-		0.00265
Zinc (Zn)-Total	mg/L	0.02	-	0.0067	0.0062
Zirconium (Zr)-Total	mg/L	0.004	-		<0.00030

Guide Limit #1: Surface Water PWQO

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.

Dissolved Metals - WATER

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID: L1918496-1 Sample Date: 26-APR-17 Sample ID: BH2	Lab ID: L1918496-2 Sample Date: 26-APR-17 Sample ID: BH6
Dissolved Metals Filtration Location		-	-	LAB	LAB
Aluminum (Al)-Dissolved	mg/L	0.015	-	0.0067	0.0059
Antimony (Sb)-Dissolved	mg/L	0.02	-	0.00022	
Arsenic (As)-Dissolved	mg/L	0.005	-	0.00112	
Barium (Ba)-Dissolved	mg/L	-	-	0.0492	
Beryllium (Be)-Dissolved	mg/L	0.011	-	<0.00010	
Bismuth (Bi)-Dissolved	mg/L	-	-	<0.000050	
Boron (B)-Dissolved	mg/L	0.2	-	0.022	
Cadmium (Cd)-Dissolved	mg/L	0.0001	-	0.000011	
Calcium (Ca)-Dissolved	mg/L	-	-	109	85.3
Cesium (Cs)-Dissolved	mg/L	-	-	<0.000010	
Chromium (Cr)-Dissolved	mg/L	-	-	<0.00050	
Cobalt (Co)-Dissolved	mg/L	0.0009	-	0.00103	
Copper (Cu)-Dissolved	mg/L	0.001	-	0.00082	
Iron (Fe)-Dissolved	mg/L	0.3	-	<0.010	
Lead (Pb)-Dissolved	mg/L	0.001	-	<0.000050	
Lithium (Li)-Dissolved	mg/L	-	-	<0.0010	
Magnesium (Mg)-Dissolved	mg/L	-	-	9.15	24.2
Manganese (Mn)-Dissolved	mg/L	-	-	0.755	
Molybdenum (Mo)-Dissolved	mg/L	0.04	-	0.00316	
Nickel (Ni)-Dissolved	mg/L	0.025	-	0.00085	
Phosphorus (P)-Dissolved	mg/L	0.01	-	<0.050	
Potassium (K)-Dissolved	mg/L	-	-	1.22	
Rubidium (Rb)-Dissolved	mg/L	-	-	0.00104	
Selenium (Se)-Dissolved	mg/L	0.1	-	0.000352	
Silicon (Si)-Dissolved	mg/L	-	-	4.24	
Silver (Ag)-Dissolved	mg/L	0.0001	-	<0.000050	
Sodium (Na)-Dissolved	mg/L	-	-	9.17	
Strontium (Sr)-Dissolved	mg/L	-	-	0.291	
Sulfur (S)-Dissolved	mg/L	-	-	2.84	

Guide Limit #1: Surface Water PWQO

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

Dissolved Metals - WATER

				Lab ID	L1918496-1	L1918496-2
				Sample Date	26-APR-17	26-APR-17
				Sample ID	BH2	BH6
		Guide Limits				
Analyte	Unit	#1	#2			
Tellurium (Te)-Dissolved	mg/L	-	-		<0.00020	
Thallium (Tl)-Dissolved	mg/L	0.0003	-		<0.000010	
Thorium (Th)-Dissolved	mg/L	-	-		<0.00010	
Tin (Sn)-Dissolved	mg/L	-	-		0.00150	
Titanium (Ti)-Dissolved	mg/L	-	-		<0.00030	
Tungsten (W)-Dissolved	mg/L	0.03	-		<0.00010	
Uranium (U)-Dissolved	mg/L	0.005	-		0.000309	
Vanadium (V)-Dissolved	mg/L	0.006	-		0.00057	
Zinc (Zn)-Dissolved	mg/L	0.02	-		0.0013	
Zirconium (Zr)-Dissolved	mg/L	0.004	-		<0.00030	

Guide Limit #1: Surface Water PWQO

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

			Lab ID	L1918496-2
			Sample Date	26-APR-17
			Sample ID	BH6
		Guide Limits		
Analyte	Unit	#1	#2	
Chromium, Hexavalent	ug/L	1	-	<1.0

Guide Limit #1: Surface Water PWQO

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.

Aggregate Organics - WATER

			Lab ID	L1918496-1
			Sample Date	26-APR-17
			Sample ID	BH2
		Guide Limits		
Analyte	Unit	#1	#2	
BOD	mg/L	-	-	<2.0
Oil and Grease, Total	mg/L	-	-	<2.0
Animal/Veg Oil & Grease	mg/L	-	-	<2.0
Mineral Oil and Grease	mg/L	-	-	<1.0
Phenols (4AAP)	mg/L	0.001	-	0.0017

Guide Limit #1: Surface Water PWQO

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.

Volatile Organic Compounds - WATER

		Lab ID		L1918496-1
		Sample Date		26-APR-17
		Sample ID		BH2
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Benzene	ug/L	100	-	<0.50
Chloroform	ug/L	-	-	<1.0
1,2-Dichlorobenzene	ug/L	2.5	-	<0.50
1,4-Dichlorobenzene	ug/L	4	-	<0.50
cis-1,2-Dichloroethylene	ug/L	-	-	<0.50
Dichloromethane	ug/L	100	-	<2.0
trans-1,3-Dichloropropene	ug/L	7	-	<0.50
Ethylbenzene	ug/L	8	-	<0.50
Methyl Ethyl Ketone	ug/L	400	-	<20
Styrene	ug/L	4	-	<0.50
1,1,2,2-Tetrachloroethane	ug/L	70	-	<0.50
Tetrachloroethylene	ug/L	50	-	<0.50
Toluene	ug/L	0.8	-	<0.50
Trichloroethylene	ug/L	20	-	<0.50
o-Xylene	ug/L	40	-	<0.50
m+p-Xylenes	ug/L	2	-	<1.0
Xylenes (Total)	ug/L	-	-	<1.1
Surrogate: 4-Bromofluorobenzene	%	-	-	101.1
Surrogate: 1,4-Difluorobenzene	%	-	-	101.6

Guide Limit #1: Surface Water PWQO

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.

Phthalate Esters - WATER

			Lab ID	L1918496-1
			Sample Date	26-APR-17
			Sample ID	BH2
		Guide Limits		
Analyte	Unit	#1	#2	
Bis(2-ethylhexyl)phthalate	ug/L	0.6	-	<2.0
Surrogate: 2-fluorobiphenyl	%	-	-	97.5
Surrogate: p-Terphenyl d14	%	-	-	87.4

Guide Limit #1: Surface Water PWQO

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.

Semi-Volatile Organics - WATER

			Lab ID	L1918496-1
			Sample Date	26-APR-17
			Sample ID	BH2
		Guide Limits		
Analyte	Unit	#1	#2	
Di-n-butylphthalate	ug/L	4	-	<1.0
Surrogate: 2-Fluorobiphenyl	%	-	-	97.5
Surrogate: p-Terphenyl d14	%	-	-	87.4

Guide Limit #1: Surface Water PWQO

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.

ANALYTICAL REPORT

Polychlorinated Biphenyls - WATER

			Lab ID	L1918496-1
			Sample Date	26-APR-17
			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
Total PCBs	ug/L	0.001	-	<0.040
Surrogate: d14-Terphenyl	%	-	-	90.3

Guide Limit #1: Surface Water PWQO

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	L1918496-1
			Sample Date	26-APR-17
			Sample ID	BH2
		Guide Limits		
Analyte	Unit	#1	#2	
Nonylphenol	ug/L	-	-	<1.0
Total Nonylphenol Ethoxylates	ug/L	-	-	<2.0

Guide Limit #1: Surface Water PWQO

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
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-BIS-2-PHTH-WT	Water	Bis(2-ethylhexyl)phthalate	SW846 8270
Aqueous samples are extracted and extracts are analyzed on GC/MSD.			
625-DNB-PHTH-WT	Water	Di-n-Butyl Phthalate	SW846 8270
Aqueous samples are extracted and extracts are analyzed on GC/MSD.			
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-PWQO-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-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.			
HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)
Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.			
MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**

Water samples are filtered (0.45 um), preserved with nitric acid, 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).

MET-T-CCMS-WT Water Total Metals 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 sample are filtered with direct injection and analyzed by LCMS/MS.

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.

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.

SO4-IC-N-WT Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

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

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.

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-N

Sample is digested to convert the TKN to ammonium sulphate. The ammonia ions are heated to produce a colour complex. The absorbance measured by the instrument is proportional to the concentration of ammonium sulphate in the sample and is reported as TKN.

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:

15-574389

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.

Quality Control Report

Workorder: L1918496 Report Date: 10-MAY-17

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-BIS-2-PHTH-WT	**Water**							
Batch R3710716								
WG2518493-2 LCS								
Bis(2-ethylhexyl)phthalate			89.4		%		50-140	01-MAY-17
WG2518493-3 LCSD		**WG2518493-2**						
Bis(2-ethylhexyl)phthalate		89.4	94.7		%	5.8	50	01-MAY-17
WG2518493-1 MB								
Bis(2-ethylhexyl)phthalate			<2.0		ug/L		2	01-MAY-17
Surrogate: 2-fluorobiphenyl			84.2		%		40-130	01-MAY-17
Surrogate: p-Terphenyl d14			100.1		%		40-130	01-MAY-17
625-DNB-PHTH-WT	**Water**							
Batch R3710716								
WG2518493-2 LCS								
Di-n-butylphthalate			97.3		%		50-150	01-MAY-17
WG2518493-3 LCSD		**WG2518493-2**						
Di-n-butylphthalate		97.3	97.9		%	0.6	50	01-MAY-17
WG2518493-1 MB								
Di-n-butylphthalate			<1.0		ug/L		1	01-MAY-17
Surrogate: 2-Fluorobiphenyl			84.2		%		40-130	01-MAY-17
Surrogate: p-Terphenyl d14			100.1		%		40-130	01-MAY-17
BOD-WT	**Water**							
Batch R3713854								
WG2518693-6 DUP		**L1918037-2**						
BOD		2.5	2.5		mg/L	0.0	20	03-MAY-17
WG2518693-7 LCS								
BOD			109.1		%		85-115	03-MAY-17
WG2518693-5 MB								
BOD			<2.0		mg/L		2	03-MAY-17
CN-TOT-WT	**Water**							
Batch R3714898								
WG2521556-3 DUP		**L1918564-2**						
Cyanide, Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-MAY-17
WG2521556-2 LCS								
Cyanide, Total			88.9		%		80-120	03-MAY-17
WG2521556-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	03-MAY-17
WG2521556-4 MS		**L1918564-2**						
Cyanide, Total			90.5		%		70-130	03-MAY-17
CR-CR6-PWQO-IC-WT	**Water**							

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CR-CR6-PWQO-IC-WT	**Water**							
Batch R3710596								
WG2518720-4 DUP		**WG2518720-3**						
Chromium, Hexavalent		<1.0	<1.0	RPD-NA	ug/L	N/A	20	28-APR-17
WG2518720-2 LCS								
Chromium, Hexavalent			99.4		%		80-120	28-APR-17
WG2518720-1 MB								
Chromium, Hexavalent			<1.0		ug/L		1	28-APR-17
WG2518720-5 MS		**WG2518720-3**						
Chromium, Hexavalent			98.8		%		70-130	28-APR-17
EC-WW-MF-WT	**Water**							
Batch R3710246								
WG2518677-3 DUP		**WG2518677-5**						
E. Coli		0	0		CFU/100mL	0.0	50	29-APR-17
WG2518677-1 MB								
E. Coli			0		CFU/100mL		1	29-APR-17
WG2518677-2 MB								
E. Coli			0		CFU/100mL		1	29-APR-17
F-IC-N-WT	**Water**							
Batch R3710968								
WG2518726-19 DUP		**WG2518726-20**						
Fluoride (F)		0.163	0.165		mg/L	1.2	20	28-APR-17
WG2518726-17 LCS								
Fluoride (F)			102.7		%		90-110	28-APR-17
WG2518726-16 MB								
Fluoride (F)			<0.020		mg/L		0.02	28-APR-17
WG2518726-18 MS		**WG2518726-20**						
Fluoride (F)			99.9		%		75-125	28-APR-17
HG-T-CVAA-WT	**Water**							
Batch R3709734								
WG2518613-3 DUP		**L1918539-1**						
Mercury (Hg)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	28-APR-17
WG2518613-2 LCS								
Mercury (Hg)-Total			97.7		%		80-120	28-APR-17
WG2518613-1 MB								
Mercury (Hg)-Total			<0.000010		mg/L		0.00001	28-APR-17
WG2518613-4 MS		**L1918495-1**						
Mercury (Hg)-Total			86.5		%		70-130	28-APR-17
MET-D-CCMS-WT	**Water**							

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R3709741								
WG2518509-4 DUP		**WG2518509-3**						
Aluminum (Al)-Dissolved		0.0067	0.0057		mg/L	15	20	28-APR-17
Antimony (Sb)-Dissolved		0.00022	0.00022		mg/L	0.3	20	28-APR-17
Arsenic (As)-Dissolved		0.00112	0.00111		mg/L	0.7	20	28-APR-17
Barium (Ba)-Dissolved		0.0492	0.0494		mg/L	0.4	20	28-APR-17
Beryllium (Be)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-APR-17
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	28-APR-17
Boron (B)-Dissolved		0.022	0.022		mg/L	0.9	20	28-APR-17
Cadmium (Cd)-Dissolved		0.000011	0.000015	J	mg/L	0.000003	0.00002	28-APR-17
Calcium (Ca)-Dissolved		109	106		mg/L	2.3	20	28-APR-17
Cesium (Cs)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	28-APR-17
Chromium (Cr)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	28-APR-17
Cobalt (Co)-Dissolved		0.00103	0.00104		mg/L	0.2	20	28-APR-17
Copper (Cu)-Dissolved		0.00082	0.00083		mg/L	1.2	20	03-MAY-17
Iron (Fe)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	28-APR-17
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	28-APR-17
Lithium (Li)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	28-APR-17
Magnesium (Mg)-Dissolved		9.15	9.27		mg/L	1.3	20	28-APR-17
Manganese (Mn)-Dissolved		0.755	0.752		mg/L	0.3	20	28-APR-17
Molybdenum (Mo)-Dissolved		0.00316	0.00323		mg/L	2.2	20	28-APR-17
Nickel (Ni)-Dissolved		0.00085	0.00074		mg/L	14	20	28-APR-17
Phosphorus (P)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	28-APR-17
Potassium (K)-Dissolved		1.22	1.24		mg/L	1.6	20	28-APR-17
Rubidium (Rb)-Dissolved		0.00104	0.00107		mg/L	3.0	20	28-APR-17
Selenium (Se)-Dissolved		0.000352	0.000343		mg/L	2.5	20	28-APR-17
Silicon (Si)-Dissolved		4.24	4.19		mg/L	1.2	20	28-APR-17
Silver (Ag)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	28-APR-17
Sodium (Na)-Dissolved		9.17	9.00		mg/L	1.9	20	28-APR-17
Strontium (Sr)-Dissolved		0.291	0.291		mg/L	0.3	20	28-APR-17
Sulfur (S)-Dissolved		2.84	2.90		mg/L	2.0	20	28-APR-17
Tellurium (Te)-Dissolved		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	28-APR-17
Thallium (Tl)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	28-APR-17
Thorium (Th)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-APR-17
Tin (Sn)-Dissolved		0.00150	0.00148		mg/L			28-APR-17

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R3709741								
WG2518509-4 DUP		**WG2518509-3**						
Tin (Sn)-Dissolved		0.00150	0.00148		mg/L	1.2	20	28-APR-17
Titanium (Ti)-Dissolved		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	28-APR-17
Tungsten (W)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-APR-17
Uranium (U)-Dissolved		0.000309	0.000306		mg/L	0.8	20	28-APR-17
Vanadium (V)-Dissolved		0.00057	0.00058		mg/L	1.4	20	28-APR-17
Zinc (Zn)-Dissolved		0.0013	0.0010	J	mg/L	0.0003	0.002	28-APR-17
Zirconium (Zr)-Dissolved		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	28-APR-17
WG2518509-2 LCS								
Aluminum (Al)-Dissolved			98.9		%		80-120	28-APR-17
Antimony (Sb)-Dissolved			99.3		%		80-120	28-APR-17
Arsenic (As)-Dissolved			98.1		%		80-120	28-APR-17
Barium (Ba)-Dissolved			99.8		%		80-120	28-APR-17
Beryllium (Be)-Dissolved			97.5		%		80-120	28-APR-17
Bismuth (Bi)-Dissolved			100.9		%		80-120	28-APR-17
Boron (B)-Dissolved			97.6		%		80-120	28-APR-17
Cadmium (Cd)-Dissolved			100.0		%		80-120	28-APR-17
Calcium (Ca)-Dissolved			99.5		%		80-120	28-APR-17
Cesium (Cs)-Dissolved			99.5		%		80-120	28-APR-17
Chromium (Cr)-Dissolved			98.6		%		80-120	28-APR-17
Cobalt (Co)-Dissolved			98.4		%		80-120	28-APR-17
Copper (Cu)-Dissolved			97.1		%		80-120	03-MAY-17
Iron (Fe)-Dissolved			93.5		%		80-120	28-APR-17
Lead (Pb)-Dissolved			105.5		%		80-120	28-APR-17
Lithium (Li)-Dissolved			97.3		%		80-120	28-APR-17
Magnesium (Mg)-Dissolved			97.8		%		80-120	28-APR-17
Manganese (Mn)-Dissolved			98.8		%		80-120	28-APR-17
Molybdenum (Mo)-Dissolved			98.3		%		80-120	28-APR-17
Nickel (Ni)-Dissolved			97.4		%		80-120	28-APR-17
Phosphorus (P)-Dissolved			94.8		%		80-120	28-APR-17
Potassium (K)-Dissolved			101.3		%		80-120	28-APR-17
Rubidium (Rb)-Dissolved			101.9		%		80-120	28-APR-17
Selenium (Se)-Dissolved			96.2		%		80-120	28-APR-17
Silicon (Si)-Dissolved			105.5		%		80-120	28-APR-17

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R3709741								
WG2518509-2 LCS								
Silver (Ag)-Dissolved			100.6		%		80-120	28-APR-17
Sodium (Na)-Dissolved			98.1		%		80-120	28-APR-17
Strontium (Sr)-Dissolved			99.6		%		80-120	28-APR-17
Sulfur (S)-Dissolved			97.4		%		80-120	28-APR-17
Tellurium (Te)-Dissolved			95.0		%		80-120	28-APR-17
Thallium (Tl)-Dissolved			100.7		%		80-120	28-APR-17
Thorium (Th)-Dissolved			104.4		%		80-120	28-APR-17
Tin (Sn)-Dissolved			97.7		%		80-120	28-APR-17
Titanium (Ti)-Dissolved			96.8		%		80-120	28-APR-17
Tungsten (W)-Dissolved			106.8		%		80-120	28-APR-17
Uranium (U)-Dissolved			104.9		%		80-120	28-APR-17
Vanadium (V)-Dissolved			98.2		%		80-120	28-APR-17
Zinc (Zn)-Dissolved			93.0		%		80-120	28-APR-17
Zirconium (Zr)-Dissolved			96.1		%		80-120	28-APR-17
WG2518509-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	28-APR-17
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	28-APR-17
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	28-APR-17
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	28-APR-17
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	28-APR-17
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	28-APR-17
Boron (B)-Dissolved			<0.010		mg/L		0.01	28-APR-17
Cadmium (Cd)-Dissolved			<0.000010		mg/L		0.00001	28-APR-17
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	28-APR-17
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	28-APR-17
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	28-APR-17
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	28-APR-17
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	03-MAY-17
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	28-APR-17
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	28-APR-17
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	28-APR-17
Magnesium (Mg)-Dissolved			<0.050		mg/L		0.05	28-APR-17
Manganese (Mn)-Dissolved			<0.00050		mg/L		0.0005	28-APR-17
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	28-APR-17

