

**re: Long-Term Groundwater Monitoring Program**  
**Proposed Lansdowne Rink – Lansdowne Park**  
**Marche Way – Ottawa**

**to:** Trinity Development Group - **Ahmed Zayed** - [azayed@trinity-group.com](mailto:azayed@trinity-group.com)

**date:** December 2, 2022

**file:** PH4424-MEMO.01

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Further to your request, Paterson Group (Paterson) completed a long term groundwater monitoring program at Lansdowne Park along Marche Way. A summary of the field program and results have been provided below.

## **Background Information**

Paterson completed a Geotechnical Investigation (PG5792-1 dated December 14, 2021) and a Hydrogeological Assessment Report (PH4423-1 dated November 19, 2021).

The long-term groundwater monitoring program commenced on September 15, 2022. At that time, the five existing monitoring wells previously installed by Amec Foster Wheeler (AFW) were available onsite for groundwater monitoring. The 5 available monitoring wells were outfitted with data loggers between September 15 and October 27, 2021. As part of the Paterson Geotechnical Investigation, 4 monitoring wells were installed onsite from November 9 to 18, 2021. Manual groundwater measurements were collected from the 5 monitoring wells installed by AFW, as well as the 4 monitoring wells installed by Paterson, on a monthly basis.

Groundwater level readings for the first five-week period were provided in the Hydrogeological Assessment Report (PH4423-1).

## **Field Survey**

The borehole locations were selected by Paterson to provide general coverage of the proposed development, taking into consideration the existing site features and underground utilities. The test hole locations and ground surface elevation at each test hole location were surveyed by Paterson using a handheld GPS and referenced to a geodetic datum. The locations of the existing monitoring wells, as well as geodetic elevations of the ground surface elevation for those wells, were taken from the AFW stratigraphic and instrumentation logs. The geodetic elevations of the ground surface at the AFW wells was confirmed by Paterson. It was noted that the ground surface elevation at AFW's monitoring well MW15-10 was erroneously recorded on the borehole log provided in their reports. The updated ground surface elevation is 64.91, which is used in this report. The locations are presented on Drawing PG5792-1 Test Hole Location Plan attached to the current memorandum.



## Subsurface Profile

According to available borehole logs, the subsurface profile at the site generally consists of varying amounts of fill material followed by a sandy silt to silty sand with varying amounts of gravel, overlying a till comprised of a silty sand with gravel, cobbles and boulders extending to the bedrock surface.

Based on coring results completed by Paterson, limestone bedrock with occasional shale partings was encountered between 21.3 and 31.6 m below ground surface (bgs). Based on available geological mapping, the subject site is located in an area where the bedrock consists of limestone, dolostone, shale, arkose, and sandstone of the Ottawa Group, Simcoe Group, and Shadow Lake Formation.

## Monitoring Well Installation

Typical monitoring well construction details are described below:

- 3.0 m of slotted 51 mm diameter PVC screen at the base of the AFM boreholes. Paterson attempted to intercept the long-term groundwater table with 3.0 m of slotted 51 mm diameter PVC screen in their boreholes based on site conditions observed during borehole drilling.
- 51 mm diameter PVC riser pipe from the top of the screen to ground surface.
- No.3 silica sand backfill within annular space around screen.
- 300 mm thick bentonite hole plug directly above PVC slotted screen.
- The 51 mm diameter PVC riser extending to the ground surface was covered with a protective steel cap (flush mount).

Specific details of the installation of each monitoring well can be found in the Soil Profile and Test Data Sheets attached to this memorandum.

## Monitoring Well Installation

Between September 15, 2021 and October 27, 2021, the five monitoring wells installed by AMF (MW15-06, MW15-07, MW15-09, MW15-10 and MW15-11) were equipped with data loggers to continuously monitor fluctuations in the groundwater levels. The data loggers were programmed to continuously measure and record groundwater levels throughout the subject site at a fixed rate of 1 reading every hour. Manual water level measurements were taken monthly using an electronic water level meter along with the logger measurements. All equipment which was used in onsite wells was cleaned and disinfected prior to use.

Although continuous monitoring for a one-year period was completed, occasionally site conditions and equipment failures resulted in infrequent missed datapoints during the groundwater monitoring period. All significant missed datapoints occurred during periods of low groundwater levels. However, it should be noted the missing data was predominantly during winter months and did not impact seasonal groundwater high measurements.



The recorded groundwater elevations at each monitoring well location and correlated precipitation events between September 15, 2021 and November 9, 2022 are presented in Figure 1: Long-Term Groundwater Monitoring Program attached to the current memorandum.

## Discussion

The recorded high and low groundwater elevations at each well location have been summarized in Table 3 below.

Table 2 – Groundwater Elevation Summary						
Monitoring Well ID	Ground Surface Elevation (m asl)	Groundwater Elevation (m asl)				Difference Between Maximum and Minimum Groundwater Elevation (m)
		Maximum	Date	Minimum	Date	
MW15-06	64.90	60.74	16-08-22	*59.72	09-03-22 20-04-22 10-05-22	*1.02
MW15-07	64.51	60.42	18-08-22	59.18	20-04-22	1.24
MW15-09	65.25	60.60	16-08-22	*59.19	09-03-22	*1.41
MW15-10	64.91	60.57	17-08-22	*59.08	09-03-22	*1.49
MW15-11	64.57	60.67	09-22-22	59.12	10-11-21	1.54
BH5-21	65.14	60.58	16-08-22	59.20	08-02-22	1.39
BH6-21	66.62	60.55	26-09-22	59.13	09-03-22	1.42
BH8-21	65.45	60.60	26-09-22	59.30	09-03-22	1.31
BH9-21	67.07	60.78	26-09-22	59.41	09-03-22	1.37

\*Dry well - the minimum groundwater elevation is noted to be at the elevation of the well invert

The groundwater aquifer accessed by the onsite monitoring well was noted to be hydraulically connected to the Rideau Canal. As such the draining and filling of the Rideau Canal directly influences the onsite groundwater levels. Groundwater levels are observed to decrease after the canal is drained and increase once the canal is filled. In March 2022, MW15-06, MW15-09 and MW5-10 were dry and MW15-06 remained dry until the canal was filled in May 2022.

## Conclusion

Based on the results from the one year long groundwater monitoring program, the long-term groundwater table ranges between <59.08 to 60.78 m asl and is within the overburden materials. Depending on the depth of well installation, a low water elevation was not able to be recorded at all locations. Maximum and minimum groundwater elevations were observed at the end of summer/early fall and the end of winter/early spring, respectively, at all groundwater monitoring locations. Groundwater levels were observed to be hydraulically connected to the Rideau Canal.



Reference should be made to the individual monitoring locations for design specifications at that borehole location. Design specifications should be based on a high water table elevation of **60.78 m asl**, the maximum groundwater elevation observed during the long-term groundwater monitoring period. It should be noted that groundwater levels can fluctuate seasonally and with precipitation events. Therefore, groundwater levels could vary.

The long-term groundwater investigation is a limited investigation of a 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 our recommendations.

We trust that this information is satisfactory for your immediate requirements.

Best Regards,

**Paterson Group Inc.**

Oliver Blume, M.Sc., G.I.T.



Michael S. Killam, P.Eng.

Erik Ardley, P.Geo.



