74 Berkeley Street, Toronto, ON M5A 2W7
Tel: 647-795-8153 | www.pecg.ca

Updated Hydrogeological Investigation – Proposed Development at 822, 828, 834, 836, 838 Richmond Street West, Toronto, Ontario

Palmer Project #
2001512

Prepared For
Watters Environmental Group Inc

November 04, 2021

November 04, 2021

Jessie Ren, M.Sc., P.Geo., EP
Project Manager
Watters Environmental Group Inc.
9135 Keele Street, Unit A1 Concord, Ontario L4K 0J4

Dear Jessie:

Re: Updated Hydrogeological Investigation – Proposed Development at 822, 828 and 834 to 838 Richmond Street West, Toronto, Ontario
Project #: 2001512

Palmer Environmental Consulting Group was retained by Watters Environmental Group Inc (the "client") to complete a preliminary and detailed hydrogeological investigation to support the proposed future redevelopment of the central and western portions of 828 to 838 Richmond Street West, Toronto, Ontario. This report has been updated from the August 12, 2021 final report to include 3 months of water level monitoring data. It is Palmer's understanding that it is intended that the site be redeveloped into a six-storey residential building with a maximum of two levels of underground parking. Currently, 822 Richmond Street West building is occupied by a four storey commercial building with the first floor partially below grade. 828 Richmond Street West building is occupied by a one storey commercial building with a full basement and 834, 836 and 838 Richmond Street West are currently operating as a parking lot.

This report summarizes the results of the hydrogeological assessment including a characterization of site geology and hydrostratigraphy, groundwater levels, and estimates for construction dewatering rates based on a non-watertight scenario. Based on the findings, a registration on the MECP EASR system is recommended for short-term construction dewatering. A long-term PTTW is not expected to be required. Both a temporary and long-term discharge permit with Toronto Water will be required for this project to manage the discharge of water during construction and during operation of the new building.

We trust that this report will be satisfactory for your current needs. If you have any questions or require further information, please contact our office at your convenience. This report is subject to the Statement of Limitations provided at the end of this report.

Yours truly,
Palmer Environmental Consulting Group Inc.

Jason Cole, M.Sc., P.Geo.
Vice President, Principal Hydrogeologist

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1. Introduction

Palmer Environmental Consulting Group (Palmer) was retained by Watters Environmental Group Inc. (the "client") to complete a preliminary and detailed hydrogeological investigation to support the proposed future redevelopment of the central and western portions of 828 to 838 Richmond Street West, Toronto, Ontario. It is Palmer's understanding that it is intended that the site be redeveloped into a six storey residential building with a maximum of two levels of underground parking extending approximately 6 m below ground surface (mbgs). Currently, 822 Richmond Street West building is occupied by a four storey commercial building with the first floor partially below grade. The eastern portion of the site (822 Richmond Street West, is understood to remain undisturbed. 828 Richmond Street West building is occupied by a one storey commercial building with a full basement and 834, 836 and 838 Richmond Street West are currently operating as a parking lot with three former residential buildings in the southern portion.

This assessment focuses on characterizing the hydrogeological conditions to estimate the dewatering requirements for the project, provide hydrogeological input into foundation design, and to evaluate groundwater discharge and permitting options during construction and for long-term drainage. Based on discussion with Watters, it is understood that short-term construction-related dewatering could be managed through obtaining a temporary discharge permit from the City of Toronto. Under the Ministry of the Environment, Conservation and Parks (MECP), registration on the Environmental Activity and Sector Registry (EASR) is required when dewatering is expected to be greater than 50,000 L/day but less than 400,000 L/day per non-overlapping water-taking area at a project site. If dewatering is expected to be greater than 400,000 L/day per non-overlapping water-taking area, a Category 3 Permit to Take Water (PTTW) from the MECP will be required.

1.1 Scope of Work

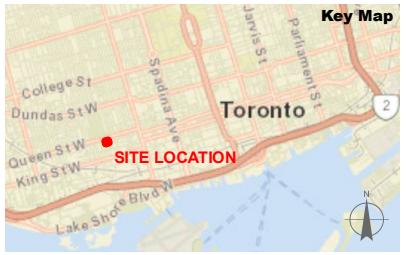
Palmer's Hydrogeological Investigation was completed based on borehole drilling and groundwater monitoring well installations completed by the client and a preliminary geotechnical report prepared by Alston Geotechnical Consultants Inc. ("Alston"). Palmer has relied on these boreholes logs and well records in its hydrogeological assessment. The logs and a site plan prepared by the client can be found in **Appendix A**. Palmer's scope of work for the Hydrogeological Investigation included the following main tasks:

- Obtain and review applicable background information including surficial geology, bedrock geology, physiography mapping, and previous reporting including:
    - "Report on Phase Two Environmental Site Assessment, 822, 828 and 834 to 838 Richmond Street West and 25 McMurrich Street, Toronto, Ontario" (Report No. 4863-18-B), Toronto Inspections Limited ("TIL"), November 01, 2018;
    - "Technical Memorandum: Preliminary Geotechnical Review, 822, 828 and 834 to 838 Richmond Street West and 25 McMurrich Street, Toronto" (Ref. No. 21.010), Alston Geotechnical Consultants Inc. ("Alston"), May 13, 2021; and
    - Grain size distribution data for the site provided by Alston Geotechnical Consultants and Terrapex on July 2nd, 2021.

LEGEND:

- Borehole
- Monitoring Well
- Subject Site

Imagery (2020) provided by City of Toronto map service



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PROJECT NO.	2001512	REVISION:	1-1
DATE:	Aug 06, 2021	SCALE:	1:750
DRAWN:	CV	DATUM:	NAD 1983
CHECKED:	SH	PROJECTION:	UTM zone 17

CLIENT: Watters Environmental Group Inc

PREPARED BY: Palmer

PROJECT: 822 Richmond Street

TITLE:

Site Location

Figure 1

Document Path: C:\Insync\Projects 2020\20015 - Watters Environmental Group Inc\2001512 - 822 Richmond Street\Mapping\Figures\5_ArcGIS\2001512_1-1_Site Location.mxd

- Review the 2021 Watters Environmental Group Inc. (Watters) borehole (BH) drilling and groundwater monitoring well (MW) installation logs. In total, six (6) BH/MWs were completed at the site to depths ranging from 4.3 to 12.25 metres below ground surface (mbgs);
- Collect groundwater level measurements to establish the water table and piezometric head levels;
- Determine the hydraulic conductivity of the geological materials through completing a single well response test (i.e., slug test) on a selected well and analyzing grain-size of selected soil samples;
- Collect one (1) groundwater sample for analysis to compare groundwater quality against City of Toronto Storm and Sanitary Sewer discharge criteria;
- Calculate short-term and long-term dewatering discharge rates for the construction phase of the project and post-construction conditions, respectively;
- Provide hydrogeological recommendations for foundation design and construction methods;
- Provide recommendations for a PTTW or EASR submission to the MECP for construction dewatering; and
- Produce a Detailed Hydrogeological Investigation Report outlining the results of the investigation

2. Hydrogeological Conditions

2.1 Physiography

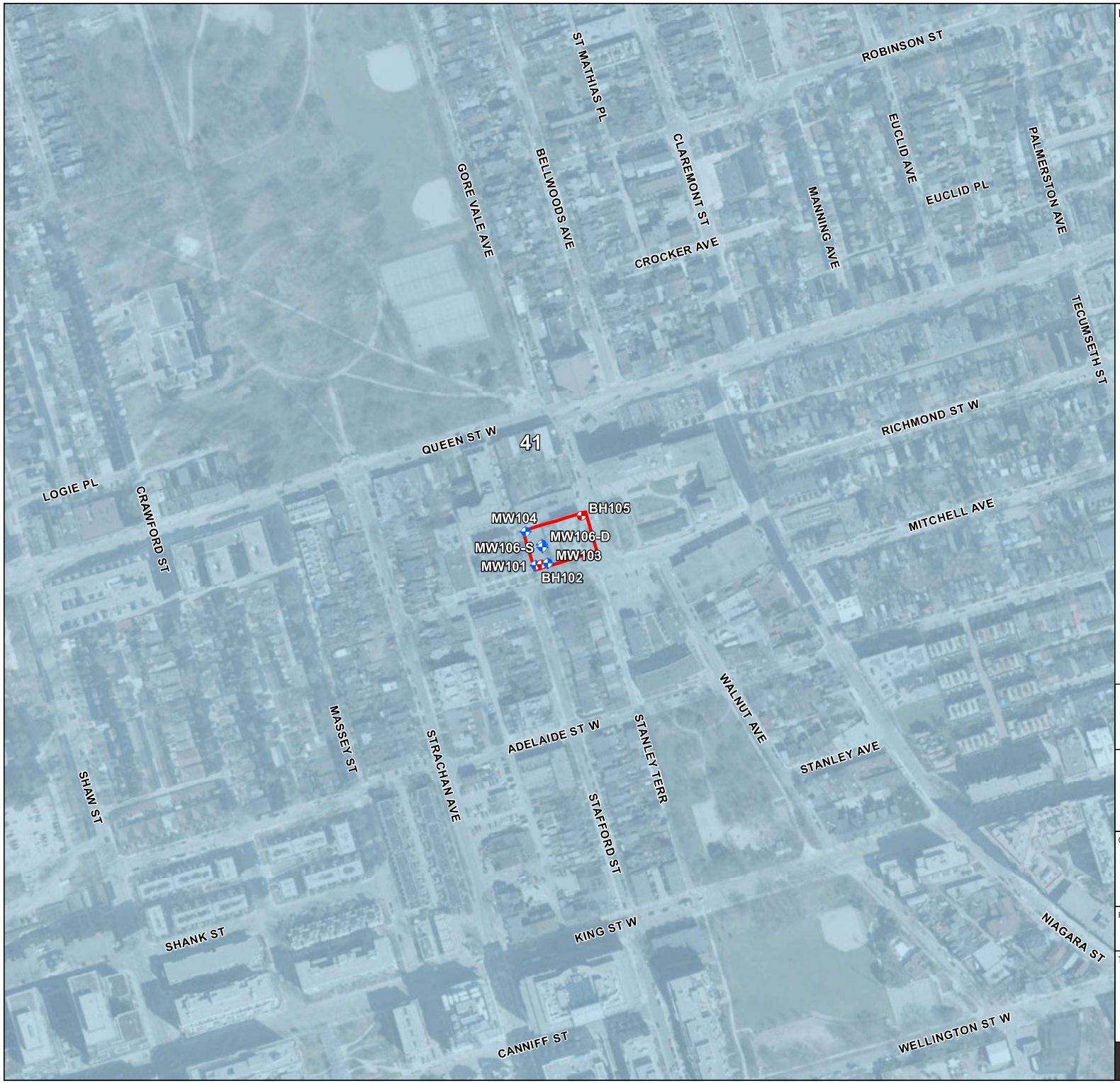
The site is located on the southern portion of the Iroquois Plain physiographic region **(Figure 2)** (Chapman and Putnam, 1984). In line with the site, the Iroquois Plain region extends roughly three kilometres in width along the lowlands bordering Lake Ontario sloping gently northward at a rate of 15 to 18 metres every 1.5 km with several drumlins exhibiting an alignment in a northeast-southwest direction (Singer et al., 2003). The region is characterized predominantly by thin glaciolacustrine sand, silt, and clay deposits at the surface, underlain by regional till units.

2.2 Surficial Geology

Ontario Geological Survey (OGS) mapping (**Figure 3**) indicates that the site is situated in an area primarily composed of undifferentiated older Halton Till deposited during the Pleistocene epoch. The tills include some interbedded lake deposits and are present at the site in a northwest to southeast alignment. The lake deposits are further described as silt and clay along with distinct organic rich beds in the form of shale. To the west of the site, coarser-textured glaciolacustrine deposits are present in the form of sand, gravel and basinal and foreshore deposits (MNDM, 2021).

2.3 Bedrock Geology

Regional bedrock consists of the Georgian Bay Formation (OGS, 2017). The Georgian Bay Formation ranges from 125 m to 200 m in thickness across Southern Ontario and is distinguished by its interbedded grey-green to dark grey shale and fossiliferous calcareous siltstone to limestone (hard beds) (Armstrong and Dodge, 2007). The abundance and thickness of these hard beds generally decreases from north to south (Johnson et al.,1992). Additionally, secondary sedimentary structures such as ripple marks and gutter casts as well as traces of fossils can be found in the Georgian Bay Formation. The bedrock is estimated to be located at approximately 12 m below ground and is expected to be encountered during the borehole drilling program.



LEGEND:

- Borehole
- Monitoring Well
- Subject Site

Physiographic Region[1]

41 Iroquois Plain

1. Chapman, L.J. and Putnam, D.F. 2007. Physiography of southern Ontario; Ontario Geological Survey, Miscellaneous Release —Data 228.

Imagery (2020) provided by City of Toronto map service. Contains information licensed under the Open Government Licence – Ontario.

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DATE:	Aug 06, 2021	SCALE:	1:4000
DRAWN:	CV	DATUM:	NAD 1983
CHECKED:	SH	PROJECTION:	UTM zone 17

CLIENT: Watters Environmental Group Inc

PREPARED BY: Palmer

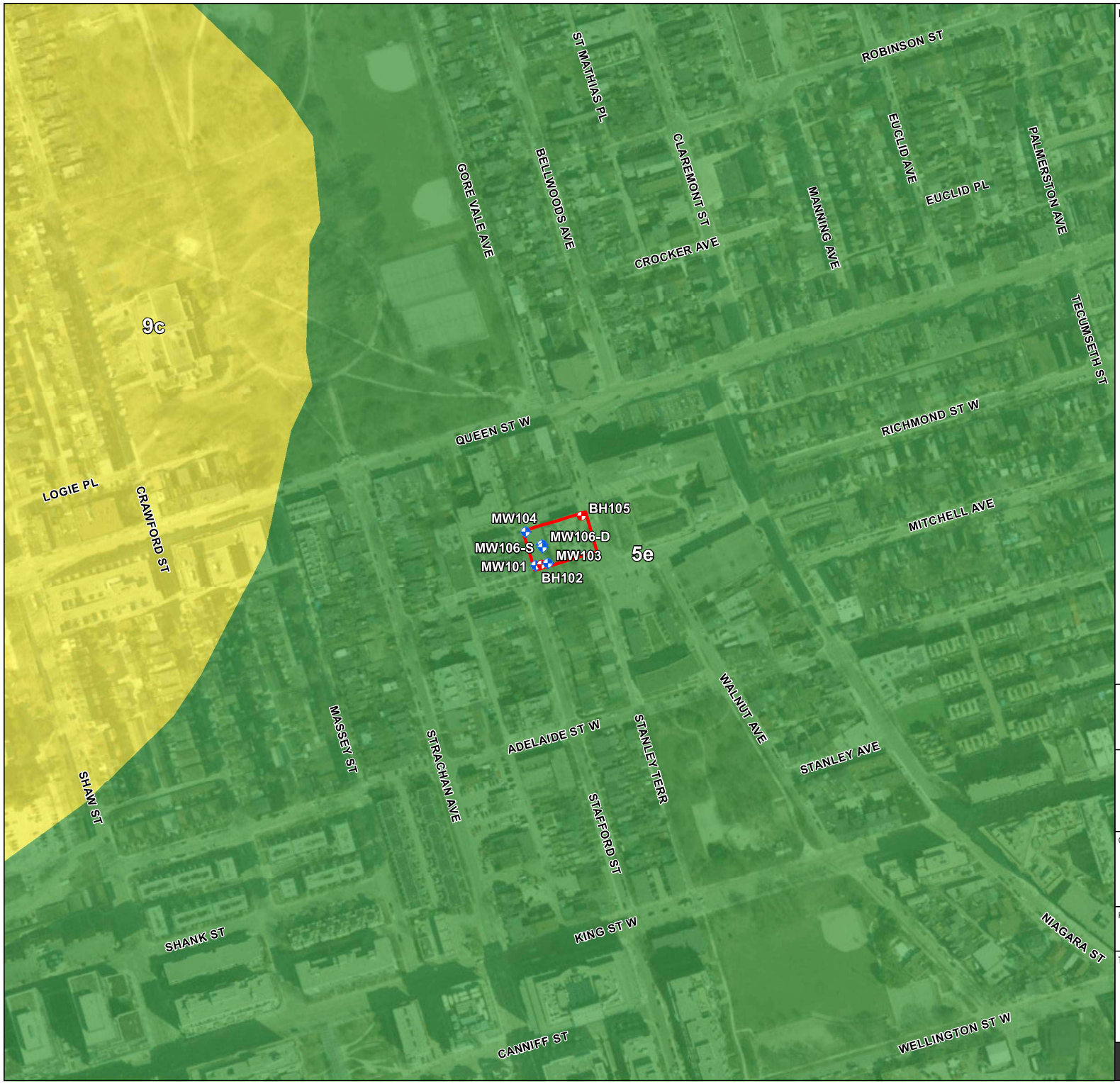
PROJECT: 822 Richmond Street

TITLE:

Physiographic Regions

Figure 2

Document Path: C:\Insync\Projects 2020\20015 - Watters Environmental Group Inc\2001512 - 822 Richmond Street\Mapping\Figures\5_ArcGIS\2001512_4-1_Physiographic Regions.mxd



LEGEND:

- Borehole
- Monitoring Well
- Subject Site

Surficial Geology[1]

PHANEROZOIC

CENOZOIC

QUATERNARY

PLEISTOCENE

9 — **Coarse-textured glaciolacustrine deposits:** sand, gravel, minor silt and clay
9c Foreshore and basinal deposits

5e — **Till:**
5e Undifferentiated older tills, may include stratified deposits

1. Ontario Geological Survey 2010 (Mapped at 1:50,000). Surficial geology of southern Ontario: Ontario Geological Survey, Miscellaneous Release- Data 128 - Revised

Imagery (2020) provided by City of Toronto map service. Contains information licensed under the Open Government Licence – Ontario.

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PROJECT NO.	2001512	REVISION:	1-1
DATE:	Aug 06, 2021	SCALE:	1:4000
DRAWN:	CV	DATUM:	NAD 1983
CHECKED:	SH	PROJECTION:	UTM zone 17

CLIENT: Watters Environmental Group Inc

PREPARED BY: Palmer

PROJECT: 822 Richmond Street

TITLE: **Surficial Geology**

Figure 3

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2.4 Drainage

The study area falls within the Lake Ontario Waterfront Watershed, which encompasses 72 linear kilometers of waterfront and falls under the jurisdiction of the Toronto and Region Conservation Authority (TRCA) (TRCA, 2021). Across this shoreline, nine watersheds (Etobicoke Creek, Mimico Creek, Humber River, Don River, Highland Creek, Rouge River, Duffins Creek, Petticoat Creek, and Carruthers Creek) all drain into Lake Ontario. This watershed is the only watershed under jurisdiction by the TRCA that is a lake watershed, draining into Lake Ontario. The Lake Ontario Waterfront watershed drains both the lower Humber and Don and drains a combined area of approximately 105 km^2. The watershed is 91% urban land cover with the remaining 9% being natural cover (TRCA, 2021). Significant features of the watershed include the Scarborough Bluffs, Toronto Islands, and Frenchman's Bay further east.

