APPENDIX 'A'

GEOTECHNICAL REPORT

To	**Vilko Maroti, P. Eng.**	From	**Robert Brown, P. Eng.**
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Project No.	**WX18381**	Pages	**19**
		Date	**11 December 2017**
Copies			

Subject: **Geotechnical Investigation**
Chief Peguis Greenway Extension
Winnipeg, Manitoba

1.0 INTRODUCTION

As authorized by Mr. Vilko Maroti, P. Eng., of WSP Canada Group Limited (WSP), Amec Foster Wheeler Environment & Infrastructure, a Division of Amec Foster Wheeler Americas Limited (Amec Foster Wheeler) completed a geotechnical investigation along the proposed Active Transport (AT) alignment of the Chief Peguis Greenway Extension. The purpose of the investigation was to provide subsurface information relative to the design of the proposed Chief Peguis Greenway Extension.

2.0 GEOTECHNICAL INVESTIGATION

2.1 FIELD INVESTIGATION

Amec Foster Wheeler conducted a geotechnical drilling program on 4 December 2017. Prior to initiating drilling, Amec Foster Wheeler contacted various public utilities to ensure drilling could be completed without contact with underground services. The drilling was conducted in accordance with City of Winnipeg signage requirements. All field activities were completed without incident.

The drilling program consisted of ten (10) test holes advanced to 2.1 m below grade, plus one (1) core hole through pavement. The test hole locations were selected by WSP and provided on a plan to Amec Foster Wheeler prior to drilling. Test holes TH01 and TH02 were located on the median of Main Street, to the north of Chief Peguis Trail; Test hole TH03 was located on the proposed AT pathway alignment to the west of Main Street in an undeveloped area; TH04 and TH05 were located on or near existing pathways to the north and south, respectively, of Chief Peguis Trail between Main Street and the Red River; TH06 and TH07 were located on existing pathways to the north and south, respectively, of Chief Peguis Trail to the east of the Red River; and TH08, TH09 and TH10 were located on proposed trail alignments to the south and north of Chief Peguis Trail, further east of TH06 and TH07. Core hole TH11 was located in the southbound

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lanes of Main Street, north of Chief Peguis Trail. The test hole locations are shown on the attached Test Hole Location Plan, Figure 1.

The test holes were drilled by Maple Leaf Drilling Ltd. of Winnipeg, Manitoba using a track mounted Geoprobe 7822DT geotechnical drill rig, equipped with 125 mm diameter solid stem continuous flight augers, under the supervision of Mr. Derek Condon, C.E.T., of Amec Foster Wheeler.

During drilling, the observed soils were visually classified according to the Modified Unified Soil Classification System, and groundwater, drilling conditions, and other relevant subsurface observations were recorded. Disturbed soil samples were recovered at regular intervals from the auger cuttings, and during drilling, pocket penetrometer testing was conducted on cohesive soil cuttings to assess relative undrained shear strength.

The test holes were left open for after completion of drilling to observe the short term groundwater seepage and sloughing conditions. The test holes were then backfilled with auger cuttings and bentonite. Test holes advanced through pavement were patched with asphalt cold patch.

Test hole logs were prepared to record the description and the relative position of the various soil strata, location of samples obtained and results of the field and laboratory tests, and are presented on Figures 2 to 12.

2.2 LABORATORY TESTING

All soil samples obtained during the field investigation were labelled, sealed to limit moisture loss, and transported to Amec Foster Wheeler's Winnipeg office for further visual examination and laboratory testing.

Selected grab samples recovered during the field investigation were tested to determine their natural moisture contents. The results of laboratory tests are recorded on the test hole logs.

3.0 SUBSURFACE CONDITIONS

3.1 SOIL PROFILE

The general soil stratigraphy encountered at the test holes, as noted in descending order from the ground surface, was as follows:

- Asphalt Pavement (TH11) and Concrete Pavement (TH01, TH02, TH11)
- Gravel Fill (TH01, TH02, TH04, TH05)
- Clay Fill (TH08, TH09)
- Clay

<u>Asphalt Pavement and Concrete Pavement</u>

Asphalt pavement was present at the TH11 only, and the measured thickness of the asphalt in the core was 68 mm. Concrete pavement was present at TH11 below the asphalt, and from surface at TH01 and TH02. The concrete thickness was 75 and 90 mm in TH01 and TH02,

respectively, and 225 mm thick below the asphalt in the core at TH11. Coring at TH11 was terminated at the bottom of the pavement. A photograph of the core is provided on Figure 13.