**Attachments**

- Soil Profile and Test Data Sheets
- Amec Foster Wheeler - Stratigraphic and Instrumentation Log
- Drawing PG5792-1 - Test Hole Location Plan
- Figure 1: Long-Term Groundwater Monitoring Program



DATUM Geodetic

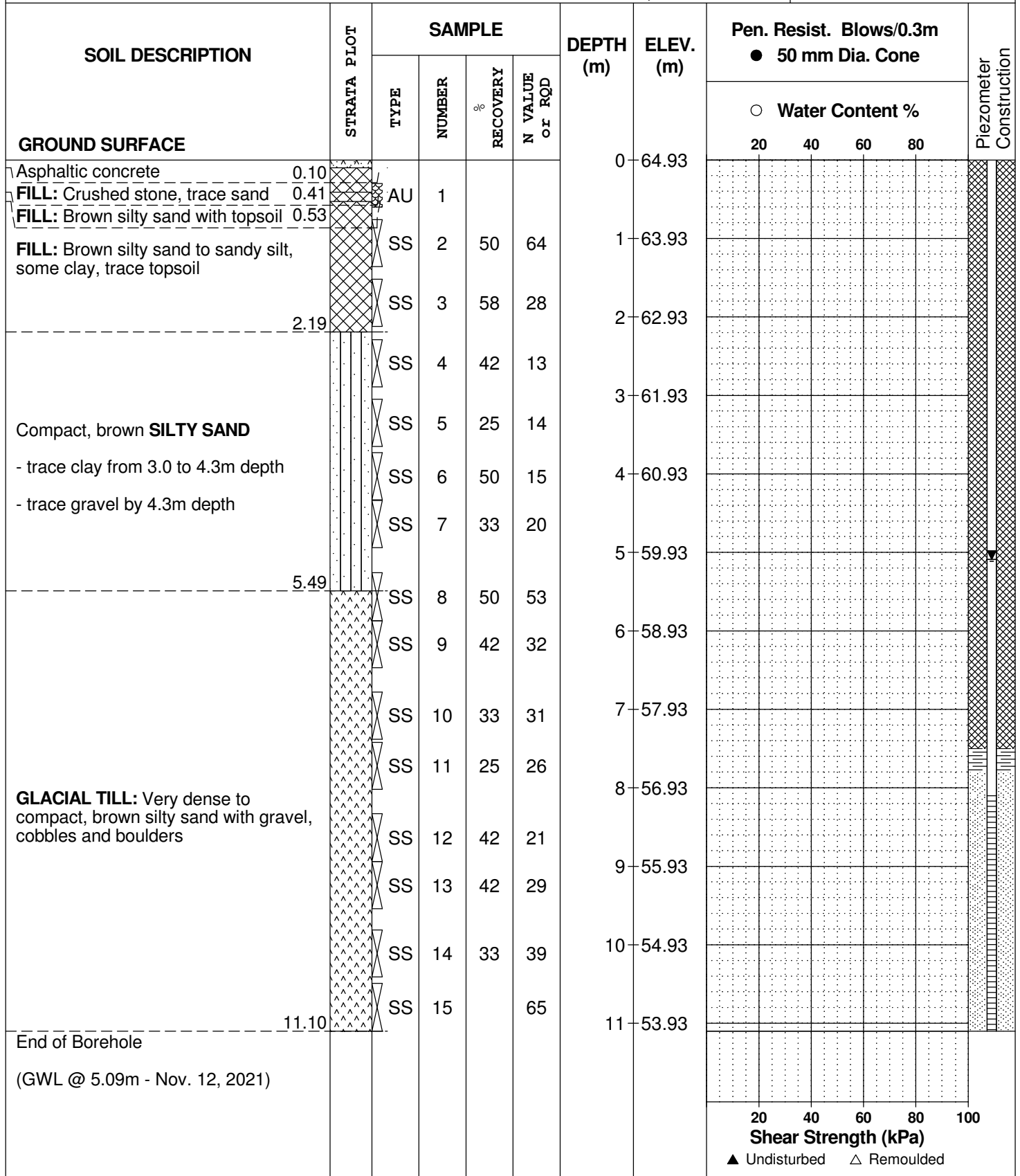
REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE October 25, 2021

FILE NO. **PG5792**

HOLE NO. **BH 1-21**



DATUM Geodetic

REMARKS

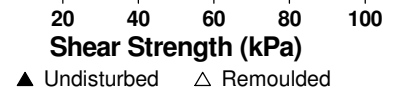
BORINGS BY CME-55 Low Clearance Drill

DATE October 25, 2021

FILE NO. **PG5792**

HOLE NO. **BH 2-21**

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		
<b>GROUND SURFACE</b>													
Asphaltic concrete	0.10					0	66.04						
<b>FILL:</b> Brown silty sand with crushed stone and gravel	0.36	AU	1										
<b>FILL:</b> Brown silty sand, trace gravel		SS	2	33	32	1	65.04						
		SS	3	50	7	2	64.04						
	2.21	SS	4	50	14	3	63.04						
<b>Compact, brown SILTY SAND</b>		SS	5	33	10	4	62.04						
- trace gravel by 4.4m depth		SS	6	33	11	4	62.04						
		SS	7	42	24	5	61.04						
	5.74	SS	8	25	59	6	60.04						
<b>GLACIAL TILL:</b> Very dense to dense, brown silty sand with gravel, cobbles and boulders		SS	9	63	50+	6	60.04						
		SS	10	50	77	7	59.04						
		SS	11	42	46	8	58.04						
		SS	12	0	63	9	57.04						
- some shale fragments from 10.5 to 10.74m depth		SS	13	8	61	9	57.04						
		SS	14		50+	10	56.04						
End of Borehole	10.74												



DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE October 27, 2021

FILE NO. **PG5792**

HOLE NO. **BH 3-21**

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	
TOPSOIL	0.36	AU	1			0	73.10					
<b>FILL:</b> Brown silty sand, some gravel, occasional cobble and boulders, trace clay and topsoil  - cored through boulder from 3.28 to 3.81m depth  - trace ash from 5.3 to 5.9m depth  - trace asphaltic concrete from 7.0 to 7.6m depth		SS	2	33	16	1	72.10					
		SS	3	22	50+	2	71.10					
		SS	4	17	11	3	70.10					
		SS	5	44	50+	3	70.10					
		RC	1	95		4	69.10					
		SS	6	33	6	4	69.10					
		SS	7	33	47	5	68.10					
		SS	8	25	50+	6	67.10					
		SS	9	25	59	6	67.10					
		SS	10	25	38	7	66.10					
		SS	11	0	50+	8	65.10					
Compact, brown <b>SILTY SAND to SANDY SILT</b>		SS	12	33	34	9	64.10					
		SS	13	50	14	10	63.10					
		SS	14	58	22	11	62.10					
Compact, brown <b>SILTY SAND</b> , some gravel	11.40	SS	15	50	28	11	62.10					
		SS	16	33	17	12	61.10					

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

DATUM Geodetic

FILE NO. **PG5792**

REMARKS

HOLE NO. **BH 3-21**

BORINGS BY CME-55 Low Clearance Drill

DATE October 27, 2021

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		
<b>GROUND SURFACE</b>						12	61.10						
Compact, brown <b>SILTY SAND</b> , some gravel		SS	17	33	19	13	60.10						
		SS	18	25	18	14	59.10						
		SS	19	4	12	15	58.10						
		SS	20	4	21	16	57.10						
		SS	21	50	36	17	56.10						
<b>GLACIAL TILL:</b> Dense to very dense, brown silty sand with gravel, cobbles and boulders  - grey by 20.2m depth  - compact by 21.3m depth	15.54	SS	22	67	60	18	55.10						
		SS	23	33	50+	19	54.10						
		RC	2	70		20	53.10						
		SS	24	4	50+	21	52.10						
		RC	3	64		22	51.10						
		RC	4	52		23	50.10						
		RC	5	30		24	49.10						
		RC	6	13									

