Date: August 20, 2024
File: PH4600-LET.02

PATERSON GROUP

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Geotechnical Engineering
Environmental Engineering
Hydrogeology
Materials Testing
Building Science
Rural Development Design
Temporary Shoring Design
Retaining Wall Design
Noise and Vibration Studies

patersongroup.ca

Premier Bus Lines Inc.
135 Cardevco Road
Ottawa, Ontario
K0A 1L0

Attention: **Eric Hochgeschurz**

Subject: **In-Situ Infiltration Testing**
Proposed Commercial Building Renovation
135 Cardevco Road – Ottawa, Ontario

Further to your request, Paterson Group (Paterson) conducted an in-situ infiltration testing investigation at 135 Cardevco Road for the proposed renovation of the existing commercial building. The purpose of the investigation is to provide unfactored estimated infiltration rates of the subsoils at the approximate invert elevation of the proposed infiltration system.

1.0 Proposed Development

It is our understanding that the proposed development will consist of a portion of the existing building being demolished and replaced with a new addition which will be smaller than the existing building. It is further expected that paved access lanes and parking areas will remain as part of the proposed development. It is anticipated that the proposed building will be serviced by a private well and septic system.

2.0 Field Observations

Surface Conditions

At the time of the current investigation, the site had a commercial building within the central portion of the site, paved areas within the eastern portion and landscaped areas within the western portion. The site is bordered to the east by Cardevco Road followed by commercial properties and to the south, west and north by commercial properties. Ground surface across the site is relatively flat. The north end of the site slopes down to the adjacent property. The site is at grade with the remaining adjacent properties.

Subsurface Conditions

Generally, the subsurface profile encountered in this current investigation at the subject site consisted of asphaltic concrete underlain by fill material overlying a glacial till deposit. The glacial till deposit consists of a brown silty sand matrix with varying amounts of gravel, cobbles and boulders.

Based on available geological mapping, the subject site is located in an area where the bedrock consists of limestone with minor shale of the Bobcaygeon Formation. The overburden drift thickness is estimated to be between 5 to 10 m.

Groundwater

At the time of the current investigation, groundwater infiltration was observed between 1.6 and 1.7 m bgs within the open test pits. However, it should be noted that groundwater levels are subject to seasonal fluctuations, therefore, the groundwater levels could vary at the time of construction.

3.0 Field Investigation

Field Program

The field program conducted for the current investigation was completed on July 9, 2024. At that time, two (2) test pits (TP1-24 and TP2-24) were excavated to a maximum depth of 1.7 m. All soils from the test pits were visually inspected and initially classified on site. The test pit locations were selected by Paterson and distributed in a manner to provide general coverage of the proposed infiltration systems taking into consideration site features and underground utilities. The test pit locations are presented in Drawing PG6018-1 – Test Hole Location Plan, attached to this report.

In-Situ Infiltration Testing

In-situ infiltration testing was conducted using a Pask Constant Head Well Permeameter to estimate infiltration rates of the unsaturated soils at the approximate invert elevation of the proposed infiltration system. The test pits were excavated to allow for safe entry into the pits, as well as infiltration testing to be conducted at different elevations.

At approximately 0.3 m above each testing elevation, an 83 mm auger hole was excavated to the desired testing elevation using a Riverside/Bucket auger. Soils from the auger flights were visually inspected and initially classified on-site. The tests were conducted by filling the permeameter reservoir with water and inverting it into the hole, ensuring it was relatively vertical and rested at the bottom of the hole. The water level of the reservoir was monitored at periodic intervals until the rate of fall out of the permeameter reached equilibrium, known

as quasi “steady state” flow rate. Quasi “steady state” flow can be considered to have been obtained after measuring 3 to 5 consecutive rate of fall readings with identical values. The values for the steady state rate of fall were recorded for each completed test.

4.0 In-Situ Infiltration Testing Results

Two (2) in-situ infiltration tests were conducted at each test pit location. The in-situ infiltration test locations were selected by Paterson in a manner to provide general coverage of the proposed infiltration systems. The field saturated hydraulic conductivity (K_{fs}) and estimated infiltration values for each completed test are presented in Table 1 below.

Field saturated hydraulic conductivity values (K_{fs}) were determined using Engineering Technologies Canada (ETC) Ltd. reference tables provided in the most recent ETC Pask Permeameter User Guide. The saturated hydraulic conductivity values can be converted to unfactored estimated infiltration rates using the approximate relationship described in Appendix C of the Credit Valley Conservation Authority and Toronto and Region Conservation Authority Low Impact Development Stormwater Management Planning and Design Guide (2011).