2.5 Hydrostratigraphy

Hydrostratigraphic units can be subdivided into three distinct groups based on their ability to allow groundwater movement. An aquifer is defined as a layer of soil that is permeable enough to permit a usable supply of water to be extracted. An aquitard is a layer of soil that inhibits groundwater movement due to its low permeability. Groundwater flow within the study area is influenced by three (3) key hydrostratigraphic units:

A surficial ***unconfined fill aquifer*** was identified on-site, and consists of damp and fairly loose intermixed silty sand, silty clay and trace gravel and trace cinder. Some areas of clay lumps and wood fragments were also encountered. The permeability of fill units can be highly variable depending upon the materials used for fill. This unit ranges from 1.5 - 4.1 m in thickness across the site and is variably saturated.

The ***silty clay aquitard*** is composed primarily of Sunnybrook Drift sediments, with interbedded lake deposits, and is the native soil layer. The layer is fissured with oxidation present on some faces and faint layering is also present in some soil samples. A few organic inclusions were observed at some locations on site (Alston Geotechnical Consultants, 2021). It is expected that the hydraulic conductivity for the silty clay aquitard is in the range of 10^{-7} m/s or lower.

The ***weathered shale*** is located below a depth of about 10.5 m. The upper subunit of this stratum exhibits characteristics comparable to that of a hard shaly clay. As the depth increases the unit the characteristic transitions to a clayey shale material. In total, this unit ranges from 2 - 4 m in thickness within the boreholes drilled across the site. It is expected hydraulic conductivity for the weathered shale is highly variable with the upper unit potentially acting as a thin aquifer, and the competent shale acting as an aquitard.

3. Hydrogeological Investigations

3.1 Previous Borehole Drilling and Monitoring Well Installations

A combined geotechnical and environmental site assessment (ESA) was conducted by Watters Environmental Group and Alston Geotechnical Consultants Inc. on June 21 and 22nd, 2021, which included

the drilling of boreholes and installation of groundwater monitoring wells. Standard penetration tests were carried out at frequent intervals of depth throughout borehole drilling to take representative soil samples. Observations of groundwater conditions were made and monitoring wells were installed in five (5) boreholes ranging in depth from 4.36 to 12.18 below ground surface (mbgs) for the monitoring of stabilized groundwater levels at the site. Corresponding borehole locations are provided on **Figure 1** and borehole logs are presented in **Appendix A**.

An additional borehole was advanced by Watters Environmental Group Inc. on July 9th, 2021 to complete BH105 and ranged in depth from 6.0 to 7.0 mbgs. A CME 75 drill rig with split spoon sampling and hollow stem augers was used to drill the boreholes. Details of the monitoring well installations are provided in **Table 1**.

Table 1. Borehole and Monitoring Well Details

Borehole/MW ID	Depth (mbgs)	Top of Screen (mbgs)	Bottom of Screen (mbgs)	Screened Geology	Hydrostratigraphic Unit
MW21-101	6.71	2.50	5.55	Silty Clay	Silty Clay
BH102	5.18	-	-	-	Fill/Silty Clay
MW21-103	12.25	9.20	12.25	Silty Clay/Shale	Weathered Shale/Silty Clay
MW21-104	12.25	6.05	9.10	Silty Clay	Silty Clay
BH105	3.81	-	-	-	Fill
MW21-106-s	4.35	1.25	4.30	Silty Clay/Loose Sand	Fill
MW21-106-d	9.75	6.15	9.20	Silty Clay	Silty Clay

3.1.1 Site Specific Geology

The results of the geotechnical borehole drilling investigations were generally consistent with the regional OGS mapping (**Figure 3**). Alston Geotechnical Consultants Inc. reviewed the soil samples and borehole logs and described the soil profile of the site as follows:

> ***Fill Materials**. The site is overlain with a layer of sand fill material which extends to depths ranging from about 1.5 m to 4 m at the borehole locations. This layer is generally in a compact condition with standard penetration tests carried out measuring N-values of 1 to 34 blows/300 mm. This can be attributed to compaction due to pavement construction. Below a depth of 0.5 m N-values range from 1 to 7 blows/300 mm, indicating loose to very loose compaction.*
>
> ***Silty Clay**. A native soil layer of silty clay material which includes a trace of sand and gravel underlies the surficial fill soil layer. The layer also is also fissured with oxidation and colouration exhibited on some fissure faces. Standard Penetration tests carried out in this deposit measured N-values ranging from 3 to 27 blows/300 mm which indicates that it is of a soft to firm up to very stiff consistency. In situ vane tests were carried out to measure soil shear strength which was found to be more than 100 kPa.*

These results indicate variable shear resistance and compressibility characteristics within the stratum across the site. The soil deposit extends to a depth of about 10.5 m.

***Weathered Shale**. The silty clay is, in turn, underlain by a local shale bedrock stratum. The stratum is split up into upper and lower subunits. The upper subunit exhibits characteristics close to that of a hard shaley clay while the lower subunit exhibits characteristics most similar to that of a clayey shale material.*

3.2 Groundwater Levels and Flow

Stabilized groundwater levels were measured by Palmer personnel on July 2nd, July 6th, July 29th, August 26th and, November 4th 2021, they are presented in **Table 2**.

Water levels were measured using a water level tape and recorded to the nearest centimetre. Stabilized water levels in the shallow well (MW21-106s) ranged from 3.19 to 3.5 mbgs. Within the deep wells (MW21-103, MW21-104, and MW21-106-d) the depth to groundwater ranged from 3.20 to 9.63 over the course of the monitoring period. It should be noted that well MW21-101 exhibited dry conditions during both monitoring events in early July, but groundwater was found later July 29th and into the fall months. This follows a typical seasonal trend indicative of lower water levels conditions in the late summer followed by higher water level conditions starting in the fall.

Table 2. Groundwater Levels

MW ID	Depth (mbgs)	Unit	Water Level				
			July 2nd, 2021	July 6th, 2021	July 29th, 2021	August 26th, 2021	November 3rd, 2021
MW21-101	6.11	mbgs	Dry at 6.11	Dry at 6.11	5.40	4.73	3.68
MW21-103	12.18	mbgs	3.81	9.63	4.95	4.03	3.60
MW21-104	9.24	mbgs	4.33	3.60	3.40	3.62	3.35
MW21-106-s	4.36	mbgs	3.46	3.46	3.34	3.45	3.19
MW21-106-d	9.18	mbgs	3.46	3.47	3.35	3.51	3.20

3.3 Hydraulic Conductivity

Monitoring wells were purged dry on July 2nd, 2021 by Palmer Staff prior to hydraulic conductivity testing. Hydraulic conductivity testing was then performed on all installed wells on site barring MW21-101 (which was dry) on July 6th, 2021, using a combination of rising head (bail) test and falling head (slug) test methods

to determine the hydraulic conductivity (K) of the screened, saturated geological material. The results are presented on **Table 3**.

For rising head tests, one bailer of water was removed from the wells and the rate of recovery was measured as the water level returned to static. For falling head tests, a slug of known volume was placed in the well and the rate of recovery was measured as the water level returned to static. Measurements were recorded using a datalogger which was set to record water levels at one-second intervals. Additionally, manual water level measurements were collected during the test in order to gauge recovery. The test was terminated once either 80% recovery had been attained or 30 minutes had elapsed. Hydraulic conductivity (K) values were calculated from the displacement-time data using the Bouwer and Rice (1976) Method as implemented in AQTESOLV ver. 4.5, HYDROSolve Inc. (**Appendix B**). The hydraulic conductivity of the saturated, screened soils at that location.

A hydraulic conductivity value of 7.3 x 10^{-6} m/s for the unconfined fill unit and a hydraulic conductivity of 3.1 x 10^{-7} m/s for the confined silty clay unit (geometric mean each unit) were used in dewatering calculations. MW21-103 was screened in both the silty clay and underlying weathered shale (approximately half in each). The hydraulic conductivity of the screened interval in this well was found to be 8.9 x 10^{-7} m/s. However, the static water level in this well, considered to be representative of conditions in the weathered shale, is below the depth of dewatering. Hence, dewatering calculations are not provided for the weathered shale and it is not necessary to address potential basal heave from this unit.

Please note that due to the low permeability of the silty clay and shale units, it cannot be confirmed at this time if the water levels in the wells screened in this unit were static during the July 6th hydraulic testing. In particular, the water level at MW21-103 rose approximately 5 m between the July 6, 2021 and the July 29, 2021 monitoring events, suggesting that this well was not at static for hydraulic testing. Additional discussion regarding groundwater levels and the implications on the hydraulic conductivity values can be provided during subsequent submissions.

Table 3. Hydraulic Conductivity Summary

BH ID	Test Type	Solution	K (m/s)	Geometric Mean K (m/s)	Screened Stratigraphy
MW103	Rising Head	Bouwer-Rice Confined	8.8 x 10^{-7}	—	Silty Clay/ Weathered Shale
MW104	Falling Head	Bouwer-Rice Confined	7.5 x 10^{-7}	—	Silty Clay
MW106-d	Falling Head	Bouwer-Rice Confined	6.9 x 10^{-8}	1.0 x 10^{-7}	Silty Clay
	Rising Head		1.8 x 10^{-7}		
MW106-s	Falling Head	Bouwer-Rice Unconfined	7.3 x 10^{-6}	4.0 x 10^{-6}	Fill Materials
	Falling Head x2		1.6 x 10^{-6}		

3.4 Groundwater Chemistry

A groundwater chemistry sample was collected on July 02, 2021 from MW21-106-s and analyzed at ALS Environmental, a CALA-accredited laboratory, for parameters included in the City of Toronto's sewer use by-law. A summary table of the groundwater analysis exceedances is presented in **Table 4** and a copy of the Certificate of Analysis is provided in **Appendix D**.

The sample from MW21-106-s exceeded City of Toronto Storm Sewer Use Limits, but not the corresponding Sanitary Sewer Use Limits, for Total Suspended Solids (TSS), Zinc, Manganese and Mercury. It is expected that the concentrations of the parameters that exceed Storm Sewer Use Limits can be lowered by lowering TSS, e.g., by using a settling tank and/or filters. Alternately, the sample did meet the Limits applicable for discharge to the sanitary sewer system.

Table 4. Groundwater Quality Exceedances

Parameter	Detection Limit	City of Toronto Sanitary Sewer Use Limit	City of Toronto Storm Sewer Use Limit	Units	Sample Concentration
					MW21-106-s
Total Suspended Solids	3.0	350	15	mg/L	**160**
Zinc, Total	0.30	2	0.04	mg/L	**0.063**
Manganese, Total	0.0050	5	0.05	mg/L	**1.11**
Mercury, Total	0.010	0.01	0.0004	mg/L	**0.00162**

4. Hydrogeological Assessment

4.1 Short Term Construction Dewatering

It is understood that the two levels of basement will extend approximately 6 mbgs with the foundations extending another 1 m. Dewatering will extend 1 m below base of excavation (this will increase to 1.2 m for frost protection if the planned basement is replaced with underground parking) resulting in a dewatering target depth of 8 mbgs. This is above the static level in the weathered shale (**Table 2**) but dewatering of the unconfined fill and a portion of the silty clay unit will be required.

It is assumed that the proposed building will occupy the entire footprint of 828 – 838 Richmond Street West, approximately 24 x 30 m. An allowance of 1 m has been added to the July 2nd, 2021 groundwater elevation in the shallow water table and clay units to account for seasonal variation as observed by the updated water level data from November 2021. The maximum thickness of the fill unit (4.1 m) is used in the dewatering calculations. The adjustment for precipitation is a nominal two year storm (25 mm in 24 hours) over the footprint of the proposed building.

It should be noted that the highest dewatering flows for the larger excavations are anticipated at the beginning of the dewatering process to achieve the target drawdown levels. After groundwater levels have

been lowered to the target elevation, the dewatering flows are anticipated to be lower when maintaining the groundwater level at the target elevation during steady-state dewatering flow conditions.

A dewatering rate estimate (Q) for the rectangular/near-square excavation was calculated using the following equation from Powers et. al (2007) for an equivalent well in an unconfined aquifer:

Unconfined Aquifer, $$Q_{unconfined} = \frac{\pi K(H^2-h^2)}{ln\,(\frac{Ro}{r_e})} \quad m^3/s$$

Where

K = hydraulic conductivity (m/s) – estimated from SWRT and/or grain size distribution data

H = saturated thickness (m)

h = saturated thickness after dewatering (m)

R_O = radius of influence (only valid if $\ln[R_o/r_e] > 1.5$) estimated using
(i) the Sichardt (1930) Approximation:
$R_O = 3000 * (H-h) * \sqrt{K}$ (m)
or
(ii) Driscoll (1986) iterative solution:
$Q = K * (H^2-h^2)/0.733 * (\log[R_o/r_e])$ (m)
or
(iii) Recharge-based estimate from Marinelli & Niccoli (2000).

r_e = equivalent well radius estimated by:

$r_e = \sqrt{\frac{a^2}{\pi}}$ (m)

Where *a* = trench width (m)

X = trench length (m)

L = line source distance (m)
L = Ro/2

Confined Aquifer, $$Q_{confined} = \frac{2\pi Kb(H-h)}{ln\,(\frac{Ro}{r_e})} \quad m^3/s$$

Where

K = hydraulic conductivity (m/s) – estimated from SWRT and/or grain size distribution data

H = saturated thickness (m)

h = saturated thickness after dewatering (m)

R_O = radius of influence (only valid if $\ln[R_o/r_e] > 1.5$) estimated using
(i) the Sichardt (1930) Approximation:
$R_O = 3000 * (H-h) * \sqrt{K}$ (m)
or
(ii) Driscoll (1986) iterative solution:
$Q = K * (H^2-h^2)/0.733 * (\log[R_o/r_e])$ (m)
or
(iii) Recharge-based estimate from Marinelli & Niccoli (2000).

r_e = equivalent well radius estimated by:

$$r_e = \sqrt{\frac{a^2}{\pi}}\ (\text{m}) \qquad \textit{Where} \quad a = \text{trench width (m)}$$

A safety factor of 1.5x is applied to all calculated dewatering flow rates.

Tables 5 and **6** present a summary of Palmer's findings and the estimated dewatering rates for the proposed excavations.

Table 5. Dewatering Rate Estimate, Unconfined Fill

Dewatering Parameter	Symbol	Unit	Values
Excavation length	X	[m]	24
Excavation width	A	[m]	30
Hydraulic Conductivity	K	[m/s]	$7.3x10^{-6}$
Saturated thickness	H	[m]	1.40
Dewatered saturated thickness	h	[m]	0
Radius of influence (Marinelli and Niccoli used)	R_0	[m]	73.8
Equivalent Well Radius	r_e	[m]	15.1
Dewatering rate	Q_{dw}	[L/day]	2,450
Total Dewatering Rate (With Safety Factor and Precipitation Allowance)	Q	[L/day]	21,675

Table 6. Dewatering Rate Estimate, Confined Silty Clay

Dewatering Parameter	Symbol	Unit	Values
Excavation length	x	[m]	24
Excavation width	a	[m]	30
Hydraulic Conductivity	K	[m/s]	$3.1x10^{-7}$
Aquifer thickness	b	[m]	6.57
Initial water column height	H	[m]	8.07
Dewatered saturated thickness	h	[m]	2.67
Radius of influence (Driscoll solution)	R_0	[m]	400
Equivalent Well Radius	r_e	[m]	15.1
Dewatering rate	Q_{dw}	[L/day]	19,270
Total Dewatering Rate (With Safety Factor)	Q	[L/day]	28,905

Based on the above calculations, if two (2) levels of underground basement are constructed at the site, the combined flow rate is estimated to be 50,580 L/day. A Category 3 PTTW would not be required at this rate but registration on the EASR would be. This volume is expected to be manageable with the use of sump pumps from the base of the excavation.

4.2 Source Water Protection

The Source Water Protection Plan identifies three main regulatory factors under the *Clean Water Act (2006)* relating to local hydrogeology to consider for site development: Significant Groundwater Recharge Areas (SGRAs), Highly Vulnerable Aquifers (HVAs), and Wellhead Protection Areas (WHPAs). This site is encompassed within the Toronto and Region Source Protection Area. Based on available MECP Source Protection Information mapping, the proposed development is within an HVA (vulnerability score of 6) but not within a SGRA or a WHPA zone (**Figure 4**). An HVA is an aquifer that is particularly susceptible to contamination because of its location near the ground's surface or where the types of materials in the ground around it are expected to be permeable.

LEGEND:

- MECP Water Well within 500m
- Borehole
- Monitoring Well
- Subject Site
- 500m Site Buffer
- Highly Vulnerable Aquifer[1]

1. *Source Protection Information Atlas*, Ministry of the Environment, Conservation and Parks © Queen's Printer for Ontario, 2021

Imagery (2020) provided by City of Toronto map service. Contains information licensed under the Open Government Licence – Ontario.

0 100 200
metres

N

PROJECT NO.	2001512	REVISION:	1-1
DATE:	Aug 06, 2021	SCALE:	1:5500
DRAWN:	CV	DATUM:	NAD 1983
CHECKED:	SH	PROJECTION:	UTM zone 17

CLIENT: Watters Environmental Group Inc

PREPARED BY: Palmer

PROJECT: 822 Richmond Street

TITLE: **Source Water Protection**

Figure 4

Document Path: C:\Insync\Projects 2020\20015 - Watters Environmental Group Inc\2001512 - 822 Richmond Street\Mapping\Figures\5_ArcGIS\2001512_3-1_Source Water Protection.mxd

5. Hydrogeological Construction Considerations

5.1 Short Term Construction Dewatering

Short-term construction dewatering is required for the installation of the building foundation, the two levels of basement. It is understood that short-term construction-related dewatering will be managed through obtaining a temporary discharge permit from the City of Toronto. If required, long-term dewatering will require a long-term discharge permit from the City of Toronto.

Under MECP requirements, registration on the Environmental and Site Activity Registry (EASR) is required when dewatering is greater than 50,000 L/day and less than 400,000 L/day. A PTTW is required when dewatering is expected to be greater than 400,000 L/day. Short-term dewatering volumes were estimated at 50,580 L/day. As this flow rate exceeds 50,000 L/day but is less than 400,000 L/day, registration on the EASR is recommended.