Gravel Fill

Gravel fill was encountered below the pavement in TH01 and TH02, and at the ground surface at TH04 and TH05. The gravel fill was 90 to 230 mm thick, contained trace to some sand, and was poorly graded, fine to coarse grained, damp, inferred as compact, light brown and consisted of crushed limestone.

Clay Fill

Clay fill was present throughout the test hole depths at TH08 and TH09, both of which were located within the roadway embankment along Chief Peguis Trail. The clay fill was silty with trace sand and trace gravel, and was high plastic, most, very stiff and grey, with occasional silt inclusions, and occasional roots to 0.1m At TH10 only, organic clay fill was present at the ground surface and was about 300 mm thick. The organic clay fill was silty with trace sand and trace gravel, high plastic, frozen and brown, and contained frequent roots and wood pieces.

Clay

Clay was present below the layers described above in TH01 to TH07 and TH10, and extended to the termination depth of 2.1 m in these test holes. The clay was frozen in the upper 0.6 m in TH01, TH03, TH04, and TH05, and was generally silty, high plastic, moist where not frozen, stiff to very stiff and brown or grey. In some test holes, the clay became stiff below 2.0 m. Silt inclusions and laminations were also variably present in the clay.

3.2 SLOUGHING AND SEEPAGE

No sloughing or seepage was encountered during drilling in any of the test holes. It should be noted that only short-term seepage and sloughing conditions were observed and ground water levels can fluctuate annually, seasonally or as a result of construction activity.

4.0 SUBGRADE PREPARATION – ACTIVE TRANSPORTATION

Except at TH08 and TH09, soil conditions encountered along the AT route generally consisted of clay. Outside of currently paved areas, gravel was present at TH04 only, at the ground surface. On this basis, subgrade can be prepared as noted in the latest revision of City of Winnipeg Construction Specification CW3325, Portland Cement Concrete Sidewalk (although it is understood that asphalt pavement would be used). It is understood that engineering design of subbase, base and pavements for the AT route will be undertaken by others. CW3325 states, “Where required as a levelling course, a maximum thickness of 50 mm of approved material shall be supplied in accordance with Specification CW 3110.” It is assumed that the levelling course will comprise base and/or subbase and its thickness may be modified in the pavement design, depending on the design standard used.

Given the locations of TH08 and TH09 within roadway embankments, as well as the length of time the clay fill has been in place, i.e. several decades, the clay fill is not expected to undergo

significant settlements. On this basis, except for moisture conditioning and recompaction, subgrade preparation in the clay fill can proceed as for native clay. Gravel fill, where present at the ground surface, may be suitable for re-use however should be checked for suitability (i.e. gradation, durability and compaction).

Organic clay fill was present at the ground surface at TH10. The full depth of any compressible organic clay fill should be removed from the AT alignment.

No silt was encountered at the test holes, however in particular given the separation between test holes and the discontinuous presence of shallow silt in the Winnipeg area, silt could be encountered. Where silt is encountered during construction, and depending on the conditions encountered, it may be necessary to sub-excavate and replace the silt, or a portion of its thickness, with a strong, permeable, nonwoven geotextile topped with a bridging material prior to placement of the AT pathway structure.

In the recommendations provided below, it is assumed that the noted potential for fill settlements, as well as uncertainty in its predicted magnitudes, are acceptable to the owner.

4.1.1 Sidewalk Subgrade

The latest revision of City of Winnipeg Specification CW3310, Section 3, should be consulted for subgrade preparation for sidewalks. Additional recommendations for preparation of sidewalk subgrade are provided below.