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R3709741								
WG2518509-1 MB								
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	28-APR-17
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	28-APR-17
Potassium (K)-Dissolved			<0.050		mg/L		0.05	28-APR-17
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	28-APR-17
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	28-APR-17
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	28-APR-17
Silver (Ag)-Dissolved			<0.000050		mg/L		0.00005	28-APR-17
Sodium (Na)-Dissolved			<0.50		mg/L		0.5	28-APR-17
Strontium (Sr)-Dissolved			<0.0010		mg/L		0.001	28-APR-17
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	28-APR-17
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	28-APR-17
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	28-APR-17
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	28-APR-17
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	28-APR-17
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	28-APR-17
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	28-APR-17
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	28-APR-17
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	28-APR-17
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	28-APR-17
Zirconium (Zr)-Dissolved			<0.00030		mg/L		0.0003	28-APR-17
WG2518509-5 MS		**WG2518509-3**						
Aluminum (Al)-Dissolved			99.5		%		70-130	28-APR-17
Antimony (Sb)-Dissolved			100.5		%		70-130	28-APR-17
Arsenic (As)-Dissolved			102.8		%		70-130	28-APR-17
Barium (Ba)-Dissolved			N/A	MS-B	%		-	28-APR-17
Beryllium (Be)-Dissolved			97.3		%		70-130	28-APR-17
Bismuth (Bi)-Dissolved			95.8		%		70-130	28-APR-17
Boron (B)-Dissolved			92.9		%		70-130	28-APR-17
Cadmium (Cd)-Dissolved			101.3		%		70-130	28-APR-17
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	28-APR-17
Cesium (Cs)-Dissolved			102.0		%		70-130	28-APR-17
Chromium (Cr)-Dissolved			100.8		%		70-130	28-APR-17
Cobalt (Co)-Dissolved			97.8		%		70-130	28-APR-17
Copper (Cu)-Dissolved			94.2		%		70-130	03-MAY-17

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R3709741								
WG2518509-5 MS		**WG2518509-3**						
Iron (Fe)-Dissolved			94.2		%		70-130	28-APR-17
Lead (Pb)-Dissolved			100.1		%		70-130	28-APR-17
Lithium (Li)-Dissolved			95.2		%		70-130	28-APR-17
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	28-APR-17
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	28-APR-17
Molybdenum (Mo)-Dissolved			95.3		%		70-130	28-APR-17
Nickel (Ni)-Dissolved			95.6		%		70-130	28-APR-17
Phosphorus (P)-Dissolved			99.4		%		70-130	28-APR-17
Potassium (K)-Dissolved			103.8		%		70-130	28-APR-17
Rubidium (Rb)-Dissolved			101.0		%		70-130	28-APR-17
Selenium (Se)-Dissolved			103.0		%		70-130	28-APR-17
Silicon (Si)-Dissolved			N/A	MS-B	%		-	28-APR-17
Silver (Ag)-Dissolved			79.0		%		70-130	03-MAY-17
Sodium (Na)-Dissolved			N/A	MS-B	%		-	28-APR-17
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	28-APR-17
Sulfur (S)-Dissolved			N/A	MS-B	%		-	28-APR-17
Tellurium (Te)-Dissolved			99.2		%		70-130	28-APR-17
Thallium (Tl)-Dissolved			97.2		%		70-130	28-APR-17
Thorium (Th)-Dissolved			100.3		%		70-130	28-APR-17
Tin (Sn)-Dissolved			99.7		%		70-130	28-APR-17
Titanium (Ti)-Dissolved			99.5		%		70-130	28-APR-17
Tungsten (W)-Dissolved			104.5		%		70-130	28-APR-17
Uranium (U)-Dissolved			N/A	MS-B	%		-	28-APR-17
Vanadium (V)-Dissolved			102.8		%		70-130	28-APR-17
Zinc (Zn)-Dissolved			96.2		%		70-130	28-APR-17
Zirconium (Zr)-Dissolved			94.6		%		70-130	28-APR-17
MET-T-CCMS-WT	**Water**							
Batch R3709606								
WG2518495-4 DUP		**WG2518495-3**						
Aluminum (Al)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	28-APR-17
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-APR-17
Arsenic (As)-Total		0.00015	0.00013		mg/L	14	20	28-APR-17
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-APR-17

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R3709606								
WG2518495-4 DUP		**WG2518495-3**						
Boron (B)-Total		0.024	0.024		mg/L	2.0	20	28-APR-17
Cadmium (Cd)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	28-APR-17
Chromium (Cr)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	28-APR-17
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-APR-17
Copper (Cu)-Total		0.0013	0.0012		mg/L	1.0	20	28-APR-17
Iron (Fe)-Total		0.948	0.963		mg/L	1.6	20	28-APR-17
Lead (Pb)-Total		0.000363	0.000360		mg/L	0.8	20	28-APR-17
Manganese (Mn)-Total		0.0427	0.0427		mg/L	0.1	20	28-APR-17
Molybdenum (Mo)-Total		0.00352	0.00366		mg/L	3.9	20	28-APR-17
Nickel (Ni)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	28-APR-17
Selenium (Se)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	28-APR-17
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	28-APR-17
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	28-APR-17
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-APR-17
Titanium (Ti)-Total		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	28-APR-17
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-APR-17
Uranium (U)-Total		0.000080	0.000078		mg/L	1.5	20	28-APR-17
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	28-APR-17
Zinc (Zn)-Total		0.0416	0.0411		mg/L	1.3	20	28-APR-17
Zirconium (Zr)-Total		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	28-APR-17
WG2518495-2 LCS								
Aluminum (Al)-Total			98.4		%		80-120	28-APR-17
Antimony (Sb)-Total			101.7		%		80-120	28-APR-17
Arsenic (As)-Total			98.3		%		80-120	28-APR-17
Beryllium (Be)-Total			92.4		%		80-120	28-APR-17
Boron (B)-Total			94.1		%		80-120	28-APR-17
Cadmium (Cd)-Total			99.3		%		80-120	28-APR-17
Chromium (Cr)-Total			95.1		%		80-120	28-APR-17
Cobalt (Co)-Total			98.1		%		80-120	28-APR-17
Copper (Cu)-Total			96.9		%		80-120	28-APR-17
Iron (Fe)-Total			98.2		%		80-120	28-APR-17
Lead (Pb)-Total			104.7		%		80-120	28-APR-17
Manganese (Mn)-Total			99.7		%		80-120	28-APR-17

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R3709606								
WG2518495-2 LCS								
Molybdenum (Mo)-Total			94.3		%		80-120	28-APR-17
Nickel (Ni)-Total			96.9		%		80-120	28-APR-17
Selenium (Se)-Total			98.0		%		80-120	28-APR-17
Silver (Ag)-Total			99.8		%		80-120	28-APR-17
Thallium (Tl)-Total			100.0		%		80-120	28-APR-17
Tin (Sn)-Total			97.9		%		80-120	28-APR-17
Titanium (Ti)-Total			97.1		%		80-120	28-APR-17
Tungsten (W)-Total			98.7		%		80-120	28-APR-17
Uranium (U)-Total			107.1		%		80-120	28-APR-17
Vanadium (V)-Total			98.3		%		80-120	28-APR-17
Zinc (Zn)-Total			90.7		%		80-120	28-APR-17
Zirconium (Zr)-Total			100.6		%		80-120	28-APR-17
WG2518495-1 MB								
Aluminum (Al)-Total			<0.010		mg/L		0.01	28-APR-17
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	28-APR-17
Arsenic (As)-Total			<0.00010		mg/L		0.0001	28-APR-17
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	28-APR-17
Boron (B)-Total			<0.010		mg/L		0.01	28-APR-17
Cadmium (Cd)-Total			<0.000010		mg/L		0.00001	28-APR-17
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	28-APR-17
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	28-APR-17
Copper (Cu)-Total			<0.0010		mg/L		0.001	28-APR-17
Iron (Fe)-Total			<0.050		mg/L		0.05	28-APR-17
Lead (Pb)-Total			<0.000050		mg/L		0.00005	28-APR-17
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	28-APR-17
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	28-APR-17
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	28-APR-17
Selenium (Se)-Total			<0.000050		mg/L		0.00005	28-APR-17
Silver (Ag)-Total			<0.000050		mg/L		0.00005	28-APR-17
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	28-APR-17
Tin (Sn)-Total			<0.00010		mg/L		0.0001	28-APR-17
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	28-APR-17
Tungsten (W)-Total			<0.00010		mg/L		0.0001	28-APR-17
Uranium (U)-Total			<0.000010		mg/L		0.00001	28-APR-17

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R3709606								
WG2518495-1 MB								
Vanadium (V)-Total			<0.00050		mg/L		0.0005	28-APR-17
Zinc (Zn)-Total			<0.0030		mg/L		0.003	28-APR-17
Zirconium (Zr)-Total			<0.00030		mg/L		0.0003	28-APR-17
WG2518495-5 MS		**WG2518495-3**						
Aluminum (Al)-Total			104.6		%		70-130	28-APR-17
Antimony (Sb)-Total			106.5		%		70-130	28-APR-17
Arsenic (As)-Total			102.9		%		70-130	28-APR-17
Beryllium (Be)-Total			93.4		%		70-130	28-APR-17
Boron (B)-Total			91.6		%		70-130	28-APR-17
Cadmium (Cd)-Total			101.9		%		70-130	28-APR-17
Chromium (Cr)-Total			101.0		%		70-130	28-APR-17
Cobalt (Co)-Total			99.7		%		70-130	28-APR-17
Copper (Cu)-Total			95.5		%		70-130	28-APR-17
Iron (Fe)-Total			N/A	MS-B	%		-	28-APR-17
Lead (Pb)-Total			94.8		%		70-130	28-APR-17
Manganese (Mn)-Total			N/A	MS-B	%		-	28-APR-17
Molybdenum (Mo)-Total			94.2		%		70-130	28-APR-17
Nickel (Ni)-Total			94.0		%		70-130	28-APR-17
Selenium (Se)-Total			102.4		%		70-130	28-APR-17
Silver (Ag)-Total			97.2		%		70-130	28-APR-17
Thallium (Tl)-Total			92.3		%		70-130	28-APR-17
Tin (Sn)-Total			103.8		%		70-130	28-APR-17
Titanium (Ti)-Total			105.2		%		70-130	28-APR-17
Tungsten (W)-Total			101.1		%		70-130	28-APR-17
Uranium (U)-Total			104.8		%		70-130	28-APR-17
Vanadium (V)-Total			106.6		%		70-130	28-APR-17
Zinc (Zn)-Total			N/A	MS-B	%		-	28-APR-17
Zirconium (Zr)-Total			101.6		%		70-130	28-APR-17
NP,NPE-LCMS-WT	**Water**							
Batch R3710655								
WG2518917-3 DUP		**L1918508-1**						
Nonylphenol		<1.0	<1.0	RPD-NA	ug/L	N/A	30	28-APR-17
Total Nonylphenol Ethoxylates		<2.0	<2.0	RPD-NA	ug/L	N/A	50	28-APR-17
WG2518917-2 LCS								

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NP,NPE-LCMS-WT	**Water**							
Batch R3710655								
WG2518917-2 LCS								
Nonylphenol			98.0		%		75-125	28-APR-17
WG2518917-1 MB								
Nonylphenol			<1.0		ug/L		1	28-APR-17
Total Nonylphenol Ethoxylates			<2.0		ug/L		2	28-APR-17
WG2518917-4 MS		**L1918508-1**						
Nonylphenol			89.7		%		50-150	28-APR-17
OGG-SPEC-WT	**Water**							
Batch R3713686								
WG2520698-2 LCS								
Oil and Grease, Total			94.5		%		70-130	02-MAY-17
Mineral Oil and Grease			90.2		%		70-130	02-MAY-17
WG2520698-3 LCSD		**WG2520698-2**						
Oil and Grease, Total		94.5	96.5		%	2.1	40	02-MAY-17
Mineral Oil and Grease		90.2	92.4		%	2.4	40	02-MAY-17
WG2520698-1 MB								
Oil and Grease, Total			<2.0		mg/L		2	02-MAY-17
Mineral Oil and Grease			<1.0		mg/L		1	02-MAY-17
P-T-COL-WT	**Water**							
Batch R3713513								
WG2521026-3 DUP		**L1918519-2**						
Phosphorus, Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	02-MAY-17
WG2521026-2 LCS								
Phosphorus, Total			98.3		%		80-120	02-MAY-17
WG2521026-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	03-MAY-17
WG2521026-4 MS		**L1918519-2**						
Phosphorus, Total			92.7		%		70-130	02-MAY-17
PCB-WT	**Water**							
Batch R3712243								
WG2518573-2 LCS								
Aroclor 1242			101.3		%		65-130	02-MAY-17
Aroclor 1248			82.6		%		65-130	02-MAY-17
Aroclor 1254			93.0		%		65-130	02-MAY-17
Aroclor 1260			89.0		%		65-130	02-MAY-17
WG2518573-3 LCSD		**WG2518573-2**						
Aroclor 1242		101.3	99.1					

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-WT	**Water**							
Batch R3712243								
WG2518573-3 LCSD		**WG2518573-2**						
Aroclor 1242		101.3	99.1		%	2.3	50	02-MAY-17
Aroclor 1248		82.6	82.6		%	0.0	50	02-MAY-17
Aroclor 1254		93.0	96.4		%	3.5	50	02-MAY-17
Aroclor 1260		89.0	87.4		%	1.8	50	02-MAY-17
WG2518573-1 MB								
Aroclor 1242			<0.020		ug/L		0.02	02-MAY-17
Aroclor 1248			<0.020		ug/L		0.02	02-MAY-17
Aroclor 1254			<0.020		ug/L		0.02	02-MAY-17
Aroclor 1260			<0.020		ug/L		0.02	02-MAY-17
Surrogate: d14-Terphenyl			92.0		%		50-150	02-MAY-17
PH-WT	**Water**							
Batch R3709892								
WG2518661-12 DUP		**WG2518661-11**						
pH		8.02	8.03	J	pH units	0.00	0.2	28-APR-17
WG2518661-9 LCS								
pH			6.98		pH units		6.9-7.1	28-APR-17
PHENOLS-4AAP-WT	**Water**							
Batch R3715420								
WG2522838-12 DUP		**L1918496-1**						
Phenols (4AAP)		0.0017	0.0014	J	mg/L	0.0003	0.002	05-MAY-17
WG2522838-10 LCS								
Phenols (4AAP)			105.7		%		85-115	05-MAY-17
WG2522838-9 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	05-MAY-17
WG2522838-11 MS		**L1918496-1**						
Phenols (4AAP)			102.3		%		75-125	05-MAY-17
SO4-IC-N-WT	**Water**							
Batch R3710968								
WG2518726-19 DUP		**WG2518726-20**						
Sulfate (SO4)		63.4	64.5		mg/L	1.8	20	28-APR-17
WG2518726-17 LCS								
Sulfate (SO4)			106.1		%		90-110	28-APR-17
WG2518726-16 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	28-APR-17
WG2518726-18 MS		**WG2518726-20**						

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-WT	**Water**							
Batch R3710968								
WG2518726-18 MS		**WG2518726-20**						
Sulfate (SO4)			100.5		%		75-125	28-APR-17
SOLIDS-TSS-WT	**Water**							
Batch R3715052								
WG2521207-3 DUP		**L1918875-2**						
Total Suspended Solids		350	349		mg/L	0.3	20	04-MAY-17
WG2521207-2 LCS								
Total Suspended Solids			98.0		%		85-115	04-MAY-17
WG2521207-1 MB								
Total Suspended Solids			<2.0		mg/L		2	04-MAY-17
TKN-WT	**Water**							
Batch R3714811								
WG2521180-3 DUP		**L1918508-1**						
Total Kjeldahl Nitrogen		<0.15	<0.15	RPD-NA	mg/L	N/A	20	03-MAY-17
WG2521180-2 LCS								
Total Kjeldahl Nitrogen			88.8		%		75-125	03-MAY-17
WG2521180-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	03-MAY-17
WG2521180-4 MS		**L1918508-1**						
Total Kjeldahl Nitrogen			102.8		%		70-130	03-MAY-17
VOC-ROU-HS-WT	**Water**							
Batch R3710761								
WG2513095-4 DUP		**WG2513095-3**						
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	01-MAY-17
cis-1,2-Dichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17
Dichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	01-MAY-17
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17
m+p-Xylenes		<1.0	<1.0	RPD-NA	ug/L	N/A	30	01-MAY-17
Methyl Ethyl Ketone		<20	<20	RPD-NA	ug/L	N/A	30	01-MAY-17
o-Xylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17
Styrene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ROU-HS-WT	**Water**							
Batch R3710761								
WG2513095-4 DUP		**WG2513095-3**						
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17
trans-1,3-Dichloropropene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	01-MAY-17
WG2513095-1 LCS								
1,1,2,2-Tetrachloroethane			98.4		%		70-130	01-MAY-17
1,2-Dichlorobenzene			98.8		%		70-130	01-MAY-17
1,4-Dichlorobenzene			98.7		%		70-130	01-MAY-17
Benzene			107.6		%		70-130	01-MAY-17
Chloroform			106.2		%		70-130	01-MAY-17
cis-1,2-Dichloroethylene			105.9		%		70-130	01-MAY-17
Dichloromethane			108.3		%		70-130	01-MAY-17
Ethylbenzene			96.9		%		70-130	01-MAY-17
m+p-Xylenes			98.0		%		70-130	01-MAY-17
Methyl Ethyl Ketone			108.8		%		60-140	01-MAY-17
o-Xylene			98.3		%		70-130	01-MAY-17
Styrene			96.0		%		70-130	01-MAY-17
Tetrachloroethylene			97.3		%		70-130	01-MAY-17
Toluene			98.8		%		70-130	01-MAY-17
trans-1,3-Dichloropropene			94.1		%		70-130	01-MAY-17
Trichloroethylene			103.7		%		70-130	01-MAY-17
WG2513095-2 MB								
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	01-MAY-17
1,2-Dichlorobenzene			<0.50		ug/L		0.5	01-MAY-17
1,4-Dichlorobenzene			<0.50		ug/L		0.5	01-MAY-17
Benzene			<0.50		ug/L		0.5	01-MAY-17
Chloroform			<1.0		ug/L		1	01-MAY-17
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	01-MAY-17
Dichloromethane			<2.0		ug/L		2	01-MAY-17
Ethylbenzene			<0.50		ug/L		0.5	01-MAY-17
m+p-Xylenes			<1.0		ug/L		1	01-MAY-17
Methyl Ethyl Ketone			<20		ug/L		20	01-MAY-17
o-Xylene			<0.50		ug/L		0.5	01-MAY-17
Styrene			<0.50		ug/L		0.5	01-MAY-17

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ROU-HS-WT	**Water**							
Batch R3710761								
WG2513095-2 MB								
Tetrachloroethylene			<0.50		ug/L		0.5	01-MAY-17
Toluene			<0.50		ug/L		0.5	01-MAY-17
trans-1,3-Dichloropropene			<0.50		ug/L		0.5	01-MAY-17
Trichloroethylene			<0.50		ug/L		0.5	01-MAY-17
Surrogate: 1,4-Difluorobenzene			102.6		%		70-130	01-MAY-17
Surrogate: 4-Bromofluorobenzene			101.0		%		70-130	01-MAY-17

Quality Control Report

Workorder: L1918496 Report Date: 10-MAY-17

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

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.