5.2 Long Term Foundation Dewatering

It is assumed that any protrusions extending below the underside of the lowest floor level, e.g., elevator pits, will be waterproofed at the time of construction to avoid any permanent dewatering requirements specific to these feature(s). Long-term dewatering will then have two requirements: (i) storm drainage and (ii) groundwater flow into the weeping tile system.

With respect to stormwater flow, it is assumed that a nominal two year storm (25 mm of rain in 24 hours) will penetrate a 1 m buffer around the building (i.e., above the weeping tile excavation). As the site has a perimeter of approximately 150 m, this equates to 3,750 L/day. Leakage from the fill would be consistent with the short-term dewatering requirements (3,675 L/day). Dewatering in the silty clay would be to the base of foundations, 1 m less than under short-term dewatering. The resulting flow rate (silty clay only) is 25,740 L/day with a safety factor of 1.5x. The combined total is 33,165 L/day. As the combined total is less than 50,000 L/day, a Category 3 PTTW will not be required. It will be necessary to obtain a long-term sewer discharge agreement with the City of Toronto for permanent discharge unless the basement level is fully waterproofed.

5.3 Discharge and Monitoring Plan

As groundwater control is required, a preliminary discharge monitoring plan is provided. Although the method of active dewatering or the means of groundwater management by the Contractor are not precisely known, some guidance is provided to assist in the review of this document. Based upon the predicted groundwater seepage rates, active dewatering methods will be required. The Contractor will be required to record daily rates and volumes during dewatering and to regularly test water quality to ensure that the discharge water meets applicable quality criteria.

Dewatering discharge can be directed to the local sewage works pending approval from Toronto Water. Water quality samples must be collected by the Contractor prior to discharging to confirm groundwater quality, and to ensure that dewatering discharge meets the applicable City of Toronto sewer use by-law criteria. Approval from the City of Toronto is required prior to discharging water to municipal storm or sanitary sewers, and it should be noted that discharge to sewers may not be permitted due to capacity issues.

Dewatering rates from **Tables 5**and **6** were estimated using field measured hydraulic conductivity. The following monitoring program (**Table 7**) is provided to support an EASR application, and to summarize the recommended hydrogeological monitoring to be undertaken by the Contractor.

Table 7. Hydrogeological Monitoring Plan

Period	Location	Parameters	Frequency	Trigger for Mitigation	Mitigation Measures	Contingency Plan
Groundwater Quality						
Pre-Construction	Existing Monitoring Well or sump	A complete screening for the City of Toronto Sanitary/Storm Sewer Discharge Criteria, depending upon the sewer type selected for discharge.	Once to obtain a City of Toronto Sewer Discharge Permit.	Exceedance of Storm Sewer or Sanitary Sewer Discharge Criteria	Install additional settling tanks or filtering/ treatment equipment to reduce groundwater chemical concentrations to within applicable limits.	If water does not meet Storm Sewer standards at the point of discharge, water shall be directed to the Sanitary Sewer (if approved) or the water will be trucked off-site for treatment and disposal
During Construction	Within excavation	Turbidity and TSS. Visual inspection for hydrocarbon sheen.	Daily measurements, or measurements immediately prior to discharge	Exceedance of Storm Sewer or Sanitary Sewer Discharge Criteria. Hydrocarbon sheen observed or exceedance for VOCs. Turbidity at 8 NTU or 25 mg/L TSS for Storm Sewer Discharge, and 350 mg/L for Sanitary Sewer Discharge.	Install additional settling tanks or filtering/ treatment equipment to reduce groundwater chemical concentrations to within applicable limits.	If water does not meet Storm Sewer standards at the point of discharge, water shall be directed to the Sanitary Sewer (if approved) or the water will be trucked off-site for treatment and disposal
Prior to Project Completion	Each discharge point	Confirmation that the sewer is free of construction related sediment.	Once following construction at each open cut section.	Accumulation of construction related sediment is observed.	Sediment will be removed to the satisfaction of the City of Toronto.	None.
Ground Settlement						
No ground settlement monitoring is recommended based on the results of the hydrogeological study. A geotechnical engineer should be retained to confirm ground settlement monitoring needs.						

Period	Location	Parameters	Frequency	Trigger for Mitigation	Mitigation Measures	Contingency Plan
Groundwater Level and Quality						
No groundwater level or groundwater quality monitoring is recommended for this project.						
Natural Environment						
No natural environmental monitoring is recommended. The nearest natural feature to the project is a Natural Heritage System located 1.2 km at the Lake Ontario shoreline.						

5.4 Impact Assessment

5.4.1 Natural Environment

No adverse impacts on the natural environment are expected as a result of this project's dewatering. No natural environment features are located within the radius of influence of dewatering. The nearest natural feature to the project is a natural heritage system located 1.2 km at the Lake Ontario shoreline.

5.4.2 Private Water Wells

Local Water Well Records (WWRs) obtained from the Ministry of the Environment, Conservation and Parks (MECP) show that there are approximately thirty wells within a 0.5 km radius of the site. These wells document static water levels of approximately 4.0-5.0 mbgs, in-accordance with depths to water measured by Palmer staff on-site. The nearest Permit to Take Water (PTTW) on record with the MECP is for a location approximately 1.1 km southeast of the site at a permitted maximum rate of 819,000 L/day. Other sites in close proximity to the site where dewatering has occurred are registered on the EASR, and therefore means that dewatering rates were 400,000 L/day or less.

It is not expected that private water wells will be impacted as a result of dewatering activities as no active private groundwater users were identified within a 500 m radius of the development site.

5.4.3 Ground Settlement

The majority of the dewatering will occur in the consolidated silty clay that has a low potential for ground settlement. A geotechnical engineer should complete a comprehensive groundwater settlement assessment based on the final design drawings.

5.5 Monitoring and Supplemental EASR Information

The contractor will be responsible for recording the daily water taking volumes and rates and reporting them to the MECP's online Water Taking and Reporting (WTRS) system. It is the responsibility of the Contractor to ensure that the discharge water meets applicable standards for clarity or TSS and City of Toronto Sewer Discharge Criteria. The Contractor will conduct a daily visual inspection of the discharge and take daily TSS and turbidity measurements to ensure dewatering discharge meets the applicable discharge criteria.

To support a project registration on EASR for construction dewatering for the proposed development, the following EASR-specific supplemental information is provided in **Table 8**.

Table 8. Supplemental Hydrogeological EASR Information

Required EASR Information	Supplemental Hydrogeological Information to Support EASR Requirements	Actions/ Recommendations
Address the potential impact soil settlement as a result of the water taking.	Changes in porewater pressure from construction dewatering has the potential to induce settlement of unconsolidated soils within the dewatering radius of influence. The geology of the site consists of sand fill over silty clay overtop silt and sand. These units are consolidated and are not prone to settlement.	From a hydrogeological perspective, a soil settlement monitoring program is not recommended. A geotechnical engineering should be retained to confirm.
The method of transfer or discharge shall not include discharge to land that is within an area that is part of a wellhead protection area and that is identified as "WHPA-A" in a source protection plan approved by the Minister under the Clean Water Act, 2006.	Based on Source Water Protection Mapping, the 822-838 Richmond Street West development project is not located within a Wellhead Protection Area-A (WHPA-A).	The project site is not within any WHPA-A radius. Discharge is planned to be directed to the City of Toronto Storm or Sanitary Sewer Systems.
With respect to any ground water, storm water, or both that is discharged to land or storm sewer, there shall be no visible petroleum hydrocarbon film or sheen present in the water, storm water or both.	No petroleum hydrocarbon film or sheen was observed during drilling at the site. If a petroleum hydrocarbon film or sheen is observed during construction, the likely source is from the Contractor and not from groundwater or stormwater. In the opinion of QP, the discharge of the groundwater, storm water or both will not cause adverse effect to the environment.	The Contractor shall make observations of the dewatering discharge to confirm the absence of a hydrocarbon sheen. In addition, the Contractor must have a spills response plan in place to address potential hydrocarbon spills or leaks. Should a hydrocarbon film or sheen be observed, discharge of water must immediately stop and contaminated water should be trucked off-site to a proper waste disposal facility.
On or before March 31st of each year, the person engaging in the [water taking] activity shall provide the [MECP] Director with a report, in a form and manner approved by the Director, setting	This report has identified that the Contractor will be responsible for *recording the daily water taking volumes and rates and report them to the MECP's online Water Taking and Reporting System (WTRS). This must be completed before March 31st of each calendar year. If a *complaint is received with respect to the taking or discharging of ground water, storm water or both and the complaint relates to the natural environment, the Ministry	The Contractor is responsible for recording the daily water taking volumes and rates and reporting them to the MECP WTRS before March 31st of each calendar year.

Required EASR Information	Supplemental Hydrogeological Information to Support EASR Requirements	Actions/ Recommendations
out the volume of ground water taken daily in the previous calendar year.	shall be notified of the complaint immediately after the complaint is received and that all spills of pollutants (e.g., oil, chemicals) or Environmental Complaints (e.g., dewatering) are to be reported to the Spills Action Centre by calling 416-325-3000, 1-800-268-6060 (toll-free).	
A summary of the qualifications and experience of the person who prepared the water taking plan.	Report Author Professional Qualifications: Jason Cole, M.Sc., P.Geo. is a Senior Hydrogeologist for Palmer in Toronto, and meets the qualifications set out in O.Reg. 63/16. Jason's professional work focuses on conducting hydrogeological investigations for design and permitting of infrastructure, mining, aggregate extraction and land development projects. Jason specializes in conducting regional and feature specific water budget analyses, dewatering and construction groundwater management, hydrogeological studies to support PTTW applications, provincial and federal Environmental Assessments, and Environmental Impact Studies. Jason has successfully obtained more than 40 PTTWs and EASR Registrations for clients such as MTO, TTC, City of Markham, Halton Region, Peel Region, City of Toronto, City of Kitchener, and Kimberly-Clark Inc.	N/A
An identification of the method of transfer or discharge referred to in paragraph 4 of subsection (1) that is to be employed in the event of a 100 year storm event.	The estimated construction dewatering rate is conservative enough to take into account a 25 mm storm event. O.Reg. 63/16 stipulates that the water taking must be less than 400,000 L/day under *normal conditions*, which would not include extreme weather events and heavy rainfalls such as the 100 yr storm. A discharge management plan should be established to provide direction to the Contractor should an extreme weather event occur during the construction period.	Should an extreme weather event occur or be imminent, the following actions should occur: ● All discharge activities to the environment must temporarily stop. ● Equipment shall be moved out of the excavation to prevent or limit the potential for contamination. ●If flooding occurs within the excavation, the water quality shall be assessed against City of Toronto Discharge Criteria (i.e., Sewer Use By-Law) prior to discharging water to the sewage works. ●Should the water quality not meet applicable discharge criteria, the water remaining in the excavation after the event that caused the flooding shall be pumped and collected in a suitable containment device for treatment, and not discharged to the environment.

Required EASR Information	Supplemental Hydrogeological Information to Support EASR Requirements	Actions/ Recommendations
A statement by the person who prepared the [dewatering] plan that the temperature of the ground water or storm water to be discharged was considered in determining the method of transfer or discharge referred to in paragraph 3 or 4.	Temperature mitigation was considered in the discharge plan for the 906 Yonge Street development project. Groundwater temperature is expected to average approximately 10°C over the year. The sanitary or storm water sewer system is the proposed discharge location.	Discharge groundwater into sanitary or stormwater sewer system.

6. Summary and Conclusions

Based on the results of our Hydrogeological Investigation for a proposed development at 822, 828 and 834 to 822 Richmond Street West, Toronto, Ontario, the following summary of conclusions and recommendations are presented:

- The site is approximately 0.117 ha in area and proposed to be redeveloped into a 6 storey development with two levels of underground parking. Currently, the site is occupied by several commercial spaces and a school as well as a parking area and is adjacent to retail businesses and residential apartment buildings.

- The site is generally underlain by a 1.5 to 4.1 m loose intermixed silty sand fill layer, followed by silty clay and weathered shale of the Georgian Bay Formation extending to a depth of approximately 14 mbgs.

- Based on grain size distribution analyses, the silty clay unit has a K-value of 1.4 x 10^{-9} m/s respectively. A recovery test was conducted on MW103 with the K-value found to be 9.7 x 10^{-7} m/s which is representative of the combined screened geological unit. The K-value calculated using grain size distribution analysis is approximately 1-2 order of magnitude lower than the results of the recovery test. This is anticipated to result from the inability of grain size-based methods to allow for the effects of soil structure, e.g., layering.

- A groundwater sample was collected from MW21-106-s on July 2nd, 2021 and analyzed for comparison against the City of Toronto Storm and Sanitary Sewer Use By-Law criteria. The sample exceeded City of Toronto Storm Sewer Use criteria for Total Suspended Solids (TSS), Zinc, Manganese and Mercury. No exceedances for the City of Toronto Sanitary Sewer Criteria were measured.

- Source water protection mapping indicates that the site is not located within a SGRA or WHPA but is located over an HVA.

- The nearest natural feature to the project is the natural heritage site near Ontario Place which is located approximately 1.2 km to the southwest of the site.

- No private groundwater users were identified within a 500 m radius of the development site.

- Short-term construction dewatering requirements for the installation of foundations and two levels of underground parking are estimated at 50,580 L/day. Registration on the EASR is recommended for this project. In addition, as the dewatering is scheduled to only be up to 7 m in depth, there is low potential for basal heave from the weather shale unit. Since the majority of dewatering will occur in the consolidated silty clay, there is low potential for ground settlement. A geotechnical engineer should complete a comprehensive groundwater settlement assessment based on the final design drawings.

- Long-term dewatering calculations consider storm drainage (nominal two-year storm) and groundwater flow into a weeping tile system. These rates were estimated at 3,750 and 3,675 L/day, respectively. The dewatering from the silty clay layer would be 25,740 L/day with a 1.5x safety factor. As the combined total is less than 50,000 L/day, a Category 3 PTTW will not be required.

- A sewer discharge agreement with the City of Toronto will be required for short- and long-term discharge if dewatering volumes are directed to the City of Toronto Storm or Sanitary Sewer systems.

7. Statement of Limitations

The extent of this study was limited to the specific scope of work for which we were retained and that is described in this report. Palmer has assumed that the information provided by the client or any secondary sources of information are factual and accurate. Palmer accepts no responsibility for any deficiency, misstatement or inaccuracy contained in this report as a result of omissions, misinterpretations or negligent acts from relied upon data. Judgment has been used by Palmer in the interpretation of the information provided but subsurface physical and chemical characteristics may differ from regional scale geology mapping and vary between or beyond well/borehole locations given the inherent variability in geological conditions.

Palmer is not a guarantor of the geological or groundwater conditions at the subject site, but warrants only that its work was undertaken and its report prepared in a manner consistent with the level of skill and diligence normally exercised by competent geoscience professionals practicing in the Province of Ontario. Our findings, conclusions and recommendations should be evaluated in light of the limited scope of our work.

The information and opinions expressed in the Report are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT PALMER'S WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS PALMER MAY EXPRESSLY APPROVE. Ownership in and copyright for the contents of the Report belongs to Palmer. Any use which a third party makes of the Report is the sole responsibility of such third party. Palmer accepts no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without Palmer's express written permission. Should the project design change following issuance of the Report, Palmer must be provided the opportunity to review and revise the Report in light of such alteration or variation.

8. Signatures

Acknowledgment of the practice of geoscience: The report of findings for Palmer's initial investigation of the site, on which this report is based, was initially prepared and reviewed by Stephen Hodgson, P.Geo., QP_{ESA}. Mr. Hodgson is no longer with Palmer.

This report was reviewed and approved by the undersigned:

Reviewed and Approved By:

Jason Cole, M.Sc., P.Geo.
Vice President, Principal Hydrogeologist

9. References

Alston Geotechnical Consultants Inc. Terrapex, July, 2021.
Grain size distribution data for 822, 828 and 834 to 838 Richmond Street West, Toronto, Ontario.

Alston Geotechnical Consultants Inc., July 12, 2021 .
Technical Memorandum: Preliminary Geotechnical Review, 822, 828 and 834 to 838 Richmond Street West

Armstrong, D.K. and J.E.P. Dodge, 2007.
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Physiography of Southern Ontario. 1973. Special Volume No. 2. Toronto, Ontario. Ontario Geological Survey. 270 p.

Johnson et al., 1992
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Ministry of the Environment and Energy (MOEE), 1995:
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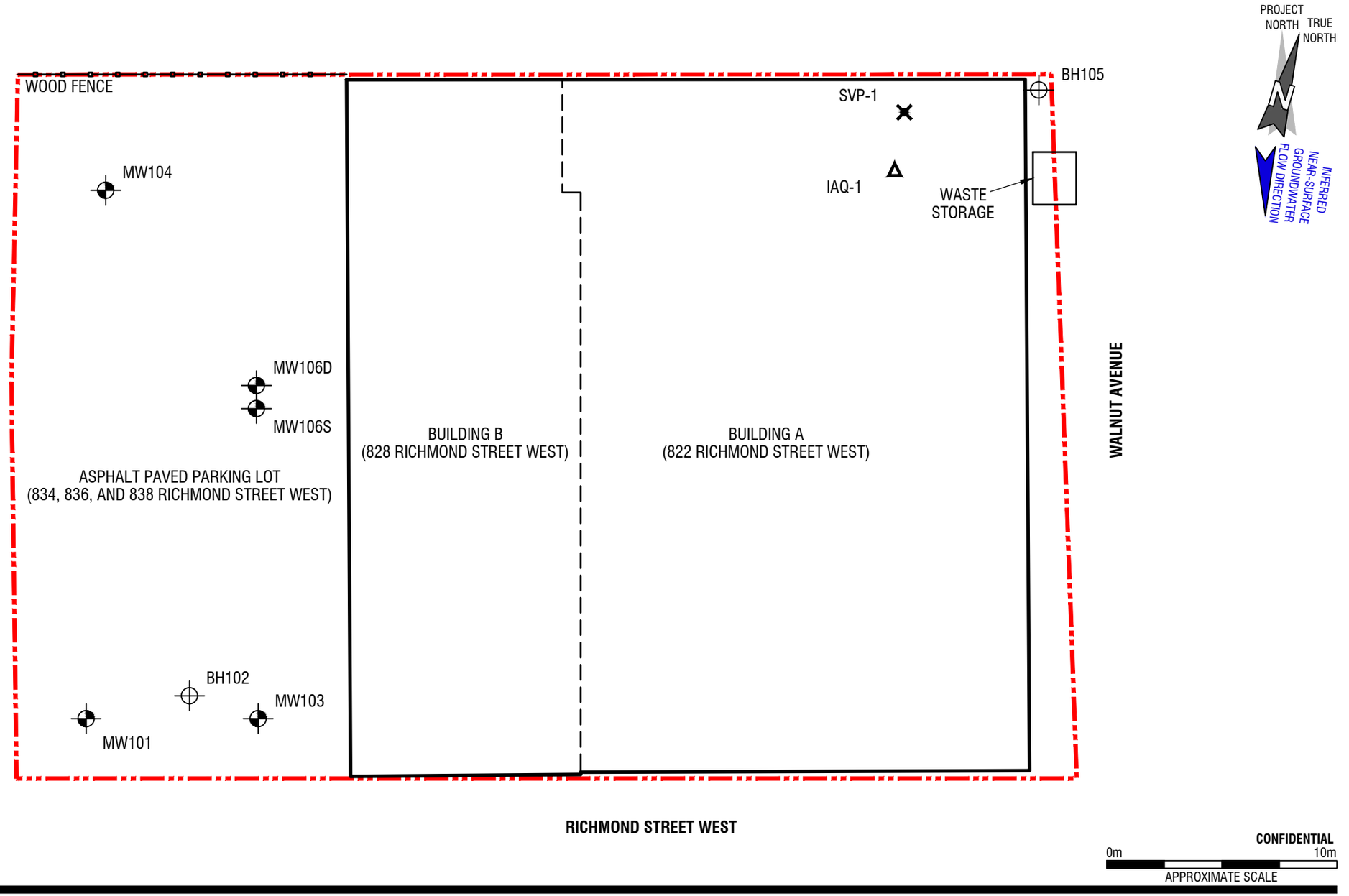
Watters Environmental Group Inc., 2021.
Site Plan and Borehole Logs for 822, 828 and 834 to 838 Richmond Street West, Toronto, Ontario.