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



DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE October 27, 2021

FILE NO. **PG5792**

HOLE NO. **BH 3-21**

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		
<b>GLACIAL TILL:</b> Compact, brown silty sand with gravel, cobbles and boulders  - cobbles and boulders content decreasing with depth		RC	7	8		24	49.10						
		RC	8	0		25	48.10						
		RC	9	0		26	47.10						
		RC	10	0		27	46.10						
		RC	11	100	71	28	45.10						
		RC	12	100	98	29	44.10						
<b>BEDROCK:</b> Good to excellent quality, grey limestone with occasional shale partings						30	43.10						
End of Borehole (GWL @ 13.46m - Nov. 16, 2021)						31	42.10						
						32	41.10						
						33	40.10						

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

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE November 5, 2021

FILE NO. **PG5792**

HOLE NO. **BH 4-21**

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	72.75						
TOPSOIL	0.30												
<b>FILL:</b> Brown silty sand iwth gravel and cobbles, occasional boulders, trace clay  - some topsoil from 5.3 to 5.9m depth  - some asphaltic concrete from 7.6 to 8.2m depth		AU	1										
		SS	2	33	5	1	71.75						
		SS	3	58	49	2	70.75						
		SS	4	50	10								
		SS	5	50	8	3	69.75						
		SS	6	50	8	4	68.75						
		SS	7	42	46	5	67.75						
		SS	8	33	28	6	66.75						
		SS	9	50	19								
		SS	10	18	9	7	65.75						
		SS	11		50+	8	64.75						
Compact, brown <b>SILTY SAND to SANDY SILT</b>	8.53	SS	12	58	13	9	63.75						
		SS	13		14								
		SS	14	42	19	10	62.75						
		SS	15	50	18	11	61.75						
		SS	16	33	59	12	60.75						
<b>GLACIAL TILL:</b> Very dense to dense, silty sand with gravel, cobbles and boulders	11.25												

○ Water Content %

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

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE November 5, 2021

FILE NO. **PG5792**

HOLE NO. **BH 4-21**

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						12	60.75						
<b>GLACIAL TILL:</b> Very dense to dense, silty sand with gravel, cobbles and boulders  - grey by 20.8m depth		SS	17	60	50+	13	59.75						
		RC	1	33		14	58.75						
		RC	2	41		15	57.75						
		SS	18	75	50+	16	56.75						
		RC	3	34		17	55.75						
		RC	4	24		18	54.75						
		SS	19	0	50+	19	53.75						
		RC	5	7		20	52.75						
		SS	20	42	15	21	51.75						
		RC	6	0		22	50.75						
		SS	21	0	50+	23	49.75						
		RC	7	20		24	48.75						

20 40 60 80 100  
**Shear Strength (kPa)**  
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DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE November 5, 2021

FILE NO. **PG5792**

HOLE NO. **BH 4-21**

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			
<b>GLACIAL TILL:</b> Very dense to dense, silty sand with gravel, cobbles and boulders		RC	8	5		24	48.75							
		SS	22	0	50+	25	47.75							
							26	46.75						
							27	45.75						
							28	44.75						
							29	43.75						
							30	42.75						
							31	41.75						
							32	40.75						
<b>BEDROCK:</b> Excellent quality, grey limestone with occasional shale partings		RC	10	100	100	31	41.75							
		RC	11	100	100	32	40.75							
End of Borehole (GWL @ 10.51m - Nov. 16, 2021)														

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

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger

DATE November 9, 2021

FILE NO. **PG5792**

HOLE NO. **BH 5-21**

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		
<b>GROUND SURFACE</b>						0	71.14						
<b>TOPSOIL</b>	0.36	AU	1										
<b>FILL:</b> Brown silty sand with gravel, occasional cobbles  - trace topsoil and concrete from 2.3 to 2.9m depth   - with asphaltic concrete by 6.1m depth		SS	2	63	50+	1	70.14						
		SS	3	50	19	2	69.14						
		SS	4	50	15	3	68.14						
		SS	5	0	14	4	67.14						
		SS	6	25	13	5	66.14						
		SS	7	0	50+	6	65.14						
		SS	8	58	43	7	64.14						
		SS	9	67	15	8	63.14						
		SS	10	50	14	9	62.14						
Compact to dense, brown <b>SILTY SAND</b>  - some gravel by 8.5m depth	6.70	SS	11	42	17	10	61.14						
		SS	12	50	34	11	60.14						
		SS	13	42	47	12	59.14						
		SS	14	50	48	13							
		SS	15	88	50+	14							
		SS	16	50	35	15							
						12	59.14						
								20	40	60	80	100	

**Shear Strength (kPa)**  
▲ Undisturbed    △ Remoulded

DATUM Geodetic

FILE NO. **PG5792**

REMARKS

HOLE NO. **BH 5-21**

BORINGS BY CME 55 Power Auger

DATE November 9, 2021

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 %				
GROUND SURFACE						12	59.14	20	40	60	80	
Compact to dense, brown <b>SILTY SAND</b> , some gravel		SS	17	21	9	13	58.14					
		SS	18	50	23	14	57.14					
		SS	19	50	28	14.20	57.14					
<b>GLACIAL TILL:</b> Very dense to dense, brown silty sand with gravel, cobbles and boulders  - grey by 18.2m depth		SS	20	55	50+	15	56.14					
		RC	1	60		16	55.14					
		SS	21	42	71	17	54.14					
		RC	2	22		18	53.14					
		SS	22	64	38	19	52.14					
		RC	3	15		20	51.14					
		SS	23	100	50+	21	50.14					
		RC	4	15		22	49.14					
		SS	24	0	50+	23	48.14					
		RC	5	19		24	47.14					

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

DATUM Geodetic

FILE NO. **PG5792**

REMARKS

HOLE NO. **BH 5-21**

BORINGS BY CME 55 Power Auger

DATE November 9, 2021

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 %					
GROUND SURFACE								20	40	60	80		
<b>GLACIAL TILL:</b> Very dense to dense, brown silty sand with gravel, cobbles and boulders		△ SS	25	80	50+	24	47.14						
		RC	6	0		25	46.14						
		SS	26	0	50+	26	45.14						
		RC	7	0		27	44.14						
		△ SS	27	86	50+	28	43.14						
		RC	8	37		29	42.14						
		SS	28	0	10	30	41.14						
		RC	9	100	100	31	40.14						
<b>BEDROCK:</b> Excellent quality, grey limestone with occasional shale partings		RC	10	100	93	30	41.14						
End of Borehole (GWL @ 11.30m - Nov. 16, 2021)													