Quality Control Report

Workorder: L1918496 Report Date: 10-MAY-17

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Bacteriological Tests							
E. Coli							
	1	26-APR-17 11:00	28-APR-17 14:45	48	52	hours	EHTL

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L1918496 were received on 27-APR-17 18:45.

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.

GeoPro Consulting Limited (Richmond Hill)
ATTN: BuJing Guan
40 Vogell Road
Unit 22
Richmond Hill ON L4B 3N6

Date Received: 02-MAY-17
Report Date: 12-MAY-17 12:38 (MT)
Version: FINAL REV. 2

Client Phone: 905-237-8336

Certificate of Analysis

Lab Work Order #: L1920280

Project P.O. #: NOT SUBMITTED
Job Reference: 17-17804
C of C Numbers: 15-1780G
Legal Site Desc:

Comments: ON DWS guideline report

Emerson Perez, B.S.E
Account Manager

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Criteria Specific Limits STANDARDS		GUIDELINES	Analyzed	Batch
L1920280-1 BH7 Sampled By: W. SUN on 01-MAY-17 @ 10:00 Matrix: WATER									
General Water Quality Package									
Ammonia, Total (as N)	1.13	DLHC	0.040	mg/L				03-MAY-17	R3713932
Bromide (Br)	<0.10		0.10	mg/L				04-MAY-17	R3715614
Silica	12.7		0.21	mg/L				02-MAY-17	
Chloride (Cl)	15.1		0.50	mg/L			250	04-MAY-17	R3715614
Colour, Apparent	13.0		2.0	CU				03-MAY-17	R3714478
Conductivity	455		3.0	umhos/cm				03-MAY-17	R3713958
Detailed Ion Balance Calculation									
Ion Balance	101			%				05-MAY-17	
Cation - Anion Balance	0.6			%				05-MAY-17	
Computed Conductivity	372			uS/cm				05-MAY-17	
Conductivity % Difference	-20.1			%				05-MAY-17	
TDS (Calculated)	228			mg/L				05-MAY-17	
Anion Sum	4.10			me/L				05-MAY-17	
Cation Sum	4.15			me/L				05-MAY-17	
Saturation pH	7.55			pH				05-MAY-17	
Langelier Index	0.5			No Unit				05-MAY-17	
Hardness (as CaCO3)	140			mg/L		**	80-100	05-MAY-17	
Orthophosphate-Dissolved (as P)	0.0413	DLHC	0.0060	mg/L				04-MAY-17	R3715404
E. Coli	0		0	CFU/100mL	0			04-MAY-17	R3715025
Fluoride (F)	0.325		0.020	mg/L	1.5			04-MAY-17	R3715614
Nitrate (as N)	0.102		0.020	mg/L	10			04-MAY-17	R3715614
Nitrite (as N)	<0.010		0.010	mg/L	1			04-MAY-17	R3715614
Redox Potential	195	PEHR	-1000	mV				04-MAY-17	R3714263
Sodium Adsorption Ratio	1.02		0.10	SAR				04-MAY-17	
Sulfate (SO4)	7.72		0.30	mg/L			500	04-MAY-17	R3715614
Total Coliforms	30	DLM	100	CFU/100mL	** 0			04-MAY-17	R3715020
Total Coliform Background	2900	DLM	100	CFU/100mL				04-MAY-17	R3715020
Total Dissolved Solids	237	DLDS	20	mg/L			500	03-MAY-17	R3714960
Total Metals by CRC ICPMS									
Aluminum (Al)-Total	0.088		0.010	mg/L			0.1	03-MAY-17	R3714203
Antimony (Sb)-Total	0.00020		0.00010	mg/L	0.006			03-MAY-17	R3714203
Arsenic (As)-Total	0.00074		0.00010	mg/L	0.025			03-MAY-17	R3714203
Barium (Ba)-Total	0.0846		0.00020	mg/L	1			03-MAY-17	R3714203
Beryllium (Be)-Total	<0.00010		0.00010	mg/L				03-MAY-17	R3714203
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L				03-MAY-17	R3714203
Boron (B)-Total	0.085		0.010	mg/L	5			03-MAY-17	R3714203
Cadmium (Cd)-Total	<0.000010		0.000010	mg/L	0.005			03-MAY-17	R3714203
Calcium (Ca)-Total	33.7		0.50	mg/L				03-MAY-17	R3714203
Chromium (Cr)-Total	<0.00050		0.00050	mg/L	0.05			03-MAY-17	R3714203
Cesium (Cs)-Total	0.000037		0.000010	mg/L				03-MAY-17	R3714203
Cobalt (Co)-Total	0.00017		0.00010	mg/L				03-MAY-17	R3714203
Copper (Cu)-Total	<0.0010		0.0010	mg/L			1	03-MAY-17	R3714203
Iron (Fe)-Total	0.085		0.050	mg/L			0.3	03-MAY-17	R3714203
Lead (Pb)-Total	<0.00010		0.00010	mg/L	0.01			03-MAY-17	R3714203

* Detection Limit for result exceeds Criteria Specific Limit. Assessment against Criteria Limit cannot be made.

** Analytical result for this parameter exceeds Criteria Specific Limit listed on this report.

Ontario DW Std O.Reg 169/03 JUNE 2007

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Criteria Specific Limits			Analyzed	Batch
						STANDARDS	GUIDELINES		
L1920280-1 BH7 Sampled By: W. SUN on 01-MAY-17 @ 10:00 Matrix: WATER									
General Water Quality Package									
Total Metals by CRC ICPMS									
Magnesium (Mg)-Total	13.5		0.050	mg/L				03-MAY-17	R3714203
Manganese (Mn)-Total	0.0423		0.00050	mg/L			0.05	03-MAY-17	R3714203
Molybdenum (Mo)-Total	0.00495		0.000050	mg/L				03-MAY-17	R3714203
Nickel (Ni)-Total	0.00142		0.00050	mg/L				03-MAY-17	R3714203
Phosphorus (P)-Total	0.058		0.050	mg/L				03-MAY-17	R3714203
Potassium (K)-Total	3.17		0.050	mg/L				03-MAY-17	R3714203
Rubidium (Rb)-Total	0.00293		0.00020	mg/L				03-MAY-17	R3714203
Selenium (Se)-Total	0.000073		0.000050	mg/L		0.01		03-MAY-17	R3714203
Silicon (Si)-Total	5.95		0.10	mg/L				03-MAY-17	R3714203
Silver (Ag)-Total	<0.000050		0.000050	mg/L				03-MAY-17	R3714203
Sodium (Na)-Total	27.6		0.50	mg/L	**	20	200	03-MAY-17	R3714203
Strontium (Sr)-Total	0.529		0.0010	mg/L				03-MAY-17	R3714203
Sulfur (S)-Total	3.27		0.50	mg/L				03-MAY-17	R3714203
Thallium (Tl)-Total	<0.000010		0.000010	mg/L				03-MAY-17	R3714203
Tellurium (Te)-Total	<0.00020		0.00020	mg/L				03-MAY-17	R3714203
Thorium (Th)-Total	<0.00010		0.00010	mg/L				03-MAY-17	R3714203
Tin (Sn)-Total	0.00334		0.00010	mg/L				03-MAY-17	R3714203
Titanium (Ti)-Total	0.00256		0.00030	mg/L				03-MAY-17	R3714203
Tungsten (W)-Total	0.00109		0.00010	mg/L				03-MAY-17	R3714203
Uranium (U)-Total	0.000289		0.000010	mg/L		0.02		03-MAY-17	R3714203
Vanadium (V)-Total	<0.00050		0.00050	mg/L				03-MAY-17	R3714203
Zinc (Zn)-Total	<0.0030		0.0030	mg/L			5	03-MAY-17	R3714203
Zirconium (Zr)-Total	<0.00030		0.00030	mg/L				03-MAY-17	R3714203
Turbidity	4.93		0.10	NTU			5	03-MAY-17	R3714934
pH	8.05		0.10	pH units			6.5-8.5	03-MAY-17	R3713958
Individual Analytes									
Speciated Alkalinity									
Alkalinity, Total (as CaCO3)	211		10	mg/L			30-500	04-MAY-17	R3715394
Alkalinity, Bicarbonate (as CaCO3)	211		10	mg/L				04-MAY-17	R3715394
Alkalinity, Carbonate (as CaCO3)	<10		10	mg/L				04-MAY-17	R3715394
Alkalinity, Hydroxide (as CaCO3)	<10		10	mg/L				04-MAY-17	R3715394

* Detection Limit for result exceeds Criteria Specific Limit. Assessment against Criteria Limit cannot be made.

** Analytical result for this parameter exceeds Criteria Specific Limit listed on this report.

Ontario DW Std O.Reg 169/03 JUNE 2007

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
PEHR	Parameter Exceeded Recommended Holding Time On Receipt: Proceed With Analysis As Requested.
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	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
ALK-SPEC-WT	Water	Speciated Alkalinity		EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

BR-IC-N-WT	Water	Bromide in Water by IC		EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CL-IC-N-WT	Water	Chloride by IC		EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

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).

COLOUR-WT	Water	Colour		APHA 2120

Apparent Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method after sample decanting. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-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

EC-WT	Water	Conductivity		APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

ETL-SAR-CALC-WT	Water	Sodium Adsorption Ratio		Calculation
ETL-SILICA-CALC-WT	Water	Calculate from SI-TOT-WT		EPA 200.8
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.

IONBALANCE-OP03-WT	Water	Detailed Ion Balance Calculation		APHA 1030E, 2330B, 2510A
MET-T-CCMS-WT	Water	Total Metals 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).

NH3-WT	Water	Ammonia, Total as N		EPA 350.1

Sample is measured colorimetrically. When sample is turbid a distillation step is required, sample is distilled into a solution of boric acid and measured colorimetrically.

NO2-IC-WT	Water	Nitrite in Water by IC		EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-WT	Water	Nitrate in Water by IC		EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

PH-ALK-WT	Water	pH		APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

PO4-DO-COL-WT	Water	Diss. Orthophosphate in Water by Colour		APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

REDOX-POTENTIAL-WT	Water	Redox Potential		APHA 2580

This analysis is carried out in accordance with the procedure described in the "APHA" method 2580 "Oxidation-Reduction Potential" 2012. Results are reported as observed oxidation-reduction potential of the platinum metal-reference electrode employed, in mV.

It is recommended that this analysis be conducted in the field.

Reference Information

17-17804

SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-WT	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 105–5°C overnight and then 180–10°C for 1hr.

TC-MF-WT	Water	Total Coliforms	SM 9222B

A 100mL volume of sample is filtered through a membrane, the membrane is placed on mENDO LES agar and incubated at 35–0.5°C for 24–2h. Method ID: WT-TM-1200

TCB-MF-WT	Water	Total Coliform Background	SM 9222B

A 100mL volume of sample is filtered through a membrane, the membrane is placed on mENDO LES agar and incubated at 35–0.5°C for 24–2h. Method ID: WT-TM-1200.

TURBIDITY-WT	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

Chain of Custody numbers:

15-1780G

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	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.

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-SPEC-WT	**Water**							
Batch R3715394								
WG2522267-3 CRM		**WT-ALK-CRM**						
Alkalinity, Total (as CaCO3)			108.1		%		80-120	04-MAY-17
WG2522267-4 DUP		**L1919502-3**						
Alkalinity, Total (as CaCO3)		156	155		mg/L	0.6	20	04-MAY-17
WG2522267-2 LCS								
Alkalinity, Total (as CaCO3)			96.6		%		85-115	04-MAY-17
WG2522267-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	04-MAY-17
BR-IC-N-WT	**Water**							
Batch R3715614								
WG2522076-10 DUP		**WG2522076-8**						
Bromide (Br)		<0.10	<0.10	RPD-NA	mg/L	N/A	20	04-MAY-17
WG2522076-7 LCS								
Bromide (Br)			98.3		%		85-115	04-MAY-17
WG2522076-6 MB								
Bromide (Br)			<0.10		mg/L		0.1	04-MAY-17
WG2522076-9 MS		**WG2522076-8**						
Bromide (Br)			91.0		%		75-125	04-MAY-17
CL-IC-N-WT	**Water**							
Batch R3715614								
WG2522076-10 DUP		**WG2522076-8**						
Chloride (Cl)		10.8	11.2		mg/L	3.6	20	04-MAY-17
WG2522076-7 LCS								
Chloride (Cl)			99.1		%		90-110	04-MAY-17
WG2522076-6 MB								
Chloride (Cl)			<0.50		mg/L		0.5	04-MAY-17
WG2522076-9 MS		**WG2522076-8**						
Chloride (Cl)			100.5		%		75-125	04-MAY-17
COLOUR-WT	**Water**							
Batch R3714478								
WG2521258-3 CRM		**WT-COLOUR-CRM**						
Colour, Apparent			98.7		%		80-120	03-MAY-17
WG2521258-4 DUP		**L1920325-1**						
Colour, Apparent		2.4	2.3		CU	3.5	20	03-MAY-17
WG2521258-2 LCS								
Colour, Apparent			101.3		%		80-120	03-MAY-17
WG2521258-1 MB								

Quality Control Report

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40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
COLOUR-WT	**Water**							
Batch R3714478								
WG2521258-1 MB								
Colour, Apparent			<2.0		CU		2	03-MAY-17
EC-MF-WT	**Water**							
Batch R3715025								
WG2521229-3 DUP		**WG2521229-5**						
E. Coli		0	0		CFU/100mL	0.0	65	04-MAY-17
WG2521229-6 DUP		**WG2521229-7**						
E. Coli		0	0		CFU/100mL	0.0	65	04-MAY-17
WG2521229-1 MB								
E. Coli			0		CFU/100mL		1	04-MAY-17
WG2521229-2 MB								
E. Coli			0		CFU/100mL		1	04-MAY-17
EC-WT	**Water**							
Batch R3713958								
WG2521195-8 DUP		**WG2521195-7**						
Conductivity		694	691		umhos/cm	0.5	10	03-MAY-17
WG2521195-5 LCS								
Conductivity			103.8		%		90-110	03-MAY-17
WG2521195-6 MB								
Conductivity			<3.0		umhos/cm		3	03-MAY-17
F-IC-N-WT	**Water**							
Batch R3715614								
WG2522076-10 DUP		**WG2522076-8**						
Fluoride (F)		0.133	0.137		mg/L	3.0	20	04-MAY-17
WG2522076-7 LCS								
Fluoride (F)			101.1		%		90-110	04-MAY-17
WG2522076-6 MB								
Fluoride (F)			<0.020		mg/L		0.02	04-MAY-17
WG2522076-9 MS		**WG2522076-8**						
Fluoride (F)			100.5		%		75-125	04-MAY-17
MET-T-CCMS-WT	**Water**							
Batch R3714203								
WG2521211-4 DUP		**WG2521211-3**						
Aluminum (Al)-Total		0.018	0.020		mg/L	6.4	20	03-MAY-17
Antimony (Sb)-Total		0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-MAY-17
Arsenic (As)-Total		0.00014	0.00013		mg/L	9.7	20	03-MAY-17

Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R3714203								
WG2521211-4 DUP		**WG2521211-3**						
Barium (Ba)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	03-MAY-17
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-MAY-17
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	03-MAY-17
Boron (B)-Total		0.040	0.041		mg/L	1.7	20	03-MAY-17
Cadmium (Cd)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	03-MAY-17
Calcium (Ca)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	20	03-MAY-17
Chromium (Cr)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-MAY-17
Cesium (Cs)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	03-MAY-17
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-MAY-17
Copper (Cu)-Total		0.0162	0.0165		mg/L	1.9	20	03-MAY-17
Iron (Fe)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	03-MAY-17
Lead (Pb)-Total		0.000589	0.000605		mg/L	2.7	20	03-MAY-17
Magnesium (Mg)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	03-MAY-17
Manganese (Mn)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-MAY-17
Molybdenum (Mo)-Total		0.000387	0.000400		mg/L	3.3	20	03-MAY-17
Nickel (Ni)-Total		0.00074	0.00078		mg/L	4.2	20	03-MAY-17
Phosphorus (P)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	03-MAY-17
Potassium (K)-Total		0.096	0.097		mg/L	0.1	20	03-MAY-17
Rubidium (Rb)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	03-MAY-17
Selenium (Se)-Total		0.000259	0.000289		mg/L	11	20	03-MAY-17
Silicon (Si)-Total		2.27	2.31		mg/L	1.7	20	03-MAY-17
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	03-MAY-17
Sodium (Na)-Total		259	260		mg/L	0.5	20	03-MAY-17
Strontium (Sr)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-MAY-17
Sulfur (S)-Total		9.30	9.60		mg/L	3.1	25	03-MAY-17
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	03-MAY-17
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	03-MAY-17
Thorium (Th)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	25	03-MAY-17
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-MAY-17
Titanium (Ti)-Total		0.00055	0.00051		mg/L	6.2	20	03-MAY-17
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-MAY-17
Uranium (U)-Total		0.000218	0.000218		mg/L	0.4	20	03-MAY-17
Vanadium (V)-Total		<0.00050	<0.00050		mg/L			03-MAY-17