Table 1 - In-Situ Infiltration Testing Results

Test Pit ID	Permeameter Test ID	Testing Elevation (m asl)	Material	K_{fs} (m/sec)	Unfactored Infiltration Rate (mm/hr)
TP2-24	PT1-24	117.27	Glacial Till	1.8×10^{-5}	100
TP2-24	PT2-24	117.22	Glacial Till	1.9×10^{-5}	102

Based on Paterson’s in-situ infiltration testing investigation, K_{fs} values for the glacial till ranged from 1.8×10^{-5} to 1.9×10^{-5} m/sec, while estimated unfactored infiltration rates varied from 100 to 102 mm/hr. The above noted hydraulic conductivity values and estimated infiltration rates measured in the test holes are generally consistent with similar material Paterson has encountered on other sites as well as published values.

The two (2) tests conducted at TP1-24 were not able to reach completion (i.e. steady state flow) due to the fact that competent auger holes could not be maintained for a complete test due to the nature of the subsurface material. Preliminary results from the tests before the auger holes’ competency diminished were similar to the tests in TP2-24. Therefore, it is Paterson’s opinion that the infiltration rates at TP1-24 are similar to those estimated for TP2-24.

It is important to note that the estimated infiltration rates derived from the K_{fs} values are unfactored. Prior to use for design purposes, a safety correction factor will need to be applied to the above infiltration rates.

5.0 Statement of Limitations

The recommendations provided in this report are in accordance with Paterson's present understanding of the project.

The hydrogeological investigation is a limited sampling of the site. Should any conditions at the site be encountered which differ from those at the test locations, Paterson requests immediate notification to permit reassessment of the recommendations.

The present report applies only to the project described in the report. The use of the report for purposes other than those described herein or by person(s) other than Premier Bus Lines Inc. or their agents are not authorized without review by Paterson. We trust that his information satisfies your requirements.

Best Regards,

Paterson Group Inc.

Oliver Blume, P.Geo.

Zavian Buchanan, EIT

Attachments

- ❑ PH4600 – Soil Profile and Test Data
- ❑ Drawing PG6018-1 – Test Hole Location Plan

patersongroup Consulting Engineers

9 Auriga Drive, Ottawa, Ontario K2E 7T9

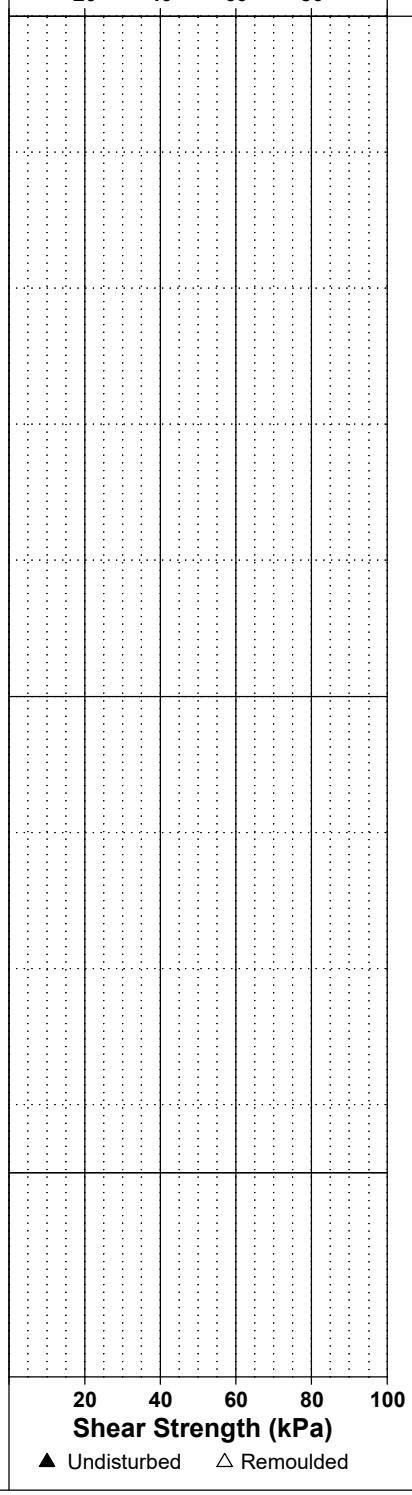
SOIL PROFILE AND TEST DATA

Infiltration Testing Program
135 Cardevco Road
Ottawa, Ontario

EASTING: 345715.269 **NORTHING:** 5017134.412 **ELEVATION:** 118.66
DATUM: Geodetic
REMARKS:
BORINGS BY: Backhoe **DATE:** July 9, 2024