Appendix A

Site Plan and Borehole Logs (Watters, 2021)



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Concord, ON. L4K 0J4
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F 416 361 2410

DRAWN:	CLIENT:	REPORT NAME:	FIGURE NAME:
B. CALDERONE	COMMUNITY	PHASE II ENVIRONMENTAL SITE ASSESSMENT	SITE LAYOUT PLAN
CHECKED: J. REN	SITE ADDRESS: 822, 828, 834, 836 AND 838 RICHMOND STREET WEST, TORONTO		PROJECT No: 21-0082.03
DATE: JULY 2021			FIGURE No: 2

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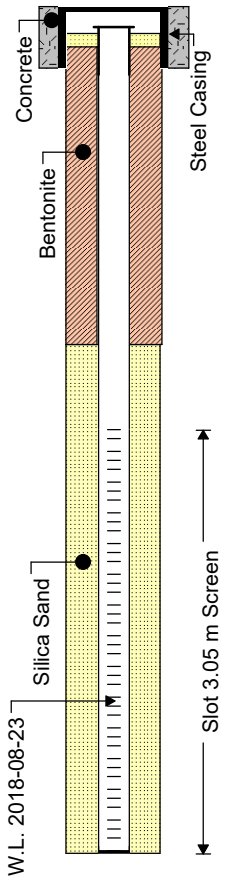
Borehole No: MW101

Project No.: 21-0082.03
Client: Community
Location: 822,828, 834 & 838 Richmond St. W., Toronto, ON
Project Manager: JR
Total Depth: 6.71 m
Logged By: TA & AW
Ground Elevation: 0

SUBSURFACE PROFILE				SAMPLE							
Depth (ft / m)	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Lab Submitted	Moisture (%)	Well Completion Data
0 / 0		Ground Surface	0.00								
		60 mm Asphalt		1	SS	9	30	0,0	X		
2		damp to moist silt, sand, gravel, cinder brick, silty clay FILL		2	SS	5	30	0,0			
4		loose									
6 / 2		very loose		3	SS	3	30	0,0			
8			-2.60	4A	SS	1	50	0,0			
		very soft to soft grey SILTY CLAY, organic inclusions		4B	SS			0,0			
10			-3.51	5	SS	3	100	0,0			
12		SILTY CLAY trace sand, trace gravel									
14 / 4		stiff blocky structure brown to grey		6	SS	18	100	0,0	X		
		very stiff brown with rust brown patches faintly layered		7	SS	19	100	0,0			
16											
18				8	SS	16	100	0,0			
20 / 6		grey fissured with oxidized faces	-6.71	9	SS	13	100	0,0			
22		End of Borehole									
24											
26 / 8											
28											



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Drill Method: Split Spoon Sampling and Hollow Augers
Drill Date: 2021-06-21
Hole Size: 200 mm
Screening Tool: Eagle II
Sheet: 1 of 1

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Borehole No: BH102

Project No.: 21-0082.03
Client: Community
Location: 822,828, 834 & 838 Richmond St. W., Toronto, ON
Project Manager: JR
Total Depth: 5.18 m
Logged By: TA & AW
Ground Elevation: 0

SUBSURFACE PROFILE				SAMPLE							Well Completion Data
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Lab Submitted	Moisture (%)	
ft / m		Ground Surface	0.00								
0 / 0		60 mm Asphalt 60 mm Sandy Silt, some gravel		1	SS	34	50	0,0			
2				2	SS	4	50	0,0			
4		loose to very loose moist silt, fine sand, trace gravel, trace cinder trace brick, frequent clay lumps FILL									
6 / 2				3	SS	7	30	0,0			
8				4	SS	2	25	0,0	X		
10				5	SS	1	25	0,0			
12			-3.81								
4		SILTY CLAY, trace sand, trace gravel brownish grey		6	SS	5	100	0,0			
14		brownfissured grey fissured faces firm to stiff									
16		very stiff	-5.18	7	SS	17	100	0,0	X		
18		End of Borehole									
20 / 6											
22											
24											
26 / 8											
28											

Drilled By: Pontil Drilling, CME 75
Drill Method: Split Spoon Sampling and Hollow Augers
Drill Date: 2021-06-21
Hole Size: 200 mm
Screening Tool: Eagle II
Sheet: 1 of 1

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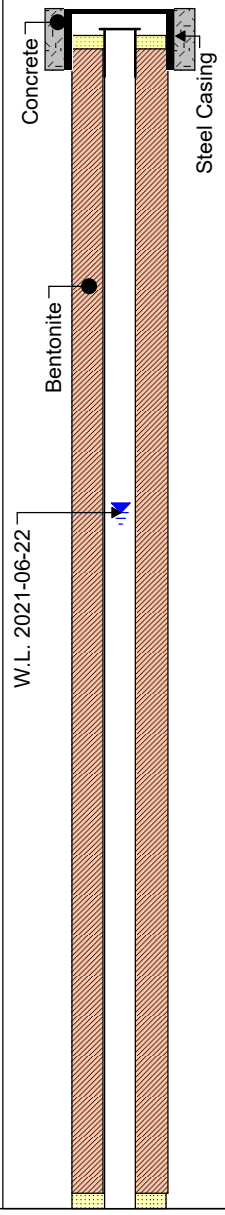
Borehole No: MW103

Project No.: 21-0082.03
Client: Community
Location: 822,828, 834 & 838 Richmond St. W., Toronto, ON
Project Manager: JR
Total Depth: 12.25 m
Logged By: TA & AW
Ground Elevation: 0

SUBSURFACE PROFILE				SAMPLE							
Depth (ft / m)	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Lab Submitted	Moisture (%)	Well Completion Data
0 / 0		Ground Surface	0.00								
		70 mm Asphalt 70 mm Silty Sand some gravel		1	SS	12	75	0,0	X		
2				2	SS	7	100	0,0			
4		loose to very loose damp to moist silt, sand, trace gravel, trace cinders trace brick, trace clay lumps and seams FILL									
6 / 2				3	SS	3	40	0,0			
8				4	SS	4	100	0,0			
10				5	SS	2	75	0,0			
12 / 4			-4.11								
14		grey mottled brown blocky structure		6	SS	4	75	0,0	X		
		firm to stiff									
16		brown fissured fissure faces grey		7	SS	21	40	0,0			
18		very stiff		8	SS	20	100	0,0			
20 / 6		SILTY CLAY trace sand, trace gravel	-6.40	9A	SS	18	100	0,0			
				9B	SS			0,0			
22		grey SILTY CLAY trace sand trace gravel faintly layered									
24											
26 / 8				10	SS	4	100	0,0			
28					SV	150 +kPa					



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Drill Date: 2021-06-21
Hole Size: 200 mm
Screening Tool: Eagle II
Sheet: 1 of 2

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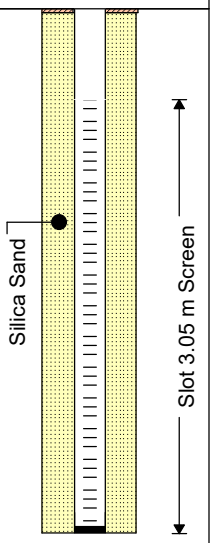
Borehole No: MW103

Project No.: 21-0082.03
Client: Community
Location: 822,828, 834 & 838 Richmond St. W., Toronto, ON
Project Manager: JR
Total Depth: 12.25 m
Logged By: TA & AW
Ground Elevation: 0

SUBSURFACE PROFILE				SAMPLE							
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Lab Submitted	Moisture (%)	Well Completion Data
		firm									
		very stiff		11	SS	20	100	0,0			
		grey SILTY CLAY trace sand, trace gravel faintly layered	-10.67								
		weatherd grey SHALY CLAY		12	SS	92 for 250 mm	75	0,0			
			-11.58								
		hard grey CLAYEY SHALE	-12.25	13	SS	50 for 50 mm	75	0,0			
		End of Borehole									



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Drill Date: 2021-06-21
Hole Size: 200 mm
Screening Tool: Eagle II
Sheet: 2 of 2

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Borehole No: MW104

Project No.: 21-0082.03
Client: Community
Location: 822,828, 834 & 838 Richmond St. W., Toronto, ON
Project Manager: JR
Total Depth: 12.25 m
Logged By: TA & AW
Ground Elevation: 0

SUBSURFACE PROFILE				SAMPLE							
Depth (ft / m)	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Lab Submitted	Moisture (%)	Well Completion Data
0 / 0		Ground Surface	0.00								
		70 mm Asphalt 70 mm Sand and Gravel 40 mm Asphalt 40 mm Sandy Silt and Gravel		1	SS	4	60	0,0	X		
4		loose brown silty clay trace brick, trace gravel FILL	-1.52	2	SS	5	30	0,0			
6 / 2		brown veined grey blocky structure		3	SS	4	100	0,0			
		firm									
8		firm to stiff		4	SS	19	100	0,0			
10		brown fissured									
		very stiff		5	SS	22	75	0,0			
12 / 4		brownish grey oxidized fissure faces		6	SS	27	75	0,0			
14		SILTY CLAY trace sand, trace gravel									
16				7	SS	20	100	15,0	X		
18				8	SS	18	100	0,0			
20 / 6		brown veined grey		9	SS	13	100	25,0			
22		stiff									
24			-7.62						X		
26 / 8		stiff grey SILTY CLAY trace sand, trace gravel faintly layered		10	SS	10	100	0,0			
28											

Concrete
Steel Casing
Bentonite
Silica Sand
Slot 3.05 m Screen

Drilled By: Pontil Drilling, CME 75
Drill Method: Split Spoon Sampling and Hollow Augers
Drill Date: 2021-06-21
Hole Size: 200 mm
Screening Tool: Eagle II
Sheet: 1 of 2

WATTERS ENVIRONMENTAL GROUP INC.®
9135 Keele Street, Unit A1
Concord, Ontario L4K 0J4
www.wattersenvironmental.com
416-361-2407

Borehole No: MW104

Project No.: 21-0082.03
Client: Community
Location: 822,828, 834 & 838 Richmond St. W., Toronto, ON
Project Manager: JR
Total Depth: 12.25 m
Logged By: TA & AW
Ground Elevation: 0

SUBSURFACE PROFILE				SAMPLE							
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Lab Submitted	Moisture (%)	Well Completion Data
		stiff grey SILTY CLAY trace sand, trace gravel faintly layered									
				11	SS	12	100	0,0	X		
			-10.67								
		weatherd grey SHALY CLAY		12	SS	58	80	0,0			
			-11.58								
		hard grey CLAYEY SHALE		13	SS	50 for 70 mm	75	0,0			
			-12.25								
		End of Borehole									

Drilled By: Pontil Drilling, CME 75
Drill Method: Split Spoon Sampling and Hollow Augers
Drill Date: 2021-06-21
Hole Size: 200 mm
Screening Tool: Eagle II
Sheet: 2 of 2

WATTERS ENVIRONMENTAL GROUP INC.®
9135 Keele Street, Unit A1
Concord, Ontario L4K 0J4
www.wattersenvironmental.com
416-361-2407

Borehole No: BH105

Project No.: 21-0082.03
Client: Community
Location: 822,828, 834 & 838 Richmond St. W., Toronto, ON
Project Manager: JR
Total Depth: 3.81 m
Logged By: TA & MW
Ground Elevation: 0

SUBSURFACE PROFILE				SAMPLE							Well Completion Data
Depth (ft / m)	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Lab Submitted	Moisture (%)	
0 / 0		Ground Surface	0.00								
		60 mm Asphalt 300 mm Sand and Gravel		1	SS		75	0,0			
2		loose, moist silt, clay, trace gravel, trace brick FILL		2	SS		90	0,0			
4				3	SS		75	0,0			
6 / 2			-1.83								
		brown to grey, silt and clay trace gravel FILL		4	SS		75	0,0			
8				5	SS		75	0,0	X		
10											
12 / 4		equipment refusal at 3.81 m	-3.81	6	SS		75	5,0	X		
		End of Borehole									
14											
16											
18											
20 / 6											
22											
24											
26 / 8											
28											

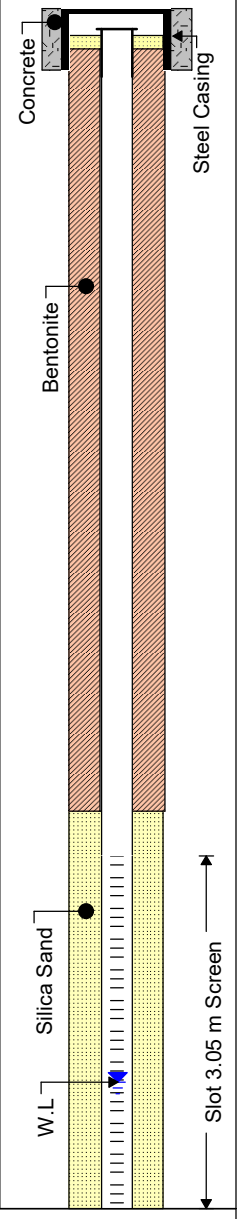
Drilled By: TriPhase Group, Hilti TE1500-AVR
Drill Method: Split Spoon Sampling
Drill Date: 2021-07-09
Hole Size: 64 mm
Screening Tool: Eagle II
Sheet: 1 of 1

WATTERS ENVIRONMENTAL GROUP INC.®
9135 Keele Street, Unit A1
Concord, Ontario L4K 0J4
www.wattersenvironmental.com
416-361-2407

Borehole No: MW106D

Project No.: 21-0082.03
Client: Community
Location: 822,828, 834 & 838 Richmond St. W., Toronto, ON
Project Manager: JR
Total Depth: 9.75 m
Logged By: TA & AW
Ground Elevation: 0

SUBSURFACE PROFILE				SAMPLE							
Depth (ft / m)	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Lab Submitted	Moisture (%)	Well Completion Data
0 / 0		Ground Surface	0.00								
		50 mm Asphalt 50 mm Sand and Gravel loose damp sand, silt trace gravel, trace brick FILL		1	SS	12	50	0,0	X		
4			-1.37	2	SS	4	10	0,0			
6 / 2		lightly compacted brown silty clay trace sand, trace gravel, trace cinder FILL		3	SS	7	100	0,0			
			-2.29								
8		loose sand, silt gravel trace cinders, trace asphalt, trace wood fragments frequent clay lumps FILL		4	SS	4	30	0,0			
10				5	SS	3	60	0,0			
12			-3.81								
14 / 4		brown veined grey stiff		6	SS	11	75	0,0			
16		brown with rust brown patches		7	SS	23	75	15,0	X		
18		very stiff brown veined grey		8	SS	21	100	0,0			
20 / 6		SILTY CLAY trace sand, trace gravel		9	SS	20	100	0,0			
22				10	SS	7	100	0,0	X		
24		grey to brown occasional closed fissure firm			SV	110 kPa R - 50 kPa					
26 / 8				11	SS	6	100	0,0			
28		grey									



Drilled By: Pontil Drilling, CME 75
Drill Method: Split Spoon Sampling and Hollow Augers
Drill Date: 2021-06-22
Hole Size: 200 mm
Screening Tool: Eagle II
Sheet: 1 of 2

WATTERS ENVIRONMENTAL GROUP INC.®
9135 Keele Street, Unit A1
Concord, Ontario L4K 0J4
www.wattersenvironmental.com
416-361-2407

Borehole No: MW106D

Project No.: 21-0082.03
Client: Community
Location: 822,828, 834 & 838 Richmond St. W., Toronto, ON
Project Manager: JR
Total Depth: 9.75 m
Logged By: TA & AW
Ground Elevation: 0

SUBSURFACE PROFILE				SAMPLE							
Depth	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Lab Submitted	Moisture (%)	Well Completion Data
		grey SILTY CLAY trace sand, trace gravel		12	SS	18	60	0,0			
				13	SS	12	50	0,0	X		
			-9.75								
		End of Borehole									

30 32 10 34 36 38 12 40 42 44 46 14 48 50 52 16 54

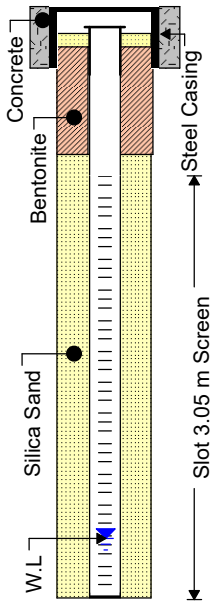
Drilled By: Pontil Drilling, CME 75
Drill Method: Split Spoon Sampling and Hollow Augers
Drill Date: 2021-06-22
Hole Size: 200 mm
Screening Tool: Eagle II
Sheet: 2 of 2

WATTERS ENVIRONMENTAL GROUP INC.®
9135 Keele Street, Unit A1
Concord, Ontario L4K 0J4
www.wattersenvironmental.com
416-361-2407