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R3714203								
WG2521211-4 DUP		**WG2521211-3**						
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-MAY-17
Zinc (Zn)-Total		0.0131	0.0136		mg/L	4.3	20	03-MAY-17
Zirconium (Zr)-Total		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	03-MAY-17
WG2521211-2 LCS								
Aluminum (Al)-Total			96.8		%		80-120	03-MAY-17
Antimony (Sb)-Total			97.7		%		80-120	03-MAY-17
Arsenic (As)-Total			95.9		%		80-120	03-MAY-17
Barium (Ba)-Total			94.7		%		80-120	03-MAY-17
Beryllium (Be)-Total			97.6		%		80-120	03-MAY-17
Bismuth (Bi)-Total			102.7		%		80-120	03-MAY-17
Boron (B)-Total			97.4		%		80-120	03-MAY-17
Cadmium (Cd)-Total			97.7		%		80-120	03-MAY-17
Calcium (Ca)-Total			95.8		%		80-120	03-MAY-17
Chromium (Cr)-Total			93.9		%		80-120	03-MAY-17
Cesium (Cs)-Total			104.4		%		80-120	03-MAY-17
Cobalt (Co)-Total			95.1		%		80-120	03-MAY-17
Copper (Cu)-Total			94.2		%		80-120	03-MAY-17
Iron (Fe)-Total			92.5		%		80-120	03-MAY-17
Lead (Pb)-Total			101.2		%		80-120	03-MAY-17
Magnesium (Mg)-Total			97.5		%		80-120	03-MAY-17
Manganese (Mn)-Total			98.5		%		80-120	03-MAY-17
Molybdenum (Mo)-Total			94.2		%		80-120	03-MAY-17
Nickel (Ni)-Total			94.1		%		80-120	03-MAY-17
Phosphorus (P)-Total			98.7		%		70-130	03-MAY-17
Potassium (K)-Total			99.2		%		80-120	03-MAY-17
Rubidium (Rb)-Total			102.3		%		80-120	03-MAY-17
Selenium (Se)-Total			92.4		%		80-120	03-MAY-17
Silicon (Si)-Total			105.9		%		60-140	03-MAY-17
Silver (Ag)-Total			101.7		%		80-120	03-MAY-17
Sodium (Na)-Total			95.3		%		80-120	03-MAY-17
Strontium (Sr)-Total			99.5		%		80-120	03-MAY-17
Sulfur (S)-Total			99.6		%		70-130	03-MAY-17
Thallium (Tl)-Total			99.0		%		80-120	03-MAY-17
Tellurium (Te)-Total			95.4				80-120	

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R3714203								
WG2521211-2 LCS								
Tellurium (Te)-Total			95.4		%		80-120	03-MAY-17
Thorium (Th)-Total			100.1		%		70-130	03-MAY-17
Tin (Sn)-Total			96.8		%		80-120	03-MAY-17
Titanium (Ti)-Total			94.7		%		80-120	03-MAY-17
Tungsten (W)-Total			98.0		%		80-120	03-MAY-17
Uranium (U)-Total			102.2		%		80-120	03-MAY-17
Vanadium (V)-Total			96.5		%		80-120	03-MAY-17
Zinc (Zn)-Total			89.7		%		80-120	03-MAY-17
Zirconium (Zr)-Total			94.8		%		80-120	03-MAY-17
WG2521211-1 MB								
Aluminum (Al)-Total			<0.010		mg/L		0.01	03-MAY-17
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	03-MAY-17
Arsenic (As)-Total			<0.00010		mg/L		0.0001	03-MAY-17
Barium (Ba)-Total			<0.00020		mg/L		0.0002	03-MAY-17
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	03-MAY-17
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	03-MAY-17
Boron (B)-Total			<0.010		mg/L		0.01	03-MAY-17
Cadmium (Cd)-Total			<0.000010		mg/L		0.00001	03-MAY-17
Calcium (Ca)-Total			<0.50		mg/L		0.5	03-MAY-17
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	03-MAY-17
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	03-MAY-17
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	03-MAY-17
Copper (Cu)-Total			<0.0010		mg/L		0.001	03-MAY-17
Iron (Fe)-Total			<0.050		mg/L		0.05	03-MAY-17
Lead (Pb)-Total			<0.000050		mg/L		0.00005	03-MAY-17
Magnesium (Mg)-Total			<0.050		mg/L		0.05	03-MAY-17
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	03-MAY-17
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	03-MAY-17
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	03-MAY-17
Phosphorus (P)-Total			<0.050		mg/L		0.05	03-MAY-17
Potassium (K)-Total			<0.050		mg/L		0.05	03-MAY-17
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	03-MAY-17
Selenium (Se)-Total			<0.000050		mg/L		0.00005	03-MAY-17
Silicon (Si)-Total			<0.10		mg/L		0.1	03-MAY-17

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R3714203								
WG2521211-1 MB								
Silver (Ag)-Total			<0.000050		mg/L		0.00005	03-MAY-17
Sodium (Na)-Total			<0.50		mg/L		0.5	03-MAY-17
Strontium (Sr)-Total			<0.0010		mg/L		0.001	03-MAY-17
Sulfur (S)-Total			<0.50		mg/L		0.5	03-MAY-17
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	03-MAY-17
Tellurium (Te)-Total			0.00023	MB-LOR	mg/L		0.0002	03-MAY-17
Thorium (Th)-Total			<0.00010		mg/L		0.0001	03-MAY-17
Tin (Sn)-Total			<0.00010		mg/L		0.0001	03-MAY-17
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	03-MAY-17
Tungsten (W)-Total			<0.00010		mg/L		0.0001	03-MAY-17
Uranium (U)-Total			<0.000010		mg/L		0.00001	03-MAY-17
Vanadium (V)-Total			<0.00050		mg/L		0.0005	03-MAY-17
Zinc (Zn)-Total			<0.0030		mg/L		0.003	03-MAY-17
Zirconium (Zr)-Total			<0.00030		mg/L		0.0003	03-MAY-17
WG2521211-5 MS		**WG2521211-3**						
Aluminum (Al)-Total			96.9		%		70-130	03-MAY-17
Antimony (Sb)-Total			102.3		%		70-130	03-MAY-17
Arsenic (As)-Total			97.9		%		70-130	03-MAY-17
Barium (Ba)-Total			93.6		%		70-130	03-MAY-17
Beryllium (Be)-Total			93.9		%		70-130	03-MAY-17
Bismuth (Bi)-Total			93.7		%		70-130	03-MAY-17
Boron (B)-Total			87.3		%		70-130	03-MAY-17
Cadmium (Cd)-Total			98.5		%		70-130	03-MAY-17
Calcium (Ca)-Total			92.0		%		70-130	03-MAY-17
Chromium (Cr)-Total			96.7		%		70-130	03-MAY-17
Cesium (Cs)-Total			104.4		%		70-130	03-MAY-17
Cobalt (Co)-Total			94.9		%		70-130	03-MAY-17
Copper (Cu)-Total			N/A	MS-B	%		-	03-MAY-17
Iron (Fe)-Total			90.4		%		70-130	03-MAY-17
Lead (Pb)-Total			94.3		%		70-130	03-MAY-17
Magnesium (Mg)-Total			95.9		%		70-130	03-MAY-17
Manganese (Mn)-Total			99.0		%		70-130	03-MAY-17
Molybdenum (Mo)-Total			94.5		%		70-130	03-MAY-17
Nickel (Ni)-Total			92.3		%		70-130	03-MAY-17

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R3714203								
WG2521211-5 MS		**WG2521211-3**						
Phosphorus (P)-Total			106.5		%		70-130	03-MAY-17
Potassium (K)-Total			98.4		%		70-130	03-MAY-17
Rubidium (Rb)-Total			100.3		%		70-130	03-MAY-17
Selenium (Se)-Total			94.9		%		70-130	03-MAY-17
Silicon (Si)-Total			N/A	MS-B	%		-	03-MAY-17
Silver (Ag)-Total			98.1		%		70-130	03-MAY-17
Sodium (Na)-Total			N/A	MS-B	%		-	03-MAY-17
Strontium (Sr)-Total			97.8		%		70-130	03-MAY-17
Sulfur (S)-Total			N/A	MS-B	%		-	03-MAY-17
Thallium (Tl)-Total			87.7		%		70-130	03-MAY-17
Tellurium (Te)-Total			88.4		%		70-130	03-MAY-17
Thorium (Th)-Total			96.7		%		70-130	03-MAY-17
Tin (Sn)-Total			98.8		%		70-130	03-MAY-17
Titanium (Ti)-Total			98.5		%		70-130	03-MAY-17
Tungsten (W)-Total			96.9		%		70-130	03-MAY-17
Uranium (U)-Total			93.4		%		70-130	03-MAY-17
Vanadium (V)-Total			100.8		%		70-130	03-MAY-17
Zinc (Zn)-Total			90.3		%		70-130	03-MAY-17
Zirconium (Zr)-Total			93.1		%		70-130	03-MAY-17
NH3-WT	**Water**							
Batch R3713932								
WG2521262-11 DUP		**L1920280-1**						
Ammonia, Total (as N)		1.13	1.10		mg/L	2.9	20	03-MAY-17
WG2521262-10 LCS								
Ammonia, Total (as N)			104.6		%		85-115	03-MAY-17
WG2521262-9 MB								
Ammonia, Total (as N)			<0.020		mg/L		0.02	03-MAY-17
WG2521262-12 MS		**L1920280-1**						
Ammonia, Total (as N)			N/A	MS-B	%		-	03-MAY-17
NO2-IC-WT	**Water**							
Batch R3715614								
WG2522076-10 DUP		**WG2522076-8**						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	25	04-MAY-17
WG2522076-7 LCS								
Nitrite (as N)			102.0				70-130	

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO2-IC-WT	**Water**							
Batch R3715614								
WG2522076-7 LCS								
Nitrite (as N)			102.0		%		70-130	04-MAY-17
WG2522076-6 MB								
Nitrite (as N)			<0.010		mg/L		0.01	04-MAY-17
WG2522076-9 MS		**WG2522076-8**						
Nitrite (as N)			99.6		%		70-130	04-MAY-17
NO3-IC-WT	**Water**							
Batch R3715614								
WG2522076-10 DUP		**WG2522076-8**						
Nitrate (as N)		0.393	0.404		mg/L	2.9	25	04-MAY-17
WG2522076-7 LCS								
Nitrate (as N)			99.1		%		70-130	04-MAY-17
WG2522076-6 MB								
Nitrate (as N)			<0.020		mg/L		0.02	04-MAY-17
WG2522076-9 MS		**WG2522076-8**						
Nitrate (as N)			100.8		%		70-130	04-MAY-17
PH-ALK-WT	**Water**							
Batch R3713958								
WG2521195-8 DUP		**WG2521195-7**						
pH		7.93	7.94	J	pH units	0.01	0.2	03-MAY-17
WG2521195-5 LCS								
pH			6.99		pH units		6.9-7.1	03-MAY-17
PO4-DO-COL-WT	**Water**							
Batch R3715404								
WG2522140-3 DUP		**L1920202-1**						
Orthophosphate-Dissolved (as P)		0.0034	0.0032		mg/L	6.0	30	04-MAY-17
WG2522140-2 LCS								
Orthophosphate-Dissolved (as P)			97.6		%		70-130	04-MAY-17
WG2522140-1 MB								
Orthophosphate-Dissolved (as P)			<0.0030		mg/L		0.003	04-MAY-17
WG2522140-4 MS		**L1920202-1**						
Orthophosphate-Dissolved (as P)			97.8		%		70-130	04-MAY-17
REDOX-POTENTIAL-WT	**Water**							
Batch R3714263								
WG2521533-1 DUP		**L1918881-1**						
Redox Potential		211	220		mV	4.2	25	04-MAY-17

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-WT	**Water**							
Batch R3715614								
WG2522076-10 DUP		**WG2522076-8**						
Sulfate (SO4)		32.3	33.4		mg/L	3.4	20	04-MAY-17
WG2522076-7 LCS								
Sulfate (SO4)			99.6		%		90-110	04-MAY-17
WG2522076-6 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	04-MAY-17
WG2522076-9 MS		**WG2522076-8**						
Sulfate (SO4)			107.0		%		75-125	04-MAY-17
SOLIDS-TDS-WT	**Water**							
Batch R3714960								
WG2521158-3 DUP		**L1919532-1**						
Total Dissolved Solids		488	485		mg/L	0.6	20	03-MAY-17
WG2521158-2 LCS								
Total Dissolved Solids			102.2		%		85-115	03-MAY-17
WG2521158-1 MB								
Total Dissolved Solids			<10		mg/L		10	03-MAY-17
TC-MF-WT	**Water**							
Batch R3715020								
WG2521228-3 DUP		**WG2521228-4**						
Total Coliforms		30	20	RPD-NA	CFU/100mL	N/A	65	04-MAY-17
WG2521228-5 DUP		**WG2521228-6**						
Total Coliforms		0	0		CFU/100mL	0.0	65	04-MAY-17
WG2521228-1 MB								
Total Coliforms			0		CFU/100mL		1	04-MAY-17
WG2521228-7 MB								
Total Coliforms			0		CFU/100mL		1	04-MAY-17
TCB-MF-WT	**Water**							
Batch R3715020								
WG2521228-3 DUP		**WG2521228-4**						
Total Coliform Background		2900	2710		CFU/100mL	8.1	65	04-MAY-17
WG2521228-5 DUP		**WG2521228-6**						
Total Coliform Background		0	0		CFU/100mL	0.0	65	04-MAY-17
WG2521228-1 MB								
Total Coliform Background			0		CFU/100mL		1	04-MAY-17
WG2521228-7 MB								
Total Coliform Background			0		CFU/100mL		1	04-MAY-17
TURBIDITY-WT	**Water**							

Quality Control Report

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-WT	**Water**							
Batch R3714934								
WG2521186-6 DUP		**L1919947-21**						
Turbidity		21.8	21.4		NTU	1.9	15	03-MAY-17
WG2521186-5 LCS								
Turbidity			104.0		%		85-115	03-MAY-17
WG2521186-4 MB								
Turbidity			<0.10		NTU		0.1	03-MAY-17

Quality Control Report

Workorder: L1920280 Report Date: 12-MAY-17

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

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.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
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.

Quality Control Report

Workorder: L1920280 Report Date: 12-MAY-17

Client: GeoPro Consulting Limited (Richmond Hill)
40 Vogell Road Unit 22
Richmond Hill ON L4B 3N6
Contact: BuJing Guan

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Colour							
	1	01-MAY-17 10:00	03-MAY-17 10:42	48	49	hours	EHTL
Redox Potential							
	1	01-MAY-17 10:00	04-MAY-17 00:00	0.25	62	hours	EHTR-FM
Bacteriological Tests							
E. coli							
	1	01-MAY-17 10:00	03-MAY-17 14:15	48	52	hours	EHTL
Total Coliforms							
	1	01-MAY-17 10:00	03-MAY-17 14:15	48	52	hours	EHTL
Total Coliform Background							
	1	01-MAY-17 10:00	03-MAY-17 14:15	48	52	hours	EHTL

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L1920280 were received on 02-MAY-17 19:00.

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.

Short Holding Time
48Hr TAT

Request Form

Canada Toll Free: 1 800 668 9878

L1920280-COFC

COC Number: 15-17806

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	GeoPro Consulting Ltd.
Contact:	BuJing Guan
Phone:	(905) 237-8336
	Company address below will appear on the final report
Street:	40 Vogell Road, Unit 57
City/Province:	Richmond Hill, ON
Postal Code:	L4B 3N6
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

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	bguan@geoproconsulting.ca
Email 2	office@geoproconsulting.ca
Email 3	will sun
Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	bguan@geoproconsulting.ca
Email 2	office@geoproconsulting.ca

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	Q58286	AFE/Cost Center:	PO#
Job #:	17-17806	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:	Concession 5, Pickering, Ontario	Location:	
ALS Lab Work Order # (lab use only)	L1920280	ALS Contact: Emerson	Sampler: will sun

Select Service Level Below - Please confirm 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)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☐
2 day [P2]	☐		

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

Potability Package ✓

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	Number of Containers
1	BH 7	2017-05-01	10:00 AM	GW	5

Drinking Water (DW) Samples [1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☒ NO	potability package
Are samples for human drinking water use? ☑ YES ☐ NO	

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		
			6.1°C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
will sun	2017 05 02						02-May-17	19:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

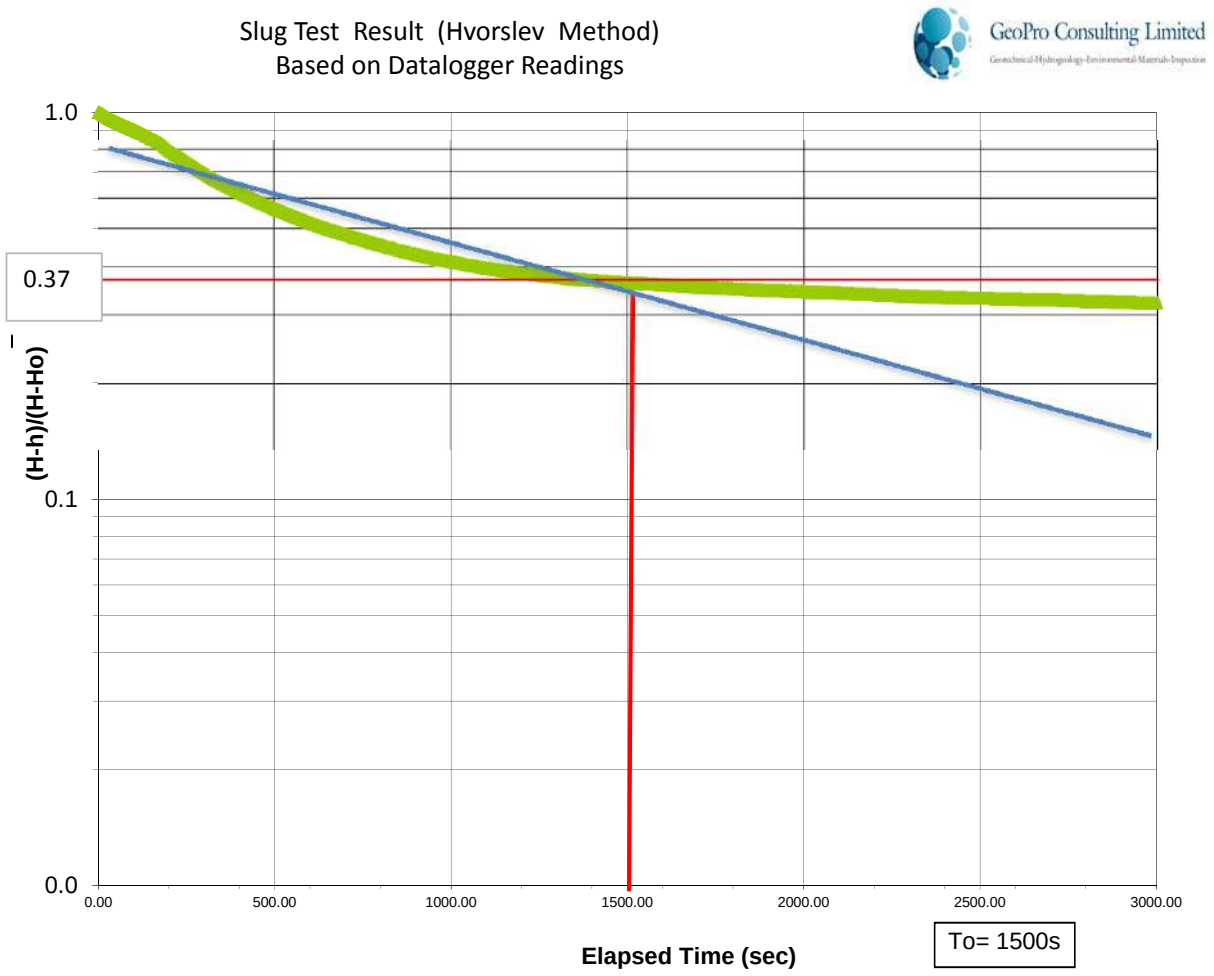
Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