1. Excavate to the design subgrade elevation, which should be taken as the underside of design AT pavement structure, which includes the asphalt surface and underlying thickness of levelling course (i.e. as noted above). Further remove any fill, fibrous organics or other unsuitable materials, except at TH08 and TH09 as noted above. Final excavation cuts should be made with an excavator equipped with a smooth bladed bucket, operating from the edge of the excavation. Construction traffic should not be allowed directly on the subgrade.
2. Once the fill and any other unsuitable material is removed, the exposed subgrade is expected to consist of stiff native clay or fill. Once final grades are achieved, the subgrade should be evaluated by the geotechnical engineer of record to detect soft or weak areas, to verify that soils are as expected and that no unsuitable materials remain.
3. In areas where clay fill is present and will not be removed, scarify the clay fill subgrade to a depth of 150 mm, uniformly moisture condition to 0 to +3% above Proctor optimum moisture content, and uniformly compact with a heavy sheepsfoot or padfoot roller to a minimum of 95% of standard Proctor maximum dry density (SPMDD).
4. The subgrade should be protected from frost, desiccation, inundation and excessive wheel loads at all times. Subgrade preparation and fill placement under freezing conditions is not recommended. The use of frozen soils for fill, placement or compaction of frozen soils, or placement or compaction of soils over frozen subgrade, should be avoided.
5. Fill materials required to raise grades to the underside of the granular section described

above should ideally consist of additional 50 mm max. crushed limestone sub-base, placed in maximum 150 mm thick lifts and uniformly compacted to 98% of SPMDD. Pre-approved engineered clay fill can also be used to raise grades and should be placed in maximum 200 mm lifts (measured uncompacted), moisture conditioned to 0 to +3% of optimum moisture content, and compacted with a sheepsfoot roller to 95% of SPMDD. Clay fill should not be placed over granular fill.

6. All granular fill materials should meet the grading and durability specifications of City of Winnipeg Construction Specifications, Section CW3110.
7. AT pavements will be subject to seasonal vertical movements related to frost, as well as swelling / shrinkage due to wetting and drying cycles. The effects of seasonal movements can be reduced through the use of appropriate drainage, and repairing pavement surface defects promptly (i.e. seal cracks, patch potholes, and repair subgrade if necessary).
8. Drainage slopes are recommended and should direct overland drainage away from the AT route at a minimum slope of 3% for landscaped areas.

5.0 TESTING AND CONSTRUCTION MONITORING

The subgrade preparation recommendations presented within this memo are based on the assumptions that an adequate level of construction monitoring will be provided during construction, and that construction will be undertaken in accordance with all applicable City of Winnipeg standards, and applicable codes and regulations. Construction should be performed according to generally accepted industry standards of care. An adequate level of construction monitoring for this project is considered to be:

1. For earthworks and pavement: - Full-time monitoring and compaction testing.

2. For concrete construction: - Testing of plastic and hardened concrete in accordance with CSA A23.1 and A23.2.

Amec Foster Wheeler can provide earthworks inspection services and CSA-certified concrete testing services on request. Amec Foster Wheeler would be pleased to provide further information that may be needed during design and to advise on the geotechnical aspects of specifications for inclusion in contract documents.

6.0 CLOSURE

The findings and recommendations of this memo were based on the results of field and laboratory investigations, combined with an interpolation of soil and groundwater conditions between test hole locations. If conditions are encountered that appear to be different from those shown by the test holes drilled at this site and described in this memo, or if the assumptions stated herein are not in keeping with the design, this office should be notified in order that the recommendations can be reviewed and adjusted, if necessary.

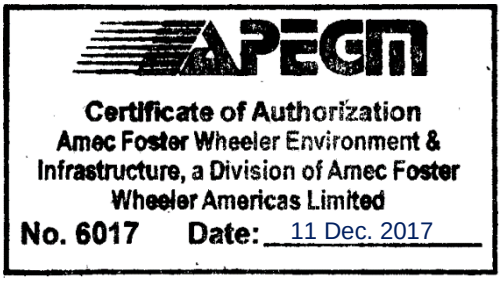
The site investigation was conducted for the sole purpose of identifying geotechnical conditions at the project site. Although no environmental issues were identified during the fieldwork, this does not indicate that no such issues exist. If the owner or other parties have any concern regarding the presence of environmental issues, then an appropriate level environmental assessment should be conducted.

Soil conditions, by their nature, can be highly variable across a site. The placement of fill and prior construction activities on a site can contribute to the variability especially for near-surface soil conditions. A contingency should always be included in any construction budget to allow for the possibility of variation in soil conditions, which may result in modification of the design and construction procedures.