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

DATUM Geodetic

FILE NO. **PG5792**

REMARKS

HOLE NO. **BH 6-21**

BORINGS BY CME-55 Low Clearance Drill

DATE November 11, 2021

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		
<b>GROUND SURFACE</b>													
Asphaltic concrete	0.08					0	65.14						
<b>FILL:</b> Brown silty sand with crushed stone and gravel	0.91												
		SS	1	67	47								
		SS	2	42	26	1	64.14						
		SS	3	50	17	2	63.14						
		SS	4	58	13	3	62.14						
Compact to dense, brown <b>SILTY SAND</b> , trace to some gravel		SS	5	50	43	4	61.14						
		SS	6	50	13	5	60.14						
		SS	7	50	50+	6	59.14						
	5.41	SS	8	50	50+	7	58.14						
		SS	9	42	34	8	57.14						
<b>GLACIAL TILL:</b> Dense brown silty sand with gravel, cobbles and boulders		SS	10	42	35	9	56.14						
		SS	11	50	34	10	55.14						
- silty sand to sandy silt layer from 8.9 to 9.3m depth		SS	12	43	78	11	54.14						
		SS	13	50	43	12	53.14						
		SS	14	42	38								
		SS	15	43	50+								
		RC	1	61									
- grey by 12.2m depth		SS	16	40	50+								
		RC	2	75									
						11	54.14						
						12	53.14						
								20	40	60	80	100	
								<b>Shear Strength (kPa)</b>					
								▲ Undisturbed    △ Remoulded					



DATUM Geodetic

FILE NO. **PG5792**

REMARKS

HOLE NO. **BH 6-21**

BORINGS BY CME-55 Low Clearance Drill

DATE November 11, 2021

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						12	53.14						
<b>GLACIAL TILL:</b> Dense, grey silty sand with gravel, cobbles and boulders  - some clay by 16.8m depth		SS	17		50+	12	53.14						
		RC	3	34			13	52.14					
		SS	18	52	41		14	51.14					
		RC	4	19			15	50.14					
		SS	19	86	50+		16	49.14					
		RC	5	0			17	48.14					
		SS	20	50	28		18	47.14					
		RC	6	11			19	46.14					
		SS	21	0	50+		20	45.14					
		RC	7	14			21	44.14					
		SS	22	0	50+		22	43.14					
		RC	8	35			23	42.14					
		RC	9	100	85		24	41.14					
		<b>BEDROCK:</b> Good to excellent quality, grey limestone with occasional shale partings											

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

## SOIL PROFILE AND TEST DATA

Geotechnical Investigation  
Lansdowne Park Redevelopment  
Prop. Multi-Storey Buildings & Rink Structure, Ontario

DATUM Geodetic


FILE NO. **PG5792**

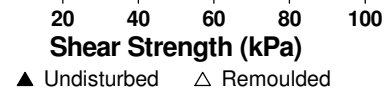
REMARKS

HOLE NO. **BH 6-21**

BORINGS BY CME-55 Low Clearance Drill

DATE November 11, 2021

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 %					
GROUND SURFACE								20	40	60	80		
					24	41.14							
<b>BEDROCK:</b> Good to excellent quality, grey limestone with occasional shale partings		RC	10	100	98	25	40.14						
End of Borehole (GWL @ 5.25m - Nov. 16, 2021)													



DATUM Geodetic

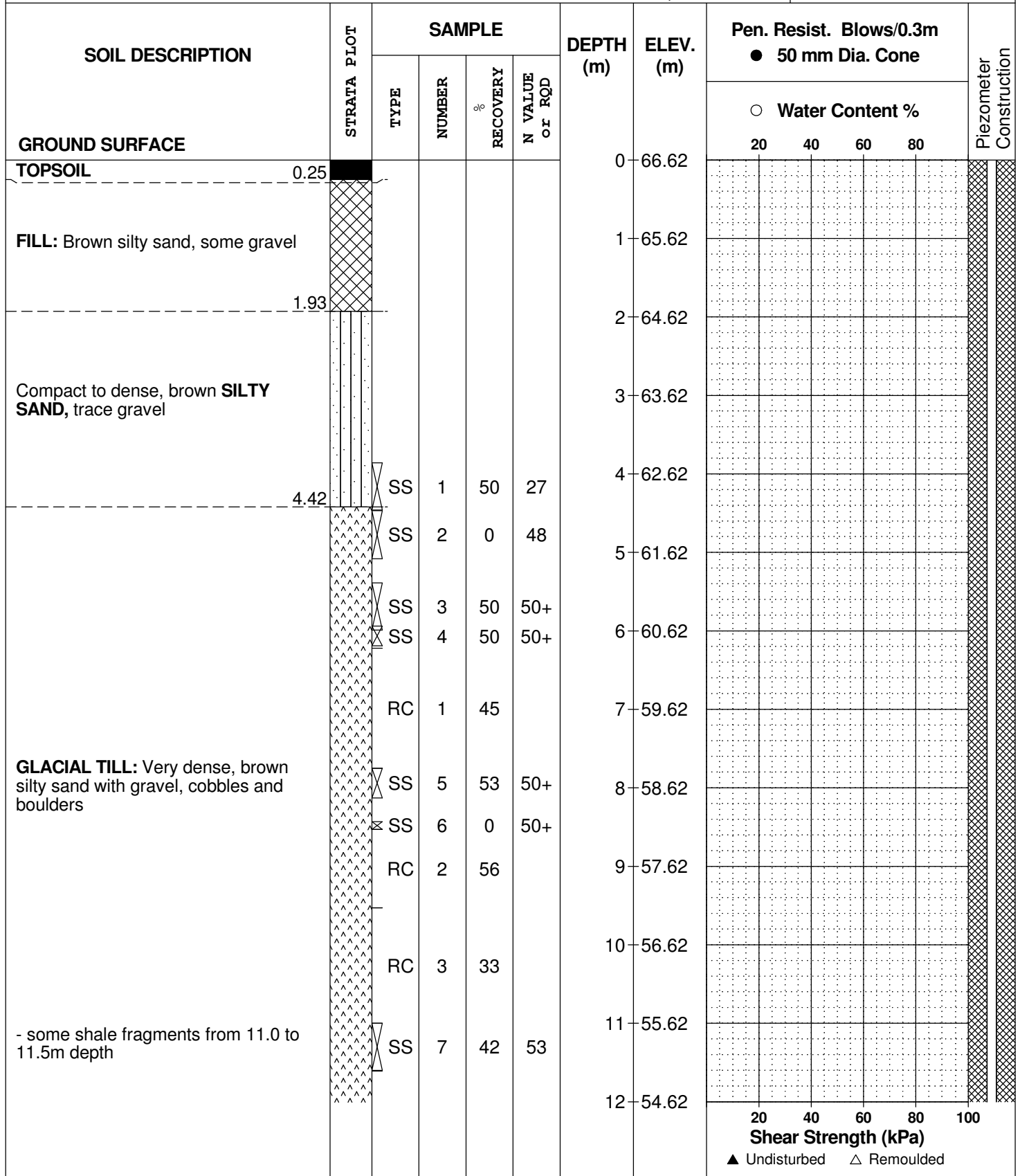
REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE November 15, 2021

FILE NO. **PG5792**

HOLE NO. **BH 7-21**



DATUM Geodetic

FILE NO. **PG5792**

REMARKS

HOLE NO. **BH 7-21**

BORINGS BY CME-55 Low Clearance Drill

DATE November 15, 2021

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		RC	4	48		12	54.62						
<b>GLACIAL TILL:</b> Very dense, brown silty sand with gravel, cobbles and boulders  - grey by 13.7m depth		△ SS	8	33	48	13	53.62						
		RC	5	47		14	52.62						
		△ SS	9	33	50+	15	51.62						
		RC	6	0		16	50.62						
		△ SS	10	0	50+	17	49.62						
		RC	7	30		18	48.62						
		△ SS	11	73	50+	19	47.62						
		RC	8	12		20	46.62						
		△ SS	12	77	50+	21	45.62						
		RC	9	18		22	44.62						
		△ SS	13	0	50+	23	43.62						
			23.80	RC	10	100	100	24	42.62				