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

APPENDIX D

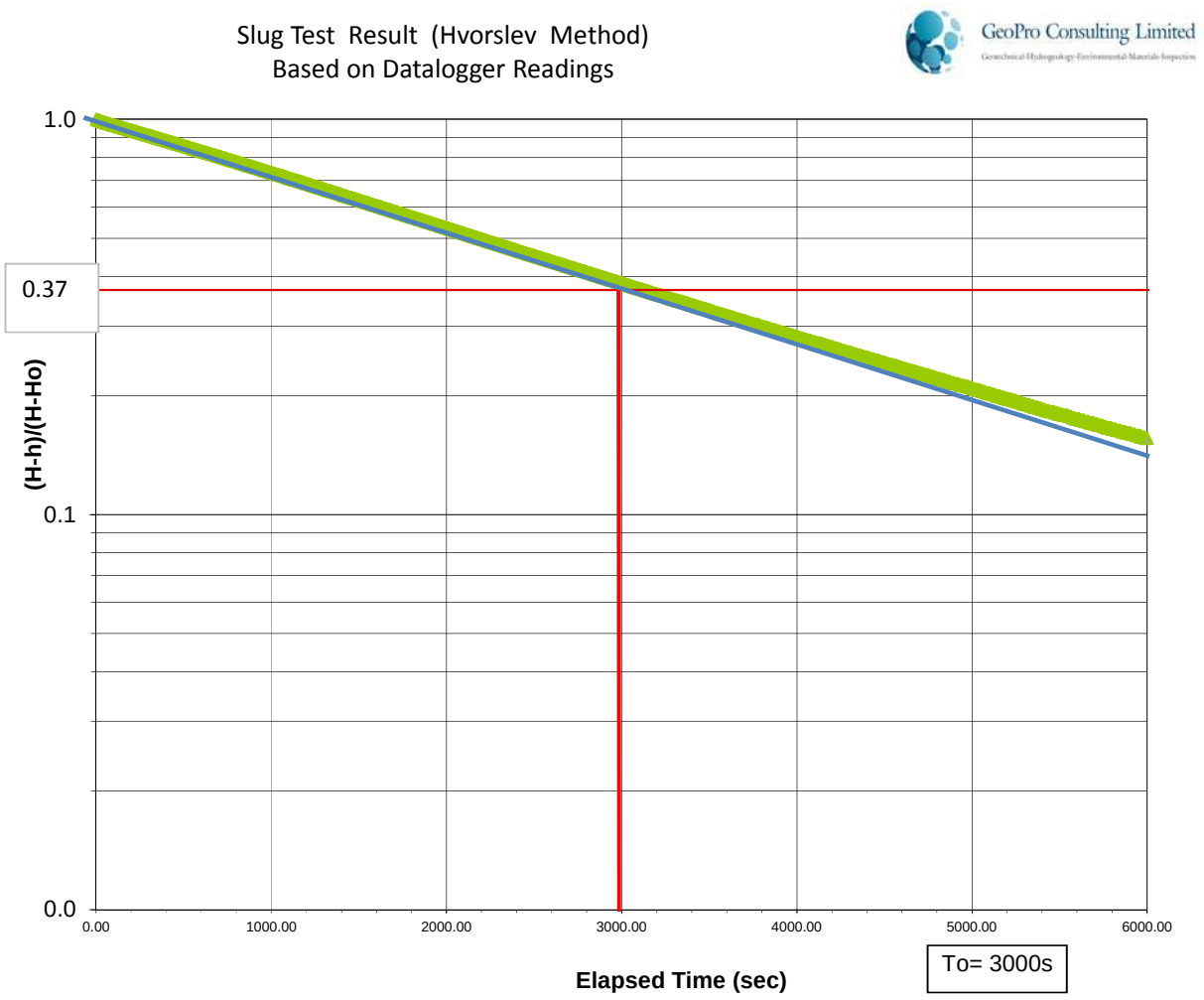
Slug Test: BH1
(Based on data from Datalogger - Rising Head Method -April 26, 2017)

Project Location: Parts of Lots 3 and 4, Concession 5, Pickering, Ontario				
Project No. : 17-1780H		H =	Assumed Initial Water Head	
Conducted by:	Kaiying Qiu	Ho =	Water Head at time = 0	
Interpretted by:	Will Sun	h =	Water Head/Level at time t	
Well Number:	BH1			
Screen Depth (mBGS):	5.2 ~ 6.7			
Well Elevation (mASL):	135.30	L =	150	cm
Well Diameter:	2.0" ID	R =	7.75	cm
Static Water Level (mBGS):	1.64	r =	2.55	cm
Finish Reading (H)	12.87	To =	1500	sec
Start Reading (h_0)	10.911	$K = r^2\ln(L/R)/(2LTo)$ =	**4.3E-05**	cm/s



Slug Test: BH2
(Based on data from Datalogger - Rising Head Method -April 26, 2017)

Project Location: Parts of Lots 3 and 4, Concession 5, Pickering, Ontario				
Project No. : 17-1780H		H =	Assumed Initial Water Head	
Conducted by:	Will Sun	Ho =	Water Head at time = 0	
Interpretted by:	Kaiying Qiu	h =	Water Head/Level at time t	
Well Number:	BH2			
Screen Depth (mBGS):	2.2 ~ 3.7			
Well Elevation (mASL):	133.00	L =	150	cm
Well Diameter:	2.0" ID	R =	7.75	cm
Static Water Level (mBGS):	0.9	r =	2.55	cm
Finish Reading (H)	12.621	To =	3000	sec
Start Reading (h_0)	10.215	$K = r^2 \ln(L/R)/(2LTo)$ =	**2.1E-05**	cm/s



Slug Test: BH3
(Based on data from Datalogger - Rising Head Method -April 26, 2017)

Project Location: Parts of Lots 3 and 4, Concession 5, Pickering, Ontario				
Project No. : 17-1780H		H =	Assumed Initial Water Head	
Conducted by:	Will Sun	Ho =	Water Head at time = 0	
Interpretted by:	Kaiying Qiu	h =	Water Head/Level at time t	
Well Number:	BH3			
Screen Depth (mBGS):	1.2 ~ 2.7			
Well Elevation (mASL):	133.60	L =	150	cm
Well Diameter:	2.0" ID	R =	7.75	cm
Static Water Level (mBGS):	0.7	r =	2.55	cm
Finish Reading (H)	11.958	To =	300	sec
Start Reading (h_0)	10.503	$K = r^2 \ln(L/R)/(2LTo)$ =	**2.1E-04**	cm/s

Slug Test Result (Hvorslev Method)
Based on Datalogger Readings

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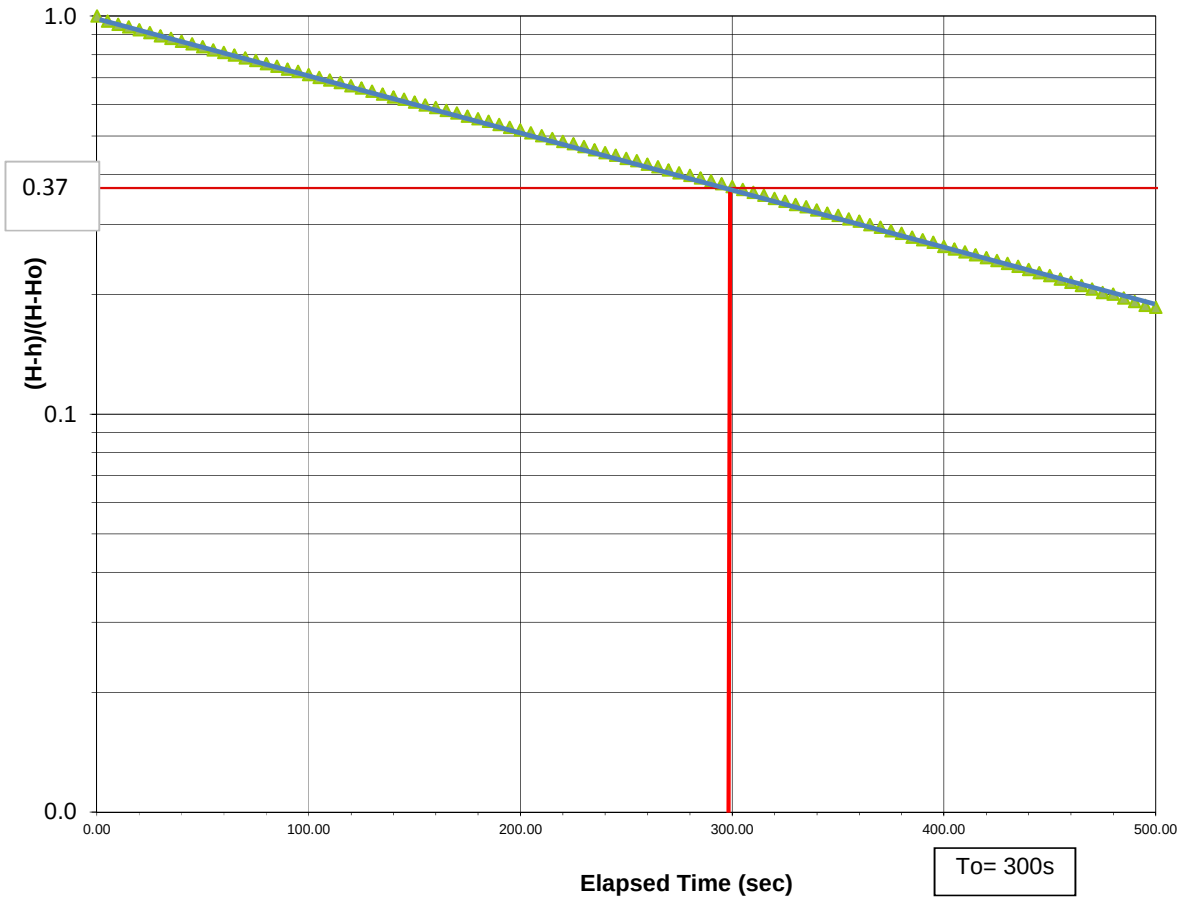
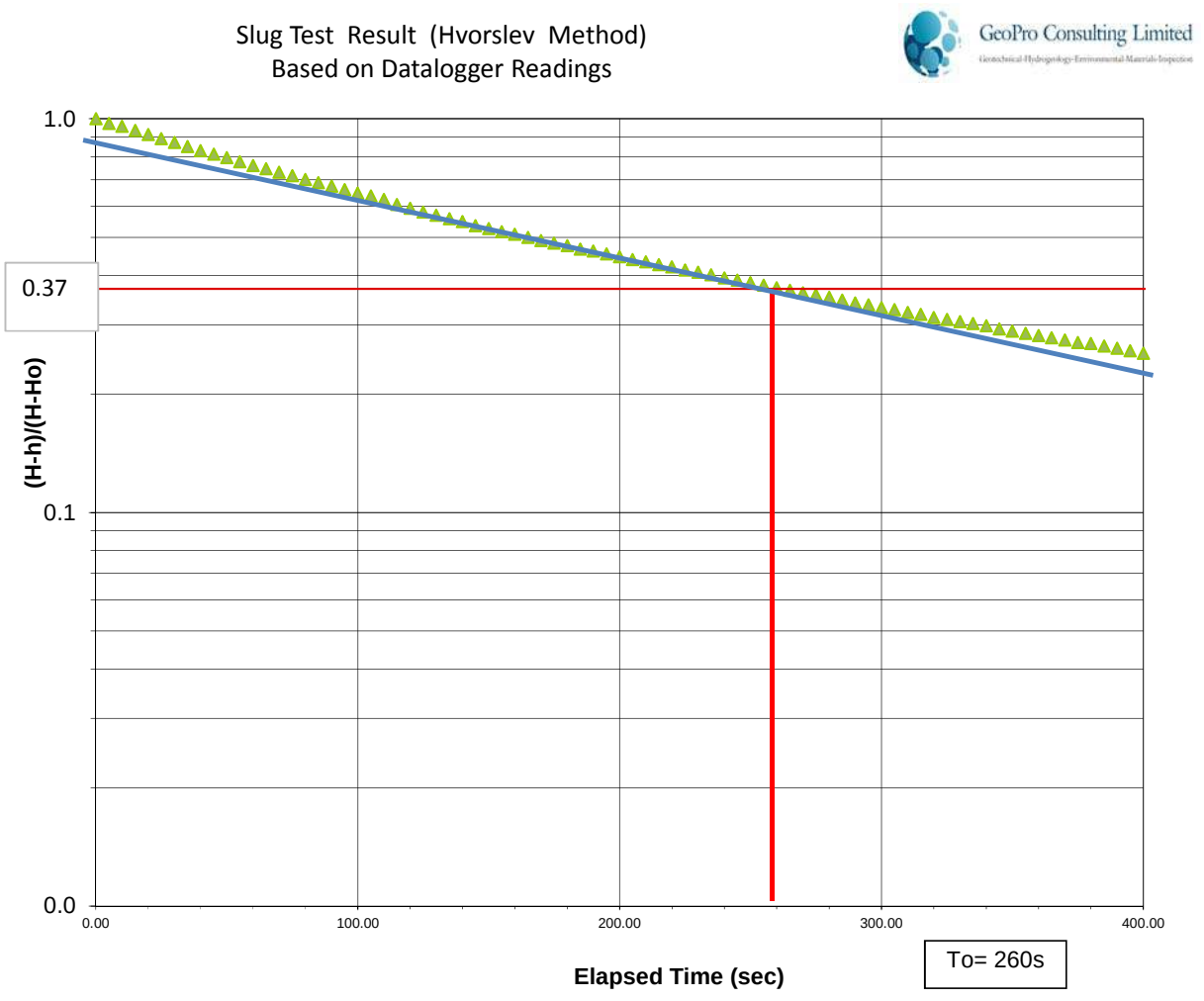


Slug Test: BH4
(Based on data from Datalogger - Rising Head Method -April 28, 2017)

Project Location: Parts of Lots 3 and 4, Concession 5, Pickering, Ontario				
Project No. : 17-1780H		H =	Assumed Initial Water Head	
Conducted by:	Will Sun	Ho =	Water Head at time = 0	
Interpretted by:	Kaiying Qiu	h =	Water Head/Level at time t	
Well Number:	BH4			
Screen Depth (mBGS):	3.1 ~ 6.1			
Well Elevation (mASL):	133.00	L =	300	cm
Well Diameter:	2.0" ID	R =	7.75	cm
Static Water Level (mBGS):	0.39	r =	2.55	cm
Finish Reading (H)	13.38	To =	260	sec
Start Reading (h_0)	11.76	$K = r^2 \ln(L/R)/(2LTo)$ =	**1.5E-04**	cm/s

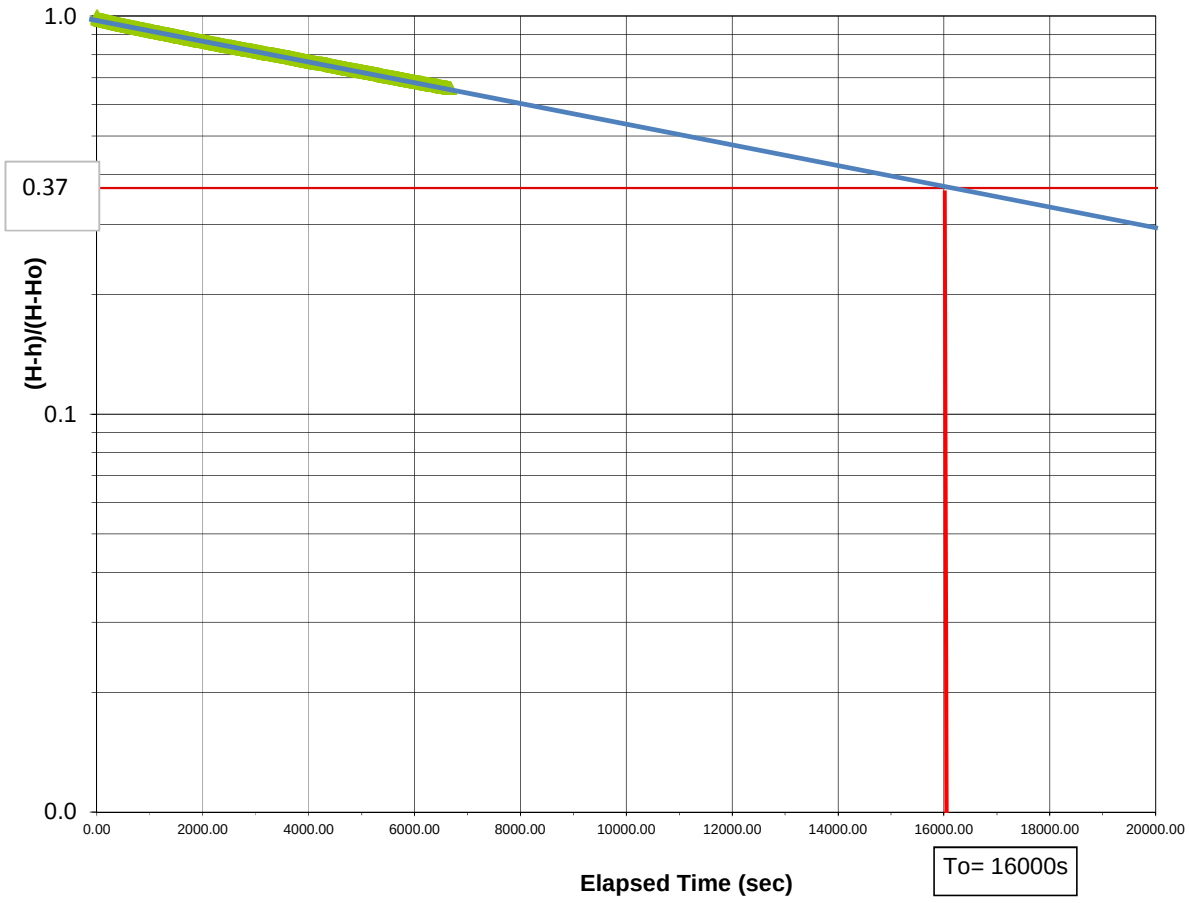


Slug Test: BH5
(Based on data from Datalogger - Failing Head Method -April 28, 2017)

Project Location: Parts of Lots 3 and 4, Concession 5, Pickering, Ontario				
Project No. : 17-1780H		H =	Assumed Initial Water Head	
Conducted by:	Will Sun	Ho =	Water Head at time = 0	
Interpretted by:	Kaiying Qiu	h =	Water Head/Level at time t	
Well Number:	BH5			
Screen Depth (mBGS):	3.1 ~ 6.1			
Well Elevation (mASL):	135.50	L =	300	cm
Well Diameter:	2.0" ID	R =	7.75	cm
Static Water Level (mBGS):	0.76	r =	2.55	cm
Finish Reading (H)	13.716	To =	16000	sec
Start Reading (h_0)	11.577	$K = r^2\ln(L/R)/(2LTo)$ =	**2.5E-06**	cm/s

