



re: Geotechnical Desktop Study – Block 261
Proposed School – Quinn’s Pointe – Stage 2
1045 Kilbirnie Drive – Ottawa

to: CEPEO – Mr. Justin Houle – justin.houle@cepeo.on.ca

to: WSP – Ms. Jill MacDonald – jill.macdonald@wsp.com

date: July 25, 2022

file: PG6364-MEMO.01

Further to your request and authorization, Paterson Group (Paterson) prepared the current memorandum to provide site-specific recommendations for the school block to be located at the subject site, from a geotechnical perspective. This memorandum should be read in conjunction with Paterson Geotechnical Reports PG4748-1 dated November 2, 2018.

Site Description

Surface conditions

The subject site is currently vacant, partially stripped, and used as a construction lay-down area for the Quinn’s Pointe subdivision. The subject site is bordered to the north, east and south by future residential lots, as well as to the north by Kilbirnie drive, to the east by Robin Easy Avenue, to the south by Teelin Circle and to the west by future Greenbank Road. The ground surface across the subject site slopes gradually from east to west with a geodetic elevation of approximately 103 m at Robin Easy Avenue to an elevation of approximately 108 m at the Kilbirnie Drive and future Greenbank Road intersection.

Subsurface conditions

Paterson has completed several test holes within the subject block as part of geotechnical investigations for the Quinn’s Pointe subdivision. Based on the test hole coverage completed by this firm within the block, the subsurface soil profile was observed to consist of a loose to dense, brown, silty sand with gravel, cobbles and boulders, extending to greater than 12 m depth below the existing ground surface.

Based on geological mapping, the subject site is located within an area underlain by dolomite bedrock of the Oxford Formation with an overburden drift thickness of 15 to 25 m below existing grade.

Groundwater

Groundwater was noted at approximate depths ranging from 2.2 to 7.4 m below the existing ground surface within the boreholes and the test pits side walls were generally noted as dry at the time of excavation. The long-term groundwater table is expected at a geodetic elevation of approximately 96.0 m. It should be noted that the groundwater levels are subject to seasonal fluctuations and could vary at the time of construction.





Discussion

Geotechnical Assessment

Based on the subsurface conditions encountered within the subject block, the proposed development is considered suitable, from a geotechnical perspective. It is expected that the proposed school building will be founded over conventional shallow footings placed on an undisturbed, compact to dense, brown silty sand.

Due to the absence of a sensitive marine silty clay deposit within the subject block, permissible grade raise restrictions and tree planting setbacks are not required for the subject site.

Foundation Design

Footings placed on an undisturbed, compact to dense, brown silty sand bearing surface can be designed using a bearing resistance value at serviceability limit states (SLS) of **150 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **250 kPa**. A geotechnical resistance factor of 0.5 has been applied to the above noted bearing resistance at ULS value.

An undisturbed soil bearing surface consists of a surface from which all topsoil and deleterious materials, such as loose, frozen, or disturbed soil, whether in situ or not, have been removed, in the dry, prior to the placement of concrete for footings.

Footings designed using the above noted bearing resistance value at SLS given above will be subjected to potential post construction total and differential settlements of 25 and 20 mm, respectively.

Where the silty sand subgrade is found to be a loose state of compactness, it is recommended that the subgrade be proof rolled using a vibratory roller making several passes and approved by Paterson at the time of construction. Soft and poor performing areas should be sub-excavated and replaced with OPSS Granular A or Granular B Type II compacted to a minimum 98% of the material's SPMDD and under the supervision of Paterson personnel.

The bearing medium under footing-supported structures is required to be provided with adequate lateral support with respect to excavations and different foundation levels. Adequate lateral support is provided to a compact to dense silty sand bearing medium with a plane extending horizontally and vertically from the footing perimeter at a minimum of 1.5H:1V, passing through in situ soil or engineered fill of equal or higher capacity.

Design for Earthquakes

The site class for seismic site response can be taken as **Class D** for the foundations at this site. The soils underlying the subject site are not susceptible to liquefaction. Reference should be made to the latest revision of the Ontario Building Code (OBC) 2012 for a full discussion on the earthquake design requirements.



Additional Geotechnical Considerations

For additional geotechnical and construction considerations and recommendations, reference should be made to Paterson Group Geotechnical Investigation Report PG4748-1 dated November 2, 2018. The recommendation provided in the above noted report are considered fully applicable to the proposed school building at the sube

Recommendations

It is a requirement for the foundation design data provided herein to be applicable that a materials testing and observation services program, including the following aspects, be performed by the geotechnical consultant.