Borehole No: MW106S

Project No.: 21-0082.03
Client: Community
Location: 822,828, 834 & 838 Richmond St. W., Toronto, ON
Project Manager: JR
Total Depth: 9.75 m
Logged By: TA & AW
Ground Elevation: 0

SUBSURFACE PROFILE				SAMPLE							Well Completion Data
Depth (ft / m)	Symbol	Description	Depth/Elev. (m)	Number	Type	N-Value	Recovery %	T.O.V. CGD/PID	Lab Submitted	Moisture (%)	
0 / 0		Ground Surface	0.00								
0 / 0		50 mm Asphalt 50 mm Sand and Gravel loose damp sand, silt trace gravel, trace brick FILL	-1.37								
6 / 2		lightly compacted brown silty clay trace sand, trace gravel, trace cinder FILL	-2.29								
8 / 2		loose sand, silt gravel trace cinders, trace asphalt, trace wood fragments frequent clay lumps FILL	-3.81								
12 / 4		SILTY CLAY trace sand trave gravel	-4.27								
14 / 4		End of Borehole									

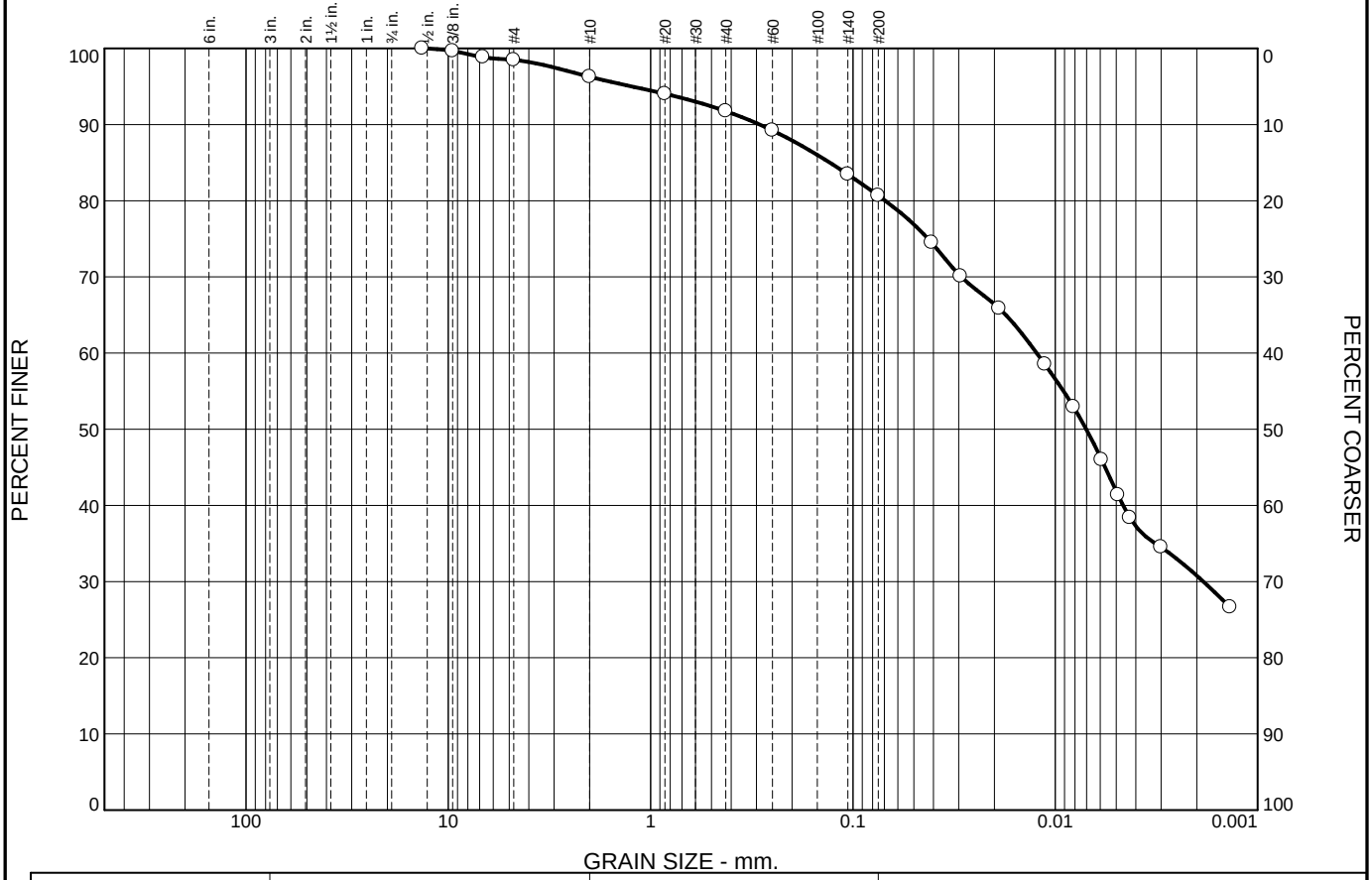


Drilled By: Pontil Drilling, CME 75
Drill Method: Split Spoon Sampling and Hollow Augers
Drill Date: 2021-06-22
Hole Size: 200 mm
Screening Tool: Eagle II
Sheet: 1 of 1

Appendix B

Grain Size Distribution Analyses (Alston, 2021)

Particle Size Distribution Report



	% +3"	% Gravel	% Sand		% Fines	
			Coarse	Fine	Silt	Clay
○	0.0	3.7	4.5	11.1	49.9	30.8

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	30	17	0.1301	0.0124	0.0070	0.0019				

Material Description	USCS	AASHTO
○ SILTY CLAY some sand trace gravel	CL	A-6(9)

Project No. CA21-035 **Client:** Alston Geotechnical Consultants Inc (AGC)

Project: Watters # 21-0082.03 822 Richmond St W

○ **Sample Number:** BH 103, Sample 10

Remarks:

○Tested on July 2, 2021

Terrapex

Figure 1

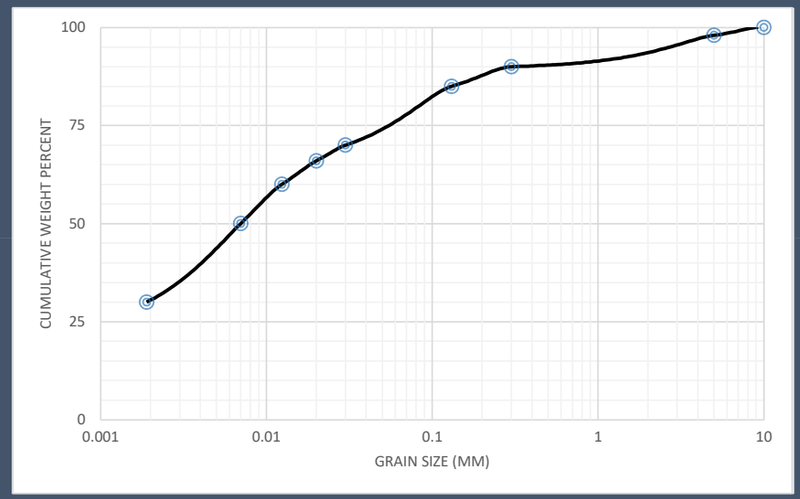
Tested By: AM

BH103, S10

Silty clay, some sand, trace gravel.

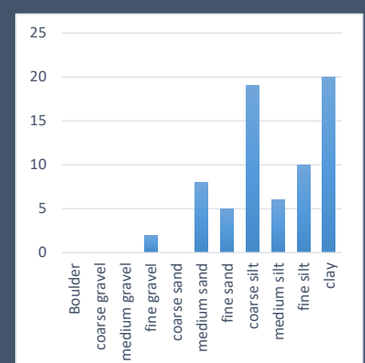
Geometric mean K = 2.0×10^{-9} m/s.

	Mass Sample (g):			T (°C)
	100			20
Sieve opening d_i (ϕ)	Sieve opening (ps) d_i (mm)	Mass of retained (mr) (g)	mass fraction (mf)	Percent Passing (pp)
3.3193	10	0	0	100
2.320091	5	2	0.02	98
-1.735591	0.3	8	0.08	90
-2.930041	0.131	5	0.05	85
-5.054891	0.03	15	0.15	70
-5.639391	0.02	4	0.04	66
-6.328505	0.0124	6	0.06	60
-7.152766	0.007	10	0.1	50
-9.032633	0.0019	20	0.2	30



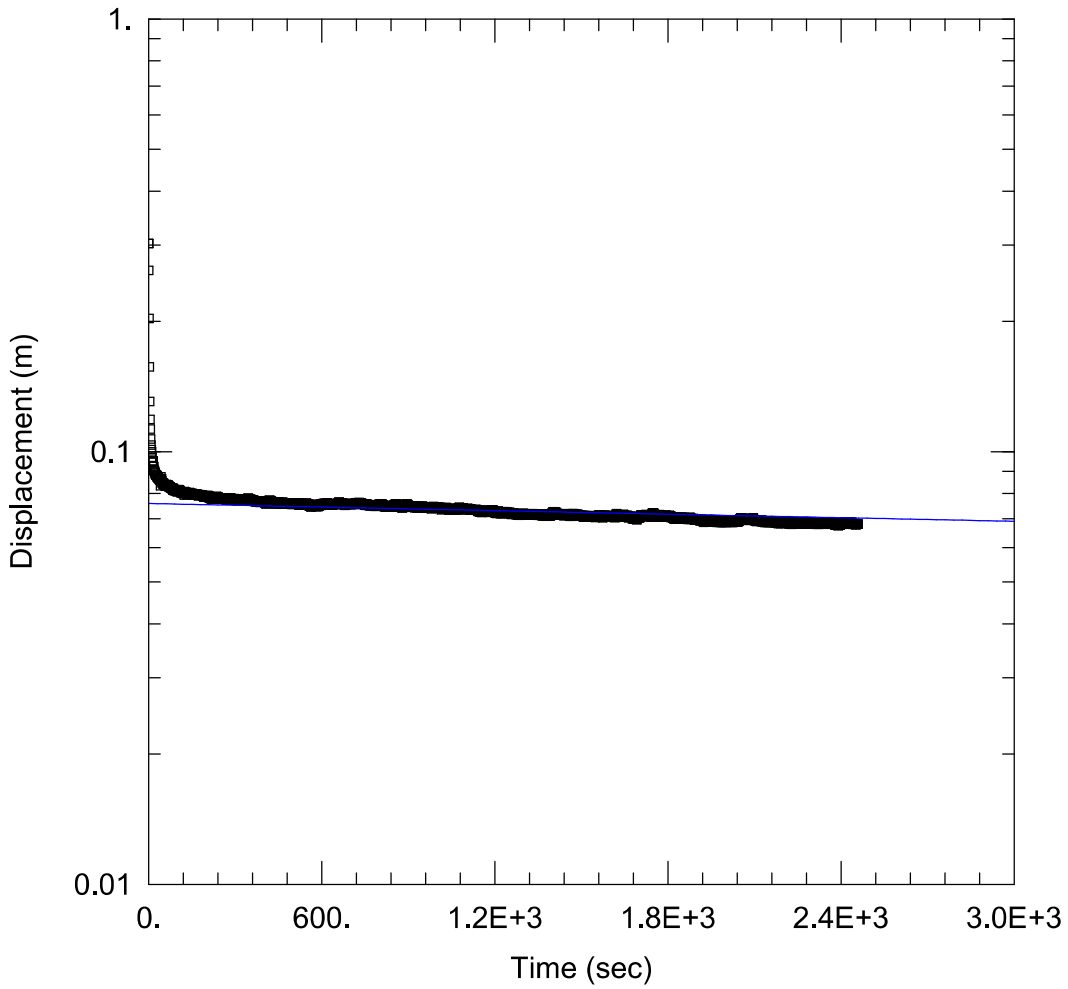
Estimation of Hydraulic Conductivity	cm/s	m/s	m/d
Hazen	.243E-06	.243E-08	0.000
Hazen K (cm/s) = d_{10}^2 (mm^2)	.401E-06	.401E-08	0.000
Slichter	.486E-07	.486E-09	0.000
Terzaghi	.710E-07	.710E-09	0.000
Beyer	.292E-06	.292E-08	0.000
✓ Sauerbrei	.149E-06	.149E-08	0.000
Kruger	.528E-04	.528E-06	0.046
Kozeny-Carmen	.379E-05	.379E-07	0.003
Zunker	.290E-05	.290E-07	0.003
Zamarin	.353E-05	.353E-07	0.003
USBR	.103E-06	.103E-08	0.000
✓ Barr	.526E-07	.526E-09	0.000
✓ Alyamani and Sen	.961E-06	.961E-08	0.001
Chapuis	.751E-09	.751E-11	0.000
Krumbein and Monk	.424E-04	.424E-06	0.037
geometric mean	.196E-06	.196E-08	.170E-03
arithmetic mean	.388E-06	.388E-08	.335E-03

Effective Grain Diameters (mm)		Other Useful Parameters	
d10	0.001	Uniformity Coef.	19.58
d17	0.001	n computed	0.261640
d20	0.001	g (cm/s^2)	980.00
d50	0.007	ρ (g/cm^3)	0.9981
d60	0.012	μ (g/cm s)	0.0098
$d_{geometric\ mean}$	0.088	ρg/μ (1/cm s)	9.9327E+04
de (Kruger)	0.016	tau (Sauerbrei)	1.053
de (Kozeny)	0.004	$d5_\phi$	-11.625
de (Zunker)	0.004	$d16_\phi$	-9.947
de (Zamarin)	0.004	$d50_\phi$	-7.153
Io (Alyameni)	-0.001	$d84_\phi$	-3.008
		$d95_\phi$	1.695
		σ_ϕ	3.753
	mm		% in sample
	>64	Boulder	
	16 - 64	coarse gravel	
	8 - 16	medium gravel	0.000
	2 - 8	fine gravel	2.000
	0.5 - 2	coarse sand	
	0.25 - 0.5	medium sand	8.000
	0.063 - 0.25	fine sand	5.000
	0.016 - 0.063	coarse silt	19
	0.008 - 0.016	medium silt	6
	0.002 - 0.008	fine silt	10
	<0.002	clay	20



Appendix C

Single Well Response Tests (Palmer, 2021)



WELL TEST ANALYSIS

Data Set: C:\Users\Andrei\Documents\Palmer\Richmond Street\MW103-RH.aqt
Date: 07/22/21 Time: 15:07:26

PROJECT INFORMATION

Company: Palmer
Client: Associated Eng
Project: 2001512
Location: 822 Richmond Street
Test Well: MW103
Test Date: July5th

AQUIFER DATA

Saturated Thickness: 2.62 m Anisotropy Ratio (Kz/Kr): 0.01

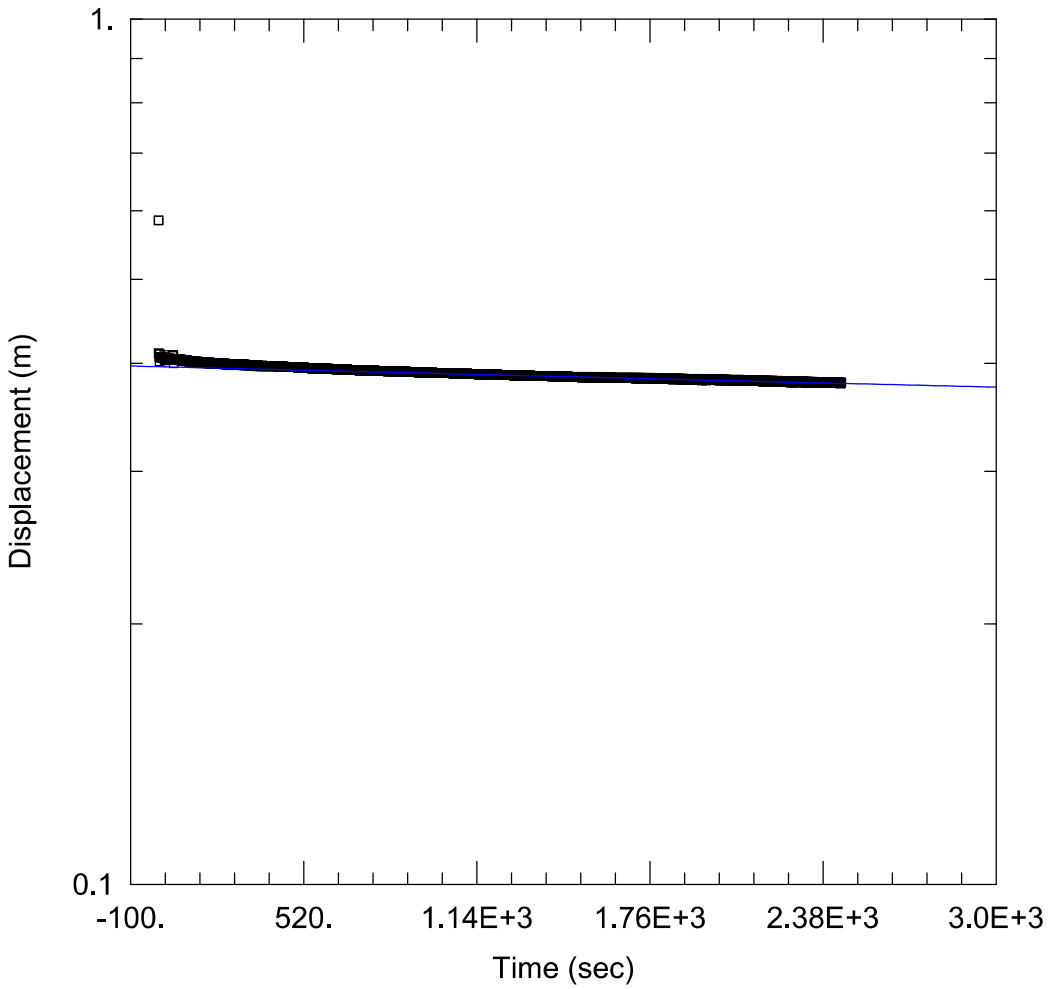
WELL DATA (MW103 RH)

Initial Displacement: 0.3026 m
Total Well Penetration Depth: 3.13 m
Casing Radius: 0.2 m
Static Water Column Height: 2.62 m
Screen Length: 3. m
Well Radius: 0.0254 m
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 8.878E-7 m/sec y0 = 0.07588 m



WELL TEST ANALYSIS

Data Set: C:\Users\Andrei\Documents\Palmer\Richmond Street\MW104-FH.aqt
Date: 07/22/21 Time: 15:13:01