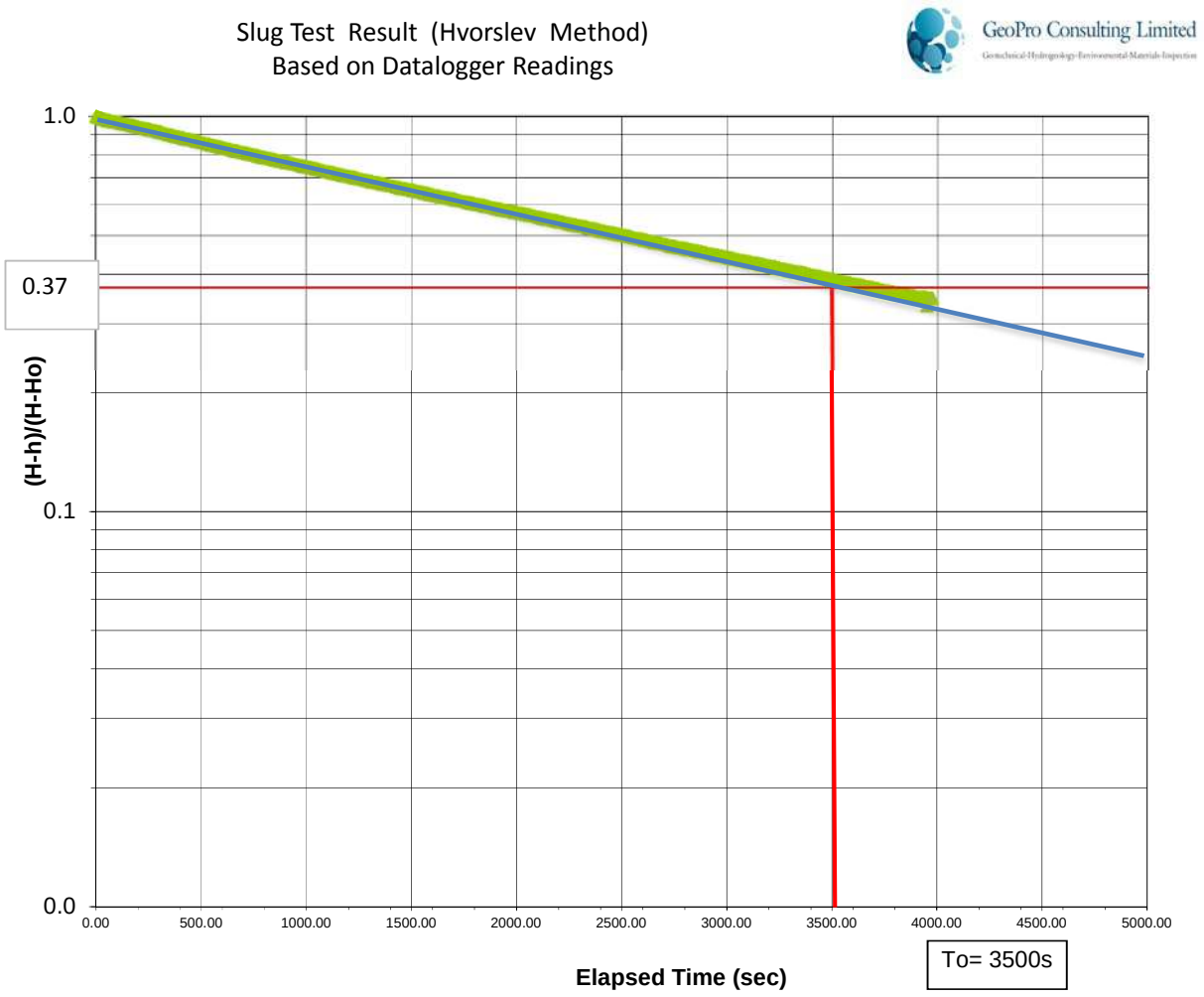
Slug Test Result (Hvorslev Method)
Based on Datalogger Readings

GeoPro Consulting Limited



Slug Test: BH6
(Based on data from Datalogger - Rising Head Method -April 26, 2017)

Project Location: Parts of Lots 3 and 4, Concession 5, Pickering, Ontario				
Project No. : 17-1780H		H =	Assumed Initial Water Head	
Conducted by:	Will Sun	Ho =	Water Head at time = 0	
Interpretted by:	Kaiying Qiu	h =	Water Head/Level at time t	
Well Number:	BH6			
Screen Depth (mBGS):	3.1 ~ 6.1			
Well Elevation (mASL):	136.70	L =	300	cm
Well Diameter:	2.0" ID	R =	7.75	cm
Static Water Level (mBGS):	1.57	r =	2.55	cm
Finish Reading (H)	12.789	To =	3500	sec
Start Reading (h_0)	11.394	$K = r^2 \ln(L/R)/(2LTo) =$	**1.1E-05**	cm/s

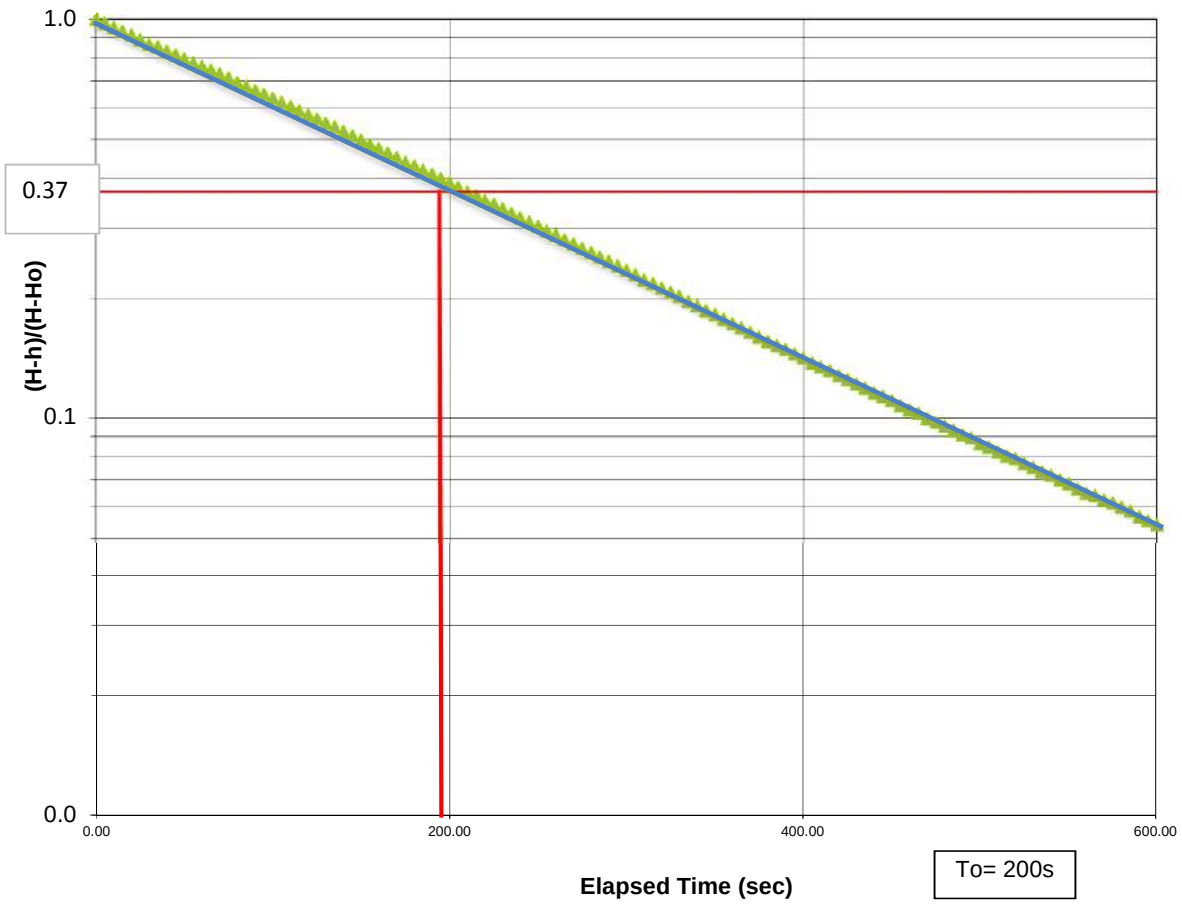


Slug Test: BH7
(Based on data from Datalogger - Rising Head Method -April 26, 2017)

Project Location: Parts of Lots 3 and 4, Concession 5, Pickering, Ontario				
Project No. : 17-1780H		H =	Assumed Initial Water Head	
Conducted by:	Will Sun	Ho =	Water Head at time = 0	
Interpretted by:	Kaiying Qiu	h =	Water Head/Level at time t	
Well Number:	BH7			
Screen Depth (mBGS):	28.1 ~ 29.6			
Well Elevation (mASL):	136.10	L =	150	cm
Well Diameter:	2.0" ID	R =	7.75	cm
Static Water Level (mBGS):	-0.66	r =	2.55	cm
Finish Reading (H)	23.1617	To =	200	sec
Start Reading (h_0)	21.2833	$K = r^2 \ln(L/R)/(2LTo)$ =	**3.2E-04**	cm/s

Slug Test Result (Hvorslev Method)
Based on Datalogger Readings

GeoPro Consulting Limited



APPENDIX E

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Chart F-1 Water Level Changes in Shallower Data Logger during Step-drawdown Pumping Tests

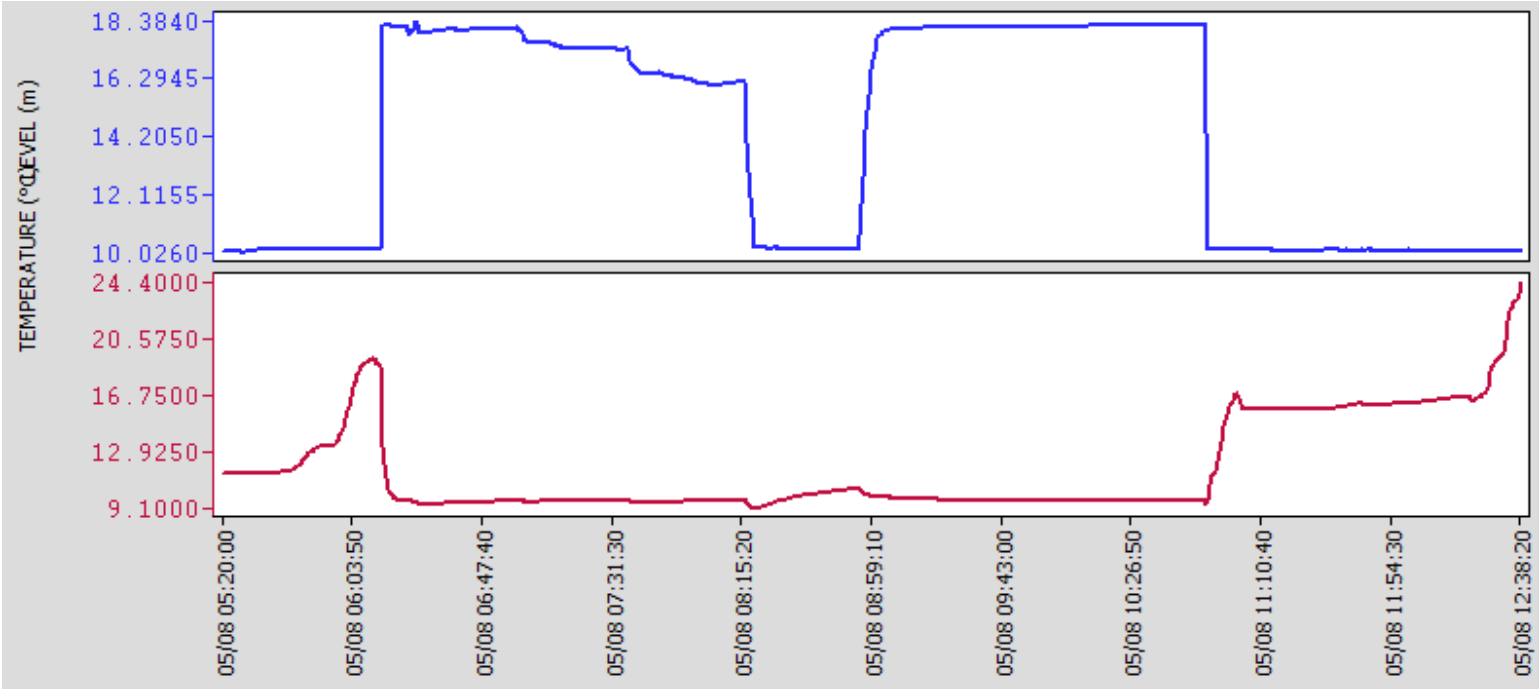

Chart F-2 Water Level Changes in Deeper Data Logger during Step-drawdown Pumping Tests

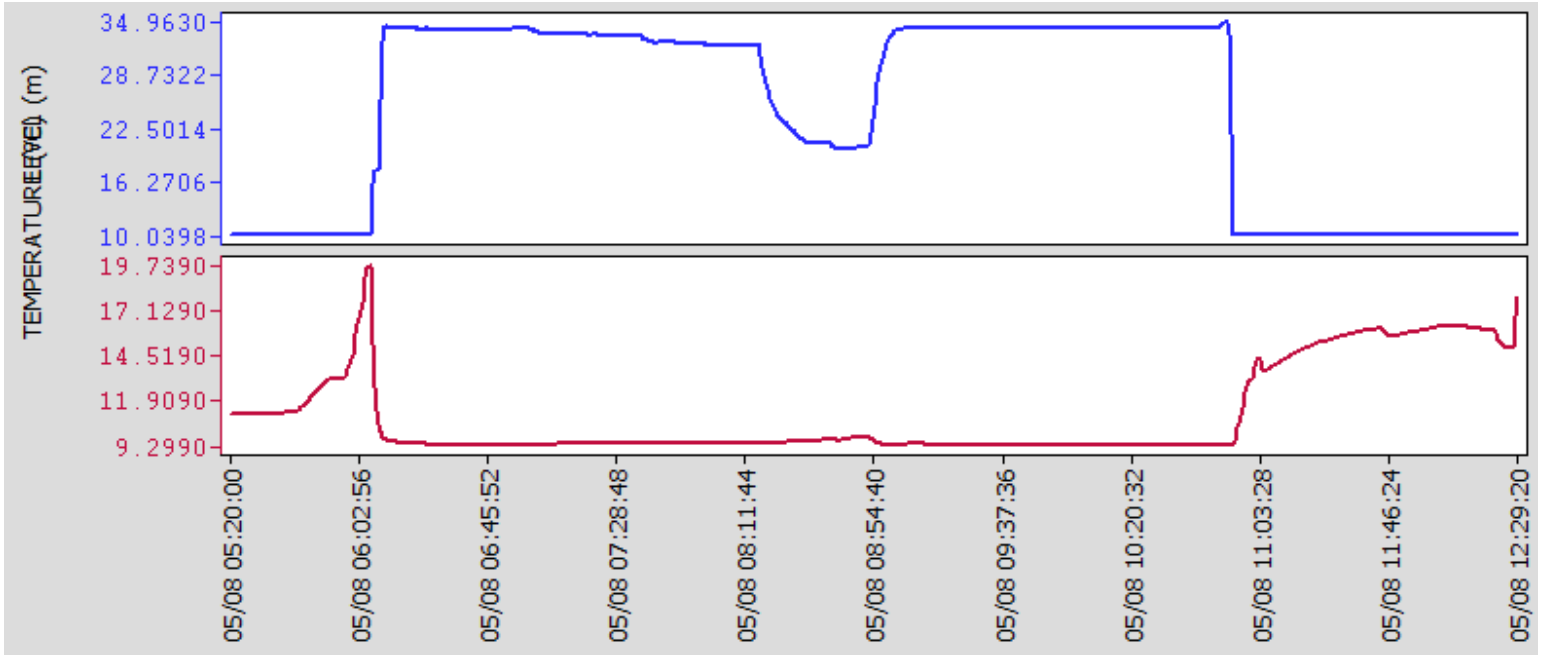

Chart F-3 Water Level Changes in Data Logger during Combined Pumping and Recovery Test

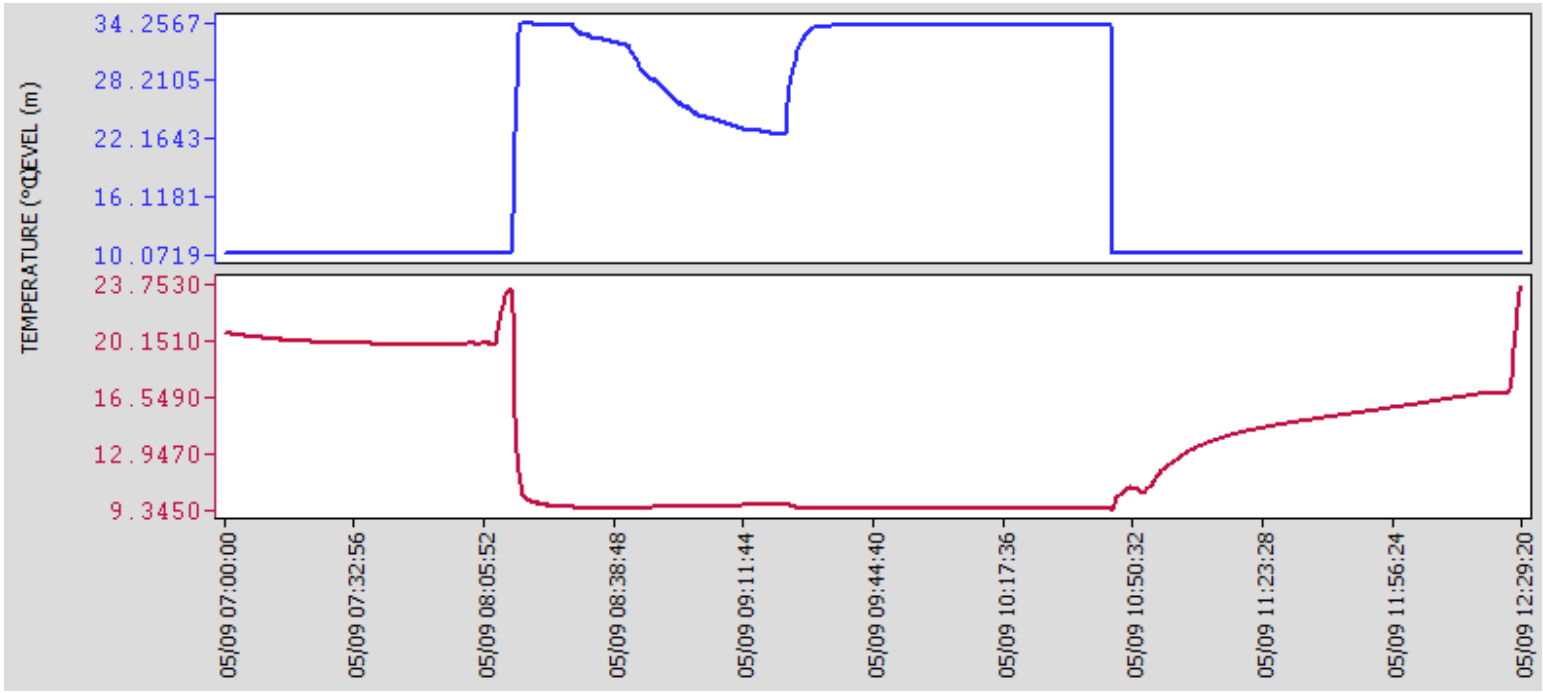

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Chart F-4 Drawdown and Pumping Rate Information of Step-drawdown Pumping Tests