- Observation of all bearing surfaces prior to the placement of concrete.
- Sampling and testing of the concrete and fill materials used.
- Periodic observation of the condition of unsupported excavation side slopes in excess of 3 m in height, if applicable.
- Observation of all subgrades prior to backfilling.
- Field density testing to determine the level of compaction achieved.
- Sampling and testing of the bituminous concrete including mix design reviews.

A report confirming that these works have been conducted in general accordance with our recommendations could be issued, upon request, following the completion of a satisfactory materials testing and observation program by the geotechnical consultant.

We trust that the current submission meets your immediate requirements.

Paterson Group Inc.

Owen Canton, EIT



Faisal I. Abou-Seido, P.Eng.



DATUM Geodetic elevations interpolated from City of Ottawa basemap.

REMARKS

BORINGS BY CME 55 Power Auger

DATE July 20, 2016

FILE NO. **PG3607**

HOLE NO. **BH32-16**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Monitoring Well Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE													
Compact, brown SILTY SAND , trace gravel, rootlets		SS	1	25	11	0	103.48						
----- 1.22		SS	2	67	15	1	102.48						
Compact to dense, brown SILTY SAND , some gravel, cobbles and boulders		SS	3	50	50+	2	101.48						
----- 2.44		SS	4	50	31	3	100.48						
Dense to very dense, grey SILTY SAND , some gravel		SS	5	71	17	4	99.48						
- some boulders by 4.1m depth		SS	6	79	51	5	98.48						
		SS	7	92	50+	6	97.48						
		SS	8	75	35	7	96.48						
		SS	9	79	70	8	95.48						
		SS	10	79	70	9	94.48						
		SS	10	100	50+	10	93.48						
						11	92.48						
----- 12.19						12	91.48						
End of Borehole (GWL @ 7.37m-July 28, 2016)													

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

DATUM Ground surface elevations provided by J.D. Barnes Limited.