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

## SOIL PROFILE AND TEST DATA

Geotechnical Investigation  
Lansdowne Park Redevelopment  
Prop. Multi-Storey Buildings & Rink Structure, Ontario

DATUM Geodetic


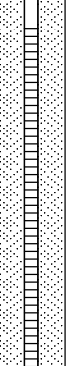
FILE NO. **PG5792**

REMARKS

HOLE NO. **BH 7-21**

BORINGS BY CME-55 Low Clearance Drill

DATE November 15, 2021

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		
<b>BEDROCK:</b> Excellent quality, grey limestone with occasional shale partings		RC	11	100	100	24	42.62						
		RC	12	100	94	26	40.62						
End of Borehole						27	39.62						
(BH dry - November 16, 2021)													

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

**SOIL PROFILE AND TEST DATA**

Geotechnical Investigation  
 Lansdowne Park Redevelopment  
 Prop. Multi-Storey Buildings & Rink Structure, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME-55 Low Clearance Drill

DATE November 17, 2021

FILE NO. **PG5792**

HOLE NO. **BH 8-21**

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		
<b>GROUND SURFACE</b>													
Concrete patio stone	0.15	AU	1			0	65.45						
FILL: Crushed stone	0.46												
FILL: Brown silty sand with gravel, occasional cobbles		SS	2	42	20	1	64.45						
		SS	3	0	15								
	2.03					2	63.45						
		SS	4	0	8								
Compact to dense, brown silty sand, some gravel		SS	5	17	37	3	62.45						
		SS	6	42	41	4	61.45						
		SS	7	50	57								
	5.13					5	60.45						
Dense, brown <b>SILTY SAND</b>		SS	8	42	36								
		SS	9	50	40	6	59.45						
		SS	10	50	36	7	58.45						
- some gravel, occasional cobbles and boulders by 7.4m depth		SS	11	58	47	8	57.45						
	8.89					9	56.45						
Dense, brown <b>SILTY SAND to SANDY SILT</b> , some gravel		SS	13	67	36								
		SS	14		45	10	55.45						
		SS	15	67	69								
	11.18					11	54.45						
<b>GLACIAL TILL:</b> Very dense, brown silty sand with gravel, cobbles and boulders		SS	16	67	43								
		SS	17	50	14	12	53.45						
						13	52.45						
								20	40	60	80	100	

**Shear Strength (kPa)**  
 ▲ Undisturbed    △ Remoulded

DATUM Geodetic

FILE NO. **PG5792**

REMARKS

HOLE NO. **BH 8-21**

BORINGS BY CME-55 Low Clearance Drill

DATE November 17, 2021

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													
<b>GLACIAL TILL:</b> Very dense, brown silty sand with gravel, cobbles and boulders		RC	1	55		13	52.45						
		RC	2	30		14	51.45						
		SS	18	58	28	15	50.45						
		RC	3	0		16	49.45						
		SS	19	0	50+	17	48.45						
		RC	4	36		18	47.45						
		SS	20	25	50+	19	46.45						
		SS	21	0		20	45.45						
		RC	6	35		21	44.45						
		SS	22		50+	22	43.45						
<b>BEDROCK:</b> Excellent quality, grey limestone with occasional shale partings		RC	7	100	90	23	42.45						
		RC	8	100	95	24	41.45						
End of Borehole													

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

DATUM Geodetic

FILE NO. **PG5792**

REMARKS

HOLE NO. **BH 9-21**

BORINGS BY CME-55 Low Clearance Drill

DATE November 18, 2021

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		
<b>GROUND SURFACE</b>													
Concrete	0.15					0	67.07						
FILL: Brown silty sand with crushed stone	0.46					1	66.07						
		AU	1			2	65.07						
FILL: Brown silty sand with gravel, occasional cobbles						3	64.07						
		SS	2	17	18	4	63.07						
Concrete (inferred footing)	4.34					5	62.07						
	4.75	SS	3	8	17	6	61.07						
		RC	1	63		7	60.07						
		SS	4	42	6	8	59.07						
		SS	5		50+	9	58.07						
		RC	2	16		10	57.07						
		SS	6	45	50+	11	56.07						
		RC	3	46		12	55.07						
		SS	7	0	50+	13	54.07						
<b>GLACIAL TILL:</b> Very dense, brown silty sand with gravel, cobbles and boulders		SS	8	50	58								
		RC	4	42									
		SS	9	25	43								
		SS	10	0	50+								
		SS	11	60	50+								
		RC	5	13									

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



DATUM Geodetic

FILE NO. **PG5792**

REMARKS

HOLE NO. **BH 9-21**

BORINGS BY CME-55 Low Clearance Drill

DATE November 18, 2021

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						13	54.07						
<b>GLACIAL TILL:</b> Very dense, brown silty sand with gravel, cobbles and boulders		SS	12	22	50+	13	54.07						
		RC	6	70		14	53.07						
		RC	7	37		15	52.07						
		RC	8	25		16	51.07						
		SS	13	0	50+	17	50.07						
		RC	9	48		18	49.07						
		RC	10	11		19	48.07						
		RC	11	100	90	20	47.07						
		RC	12	100	100	21	46.07						
		RC				22	45.07						
<b>BEDROCK:</b> Excellent quality, grey limestone with occasional shale partings						23	44.07						
						24	43.07						
End of Borehole													

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

# SYMBOLS AND TERMS

## SOIL DESCRIPTION

Behavioural properties, such as structure and strength, take precedence over particle gradation in describing soils. Terminology describing soil structure are as follows:

Desiccated	-	having visible signs of weathering by oxidation of clay minerals, shrinkage cracks, etc.
Fissured	-	having cracks, and hence a blocky structure.
Varved	-	composed of regular alternating layers of silt and clay.
Stratified	-	composed of alternating layers of different soil types, e.g. silt and sand or silt and clay.
Well-Graded	-	Having wide range in grain sizes and substantial amounts of all intermediate particle sizes (see Grain Size Distribution).
Uniformly-Graded	-	Predominantly of one grain size (see Grain Size Distribution).

The standard terminology to describe the strength of cohesionless soils is the relative density, usually inferred from the results of the Standard Penetration Test (SPT) 'N' value. The SPT N value is the number of blows of a 63.5 kg hammer, falling 760 mm, required to drive a 51 mm O.D. split spoon sampler 300 mm into the soil after an initial penetration of 150 mm.

Relative Density	'N' Value	Relative Density %
Very Loose	<4	<15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	>50	>85

The standard terminology to describe the strength of cohesive soils is the consistency, which is based on the undisturbed undrained shear strength as measured by the in situ or laboratory vane tests, penetrometer tests, unconfined compression tests, or occasionally by Standard Penetration Tests.

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

## SYMBOLS AND TERMS (continued)

### SOIL DESCRIPTION (continued)

Cohesive soils can also be classified according to their "sensitivity". The sensitivity is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil.

Terminology used for describing soil strata based upon texture, or the proportion of individual particle sizes present is provided on the Textural Soil Classification Chart at the end of this information package.

### ROCK DESCRIPTION

The structural description of the bedrock mass is based on the Rock Quality Designation (RQD).

The RQD classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be a result of closely-spaced discontinuities (resulting from shearing, jointing, faulting, or weathering) in the rock mass and are not counted. RQD is ideally determined from NXL size core. However, it can be used on smaller core sizes, such as BX, if the bulk of the fractures caused by drilling stresses (called "mechanical breaks") are easily distinguishable from the normal in situ fractures.