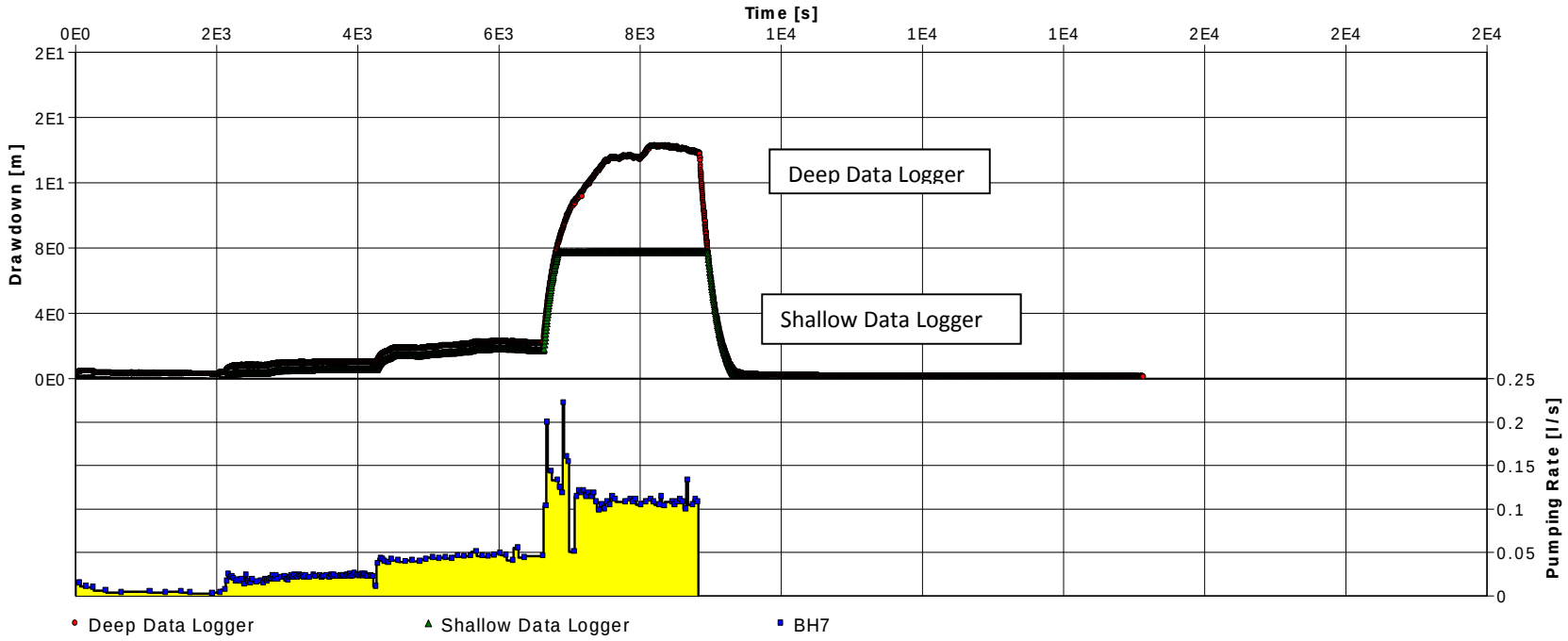

Chart F-5 Detailed Drawdown Information During Each Step of The Step-Drawdown Tests

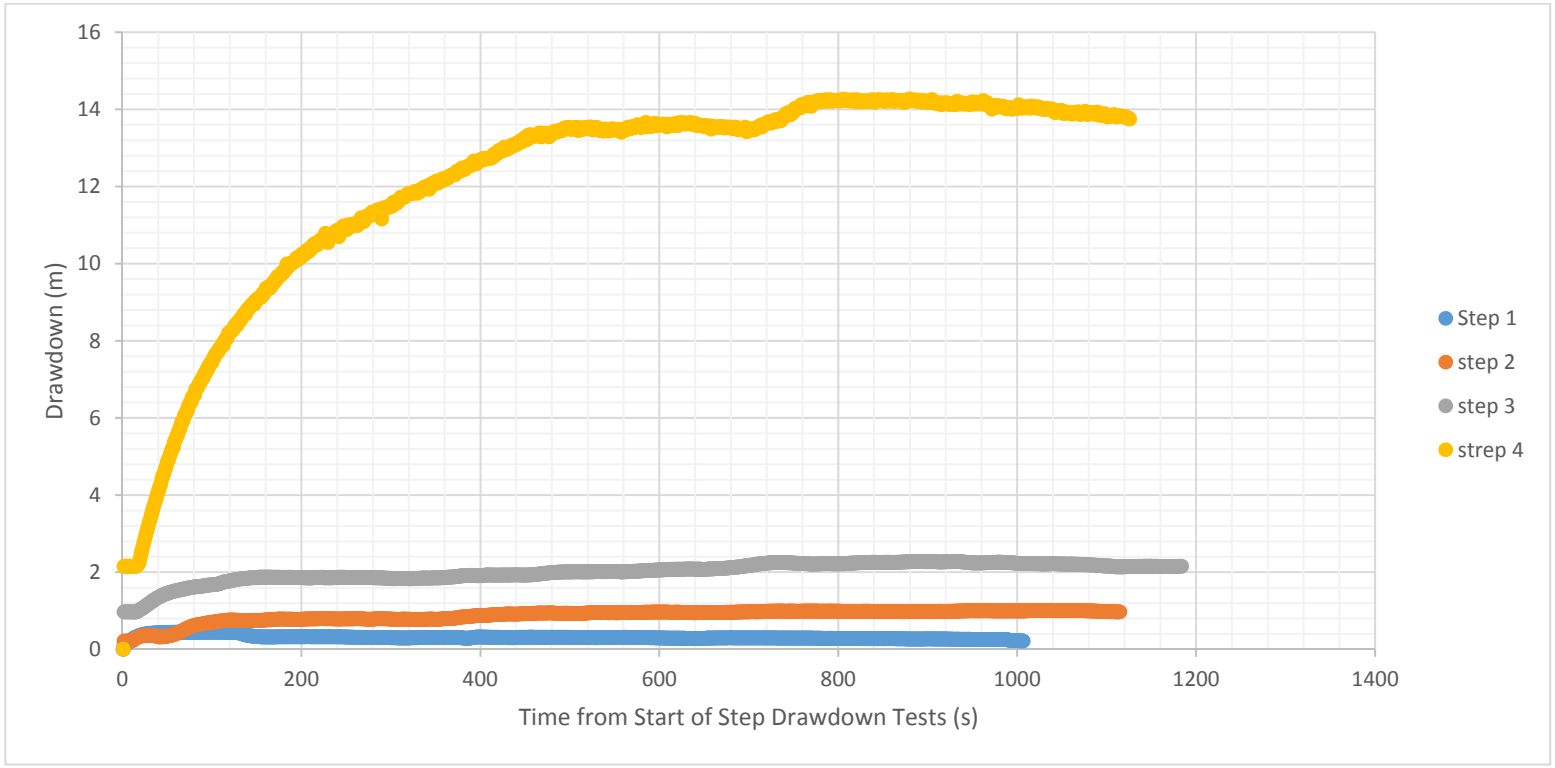

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Chart F-6 Drawdown and Pumping Rate Relation

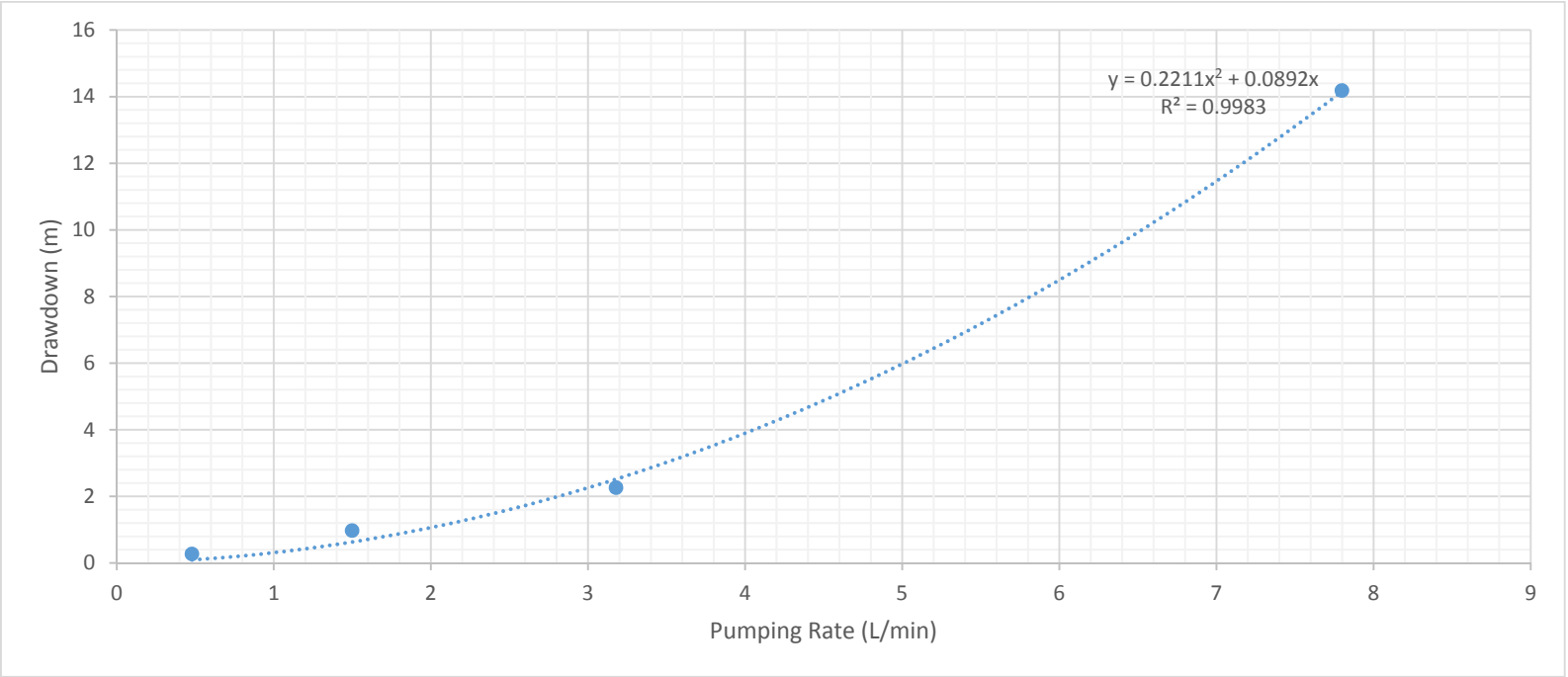

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Chart F-7 Optimum Pumping Rate

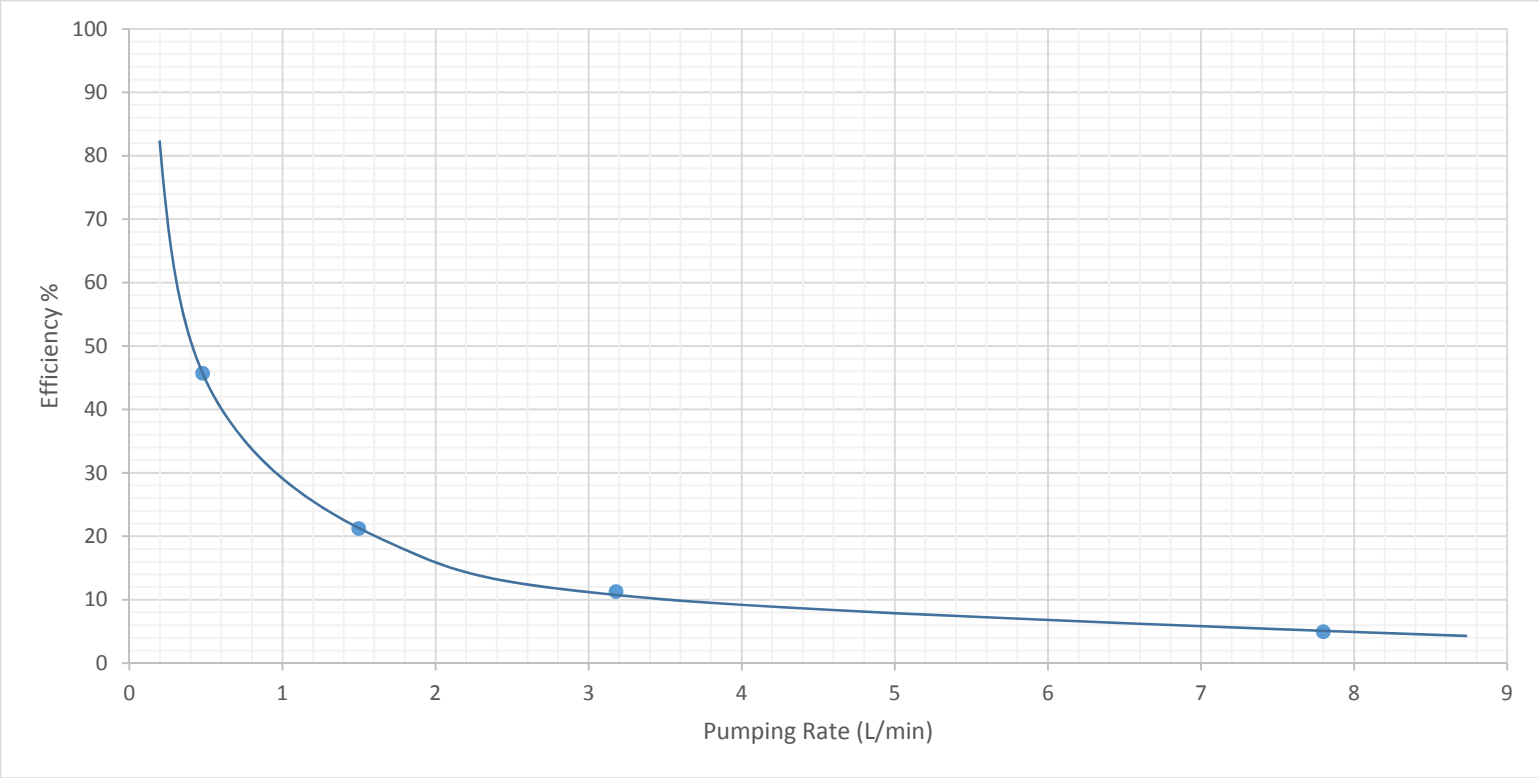

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Chart F-8 Specific Capacity and Pumping Rate Relation

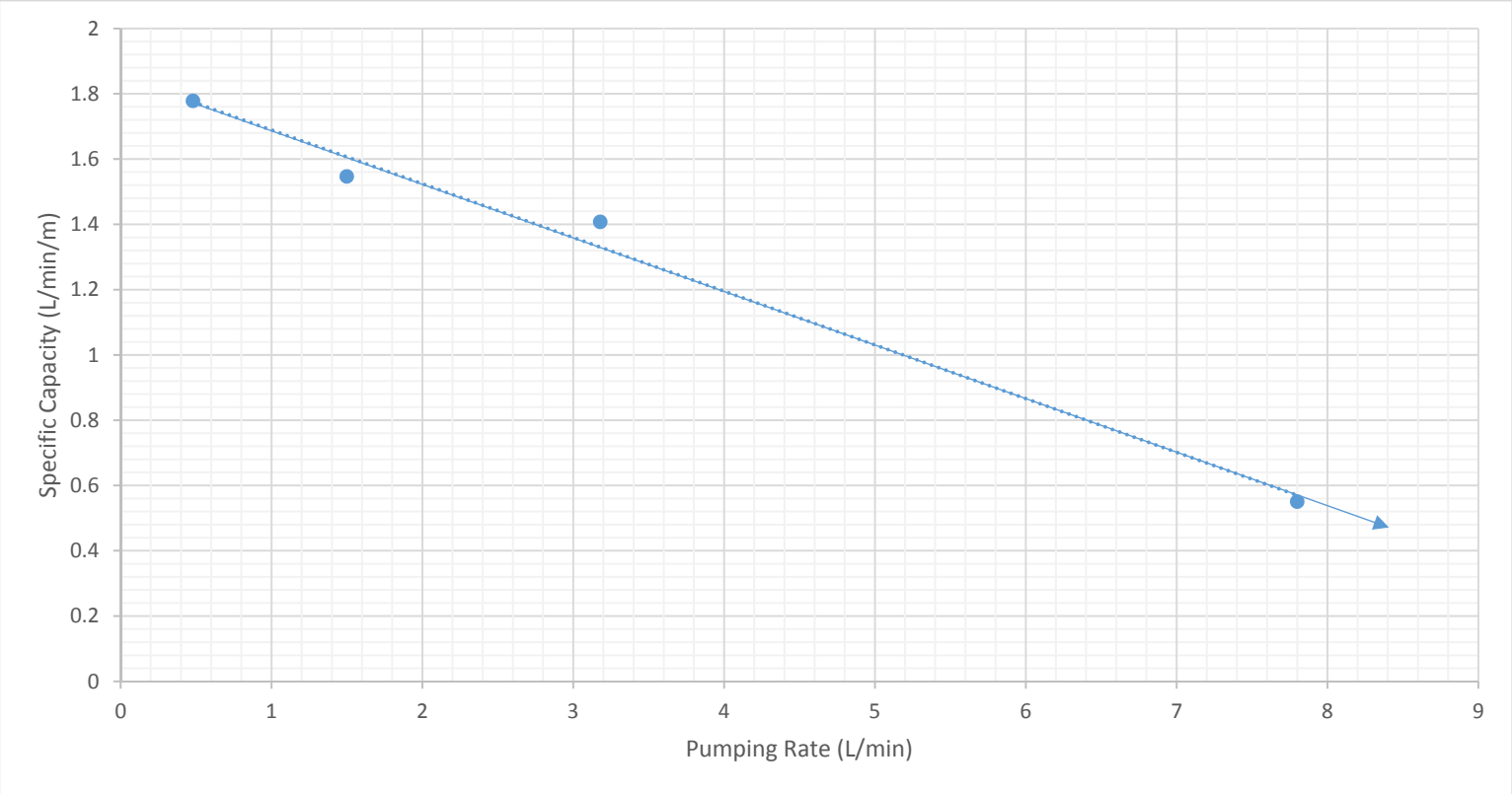

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Chart F-9 Drawdown and Pumping Rate Information of Combined Pumping and Recovery Test