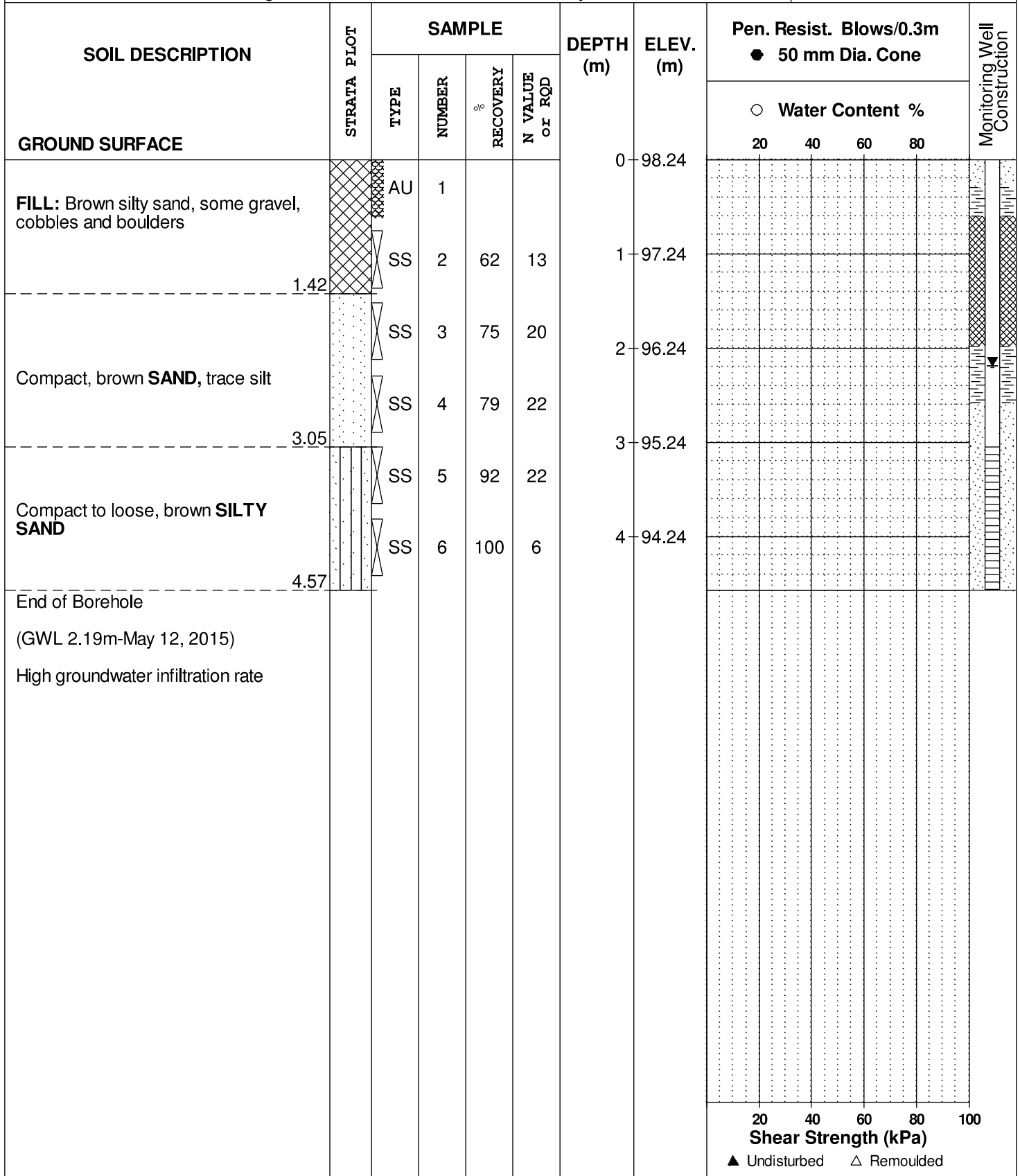
FILE NO. **PG3450**

REMARKS

HOLE NO. **BH11-15**

BORINGS BY CME 75 Power Auger

DATE May 8, 2015



DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. **PG3607**

REMARKS

HOLE NO. **TP 18-15**

BORINGS BY Backhoe

DATE December 1, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction		
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			20	40	60	80			
GROUND SURFACE						0	107.40							
Dense to very dense, brown SILTY SAND , some gravel and cobbles, trace to some boulders - rootlets in upper 100mm		G	1			1	106.40							
		G	2			2	105.40							
End of Test Pit (TP dry upon completion)	3.00					3	104.40							
								20	40	60	80	100		
								Shear Strength (kPa)						
								▲ Undisturbed △ Remoulded						

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.


REMARKS

BORINGS BY Backhoe

DATE December 1, 2015

FILE NO. **PG3607**

HOLE NO. **TP 19-15**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY	N VALUE or RQD			○ Water Content %				
GROUND SURFACE								20	40	60	80	
Compact to very dense, brown SILTY SAND with gravel, some cobbles and boulders		G	1			0	104.40					
		G	2			1	103.40					
End of Test Pit (TP dry upon completion)	3.00					2	102.40					
						3	101.40					

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Barrhaven South Urban Expansion
Ottawa, Ontario

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

FILE NO. **PG3607**

REMARKS

HOLE NO. **TP 31-15**

BORINGS BY Backhoe

DATE December 1, 2015

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %				
GROUND SURFACE							20	40	60	80		
Very dense, brown SILTY SAND with gravel, cobbles and oversized boulders - rootlets in upper 100mm	[Strata Plot]	G	1			0	105.50					
						1	104.50					
						2	103.50					
		G	2			3	102.50					
End of Test Pit (TP dry upon completion)	3.00											

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

DATUM Geodetic elevations interpolated from City of Ottawa basemap.