<b>RQD %</b>	<b>ROCK QUALITY</b>
90-100	Excellent, intact, very sound
75-90	Good, massive, moderately jointed or sound
50-75	Fair, blocky and seamy, fractured
25-50	Poor, shattered and very seamy or blocky, severely fractured
0-25	Very poor, crushed, very severely fractured

### SAMPLE TYPES

SS	-	Split spoon sample (obtained in conjunction with the performing of the Standard Penetration Test (SPT))
TW	-	Thin wall tube or Shelby tube
PS	-	Piston sample
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size AXT, BXL, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

## SYMBOLS AND TERMS (continued)

### GRAIN SIZE DISTRIBUTION

MC%	-	Natural moisture content or water content of sample, %
LL	-	Liquid Limit, % (water content above which soil behaves as a liquid)
PL	-	Plastic limit, % (water content above which soil behaves plastically)
PI	-	Plasticity index, % (difference between LL and PL)
Dxx	-	Grain size which xx% of the soil, by weight, is of finer grain sizes These grain size descriptions are not used below 0.075 mm grain size
D10	-	Grain size at which 10% of the soil is finer (effective grain size)
D60	-	Grain size at which 60% of the soil is finer
Cc	-	Concavity coefficient = $(D_{30})^2 / (D_{10} \times D_{60})$
Cu	-	Uniformity coefficient = $D_{60} / D_{10}$

Cc and Cu are used to assess the grading of sands and gravels:

Well-graded gravels have:  $1 < Cc < 3$  and  $Cu > 4$

Well-graded sands have:  $1 < Cc < 3$  and  $Cu > 6$

Sands and gravels not meeting the above requirements are poorly-graded or uniformly-graded.

Cc and Cu are not applicable for the description of soils with more than 10% silt and clay (more than 10% finer than 0.075 mm or the #200 sieve)

### CONSOLIDATION TEST

$p'_o$	-	Present effective overburden pressure at sample depth
$p'_c$	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below $p'_c$ )
Cc	-	Compression index (in effect at pressures above $p'_c$ )
OC Ratio		Overconsolidation ratio = $p'_c / p'_o$
Void Ratio		Initial sample void ratio = volume of voids / volume of solids
Wo	-	Initial water content (at start of consolidation test)

### PERMEABILITY TEST

k	-	Coefficient of permeability or hydraulic conductivity is a measure of the ability of water to flow through the sample. The value of k is measured at a specified unit weight for (remoulded) cohesionless soil samples, because its value will vary with the unit weight or density of the sample during the test.
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## SYMBOLS AND TERMS (continued)

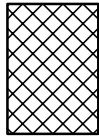
### STRATA PLOT



Topsoil



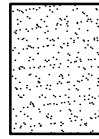
Asphalt



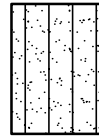
Fill



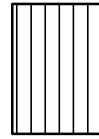
Peat



Sand



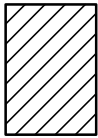
Silty Sand



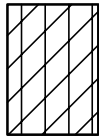
Silt



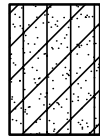
Sandy Silt



Clay



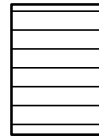
Silty Clay



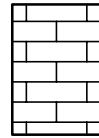
Clayey Silty Sand



Glacial Till



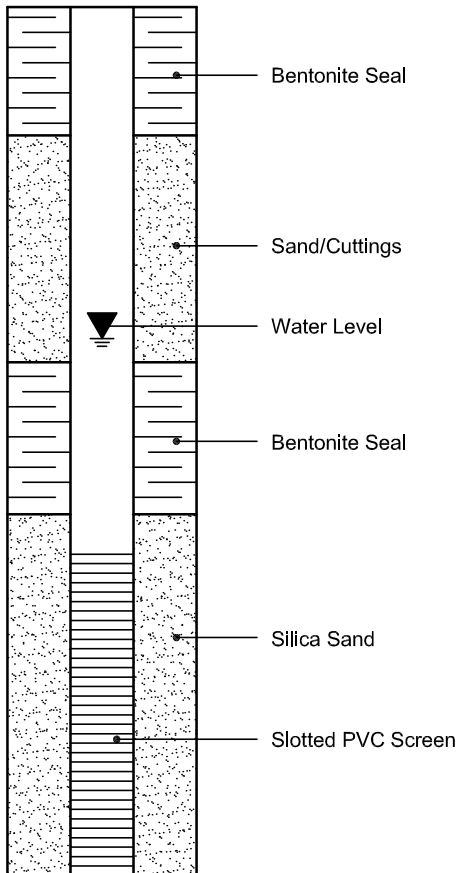
Shale



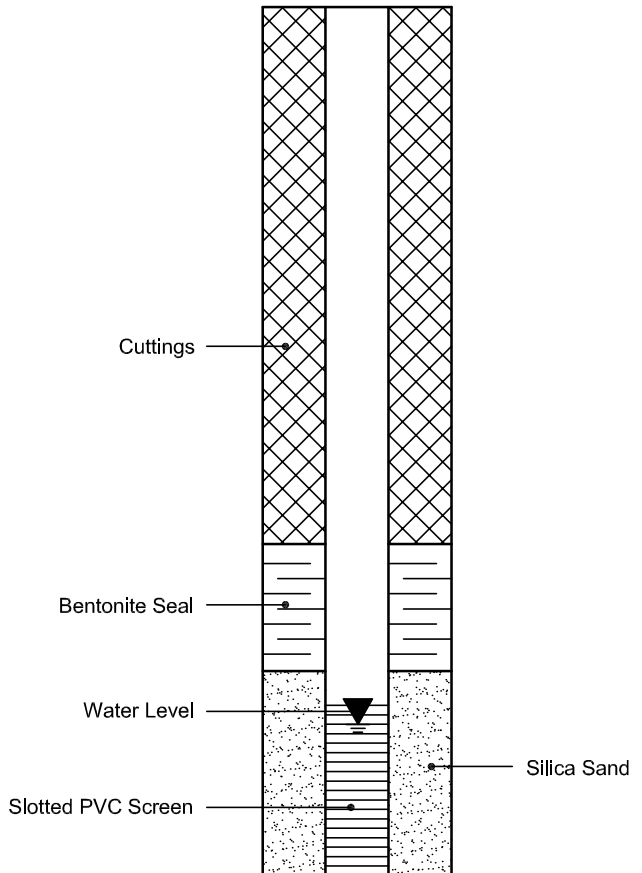
Bedrock

### MONITORING WELL AND PIEZOMETER CONSTRUCTION

#### MONITORING WELL CONSTRUCTION



#### PIEZOMETER CONSTRUCTION



# Stratigraphic and Instrumentation Log: MW15-6 / GP15-10



Amec Foster Wheeler  
300-210 Colonnade Road  
Ottawa, Ontario K2E 7L5

<b>Project No:</b> TZ10100106 <b>Location:</b> 945 Bank Street, Ottawa <b>Logged By:</b> JFT <b>Drill Date:</b> October 21, 2015 <b>Hole Size:</b> 127 mm	<b>Project Name:</b> CPU Ground Water Monitoring Program <b>Client:</b> City of Ottawa <b>Entered By:</b> KYLT <b>Drill Method:</b> Direct Push <b>Drilled By:</b> Strata Drilling Group
---	--