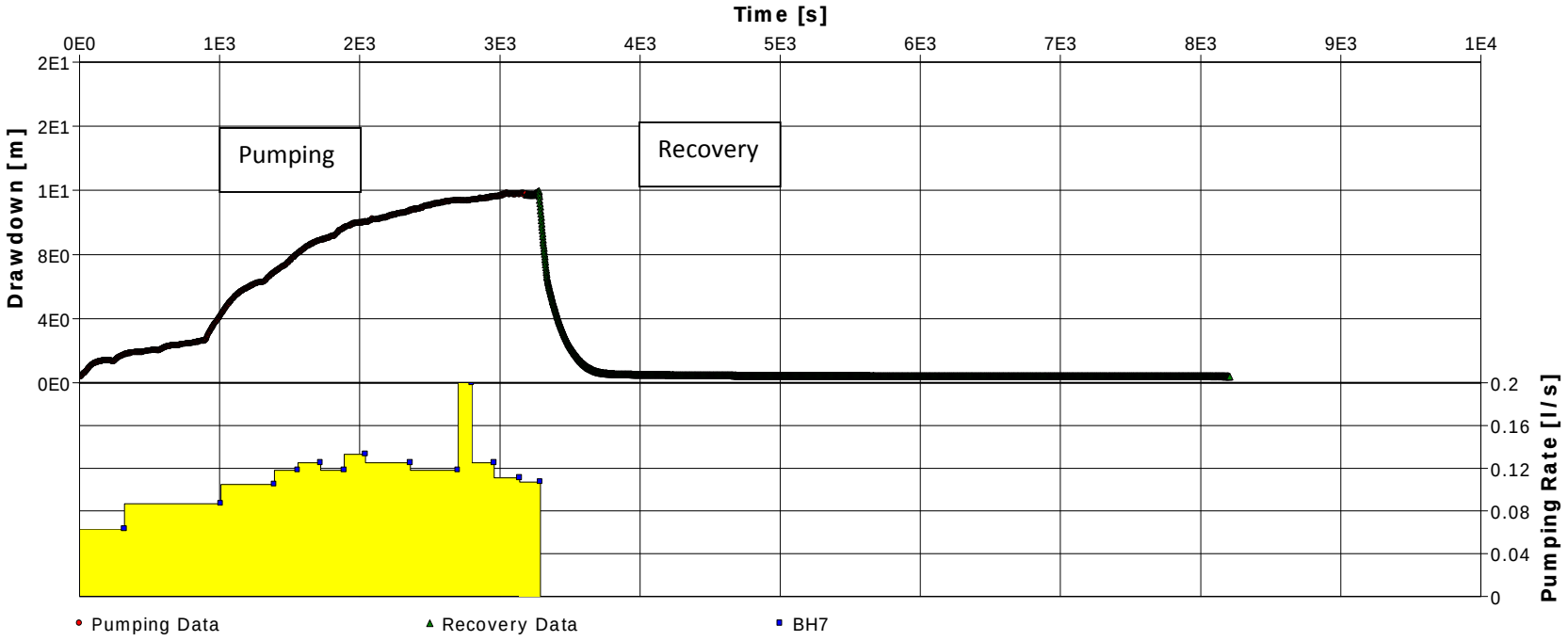

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Chart F-10 Drawdown Over Time of Constant Rate Combined Pumping and Recovery Test (Pumping Data)

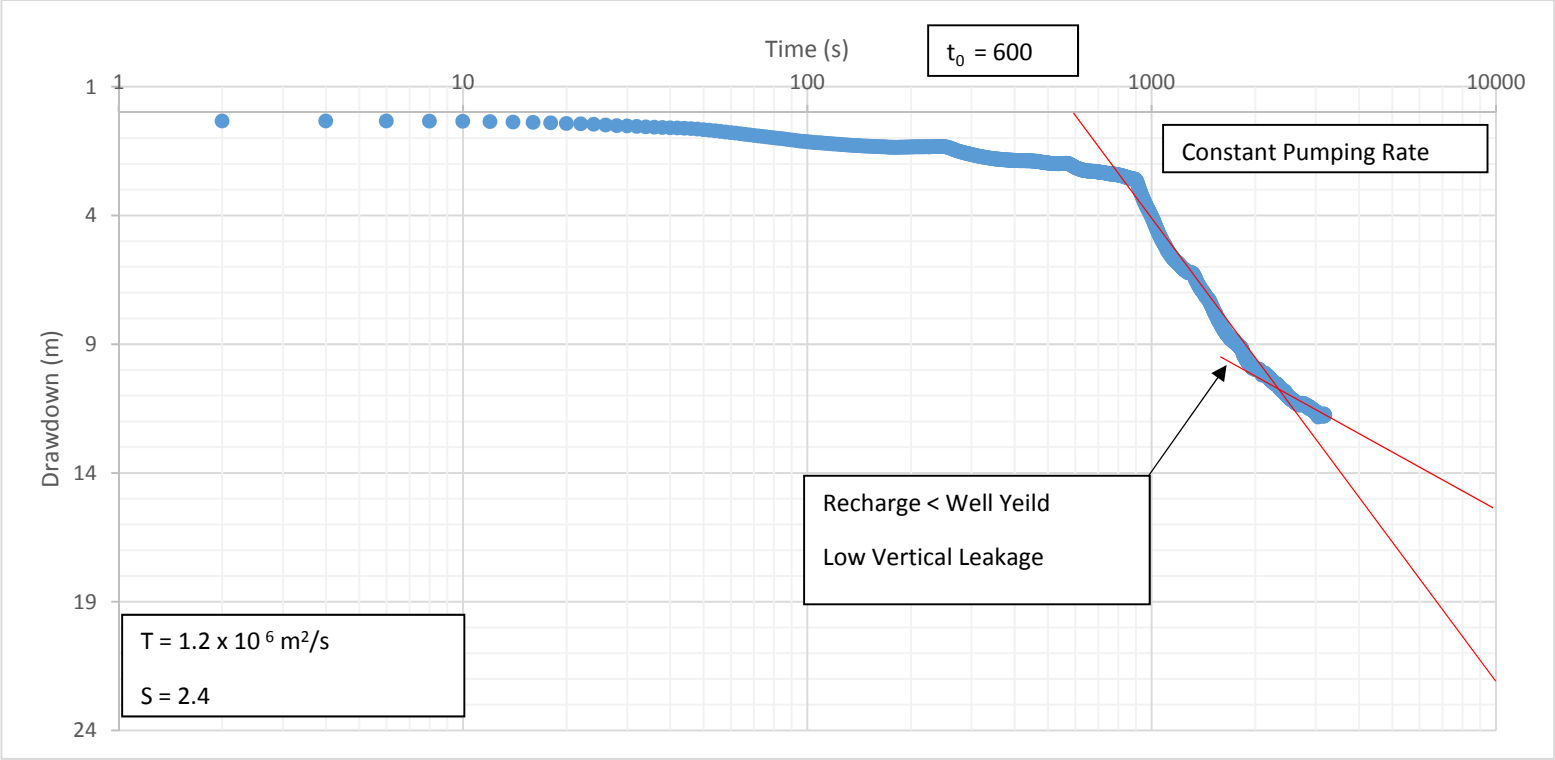

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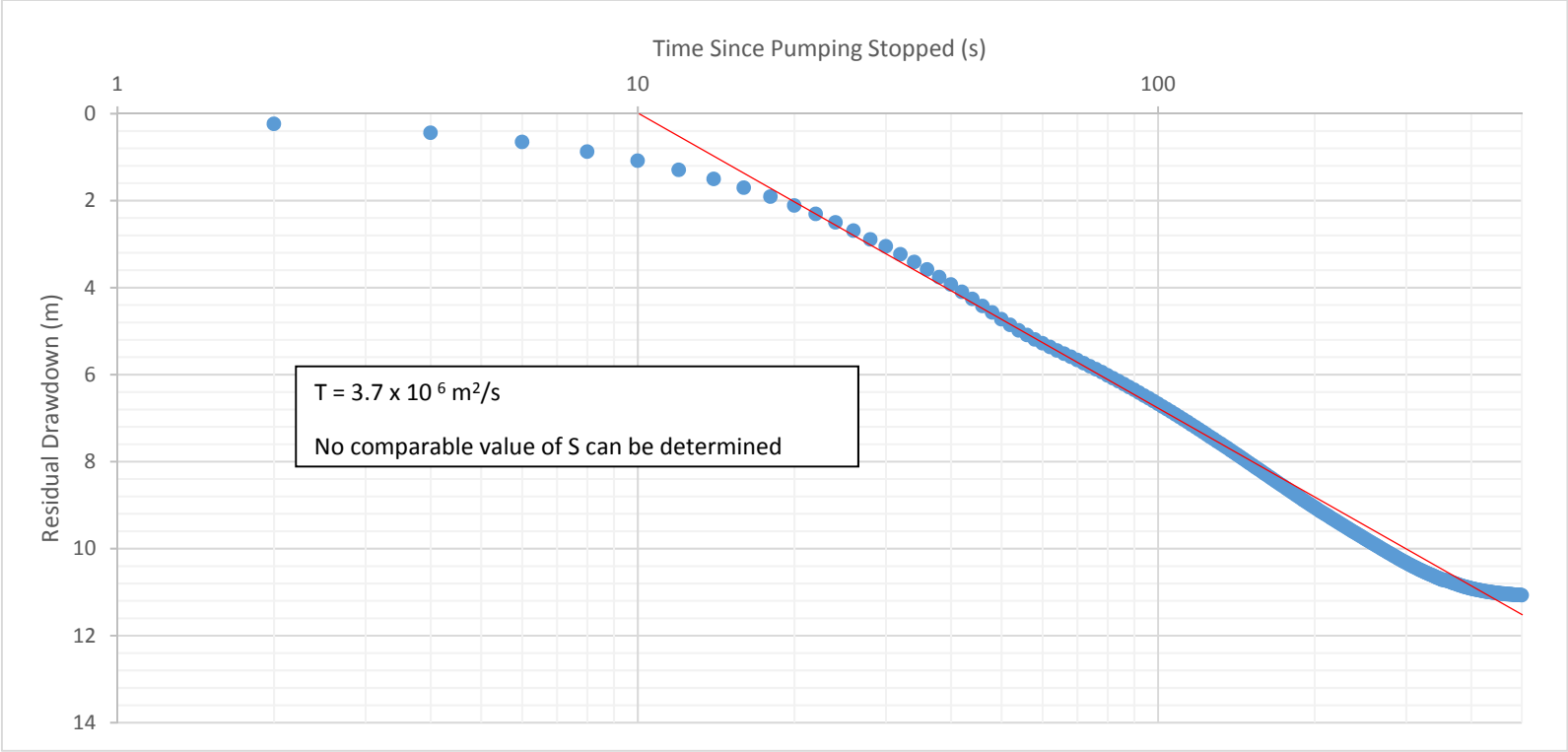
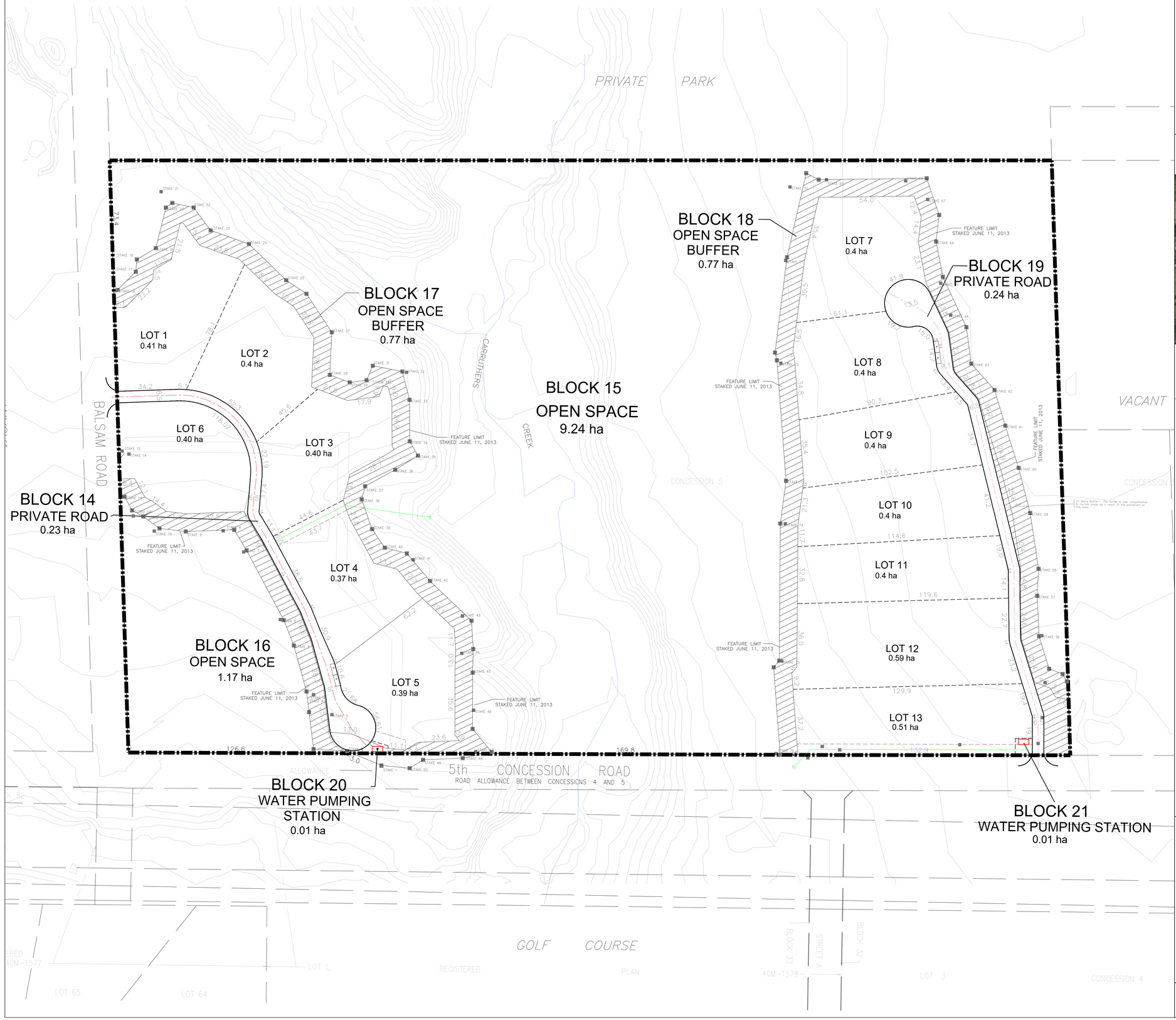
Chart F-11 Drawdown Over Time of Constant Rate Combined Pumping and Recovery Test (Recovery Data)

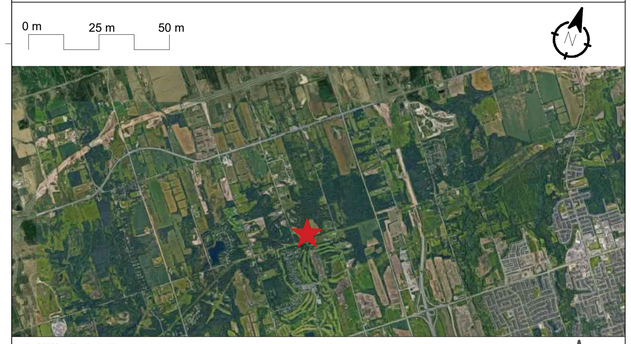


APPENDIX F

PROPOSED DRAFT PLAN OF SUBDIVISION
PART OF LOTS 3 AND 4 CONCESSION 5
(Geographic Township of Pickering)
Now in the City of Pickering
REGIONAL MUNICIPALITY
of DURHAM



0 m 25 m 50 m



KEYMAP

Subject Property

LEGEND

- Subject Site Boundary
- 10 m Buffer from Staked Limit
- Lot Lines
- Easement Line
- Storm Sewer
- Road Centreline

AREA TABLE

Residential Lots	Lots 1-13	5.47	ha.
Open Space	Blocks 15,16	10.41	ha.
Open Space 10 m Buffer	Blocks 17,18	1.54	ha.
Water Pumping Station	Blocks 20, 21	0.02	ha.
Private Road	Blocks 14, 19	0.47	ha.
TOTAL		17.91	ha.

ADDITIONAL INFORMATION REQUIRED UNDER THE PLANNING ACT

C. The applicant is not interested in any additional land adjacent to the proposed subdivision.
D. Residential single-detached, open space and R.O.W easement.
H. Piped water to be provided.
I. Clay loam and sandy soil.
K. Sanitary and storm sewers to be provided

UNIT COUNT

Single-Detached 13 u

ROAD LENGTH

6.5 m Private Road 562.5 m

PARKING

Parking Spots (2.6 m x 5.3 m) 4 spots

SURVEYOR'S CERTIFICATE

I hereby certify that the boundaries of the land to be subdivided as shown on this plan, and their relationship to the adjacent lands are accurately and correctly shown.

Gabriel C. Laframboise – O.L.S. Signature Day Month Year
J.D. Barnes Ltd.

OWNERS AUTHORIZATION

I, Paul Bigoni here by authorize Maurizio Rogato to prepare and submit a draft plan of subdivision for approval.

Paul Bigoni Signature Day Month Year
869547 Ontario Inc.

BLACKTHORN Development Corp.

Land Development | Land Use Planning | Project Management | Government Relations

1:1000	July 11th /2023	21226-15	Rev.	Drawn	RW
Scale	Date	Drawing Number			Design

APPENDIX G

Monitoring Well ID	Screen Interval	Groundwater Level					
		April 28, 2017	May 9, 2017	March 2, 2018	April 2, 2018	September 5, 2018	December 7, 2021
	(mBGS)	(mBGS)	(mBGS)	(mBGS)	(mBGS)	(mBGS)	(mBGS)
BH1	5.2 - 6.7	1.72	1.35	1.91	1.67	2.44	2.53
BH2	2.2 - 6.7	1.05	0.70	0.66	0.65	2.05	1.33
BH3	1.2 - 6.7	0.76	0.57	0.45	0.62	1.41	0.99
BH4	3.1 - 6.1	0.39	0.27	0.22	0.26	1.10	1.43
BH5	3.1 - 6.1	0.76	0.49	0.45	0.51	1.92	0.54*
BH6	3.1 - 6.1	1.62	1.31	1.21	1.21	2.55	1.66
BH7	28.1 - 29.6	-0.65	-0.63	-0.67	-0.61	-0.54	Artesian

Note: * = monitoring well was damaged

LIMITATIONS TO THE REPORT

This report is intended solely for the Client named. The report is prepared based on the work has been undertaken in accordance with normally accepted geotechnical engineering practices in Ontario.

The comments and recommendations given in this report are based on information determined at the limited number of the test hole and test pit locations. Subsurface and groundwater conditions between and beyond the test holes and test pit may differ significantly from those encountered at the test hole and test pit locations. The benchmark and elevations used in this report are primarily to establish relative elevation differences between the test hole and test pit locations and should not be used for other purposes, such as grading, excavating, planning, development, etc.

The report reflects our best judgment based on the information available to GeoPro Consulting Limited at the time of preparation. Unless otherwise agreed in writing by GeoPro Consulting Limited, it shall not be used to express or imply warranty as to any other purposes. No portion of this report shall be used as a separate entity, it is written to be read in its entirety. The information contained herein in no way reflects on the environment aspects of the project, unless otherwise stated.

The design recommendations given in this report are applicable only to the project designed and constructed completely in accordance with the details stated in this report.

Should any comments and recommendations provided in this report be made on any construction related issues, they are intended only for the guidance of the designers. The number of test holes and test pits may not be sufficient to determine all the factors that may affect construction activities, methods and costs. Such as, the thickness of surficial topsoil or fill layers may vary significantly and unpredictably; the amount of the cobbles and boulders may vary significantly than what described in the report; unexpected water bearing zones/layers with various thickness and extent may be encountered in the fill and native soils. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and make their own conclusions as to how the subsurface conditions may affect their work and determine the proper construction methods.

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. GeoPro Consulting Limited accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We accept no responsibility for any decisions made or actions taken as a result of this report unless we are specifically advised of and participate in such action, in which case our responsibility will be as agreed to at that time.