PROJECT INFORMATION

Company: Palmer
Client: Associated Eng
Project: 2001512
Location: 822 Richmond Street
Test Well: MW104
Test Date: July5th

AQUIFER DATA

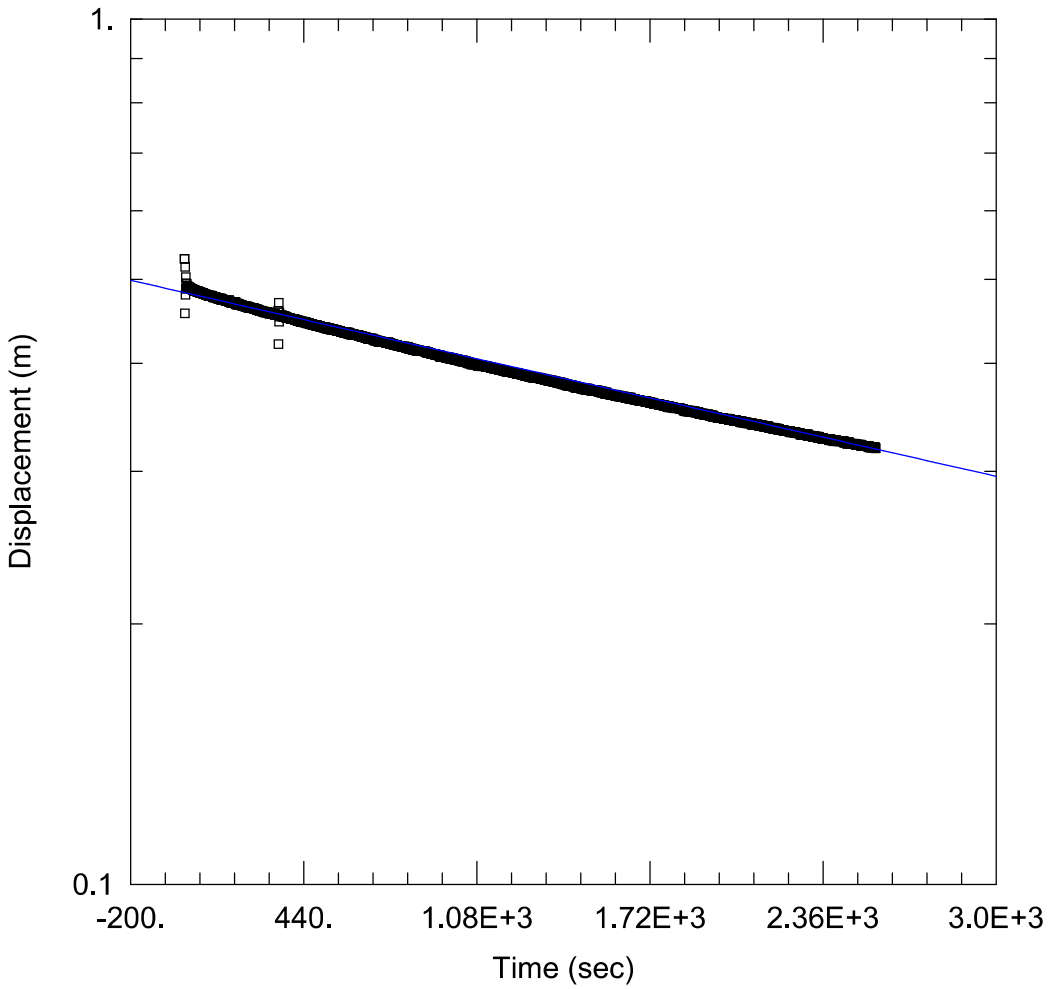
Saturated Thickness: 7.15 m Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW104 Falling)

Initial Displacement: 0.585 m
Total Well Penetration Depth: 5.5 m
Casing Radius: 0.254 m
Static Water Column Height: 7.15 m
Screen Length: 3. m
Well Radius: 0.2 m
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 7.534E-7 m/sec
y0 = 0.3964 m



WELL TEST ANALYSIS

Data Set: C:\Users\Andrei\Documents\Palmer\Richmond Street\MW106-d-FH.aqt
Date: 07/22/21 Time: 15:14:25

PROJECT INFORMATION

Company: Palmer
Client: Associated Eng
Project: 2001512
Location: 822 Richmond Street
Test Well: MW106-d Falling
Test Date: July5th

AQUIFER DATA

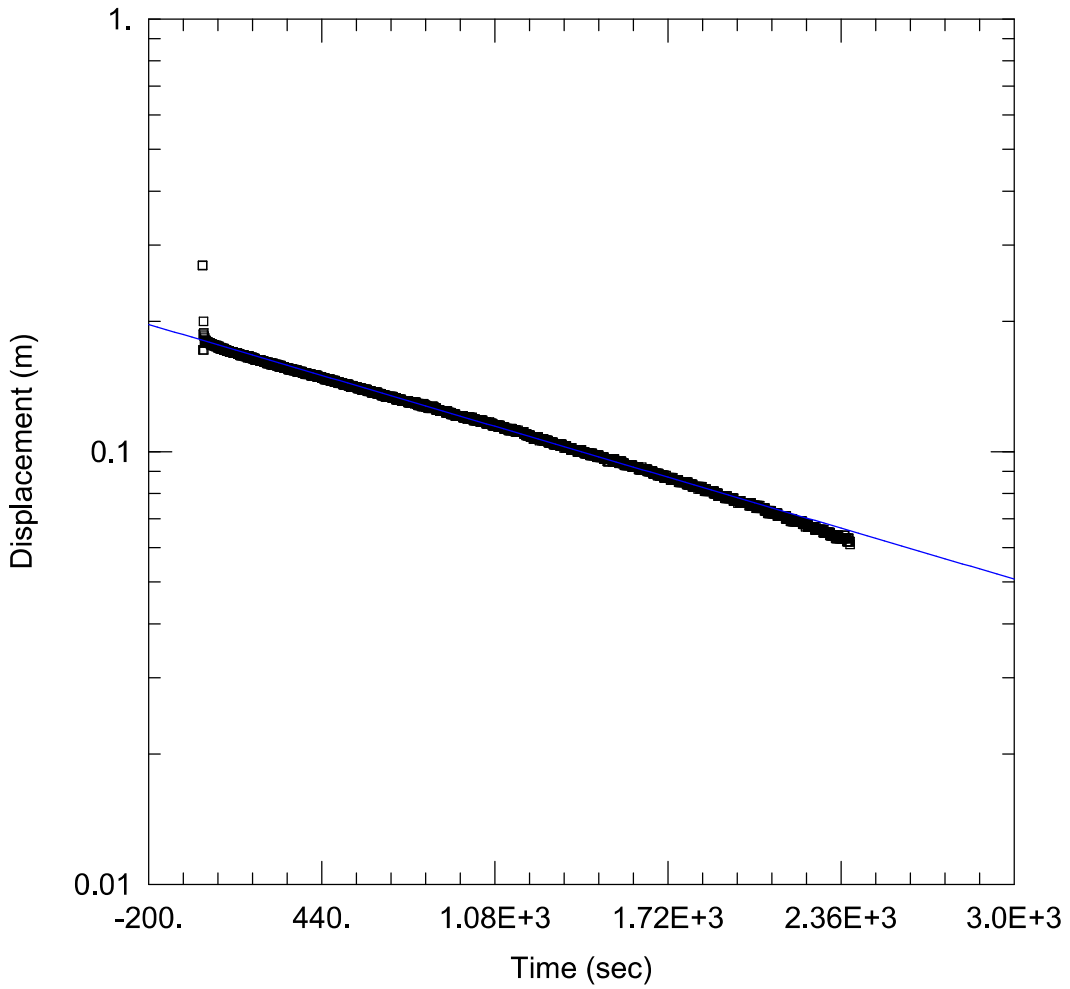
Saturated Thickness: 5.95 m
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW106-d Falling)

Initial Displacement: 0.528 m
Total Well Penetration Depth: 5.3 m
Casing Radius: 0.0254 m
Static Water Column Height: 2.48 m
Screen Length: 3. m
Well Radius: 0.2 m
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 6.871E-8 m/sec
y0 = 0.4828 m



WELL TEST ANALYSIS

Data Set: C:\Users\Andrei\Documents\Palmer\Richmond Street\MW106-d-RH.aqt
Date: 07/22/21 Time: 15:15:16

PROJECT INFORMATION

Company: Palmer
Client: Associated Eng
Project: 2001512
Location: 822 Richmond Street
Test Well: MW106-d Rising
Test Date: July5th

AQUIFER DATA

Saturated Thickness: 5.95 m Anisotropy Ratio (Kz/Kr): 0.01

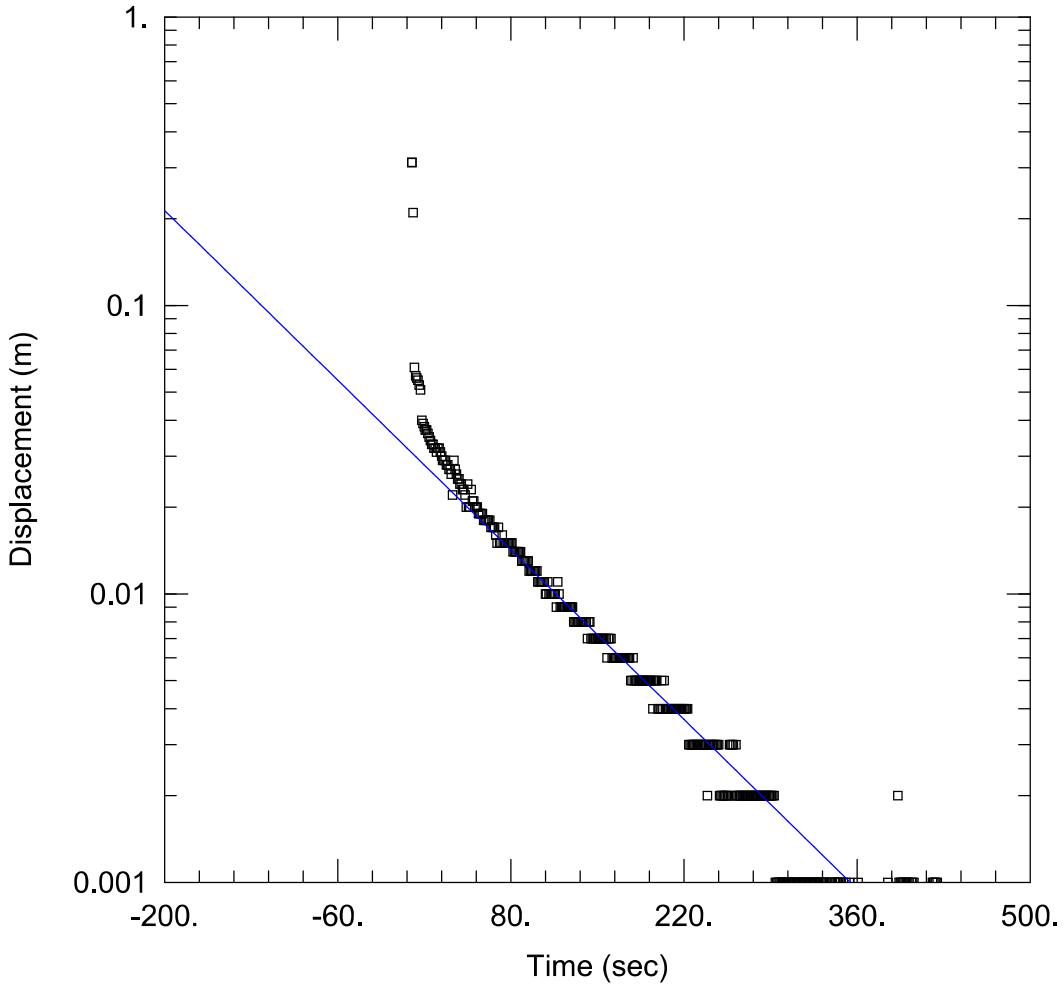
WELL DATA (MW106-d Rising)

Initial Displacement: 0.2695 m
Total Well Penetration Depth: 5.3 m
Casing Radius: 0.0254 m
Static Water Column Height: 2.48 m
Screen Length: 3. m
Well Radius: 0.2 m
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Confined Solution Method: Bouwer-Rice

K = 1.786E-7 m/sec y0 = 0.1808 m



WELL TEST ANALYSIS

Data Set: C:\Users\Andrei\Documents\Palmer\Richmond Street\MW106-s-First RH.aqt
Date: 07/22/21 Time: 15:16:34

PROJECT INFORMATION

Company: Palmer
Client: Associated Eng
Project: 2001512
Location: 822 Richmond Street
Test Well: MW106-s First RH
Test Date: July5th

AQUIFER DATA

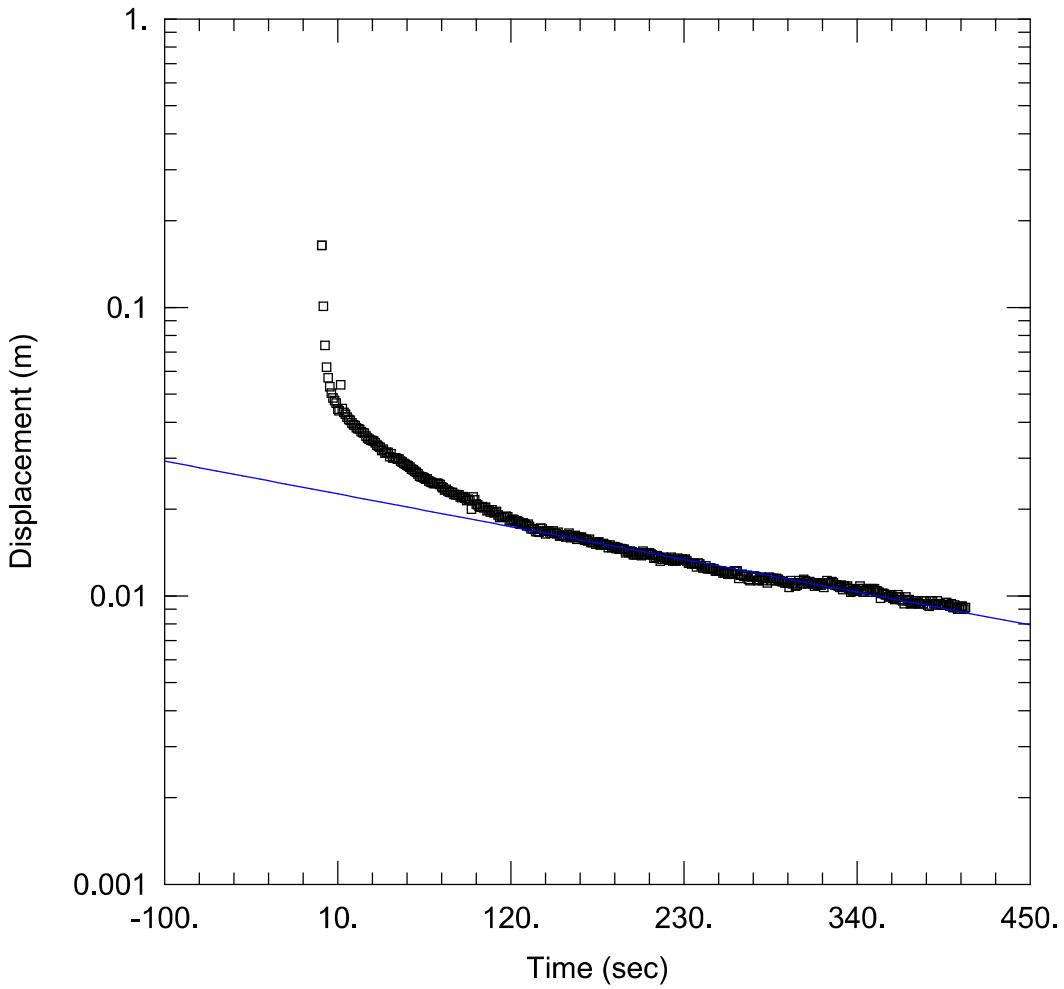
Saturated Thickness: 0.81 m
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW106-s (First RH))

Initial Displacement: 0.3134 m
Total Well Penetration Depth: 5.26 m
Casing Radius: 0.0254 m
Static Water Column Height: 0.81 m
Screen Length: 3. m
Well Radius: 0.2 m
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 7.342E-6 m/sec
y0 = 0.03081 m



WELL TEST ANALYSIS

Data Set: C:\Users\Andrei\Documents\Palmer\Richmond Street\MW106-s-SEcond RH.aqt
Date: 07/22/21 Time: 15:17:25

PROJECT INFORMATION

Company: Palmer
Client: Associated Eng
Project: 2001512
Location: 822 Richmond Street
Test Well: MW106-s Second RH
Test Date: July5th

AQUIFER DATA

Saturated Thickness: 0.81 m
Anisotropy Ratio (Kz/Kr): 0.01

WELL DATA (MW106-s Second RH)

Initial Displacement: 0.1642 m
Total Well Penetration Depth: 3. m
Casing Radius: 0.0254 m
Static Water Column Height: 0.81 m
Screen Length: 3. m
Well Radius: 0.2 m
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.593E-6 m/sec
y0 = 0.02311 m

Appendix D

Laboratory Certificate of Analysis (ALS, 2021)

PALMER ENVIRONMENTAL CONSULTING
GROUP INC. (Richmond Hill)
ATTN: Andrei Miler
74 Berkeley Street
Toronto ON M5V 1E3

Date Received: 02-JUL-21
Report Date: 14-JUL-21 12:21 (MT)
Version: FINAL

Client Phone: 647-795-8153

Certificate of Analysis

Lab Work Order #: L2609138

Project P.O. #: NOT SUBMITTED
Job Reference: 822
C of C Numbers:
Legal Site Desc:

Jennifer Barkshire-Paterson
Account Manager

ANALYTICAL REPORT

Summary of Guideline Exceedances

Guideline ALS ID	Client ID	Grouping	Analyte	Result	Guideline Limit	Unit
Ontario Toronto Sanitary Discharge Sewer By-Law 100-2016 (FEB 4,2016) - Ontario Toronto Sanitary Discharge Sewer By-Law						
(No parameter exceedances)						
Ontario Toronto Sanitary Discharge Sewer By-Law 100-2016 (FEB 4,2016) - Ontario Toronto Storm Sewer By-Law						
L2609138-1	MW-106- 5	Physical Tests	Total Suspended Solids	160	15	mg/L
		Total Metals	Manganese (Mn)-Total	1.11	0.05	mg/L
			Mercury (Hg)-Total	0.00162	0.0004	mg/L
			Zinc (Zn)-Total	0.063	0.04	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: L2609138-1 Sample Date: 02-JUL-21 Sample ID: MW-106- 5
pH	pH units	6.00-11.5	6.0-9.5	7.37
Total Suspended Solids	mg/L	350	15	160