FILE NO. PH4600
HOLE NO. TP 1-24

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	PIEZOMETER CONSTRUCTION
Ground Surface									
ASPHALTIC CONCRETE 0.06						0	118.66		
FILL: Compact brown silty sand with gravel, some asphaltic concrete 0.24		G	1						
GLACIAL TILL: Dense to very dense brown silty sand with gravel, cobbles and boulders		G	2						
		G	3						
		G	4			1	117.66		
		G	5						
1.70 End of Test Pit									



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9 Auriga Drive, Ottawa, Ontario K2E 7T9

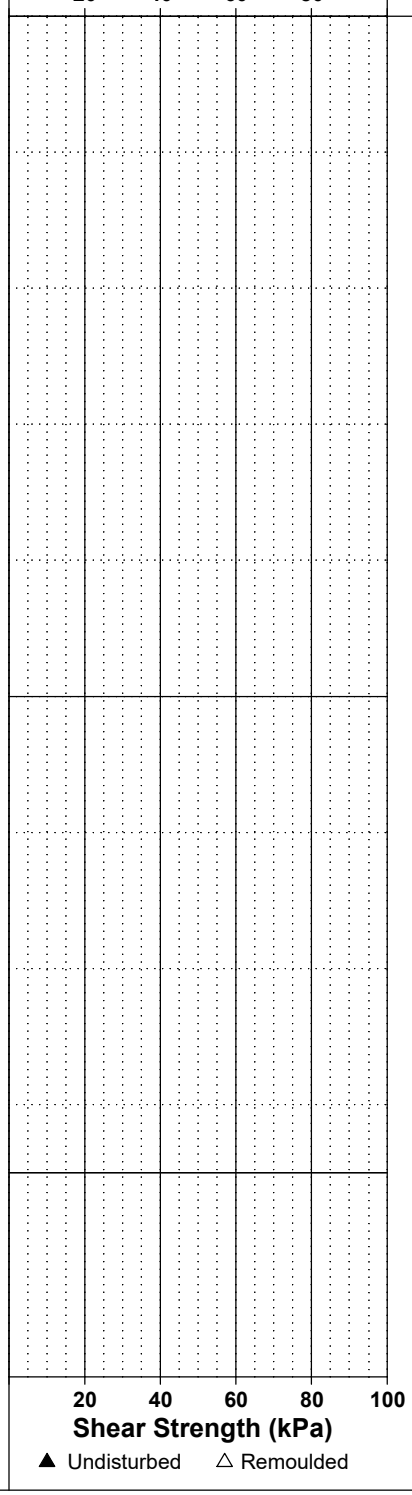
SOIL PROFILE AND TEST DATA

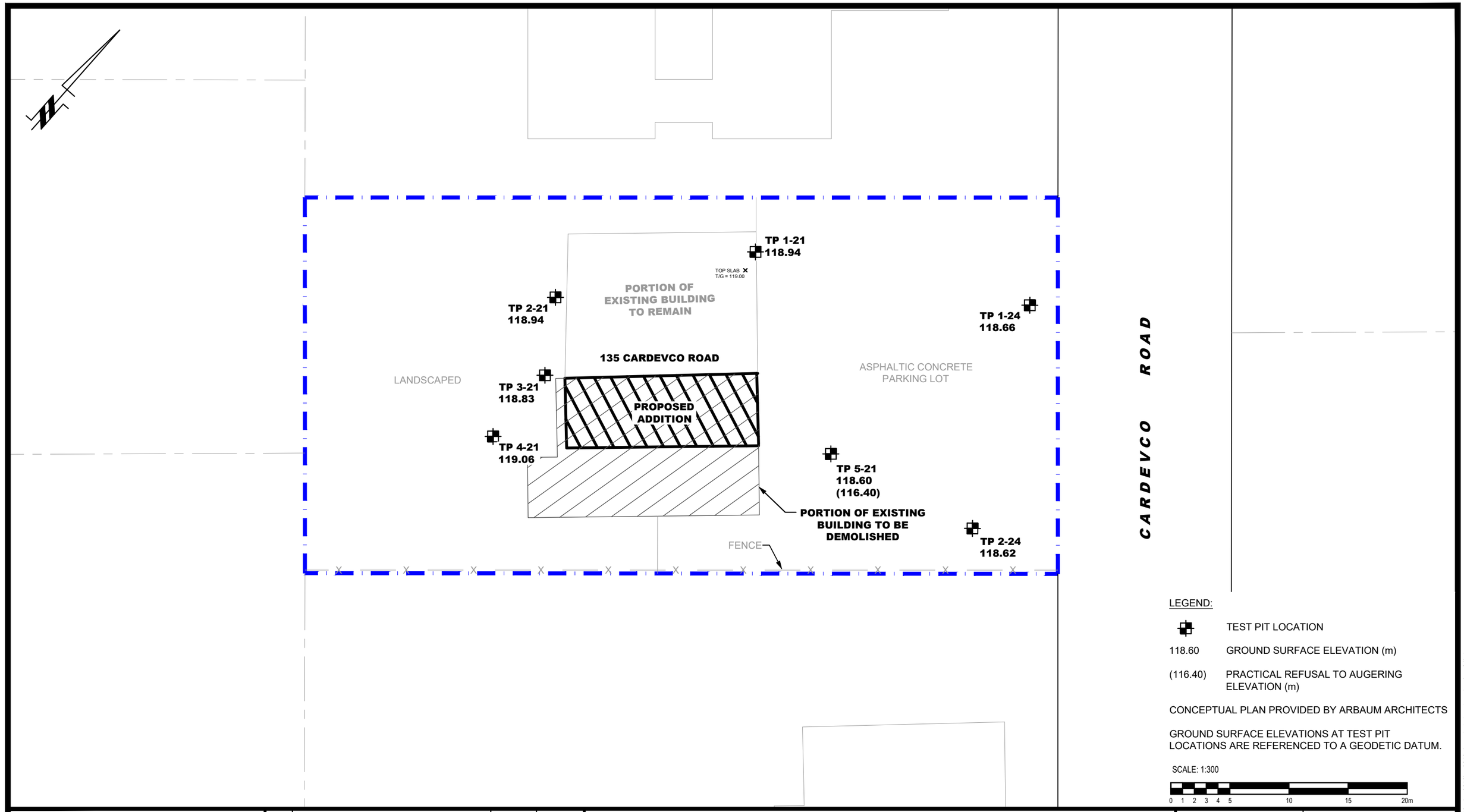
Infiltration Testing Program
135 Cardevco Road
Ottawa, Ontario

EASTING: 345724.169 **NORTHING:** 5017117.07 **ELEVATION:** 118.62
DATUM: Geodetic
REMARKS:
BORINGS BY: Backhoe **DATE:** July 9, 2024

FILE NO. PH4600
HOLE NO. TP 2-24

SAMPLE DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone / ○ Water Content %	PIEZOMETER CONSTRUCTION
Ground Surface									
ASPHALTIC CONCRETE 0.05						0	118.62		