This memo was prepared exclusively for WSP Canada Group Limited and their agents for the proposed development as described in the memo. The data and recommendations provided herein should not be used for any other purpose, or by any other parties, without review and written advice from Amec Foster Wheeler. The findings and recommendations of this memo were prepared in accordance with generally accepted professional engineering principles and practice. No other warranty, expressed or implied, is given.

Yours truly,

Amec Foster Wheeler Environment & Infrastructure,
A division of Amec Foster Wheeler Americas Limited



Robert Brown, P. Eng.
Geotechnical Engineer

Attachments: Figure 1 – Test Hole Location Plan
Figures 2 to 12 – Test Hole Logs
Figure 13 – Photo of TH11 Core

LEGEND:

TEST HOLE

REVISION	BY	DATE
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CLIENT: WSP

Amec Foster Wheeler
Environment & Infrastructure
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amec foster wheeler

DWN BY:	MD
CHK'D BY:	RB
DATUM:	NAD83
PROJECTION:	UTM Zone 14 U
SCALE:	AS SHOWN

GEOTECHNICAL INVESTIGATION
PROPOSED CHIEF PEGUIS GREENWAY EXTENSION
WINNIPEG, MANITOBA

TEST HOLE LOCATION PLAN

DATE:	NOVEMBER 2017
PROJECT NO:	WX18381
REV. NO.:	A
FIGURE NO:	FIGURE 1

P:\JOBS\18300'S\18380\18381 WSP – CHIEF PEGUIS GREENWAY EXTENSION\DRAWINGS\WX18381.DWG

PROJECT: Chief Pegius Trail Greenway Extension	DRILLED BY: Maple Leaf Drilling Ltd.	BORE HOLE NO: **TH01**
CLIENT: WSP Canada Group Limited	DRILL TYPE: Track Mounted Geoprobe 7822DT	PROJECT NO: WX18381
LOCATION: Chief Pegius at Kildonan Bridge	DRILL METHOD: 125 mm SSA	ELEVATION:

SAMPLE TYPE: Shelby Tube; No Recovery; SPT (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Drill Cuttings; Grout; Slough; Sand

Depth (m)	SOIL SYMBOL	MUSCS	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	Depth (m)
0			Concrete Pavement - 75mm thick					0
		GP	GRAVEL (FILL) - 150mm thick, trace sand, poorly graded, fine to coarse grained, damp, compact (inferred), light brown (crushed limestone)		1			
			CLAY - silty, trace sand, trace gravel, high plastic, mottled black/grey, occasional silt inclusions - frozen to 0.6m		2			
			- moist, very stiff, brown below 0.6m		3			
1		CH						1
					4			
			- stiff below 2.0m					
2					5			2
			TEST HOLE TERMINATED AT 2.1m BELOW GRADE. NOTES: - No sloughing was observed during drilling. - No seepage was observed during drilling. - Test hole remained open to 2.1m with no groundwater accumulation within 5 minutes of completion. - Test hole was backfilled with auger cuttings and bentonite. Asphalt cold patch was used for surface repair.					
3								3
4								

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LOGGED BY: DC	COMPLETION DEPTH: 2.1 m
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Figure No. 2	Page 1 of 1

PROJECT: Chief Pegius Trail Greenway Extension	DRILLED BY: Maple Leaf Drilling Ltd.	BORE HOLE NO: **TH02**
CLIENT: WSP Canada Group Limited	DRILL TYPE: Track Mounted Geoprobe 7822DT	PROJECT NO: WX18381
LOCATION: Chief Pegius at Kildonan Bridge	DRILL METHOD: 125 mm SSA	ELEVATION:

SAMPLE TYPE: Shelby Tube; No Recovery; SPT (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Drill Cuttings; Grout; Slough; Sand