SUBSURFACE PROFILE				SAMPLE DATA					WELLS		Remarks						
Depth	Symbol	Description	Elevation (m)	Type	Number	Sample	N or RQD	Recovery (%)	Combustible Vapour (ppm)				GP	MW			
									○	○		○			○	Total Organic Vapour (ppm)	
										20	40	60	80	●	●	●	●
0		Ground Surface	64.9														
0		<b>TOPSOIL</b>	0.0														
1			64.5	SS													
2		<b>FILL</b> Fine grained loamy sand, trace gravel, dark brown	0.4														
3																	
4				SS	1			45									
5																	
6																	
7				SS	2			65									
8		Very fine grained sandy loam, dark brown, moist															
9		Brownish grey, wet															
10																	
11																	
12		Fine to medium grained sand, grey															
13																	
14		Trace gravel															
15		Fine to medium grained sandy loam and gravel															
16			60.2														
17		<b>SAND</b> Fine to coarse grained sand, trace gravel	4.7														
18			59.7														
19		<b>END OF BOREHOLE</b>	5.2														
20																	
21																	
22																	
23																	

Elevation: 64.924 masl	Casing Elevation: 64.615 masl	Filter Pack Size: MW 6.7 mm/GP 9.5 mm	Datum: Geodetic
Easting: 368843.807	Well Casing Size: MW 50.8 mm/GP 12.7 mm	Well Material: Schedule 40 PVC	Checked by: KDH
Northing: 5029183.520	Screen Slot Size: MW 0.25 mm/GP 6.4 mm	Vapour Unit: N/A	Sheet: 1 of 1

# Stratigraphic and Instrumentation Log: MW15-7



Amec Foster Wheeler  
300-210 Colonnade Road  
Ottawa, Ontario K2E 7L5

<b>Project No:</b> TZ10100106 <b>Location:</b> 945 Bank Street, Ottawa <b>Logged By:</b> JFT <b>Drill Date:</b> October 21, 2015 <b>Hole Size:</b> 127 mm	<b>Project Name:</b> CPU Ground Water Monitoring Program <b>Client:</b> City of Ottawa <b>Entered By:</b> KYLT <b>Drill Method:</b> Direct Push <b>Drilled By:</b> Strata Drilling Group
---	--

SUBSURFACE PROFILE				SAMPLE DATA				COMBUSTIBLE VAPOUR (ppm)			Monitoring Well Details	Remarks			
Depth	Symbol	Description	Elevation (m)	Type	Number	Sample	N or RQD	Recovery (%)	COMBUSTIBLE VAPOUR (ppm)						
									250	750	1250				
									TOTAL ORGANIC VAPOUR (ppm)						
									20	60	100	140	180		
0		Ground Surface	64.51												
0		<b>TOPSOIL</b>	0.00												
1		<b>FILL</b>	64.12												
2		Gravel and sand, grey	0.40												
3		Fine loamy sand, greyish brown													
4				SS	1			68							
5															
6															
7		Wet													
8				SS	2			70							
9															
10		Fine to medium grained sand, brown													
11															
12		Fine grained sandy loam	60.80												
13		<b>SAND</b>	3.71												
14		Fine to coarse grained sand, trace gravel, brown, wet		SS	3			65							
15															
16		Trace silt													
17															
18		Slightly grey													
19				SS	4			55							
20			58.42												
20		<b>END OF BOREHOLE</b>	6.10												
21															
22															
23															

Elevation: 64.513 masl  
Easting: 368911.901  
Northing: 5029169.410

Casing Elevation: 64.431 masl  
Well Casing Size: 50.8 mm  
Screen Slot Size: 0.25 mm

Filter Pack Size: 6.7 mm  
Well Material: Schedule 40 PVC  
Vapour Unit: N/A

Datum: Geodetic  
Checked by: KDH  
Sheet: 1 of 1

# Stratigraphic and Instrumentation Log: MW15-9



Amec Foster Wheeler  
300-210 Colonnade Road  
Ottawa, Ontario K2E 7L5

<b>Project No:</b> TZ10100106 <b>Location:</b> 945 Bank Street, Ottawa <b>Logged By:</b> JFT <b>Drill Date:</b> October 21, 2015 <b>Hole Size:</b> 127 mm	<b>Project Name:</b> CPU Ground Water Monitoring Program <b>Client:</b> City of Ottawa <b>Entered By:</b> KYLT <b>Drill Method:</b> Direct Push <b>Drilled By:</b> Strata Drilling Group
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SUBSURFACE PROFILE				SAMPLE DATA					Monitoring Well		Remarks				
Depth	Symbol	Description	Elevation (m)	Type	Number	Sample	N or RQD	Recovery (%)	Combustible Vapour (ppm)			Monitoring Well Details			
									250	750	1250				
									Total Organic Vapour (ppm)						
									20	60	100	140	180		
0		Ground Surface	65.25												
0		<b>ASPHALT</b>	0.00												
1		<b>FILL</b>	64.86												
2		Fine to medium grained loamy sand, trace gravel, brown	0.40												
3															
4				SS	1			68.1							
5															
6		Fine to medium grained sand, trace coarse grained sand, brown													
7															
8				SS	2			70							
9		Brownish grey													
10															
11		Damp/moist Fine to medium grained sand													
12															
13				SS	3			65							
14		Medium to coarse grained sand, moist/wet													
15		Very fine to fine grained sand, grey	60.68												
16		<b>SAND</b> Fine to coarse grained sand, trace gravel, grey, wet	4.57												
17			60.07												
18		<b>LOAMY SAND</b> Fine to medium grained loamy sand and gravel, some pieces of rock	5.18												
19				SS	4			55							
20			59.16												
21		<b>END OF BOREHOLE</b>	6.10												
22															
23															

Elevation: 65.253 masl  
Easting: 368798.392  
Northing: 5029125.377

Casing Elevation: 65.148 masl  
Well Casing Size: 50.8 mm  
Screen Slot Size: 0.25 mm

Filter Pack Size: 6.7 mm  
Well Material: Schedule 40 PVC  
Vapour Unit: N/A

Datum: Geodetic  
Checked by: KDH  
Sheet: 1 of 1



# Stratigraphic and Instrumentation Log: MW15-10



Amec Foster Wheeler  
300-210 Colonnade Road  
Ottawa, Ontario K2E 7L5

<b>Project No:</b> TZ10100106 <b>Location:</b> 945 Bank Street, Ottawa <b>Logged By:</b> JFT <b>Drill Date:</b> October 22, 2015 <b>Hole Size:</b> 127 mm	<b>Project Name:</b> CPU Ground Water Monitoring Program <b>Client:</b> City of Ottawa <b>Entered By:</b> KYLT <b>Drill Method:</b> Direct Push <b>Drilled By:</b> Strata Drilling Group
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SUBSURFACE PROFILE				SAMPLE DATA					Monitoring Well			Remarks		
Depth	Symbol	Description	Elevation (m)	Type	Number	Sample	N or RQD	Recovery (%)	Combustible Vapour (ppm)				Monitoring Well Details	
									250	750	1250			
									Total Organic Vapour (ppm)					
									20	60	100	140	180	
0		Ground Surface	64.04											
0		<b>TOPSOIL</b>	0.00											
1		<b>FILL</b>	63.65											
2		Very fine to fine grained loamy sand, brown	0.40											
3		Very fine to fine grained sand		SS	1			68						
4		Very fine sandy loam, dark brown												
5		Very fine grained loamy sand, brown		SS	2			85						
6		Very fine grained sandy loam												
7		Very fine grained loamy sand												
8		Very fine to fine grained loamy sand												
9		Very fine grained sandy loam, brown, moist/wet												
10		Very fine to fine grained loamy sand												
11		Very fine grained sandy loam		SS	3			85						
12		Very fine to fine grained loamy sand												
13		Very fine to fine grained sand	59.93											
14		<b>SAND</b>	4.11											
15		Fine to medium grained, trace coarse grained sand, some gravel, some rock												
16		Medium to coarse grained sand, some gravel		SS	4			43						
17														
18														
19														
20		<b>END OF BOREHOLE</b>	57.95											
21			6.10											
22														
23														