FILL: Compact brown silty sand with gravel, some asphaltic concrete, trace clay 0.24		G	1						
GLACIAL TILL: Compact to very dense brown silty sand with gravel, cobbles and boulders		G	2						
- Boulder content increasing with depth		G	3			1	117.62		
		G	4						
1.70 End of Test Pit									





LEGEND:

⊕	TEST PIT LOCATION
118.60	GROUND SURFACE ELEVATION (m)
(116.40)	PRACTICAL REFUSAL TO AUGERING ELEVATION (m)

CONCEPTUAL PLAN PROVIDED BY ARBAUM ARCHITECTS

GROUND SURFACE ELEVATIONS AT TEST PIT LOCATIONS ARE REFERENCED TO A GEODETIC DATUM.

SCALE: 1:300

0 1 2 3 4 5 10 15 20m

PATERSON GROUP
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NO.	REVISIONS	DATE	INITIAL
1	ADDED 2024 TEST PITS	10/07/2024	OB

PREMIER BUS LINES INC.

GEOTECHNICAL INVESTIGATION
PROPOSED INDUSTRIAL REDEVELOPMENT
135 CARDEVCO ROAD

OTTAWA (CARP), ONTARIO

Title: TEST HOLE LOCATION PLAN

Scale: 1:300	Date: 11/2021
Drawn by: JM	Report No.: PE6018-1
Checked by: MS	Dwg. No.: PG6018-1
Approved by: DJG	Revision No.: 1

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11x17