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

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

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

Anions and Nutrients - WATER

			Lab ID	L2609138-1
			Sample Date	02-JUL-21
			Sample ID	MW-106- 5
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Fluoride (F)	mg/L	10	-	0.14 DLDS
Total Kjeldahl Nitrogen	mg/L	100	-	2.00 DLM
Phosphorus, Total	mg/L	10	0.4	0.347

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

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

ANALYTICAL REPORT

Cyanides - WATER

			Lab ID	L2609138-1
			Sample Date	02-JUL-21
			Sample ID	MW-106- 5
		Guide Limits		
Analyte	Unit	#1	#2	
Cyanide, Total	mg/L	2	0.02	<0.0020

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

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

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

ANALYTICAL REPORT

Bacteriological Tests - WATER

		Guide Limits		Lab ID	Sample Date	Sample ID
Analyte	Unit	#1	#2			
				L2609138-1	02-JUL-21	MW-106- 5
E. Coli	CFU/100mL	-	200	0		

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

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

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

ANALYTICAL REPORT

Total Metals - WATER

			Lab ID	L2609138-1
			Sample Date	02-JUL-21
			Sample ID	MW-106- 5
Analyte	**Unit**	**Guide Limits #1**	**#2**	
Aluminum (Al)-Total	mg/L	50	-	3.18 DLHC
Antimony (Sb)-Total	mg/L	5	-	<0.0010 DLHC
Arsenic (As)-Total	mg/L	1	0.02	0.0048 DLHC
Cadmium (Cd)-Total	mg/L	0.7	0.008	0.000063 DLHC
Chromium (Cr)-Total	mg/L	4	0.08	0.0071 DLHC
Cobalt (Co)-Total	mg/L	5	-	0.0027 DLHC
Copper (Cu)-Total	mg/L	2	0.04	0.0127 DLHC
Lead (Pb)-Total	mg/L	1	0.12	0.104 DLHC
Manganese (Mn)-Total	mg/L	5	0.05	1.11 DLHC
Mercury (Hg)-Total	mg/L	0.01	0.0004	0.00162
Molybdenum (Mo)-Total	mg/L	5	-	0.00276 DLHC
Nickel (Ni)-Total	mg/L	2	0.08	0.0064 DLHC
Selenium (Se)-Total	mg/L	1	0.02	0.00073 DLHC
Silver (Ag)-Total	mg/L	5	0.12	<0.00050 DLHC
Tin (Sn)-Total	mg/L	5	-	0.0247 DLHC
Titanium (Ti)-Total	mg/L	5	-	0.109 DLHC
Zinc (Zn)-Total	mg/L	2	0.04	0.063 DLHC

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

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

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

ANALYTICAL REPORT

Speciated Metals - WATER

		Lab ID	L2609138-1
		Sample Date	02-JUL-21
		Sample ID	MW-106- 5
Analyte	Unit	Guide Limits #1	#2	
Chromium, Hexavalent	mg/L	2	0.04	<0.00050

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

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

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

Aggregate Organics - WATER

Analyte	Unit	Guide Limits #1	Guide Limits #2	Lab ID: L2609138-1 Sample Date: 02-JUL-21 Sample ID: MW-106- 5
BOD	mg/L	300	15	<3.0 BODL
Oil and Grease, Total	mg/L	-	-	<5.0
Animal/Veg Oil & Grease	mg/L	150	-	<5.0
Mineral Oil and Grease	mg/L	15	-	<2.5
Phenols (4AAP)	mg/L	1.0	0.008	<0.0010

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

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

Volatile Organic Compounds - WATER

			Lab ID	L2609138-1
			Sample Date	02-JUL-21
			Sample ID	MW-106- 5
		Guide Limits		
Analyte	Unit	#1	#2	
Benzene	ug/L	10	2	<0.50 OWP
Chloroform	ug/L	40	2	<1.0 OWP
1,2-Dichlorobenzene	ug/L	50	5.6	<0.50 OWP
1,4-Dichlorobenzene	ug/L	80	6.8	<0.50 OWP
cis-1,2-Dichloroethylene	ug/L	4000	5.6	<0.50 OWP
Dichloromethane	ug/L	2000	5.2	<2.0 OWP
trans-1,3-Dichloropropene	ug/L	140	-	<0.50 OWP
Ethylbenzene	ug/L	160	2	<0.50 OWP
1,1,2,2-Tetrachloroethane	ug/L	1400	17	<0.50 OWP
Tetrachloroethylene	ug/L	1000	4.4	<0.50 OWP
Toluene	ug/L	16	2	<0.50 OWP
Trichloroethylene	ug/L	400	7.6	<0.50 OWP
o-Xylene	ug/L	-	-	<0.50 OWP
m+p-Xylenes	ug/L	-	-	<1.0 OWP
Xylenes (Total)	ug/L	1400	4.4	<1.1
Surrogate: 4-Bromofluorobenzene	%	-	-	97.0
Surrogate: 1,4-Difluorobenzene	%	-	-	100.6

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

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

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

Polycyclic Aromatic Hydrocarbons - WATER

			Lab ID	L2609138-1
			Sample Date	02-JUL-21
			Sample ID	MW-106- 5
		Guide Limits		
Analyte	Unit	#1	#2	
Acenaphthene	ug/L	-	-	<0.010
Anthracene	ug/L	-	-	<0.010
Benzo(a)anthracene	ug/L	-	-	0.032
Benzo(a)pyrene	ug/L	-	-	0.032
Benzo(b&j)fluoranthene	ug/L	-	-	0.047
Benzo(e)pyrene	ug/L	-	-	<0.050
Benzo(ghi)perylene	ug/L	-	-	0.024
Benzo(k)fluoranthene	ug/L	-	-	0.014
Chrysene	ug/L	-	-	0.042
Dibenz(a,h)acridine	ug/L	-	-	<0.050
Dibenz(a,j)acridine	ug/L	-	-	<0.050
Dibenz(a,h)anthracene	ug/L	-	-	<0.010
Dibenzo(a,i)pyrene	ug/L	-	-	<0.050
7H-Dibenzo(c,g)carbazole	ug/L	-	-	<0.050
1,3-Dinitropyrene	ug/L	-	-	<1.0
1,6-Dinitropyrene	ug/L	-	-	<1.0
1,8-Dinitropyrene	ug/L	-	-	<1.0
Fluoranthene	ug/L	-	-	0.074
Fluorene	ug/L	-	-	<0.010
Indeno(1,2,3-cd)pyrene	ug/L	-	-	0.025
Naphthalene	ug/L	-	-	0.011
Perylene	ug/L	-	-	0.020
Phenanthrene	ug/L	-	-	0.033
Pyrene	ug/L	-	-	0.059
Surrogate: 2-Fluorobiphenyl	%	-	-	78.0
Surrogate: D14-Terphenyl	%	-	-	61.8
Surrogate: d14-Terphenyl	%	-	-	63.5
Total PAHs	ug/L	5	2	<1.7

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

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

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

ANALYTICAL REPORT

Semi-Volatile Organics - WATER

			Lab ID	L2609138-1
			Sample Date	02-JUL-21
			Sample ID	MW-106- 5
		Guide Limits		
Analyte	Unit	#1	#2	
3,3'-Dichlorobenzidine	ug/L	2	0.8	<0.40
Di-n-butylphthalate	ug/L	80	15	<1.0
Bis(2-ethylhexyl)phthalate	ug/L	12	8.8	<2.0
Pentachlorophenol	ug/L	5	2	<0.50
Surrogate: 2-Fluorobiphenyl	%	-	-	86.9
Surrogate: p-Terphenyl d14	%	-	-	59.0
Surrogate: 2,4,6-Tribromophenol	%	-	-	94.0

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

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

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

ANALYTICAL REPORT

Polychlorinated Biphenyls - WATER

			Lab ID	L2609138-1
			Sample Date	02-JUL-21
			Sample ID	MW-106- 5
		Guide Limits		
Analyte	Unit	#1	#2	
Aroclor 1242	ug/L	-	-	<0.020
Aroclor 1248	ug/L	-	-	<0.020
Aroclor 1254	ug/L	-	-	<0.020
Aroclor 1260	ug/L	-	-	<0.020
Surrogate: Decachlorobiphenyl	%	-	-	65.7
Total PCBs	ug/L	1	0.4	<0.040
Surrogate: Tetrachloro-m-xylene	%	-	-	72.9

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

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

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

Organic Parameters - WATER

			Lab ID	L2609138-1
			Sample Date	02-JUL-21
			Sample ID	MW-106- 5
		Guide Limits		
Analyte	**Unit**	**#1**	**#2**	
Nonylphenol	ug/L	20	1	<1.0
Nonylphenol Diethoxylates	ug/L	-	-	<0.10
Total Nonylphenol Ethoxylates	ug/L	200	10	<2.0
Nonylphenol Monoethoxylates	ug/L	-	-	<2.0

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

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

Reference Information

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
BODL	Limit of Reporting for BOD was increased to account for the largest volume of sample tested.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
OWP	Organic water sample contained visible sediment (must be included as part of analysis). Measured concentrations of organic substances in water can be biased high due to presence of

Reference Information

sediment.

DLHC Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
625-PAH-LOW-WT	Water	EPA 8270 PAH (Low Level)	SW846 8270

Aqueous samples are extracted and extracts are analyzed on GC/MSD. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

625-SAN-WT	Water	Ontario Sanitary Sewer SVOC Target List	SW-846 8270

Samples are extracted with solvent and then analyzed by GC/MS.

BOD-WT	Water	BOD	APHA 5210 B

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

CR-CR6-IC-WT	Water	Chromium +6	EPA 7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution. Chromium (III) is calculated as the difference between the total chromium and the chromium (VI) results.

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

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WW-MF-WT	Water	E. Coli	SM 9222D

A 100 mL volume of sample is filtered through a membrane, the membrane is placed on mFC-BCIG agar and incubated at 44.5 –0 .2 °C for 24 – 2 h. Method ID: WT-TM-1200

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

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

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

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

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

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**

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

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

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

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

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

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

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

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

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

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

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

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

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

PCB-WT	Water	Polychlorinated Biphenyls	EPA 8082

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

PH-WT	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

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

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

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

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

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104–1°C for a minimum of four hours or until a constant weight is achieved.

TKN-F-WT	Water	TKN in Water by Fluorescence	J. ENVIRON. MONIT., 2005,7,37-42,RSC

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference**
		Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection	
VOC-ROU-HS-WT	Water	Volatile Organic Compounds	SW846 8260
		Aqueous samples are analyzed by headspace-GC/MS.	
XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION
		Total xylenes represents the sum of o-xylene and m&p-xylene.	

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

Chain of Custody Numbers:

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

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

GLOSSARY OF REPORT TERMS

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

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

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

Quality Control Report

Workorder: L2609138 Report Date: 14-JUL-21

Client: PALMER ENVIRONMENTAL CONSULTING GROUP INC. (Richmond Hill)
74 Berkeley Street
Toronto ON M5V 1E3
Contact: Andrei Miler

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-PAH-LOW-WT	**Water**							
Batch R5514523								
WG3570485-2 LCS								
Acenaphthene			64.4		%		50-140	08-JUL-21
Anthracene			78.0		%		50-140	08-JUL-21
Benzo(a)anthracene			97.4		%		50-140	08-JUL-21
Benzo(a)pyrene			74.0		%		60-130	08-JUL-21
Benzo(b&j)fluoranthene			87.1		%		60-130	08-JUL-21
Benzo(ghi)perylene			62.8		%		50-140	08-JUL-21
Benzo(k)fluoranthene			84.2		%		50-140	08-JUL-21
Chrysene			99.3		%		50-140	08-JUL-21
Dibenz(a,h)anthracene			72.2		%		50-140	08-JUL-21
Fluoranthene			90.5		%		50-140	08-JUL-21
Fluorene			73.1		%		50-140	08-JUL-21
Indeno(1,2,3-cd)pyrene			55.9		%		50-140	08-JUL-21
Naphthalene			64.0		%		50-130	08-JUL-21
Perylene			82.4		%		50-140	08-JUL-21
Phenanthrene			81.6		%		50-140	08-JUL-21
Pyrene			90.8		%		50-140	08-JUL-21
WG3570485-1 MB								
Acenaphthene			<0.010		ug/L		0.01	08-JUL-21
Anthracene			<0.010		ug/L		0.01	08-JUL-21
Benzo(a)anthracene			<0.010		ug/L		0.01	08-JUL-21
Benzo(a)pyrene			<0.010		ug/L		0.01	08-JUL-21
Benzo(b&j)fluoranthene			<0.010		ug/L		0.01	08-JUL-21
Benzo(ghi)perylene			<0.010		ug/L		0.01	08-JUL-21
Benzo(k)fluoranthene			<0.010		ug/L		0.01	08-JUL-21
Chrysene			<0.010		ug/L		0.01	08-JUL-21
Dibenz(a,h)anthracene			<0.010		ug/L		0.01	08-JUL-21
Fluoranthene			<0.010		ug/L		0.01	08-JUL-21
Fluorene			<0.010		ug/L		0.01	08-JUL-21
Indeno(1,2,3-cd)pyrene			<0.010		ug/L		0.01	08-JUL-21
Naphthalene			<0.010		ug/L		0.01	08-JUL-21
Perylene			<0.010		ug/L		0.01	08-JUL-21
Phenanthrene			<0.010		ug/L		0.01	08-JUL-21
Pyrene			<0.010		ug/L		0.01	08-JUL-21
Surrogate: 2-Fluorobiphenyl			72.5		%		40-130	08-JUL-21

Quality Control Report

Client: PALMER ENVIRONMENTAL CONSULTING GROUP INC. (Richmond Hill)
74 Berkeley Street
Toronto ON M5V 1E3
Contact: Andrei Miler

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
625-PAH-LOW-WT	**Water**							
Batch R5514523								
WG3570485-1 MB								
Surrogate: D14-Terphenyl			84.0		%		40-130	08-JUL-21
625-SAN-WT	**Water**							
Batch R5516357								
WG3570485-2 LCS								
3,3'-Dichlorobenzidine			53.0		%		50-140	09-JUL-21
Bis(2-ethylhexyl)phthalate			99.7		%		50-140	09-JUL-21
Di-n-butylphthalate			93.5		%		50-140	09-JUL-21
Pentachlorophenol			121.4		%		50-140	09-JUL-21
WG3570485-1 MB								
3,3'-Dichlorobenzidine			<0.40		ug/L		0.4	09-JUL-21
Bis(2-ethylhexyl)phthalate			<2.0		ug/L		2	09-JUL-21
Di-n-butylphthalate			<1.0		ug/L		1	09-JUL-21
Pentachlorophenol			<0.50		ug/L		0.5	09-JUL-21
Surrogate: 2-Fluorobiphenyl			81.0		%		40-130	09-JUL-21
Surrogate: 2,4,6-Tribromophenol			71.9		%		40-130	09-JUL-21
Surrogate: p-Terphenyl d14			105.7		%		40-130	09-JUL-21
BOD-WT	**Water**							
Batch R5514134								
WG3568130-2 DUP		**L2608943-1**						
BOD		<3.0	<3.0	RPD-NA	mg/L	N/A	30	02-JUL-21
WG3568130-3 LCS								
BOD			94.4		%		85-115	02-JUL-21
WG3568130-1 MB								
BOD			<2.0		mg/L		2	02-JUL-21
CN-TOT-WT	**Water**							
Batch R5514075								
WG3570775-24 DUP		**WG3570775-22**						
Cyanide, Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	08-JUL-21
WG3570775-21 LCS								
Cyanide, Total			99.3		%		80-120	08-JUL-21
WG3570775-20 MB								
Cyanide, Total			<0.0020		mg/L		0.002	08-JUL-21
WG3570775-23 MS		**WG3570775-22**						
Cyanide, Total			99.8		%		70-130	08-JUL-21

Quality Control Report

Client: PALMER ENVIRONMENTAL CONSULTING GROUP INC. (Richmond Hill)
74 Berkeley Street
Toronto ON M5V 1E3
Contact: Andrei Miler

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CR-CR6-IC-WT	**Water**							
Batch R5514033								
WG3570174-4 DUP		**WG3570174-3**						
Chromium, Hexavalent		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	06-JUL-21
WG3570174-2 LCS								
Chromium, Hexavalent			92.9		%		80-120	06-JUL-21
WG3570174-1 MB								
Chromium, Hexavalent			<0.00050		mg/L		0.0005	06-JUL-21
WG3570174-5 MS		**WG3570174-3**						
Chromium, Hexavalent			95.8		%		70-130	06-JUL-21
EC-WW-MF-WT	**Water**							
Batch R5509996								
WG3568425-1 MB								
E. Coli			0		CFU/100mL		1	03-JUL-21
F-IC-N-WT	**Water**							
Batch R5513472								
WG3570369-14 DUP		**WG3570369-13**						
Fluoride (F)		0.023	0.024		mg/L	6.1	20	06-JUL-21
WG3570369-12 LCS								
Fluoride (F)			103.3		%		90-110	06-JUL-21
WG3570369-11 MB								
Fluoride (F)			<0.020		mg/L		0.02	06-JUL-21
WG3570369-15 MS		**WG3570369-13**						
Fluoride (F)			102.9		%		75-125	06-JUL-21
HG-T-CVAA-WT	**Water**							
Batch R5513159								
WG3569822-3 DUP		**L2608837-1**						
Mercury (Hg)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	06-JUL-21
WG3569822-2 LCS								
Mercury (Hg)-Total			92.3		%		80-120	06-JUL-21
WG3569822-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	06-JUL-21
WG3569822-4 MS		**L2608934-1**						
Mercury (Hg)-Total			N/A	MS-B	%		-	06-JUL-21
MET-T-CCMS-WT	**Water**							

Quality Control Report

Client: PALMER ENVIRONMENTAL CONSULTING GROUP INC. (Richmond Hill)
74 Berkeley Street
Toronto ON M5V 1E3
Contact: Andrei Miler