REMARKS

BORINGS BY Backhoe

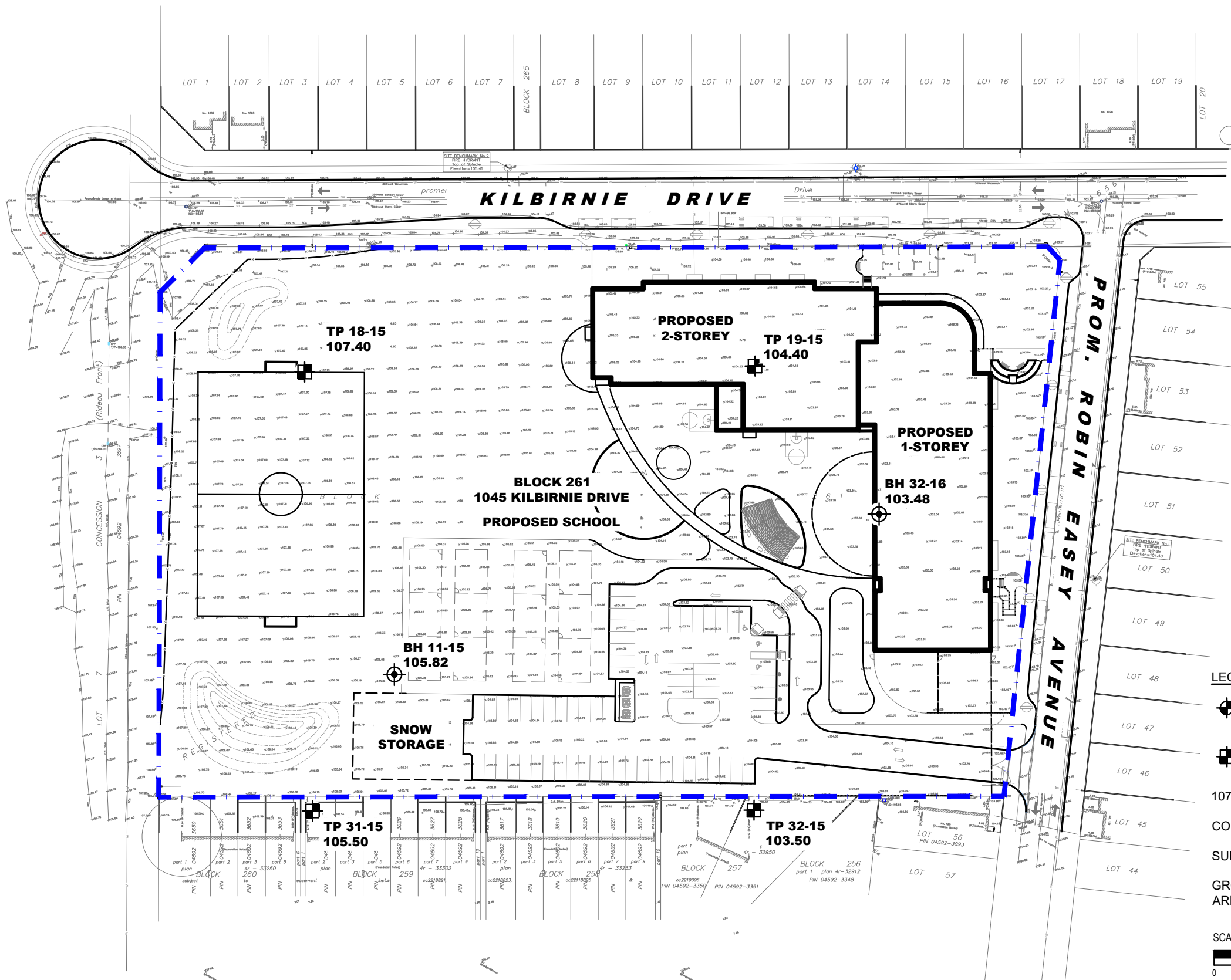
DATE December 1, 2015

FILE NO. **PG3607**

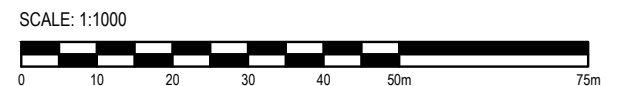
HOLE NO. **TP 32-15**

SOIL DESCRIPTION	STRATA PLOT	SAMPLE				DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone				Piezometer Construction	
		TYPE	NUMBER	RECOVERY %	N VALUE or RQD			○ Water Content %					
								20	40	60	80		
GROUND SURFACE						0	103.50						
Dense to very dense, brown SILTY SAND with gravel, cobbles and boulders	[Strata Plot: Dotted pattern]	G	1			1	102.50						▽
		G	2			2	101.50						
End of Test Pit (Open hole GWL @ 0.8m depth)						3	100.50						

20 40 60 80 100
Shear Strength (kPa)
 ▲ Undisturbed △ Remoulded



- LEGEND:**
- BOREHOLE LOCATION WITH MONITORING WELL (PREVIOUS INVESTIGATION, PG3607, 2015 & 2016)
 - TEST PIT LOCATION (PREVIOUS INVESTIGATION, PG3607, 2015)
 - 107.40 GROUND SURFACE ELEVATION (m)
 - CONCEPTUAL PLAN PROVIDED BY ARCHITECTURE 49.
 - SURVEY PLAN PROVIDED BY WSP.
 - GROUND SURFACE ELEVATIONS AT BOREHOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM.



NO.	REVISIONS	DATE	INITIAL

EASTERN ONTARIO SCHOOL BOARD
GEOTECHNICAL REVIEW MEMORANDUM
1045 KILBIRNIE DRIVE

OTTAWA, ONTARIO
 Title: **TEST HOLE LOCATION PLAN**

Scale:	1:1000	Date:	07/2022
Drawn by:	GK	Report No.:	PG6364-1
Checked by:	OC	Dwg. No.:	PG6364-1
Approved by:	FA	Revision No.:	