▲ UNCONFINED COMPRESSION (kPa) ▲ 100 200 300 400

■ POCKET PENETROMETER (kPa) ■ 100 200 300 400

PLASTIC M.C. LIQUID 20 40 60 80

Depth (m)	SOIL SYMBOL	MUSCS	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	Depth (m)
0			Concrete Pavement - 90mm thick					0
		GP	GRAVEL (FILL) - 90mm thick, trace sand, poorly graded, fine to coarse grained, damp, compact (inferred), light brown (crushed limestone)		1			
			CLAY - silty, trace sand, high plastic, moist, stiff, mottled black/greyish brown					
			- trace gravel, very stiff, greyish brown below 0.6m		2			
1		CH						1
			- brown, occasional silt inclusions below 1.4m		3			
2			- mottled brown, occasional silt lenses (~ 1mm thick) below 2.0m		4			2
			TEST HOLE TERMINATED AT 2.1m BELOW GRADE.					
			NOTES:					
			- No sloughing was observed during drilling.					
			- No seepage was observed during drilling.					
			- Test hole remained open to 2.1m with no groundwater accumulation within 5 minutes of completion.					
			- Test hole was backfilled with auger cuttings and bentonite. Asphalt cold patch was used for surface repair.					
3								3
4								

WX18381 - CPT GREENWAY EXTENSION.GPJ 17-12-11 09:17 PM (GEOTECHNICAL - REVISED)

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Winnipeg, Manitoba

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REVIEWED BY: RB	COMPLETION DATE: 4 December 2017
Figure No. 3	Page 1 of 1

PROJECT: Chief Pegius Trail Greenway Extension	DRILLED BY: Maple Leaf Drilling Ltd.	BORE HOLE NO: **TH03**
CLIENT: WSP Canada Group Limited	DRILL TYPE: Track Mounted Geoprobe 7822DT	PROJECT NO: WX18381
LOCATION: Chief Pegius at Kildonan Bridge	DRILL METHOD: 125 mm SSA	ELEVATION:

SAMPLE TYPE: Shelby Tube; No Recovery; SPT (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Drill Cuttings; Grout; Slough; Sand

Depth (m)	SOIL SYMBOL	MUSCS	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	Depth (m)
0			CLAY - silty, trace sand, trace gravel, high plastic, dark grey to black, occasional light brown silt inclusions and lenses - frozen to 0.6m		1			0
			- moist, very stiff, brown below 0.6m		2			
1		CH						1
			- occasional silt inclusions below 1.4m		3			
2			- stiff below 2.0m		4			2
			TEST HOLE TERMINATED AT 2.1m BELOW GRADE. NOTES: - No sloughing was observed during drilling. - No seepage was observed during drilling. - Test hole remained open to 2.1m with no groundwater accumulation within 5 minutes of completion. - Test hole was backfilled with auger cuttings and bentonite.					
3								3
4								

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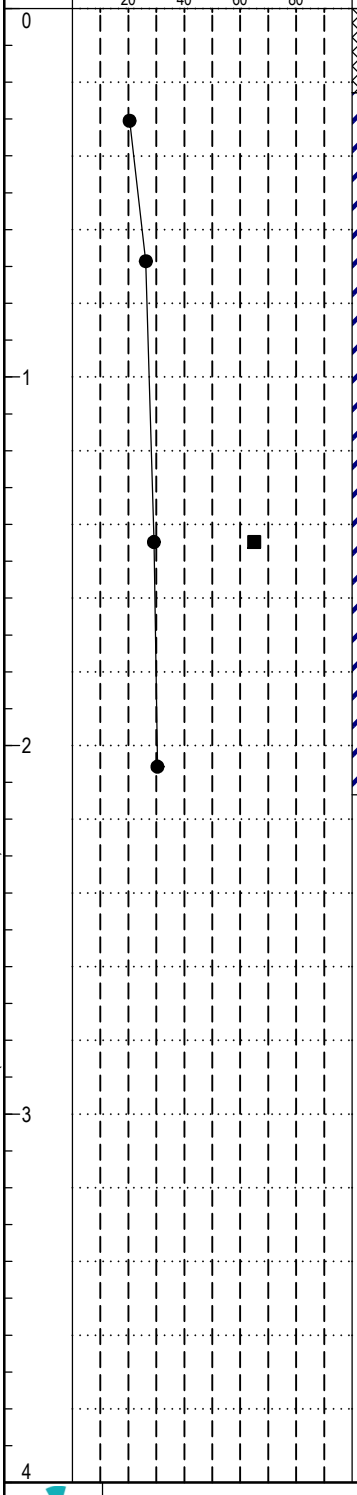
Figure No. 4	Page 1 of 1