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R5511962								
WG3568732-4 DUP		**WG3568732-3**						
Aluminum (Al)-Total		18.5	18.1		mg/L	1.8	20	05-JUL-21
Antimony (Sb)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	05-JUL-21
Arsenic (As)-Total		0.0094	0.0089		mg/L	4.9	20	05-JUL-21
Cadmium (Cd)-Total		0.000272	0.000286		mg/L	4.8	20	05-JUL-21
Chromium (Cr)-Total		0.0351	0.0353		mg/L	0.8	20	05-JUL-21
Cobalt (Co)-Total		0.0133	0.0133		mg/L	0.1	20	05-JUL-21
Copper (Cu)-Total		0.0397	0.0388		mg/L	2.2	20	05-JUL-21
Lead (Pb)-Total		0.0238	0.0238		mg/L	0.1	20	05-JUL-21
Manganese (Mn)-Total		0.890	0.888		mg/L	0.2	20	05-JUL-21
Molybdenum (Mo)-Total		0.0109	0.0107		mg/L	1.6	20	05-JUL-21
Nickel (Ni)-Total		0.0294	0.0298		mg/L	1.4	20	05-JUL-21
Selenium (Se)-Total		0.00090	0.00103		mg/L	13	20	05-JUL-21
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	05-JUL-21
Tin (Sn)-Total		0.0022	0.0021		mg/L	3.7	20	05-JUL-21
Titanium (Ti)-Total		0.678	0.660		mg/L	2.8	20	05-JUL-21
Zinc (Zn)-Total		0.106	0.099		mg/L	6.5	20	05-JUL-21
WG3568732-2 LCS								
Aluminum (Al)-Total			102.4		%		80-120	05-JUL-21
Antimony (Sb)-Total			110.1		%		80-120	05-JUL-21
Arsenic (As)-Total			110.5		%		80-120	05-JUL-21
Cadmium (Cd)-Total			106.9		%		80-120	05-JUL-21
Chromium (Cr)-Total			105.6		%		80-120	05-JUL-21
Cobalt (Co)-Total			107.9		%		80-120	05-JUL-21
Copper (Cu)-Total			106.7		%		80-120	05-JUL-21
Lead (Pb)-Total			107.7		%		80-120	05-JUL-21
Manganese (Mn)-Total			106.1		%		80-120	05-JUL-21
Molybdenum (Mo)-Total			102.7		%		80-120	05-JUL-21
Nickel (Ni)-Total			105.8		%		80-120	05-JUL-21
Selenium (Se)-Total			109.7		%		80-120	05-JUL-21
Silver (Ag)-Total			107.8		%		80-120	05-JUL-21
Tin (Sn)-Total			107.2		%		80-120	05-JUL-21
Titanium (Ti)-Total			102.1		%		80-120	05-JUL-21
Zinc (Zn)-Total			108.8		%		80-120	05-JUL-21

Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R5511962								
WG3568732-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	05-JUL-21
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	05-JUL-21
Arsenic (As)-Total			<0.00010		mg/L		0.0001	05-JUL-21
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	05-JUL-21
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	05-JUL-21
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	05-JUL-21
Copper (Cu)-Total			<0.00050		mg/L		0.0005	05-JUL-21
Lead (Pb)-Total			<0.000050		mg/L		0.00005	05-JUL-21
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	05-JUL-21
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	05-JUL-21
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	05-JUL-21
Selenium (Se)-Total			<0.000050		mg/L		0.00005	05-JUL-21
Silver (Ag)-Total			<0.000050		mg/L		0.00005	05-JUL-21
Tin (Sn)-Total			<0.00010		mg/L		0.0001	05-JUL-21
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	05-JUL-21
Zinc (Zn)-Total			<0.0030		mg/L		0.003	05-JUL-21
WG3568732-5 MS		**WG3568732-6**						
Aluminum (Al)-Total			N/A	MS-B	%		-	05-JUL-21
Antimony (Sb)-Total			107.5		%		70-130	05-JUL-21
Arsenic (As)-Total			110.4		%		70-130	05-JUL-21
Cadmium (Cd)-Total			112.3		%		70-130	05-JUL-21
Chromium (Cr)-Total			111.4		%		70-130	05-JUL-21
Cobalt (Co)-Total			106.3		%		70-130	05-JUL-21
Copper (Cu)-Total			98.5		%		70-130	05-JUL-21
Lead (Pb)-Total			103.1		%		70-130	05-JUL-21
Manganese (Mn)-Total			N/A	MS-B	%		-	05-JUL-21
Molybdenum (Mo)-Total			106.6		%		70-130	05-JUL-21
Nickel (Ni)-Total			108.4		%		70-130	05-JUL-21
Selenium (Se)-Total			109.6		%		70-130	05-JUL-21
Silver (Ag)-Total			104.9		%		70-130	05-JUL-21
Tin (Sn)-Total			103.4		%		70-130	05-JUL-21
Titanium (Ti)-Total			N/A	MS-B	%		-	05-JUL-21
Zinc (Zn)-Total			106.2		%		70-130	05-JUL-21
NP,NPE-LCMS-WT	**Water**							

Quality Control Report

Client: PALMER ENVIRONMENTAL CONSULTING GROUP INC. (Richmond Hill)
74 Berkeley Street
Toronto ON M5V 1E3
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NP,NPE-LCMS-WT	**Water**							
Batch R5515520								
WG3569017-3 DUP		**L2608572-1**						
Nonylphenol		<1.0	<1.0	RPD-NA	ug/L	N/A	30	06-JUL-21
Nonylphenol Monoethoxylates		<2.0	<2.0	RPD-NA	ug/L	N/A	30	06-JUL-21
Nonylphenol Diethoxylates		<0.10	<0.10	RPD-NA	ug/L	N/A	30	06-JUL-21
WG3569017-2 LCS								
Nonylphenol			86.1		%		75-125	06-JUL-21
Nonylphenol Monoethoxylates			88.5		%		75-125	06-JUL-21
Nonylphenol Diethoxylates			97.5		%		75-125	06-JUL-21
WG3569017-1 MB								
Nonylphenol			<1.0		ug/L		1	06-JUL-21
Nonylphenol Monoethoxylates			<2.0		ug/L		2	06-JUL-21
Nonylphenol Diethoxylates			<0.10		ug/L		0.1	06-JUL-21
WG3569017-4 MS		**L2608572-1**						
Nonylphenol			101.1		%		50-150	06-JUL-21
Nonylphenol Monoethoxylates			98.1		%		50-150	06-JUL-21
Nonylphenol Diethoxylates			97.3		%		50-150	06-JUL-21
OGG-SPEC-WT	**Water**							
Batch R5521329								
WG3574045-2 LCS								
Oil and Grease, Total			94.0		%		70-130	12-JUL-21
Mineral Oil and Grease			89.2		%		70-130	12-JUL-21
WG3574045-1 MB								
Oil and Grease, Total			<5.0		mg/L		5	12-JUL-21
Mineral Oil and Grease			<2.5		mg/L		2.5	12-JUL-21
P-T-COL-WT	**Water**							
Batch R5514071								
WG3569174-3 DUP		**L2608356-3**						
Phosphorus, Total		0.0249	0.0226		mg/L	9.8	20	07-JUL-21
WG3569174-2 LCS								
Phosphorus, Total			99.2		%		80-120	07-JUL-21
WG3569174-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	07-JUL-21
WG3569174-4 MS		**L2608356-3**						
Phosphorus, Total			89.1		%		70-130	07-JUL-21
PAH-EXTRA-WT	**Water**							

Quality Control Report

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74 Berkeley Street
Toronto ON M5V 1E3
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAH-EXTRA-WT	**Water**							
Batch R5515456								
WG3570485-2 LCS								
Benzo(e)pyrene			85.1		%		60-130	08-JUL-21
1,3-Dinitropyrene			111.4		%		60-130	08-JUL-21
1,6-Dinitropyrene			163.8	LCS-H	%		60-130	08-JUL-21
Dibenz(a,h)acridine			99.5		%		60-130	08-JUL-21
1,8-Dinitropyrene			126.2		%		60-130	08-JUL-21
Dibenz(a,j)acridine			99.8		%		60-130	08-JUL-21
7H-Dibenzo(c,g)carbazole			113.1		%		60-130	08-JUL-21
Dibenzo(a,i)pyrene			100.9		%		60-130	08-JUL-21
WG3570485-1 MB								
Benzo(e)pyrene			<0.050		ug/L		0.05	08-JUL-21
1,3-Dinitropyrene			<1.0		ug/L		1	08-JUL-21
1,6-Dinitropyrene			<1.0		ug/L		1	08-JUL-21
Dibenz(a,h)acridine			<0.050		ug/L		0.05	08-JUL-21
1,8-Dinitropyrene			<1.0		ug/L		1	08-JUL-21
Dibenz(a,j)acridine			<0.050		ug/L		0.05	08-JUL-21
7H-Dibenzo(c,g)carbazole			<0.050		ug/L		0.05	08-JUL-21
Dibenzo(a,i)pyrene			<0.050		ug/L		0.05	08-JUL-21
Surrogate: d14-Terphenyl			85.8		%		40-130	08-JUL-21
PCB-WT	**Water**							
Batch R5516501								
WG3569515-2 LCS								
Aroclor 1242			110.6		%		65-130	09-JUL-21
Aroclor 1248			88.4		%		65-130	09-JUL-21
Aroclor 1254			112.9		%		65-130	09-JUL-21
Aroclor 1260			113.1		%		65-130	09-JUL-21
WG3569515-1 MB								
Aroclor 1242			<0.020		ug/L		0.02	09-JUL-21
Aroclor 1248			<0.020		ug/L		0.02	09-JUL-21
Aroclor 1254			<0.020		ug/L		0.02	09-JUL-21
Aroclor 1260			<0.020		ug/L		0.02	09-JUL-21
Surrogate: Decachlorobiphenyl			110.2		%		50-150	09-JUL-21
Surrogate: Tetrachloro-m-xylene			78.3		%		50-150	09-JUL-21
PH-WT	**Water**							

Quality Control Report

Client: PALMER ENVIRONMENTAL CONSULTING GROUP INC. (Richmond Hill)
74 Berkeley Street
Toronto ON M5V 1E3
Contact: Andrei Miler

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-WT	**Water**							
Batch R5510702								
WG3568407-4 DUP		**WG3568407-3**						
pH		7.58	7.54	J	pH units	0.04	0.2	03-JUL-21
WG3568407-2 LCS								
pH			7.00		pH units		6.9-7.1	03-JUL-21
PHENOLS-4AAP-WT	**Water**							
Batch R5513831								
WG3569956-3 DUP		**WG3569956-5**						
Phenols (4AAP)		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	06-JUL-21
WG3569956-2 LCS								
Phenols (4AAP)			99.2		%		85-115	06-JUL-21
WG3569956-1 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	06-JUL-21
WG3569956-4 MS		**WG3569956-5**						
Phenols (4AAP)			95.5		%		75-125	06-JUL-21
SOLIDS-TSS-WT	**Water**							
Batch R5514559								
WG3570562-3 DUP		**L2608963-1**						
Total Suspended Solids		850	850		mg/L	0.0	20	08-JUL-21
WG3570562-2 LCS								
Total Suspended Solids			98.0		%		85-115	08-JUL-21
WG3570562-1 MB								
Total Suspended Solids			<3.0		mg/L		3	08-JUL-21
TKN-F-WT	**Water**							
Batch R5513183								
WG3569169-3 DUP		**L2608128-3**						
Total Kjeldahl Nitrogen		0.770	0.730		mg/L	5.3	20	06-JUL-21
WG3569169-2 LCS								
Total Kjeldahl Nitrogen			98.8		%		75-125	06-JUL-21
WG3569169-1 MB								
Total Kjeldahl Nitrogen			<0.050		mg/L		0.05	06-JUL-21
WG3569169-4 MS		**L2608128-3**						
Total Kjeldahl Nitrogen			92.4		%		70-130	06-JUL-21
VOC-ROU-HS-WT	**Water**							
Batch R5517259								
WG3572891-4 DUP		**WG3572891-3**						
1,1,2,2-Tetrachloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	12-JUL-21
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	12-JUL-21

Quality Control Report

Client: PALMER ENVIRONMENTAL CONSULTING GROUP INC. (Richmond Hill)
74 Berkeley Street
Toronto ON M5V 1E3
Contact: Andrei Miler

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ROU-HS-WT	**Water**							
Batch R5517259								
WG3572891-4 DUP		**WG3572891-3**						
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	12-JUL-21
Benzene		1.38	1.28		ug/L	7.5	30	12-JUL-21
Chloroform		<1.0	<1.0	RPD-NA	ug/L	N/A	30	12-JUL-21
cis-1,2-Dichloroethylene		1.34	1.37		ug/L	2.2	30	12-JUL-21
Dichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	12-JUL-21
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	12-JUL-21
m+p-Xylenes		<0.40	<0.40	RPD-NA	ug/L	N/A	30	12-JUL-21
o-Xylene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	12-JUL-21
Tetrachloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	12-JUL-21
Toluene		<0.40	<0.40	RPD-NA	ug/L	N/A	30	12-JUL-21
trans-1,3-Dichloropropene		<0.30	<0.30	RPD-NA	ug/L	N/A	30	12-JUL-21
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	12-JUL-21
WG3572891-1 LCS								
1,1,2,2-Tetrachloroethane			80.1		%		70-130	12-JUL-21
1,2-Dichlorobenzene			95.8		%		70-130	12-JUL-21
1,4-Dichlorobenzene			97.8		%		70-130	12-JUL-21
Benzene			92.4		%		70-130	12-JUL-21
Chloroform			94.9		%		70-130	12-JUL-21
cis-1,2-Dichloroethylene			94.8		%		70-130	12-JUL-21
Dichloromethane			87.9		%		70-130	12-JUL-21
Ethylbenzene			100.5		%		70-130	12-JUL-21
m+p-Xylenes			100.1		%		70-130	12-JUL-21
o-Xylene			107.2		%		70-130	12-JUL-21
Tetrachloroethylene			98.4		%		70-130	12-JUL-21
Toluene			98.5		%		70-130	12-JUL-21
trans-1,3-Dichloropropene			82.7		%		70-130	12-JUL-21
Trichloroethylene			96.3		%		70-130	12-JUL-21
WG3572891-2 MB								
1,1,2,2-Tetrachloroethane			<0.50		ug/L		0.5	12-JUL-21
1,2-Dichlorobenzene			<0.50		ug/L		0.5	12-JUL-21
1,4-Dichlorobenzene			<0.50		ug/L		0.5	12-JUL-21
Benzene			<0.50		ug/L		0.5	12-JUL-21
Chloroform			<1.0		ug/L		1	12-JUL-21
cis-1,2-Dichloroethylene			<0.50				0.5	

Quality Control Report

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74 Berkeley Street
Toronto ON M5V 1E3
Contact: Andrei Miler

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ROU-HS-WT	**Water**							
Batch R5517259								
WG3572891-2 MB								
cis-1,2-Dichloroethylene			<0.50		ug/L		0.5	12-JUL-21
Dichloromethane			<2.0		ug/L		2	12-JUL-21
Ethylbenzene			<0.50		ug/L		0.5	12-JUL-21
m+p-Xylenes			<0.40		ug/L		0.4	12-JUL-21
o-Xylene			<0.30		ug/L		0.3	12-JUL-21
Tetrachloroethylene			<0.50		ug/L		0.5	12-JUL-21
Toluene			<0.40		ug/L		0.4	12-JUL-21
trans-1,3-Dichloropropene			<0.30		ug/L		0.3	12-JUL-21
Trichloroethylene			<0.50		ug/L		0.5	12-JUL-21
Surrogate: 1,4-Difluorobenzene			101.0		%		70-130	12-JUL-21
Surrogate: 4-Bromofluorobenzene			97.5		%		70-130	12-JUL-21
WG3572891-5 MS		**WG3572891-3**						
1,1,2,2-Tetrachloroethane			79.9		%		50-150	12-JUL-21
1,2-Dichlorobenzene			94.1		%		50-150	12-JUL-21
1,4-Dichlorobenzene			93.9		%		50-150	12-JUL-21
Benzene			89.4		%		50-150	12-JUL-21
Chloroform			93.0		%		50-150	12-JUL-21
cis-1,2-Dichloroethylene			92.7		%		50-150	12-JUL-21
Dichloromethane			87.3		%		50-150	12-JUL-21
Ethylbenzene			95.3		%		50-150	12-JUL-21
m+p-Xylenes			93.1		%		50-150	12-JUL-21
o-Xylene			101.8		%		50-150	12-JUL-21
Tetrachloroethylene			87.0		%		50-150	12-JUL-21
Toluene			91.6		%		50-150	12-JUL-21
trans-1,3-Dichloropropene			81.5		%		50-150	12-JUL-21
Trichloroethylene			90.5		%		50-150	12-JUL-21

Quality Control Report

Workorder: L2609138 Report Date: 14-JUL-21

Client: PALMER ENVIRONMENTAL CONSULTING GROUP INC. (Richmond Hill)
74 Berkeley Street
Toronto ON M5V 1E3
Contact: Andrei Miler

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.
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
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.

Hold Time Exceedances:

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

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

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

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

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 - 889260

Page 1 of 1

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Report To	Contact and company name below will appear on the final report
Company:	Palmer
Contact:	Andrei Miler (andrei.miler@pecg.ca
Phone:	647-808-5612
Company address below will appear on the final report	
Street:	74 Berkeley Street
City/Province:	Toronto, Ontario
Postal Code:	M5V, 1E3
Invoice To	Same as Report To ☒ YES ☐ NO
	Copy of Invoice with Report ☒ YES ☐ NO
Company:	
Contact:	

Reports / Recipients

Select Report Format: ☒ PDF ☒ EXCEL ☐ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☒ YES ☐ NO ☐ N/A

☒ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☒ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: andrei.miler@pecg.ca

Email 2: jason.cole@pecg.ca

Email 3:

Invoice Recipients

Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax:

Email 2:

Turnaround Time (TAT) Requested

☒ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

AFFIX ALS BARCODE LABEL HERE (ALS use only)

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

For all tests with rush TATs requested, please contact your AM to confirm availability.

Project Information

ALS Account # / Quote #:	PALMER Quote
Job #:	822
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)

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

ALS Lab Work Order # (ALS use only): L2609138

ALS Contact: Sampler:

Analysis Request

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

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm) AM	Sample Type	NUMBER OF CONTAINERS	City of Toronto Storm + Sanitary Sewer Discharge	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	MW-106-S	02-07-21	10:30	GW	20	X			

L2609138-COFC

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

Are samples taken from a Regulated DW System? ☐ YES ☒ NO

Are samples for human consumption/ use? ☐ YES ☒ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

Toronto Storm + Sanitary Sewer Discharge.

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☒ ICE ☒ ICE PACKS ☐ FROZEN ☒ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
13.3				3.8			

SHIPMENT RELEASE (client use)

Released by: Andrei Miler Date: 02-07-21 Time: 1:15 PM

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by: Karan Date: 7/2/2021 Time: 13:47

FINAL SHIPMENT RECEPTION (ALS use only)

Received by: Date: 7/2/21 Time: 1600

7/2/21

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

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

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