Elevation: 64.043 masl  
Easting: 368878.435  
Northing: 5029083.949

Casing Elevation: 64.979 masl  
Well Casing Size: 50.8 mm  
Screen Slot Size: 0.25 mm

Filter Pack Size: 6.7 mm  
Well Material: Schedule 40 PVC  
Vapour Unit: N/A

Datum: Geodetic  
Checked by: KDH  
Sheet: 1 of 1

# Stratigraphic and Instrumentation Log: MW15-11



Amec Foster Wheeler  
300-210 Colonnade Road  
Ottawa, Ontario K2E 7L5

<b>Project No:</b> TZ10100106 <b>Location:</b> 945 Bank Street, Ottawa <b>Logged By:</b> JFT <b>Drill Date:</b> October 22, 2015 <b>Hole Size:</b> 127 mm	<b>Project Name:</b> CPU Ground Water Monitoring Program <b>Client:</b> City of Ottawa <b>Entered By:</b> KYLT <b>Drill Method:</b> Direct Push <b>Drilled By:</b> Strata Drilling Group
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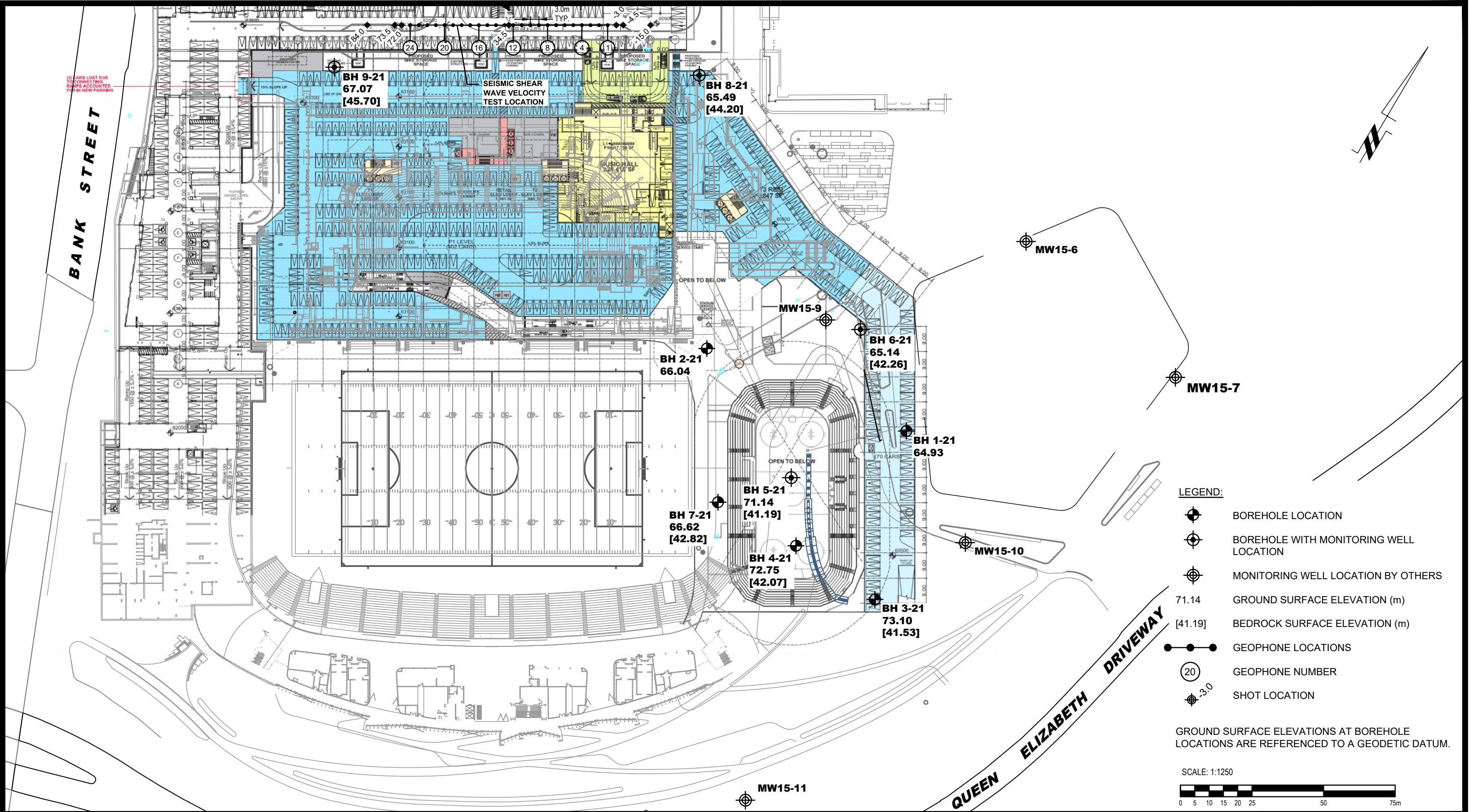
SUBSURFACE PROFILE				SAMPLE DATA					Monitoring Well Details	Remarks
Depth	Symbol	Description	Elevation (m)	Type	Number	Sample	N or RQD	Recovery (%)		
									250	750
									Total Organic Vapour (ppm)	
									20 60 100 140 180	
0		Ground Surface	64.57							
0		<b>TOPSOIL</b>	0.00							
1		<b>FILL</b>	64.17							
2		Very fine to fine grained sand, trace silt, grey/brown	0.40							
3										
4				SS	1			66		
5										
6		Very fine to medium grained sand, brown/grey								
7										
8				SS	2			58		
9										
10		Fine to medium grained loamy sand and gravel, moist								
11										
12		Gravelly loamy sand, some pieces of rock								
13				SS	3			52		
14										
15		Wet	60.00							
16		<b>SAND</b>	4.57							
17		Fine to medium and trace grained sand, some gravel								
18										
19		Coarse sand and gravel								
20			58.47							
21		<b>END OF BOREHOLE</b>	6.10							
22										
23										

Elevation: 64.571 masl  
Easting: 368858.743  
Northing: 5028968.821

Casing Elevation: 64.447 masl  
Well Casing Size: 50.8 mm  
Screen Slot Size: 0.25 mm

Filter Pack Size: 6.7 mm  
Well Material: Schedule 40 PVC  
Vapour Unit: N/A

Datum: Geodetic  
Checked by: KDH  
Sheet: 1 of 1



**patersongroup**  
consulting engineers

154 Colonnade Road South  
Ottawa, Ontario K2E 7J5  
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NO.	REVISIONS	DATE	INITIAL

TRINITY DEVELOPMENT GROUP  
GEOTECHNICAL INVESTIGATION  
LANSDOWNE PARK REDEVELOPMENT  
PROP. MULTI-STORY BUILDINGS AND RINK STRUCTURE ONTARIO

OTTAWA,  
Title:

**TEST HOLE LOCATION PLAN**

Scale:	1:1250	Date:	12/2021
Drawn by:	YA	Report No.:	PG5792-1
Checked by:	MS	Dwg. No.:	<b>PG5792-1</b>
Approved by:	DJG	Revision No.:	

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Figure 1: Long-Term Groundwater Monitoring Program