PROJECT: Chief Pegius Trail Greenway Extension	DRILLED BY: Maple Leaf Drilling Ltd.	BORE HOLE NO: **TH04**
CLIENT: WSP Canada Group Limited	DRILL TYPE: Track Mounted Geoprobe 7822DT	PROJECT NO: WX18381
LOCATION: Chief Pegius at Kildonan Bridge	DRILL METHOD: 125 mm SSA	ELEVATION:

SAMPLE TYPE: Shelby Tube; No Recovery; SPT (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Drill Cuttings; Grout; Slough; Sand



SOIL SYMBOL	MUSCS	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	Depth (m)
	GP	GRAVEL (FILL) - 230mm thick, some sand, poorly graded, fine to coarse grained, damp, compact (inferred), light brown (limestone)					
	CH	CLAY - silty, trace sand, trace gravel, high plastic, dark brownish grey, occasional silt inclusions and lenses - frozen to 0.6m		1			
		- moist, very stiff, black below 0.6m		2			
		- mottled brown, occasional oxidized inclusions below 1.4m		3			
				4			
		TEST HOLE TERMINATED AT 2.1m BELOW GRADE. NOTES: - No sloughing was observed during drilling. - No seepage was observed during drilling. - Test hole remained open to 2.1m with no groundwater accumulation within 5 minutes of completion. - Test hole was backfilled with auger cuttings and bentonite.					

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WX18381 - CPT GREENWAY EXTENSION.GPJ 17-12-11 09:17 PM (GEOTECHNICAL - REVISED)

PROJECT: Chief Pegius Trail Greenway Extension	DRILLED BY: Maple Leaf Drilling Ltd.	BORE HOLE NO: **TH05**
CLIENT: WSP Canada Group Limited	DRILL TYPE: Track Mounted Geoprobe 7822DT	PROJECT NO: WX18381
LOCATION: Chief Pegius at Kildonan Bridge	DRILL METHOD: 125 mm SSA	ELEVATION:

SAMPLE TYPE: Shelby Tube; No Recovery; SPT (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Drill Cuttings; Grout; Slough; Sand

▲ UNCONFINED COMPRESSION (kPa) ▲ 100 200 300 400

■ POCKET PENETROMETER (kPa) ■ 100 200 300 400

PLASTIC M.C. LIQUID 20 40 60 80

Depth (m)	SOIL SYMBOL	MUSCS	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	Depth (m)
0		GP	GRAVEL (FILL) - 230mm thick, trace sand, poorly graded, fine to coarse grained, damp, compact (inferred), light brown (limestone)		1			0
			CLAY - silty, trace sand, trace gravel, high plastic, dark brownish grey, occasional silt inclusions - frozen to 0.6m		2			
			- moist, very stiff below 0.6m		3			
1		CH						1
			- greyish brown below 1.4m		4			
2					5			2
			TEST HOLE TERMINATED AT 2.1m BELOW GRADE. NOTES: - No sloughing was observed during drilling. - No seepage was observed during drilling. - Test hole remained open to 2.1m with no groundwater accumulation within 5 minutes of completion. - Test hole was backfilled with auger cuttings and bentonite.					
3								3
4								

WX18381 - CPT GREENWAY EXTENSION.GPJ 17-12-11 09:17 PM (GEOTECHNICAL - REVISED)

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Winnipeg, Manitoba

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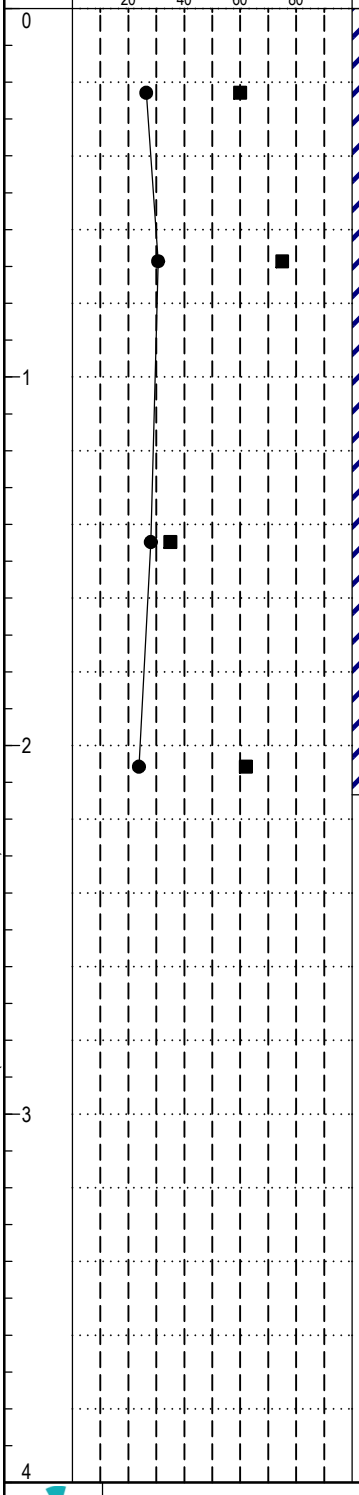
Figure No. 6	Page 1 of 1

PROJECT: Chief Pegius Trail Greenway Extension	DRILLED BY: Maple Leaf Drilling Ltd.	BORE HOLE NO: **TH06**
CLIENT: WSP Canada Group Limited	DRILL TYPE: Track Mounted Geoprobe 7822DT	PROJECT NO: WX18381
LOCATION: Chief Pegius at Kildonan Bridge	DRILL METHOD: 125 mm SSA	ELEVATION:

SAMPLE TYPE: Shelby Tube; No Recovery; SPT (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Drill Cuttings; Grout; Slough; Sand



Depth (m)	SOIL SYMBOL	MUSCS	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	Depth (m)
0			CLAY - silty, trace sand, trace gravel, high plastic, moist, very stiff, grey, occasional to frequent silt inclusions, occasional roots to 0.1m		1			0
1		CH	- frequent to abundant silt inclusions and lenses (~150mm thick) below 1.4m		2			1
2					3			2
					4			
			TEST HOLE TERMINATED AT 2.1m BELOW GRADE. NOTES: - No sloughing was observed during drilling. - No seepage was observed during drilling. - Test hole remained open to 2.1m with no groundwater accumulation within 5 minutes of completion. - Test hole was backfilled with auger cuttings and bentonite.					
3								3
4								

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Winnipeg, Manitoba

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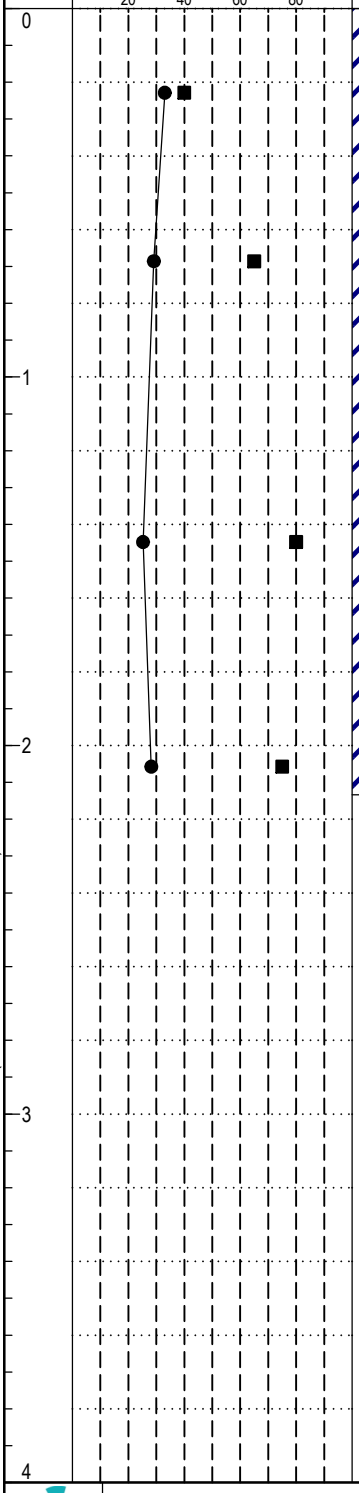
Figure No. 7	Page 1 of 1

PROJECT: Chief Pegius Trail Greenway Extension	DRILLED BY: Maple Leaf Drilling Ltd.	BORE HOLE NO: **TH07**
CLIENT: WSP Canada Group Limited	DRILL TYPE: Track Mounted Geoprobe 7822DT	PROJECT NO: WX18381
LOCATION: Chief Pegius at Kildonan Bridge	DRILL METHOD: 125 mm SSA	ELEVATION:

SAMPLE TYPE: Shelby Tube; No Recovery; SPT (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Drill Cuttings; Grout; Slough; Sand



Depth (m)	SOIL SYMBOL	MUSCS	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	Depth (m)
0			CLAY - silty, trace sand, trace gravel, high plastic, moist, stiff to very stiff, grey, occasional to frequent silt inclusions, occasional roots to 0.1m		1			0
			- very stiff below 0.6m		2			
1		CH			3			1
2			- occasional sulphate inclusions below 2.0m		4			2
			TEST HOLE TERMINATED AT 2.1m BELOW GRADE.					
3			NOTES: - No sloughing was observed during drilling. - No seepage was observed during drilling. - Test hole remained open to 2.1m with no groundwater accumulation within 5 minutes of completion. - Test hole was backfilled with auger cuttings and bentonite.					3
4								

Amec Foster Wheeler Environment & Infrastructure
Winnipeg, Manitoba

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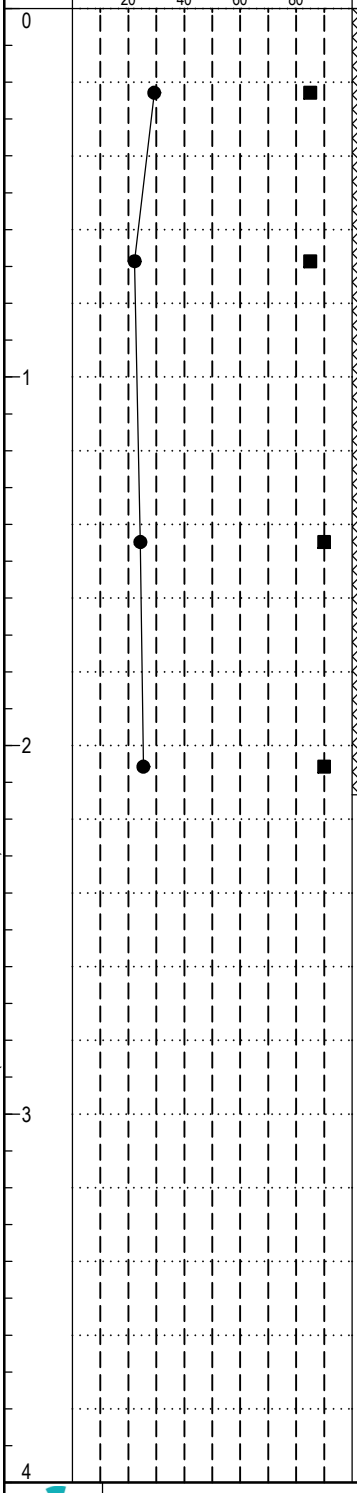
REVIEWED BY: RB	COMPLETION DATE: 4 December 2017
Figure No. 8	Page 1 of 1

PROJECT: Chief Pegius Trail Greenway Extension	DRILLED BY: Maple Leaf Drilling Ltd.	BORE HOLE NO: **TH08**
CLIENT: WSP Canada Group Limited	DRILL TYPE: Track Mounted Geoprobe 7822DT	PROJECT NO: WX18381
LOCATION: Chief Pegius at Kildonan Bridge	DRILL METHOD: 125 mm SSA	ELEVATION:

SAMPLE TYPE: Shelby Tube; No Recovery; SPT (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Drill Cuttings; Grout; Slough; Sand



SOIL SYMBOL	MUSCS	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	Depth (m)
	CH	CLAY (FILL) - silty, trace sand, trace gravel, high plastic, moist, very stiff, grey, occasional silt inclusions, occasional roots to 0.1m		1			0
				2			
		- frequent silt inclusions below 1.4m		3			1
		- occasional oxidized inclusions below 2.0m		4			2
		TEST HOLE TERMINATED AT 2.1m BELOW GRADE.					
		NOTES: - No sloughing was observed during drilling. - No seepage was observed during drilling. - Test hole remained open to 2.1m with no groundwater accumulation within 5 minutes of completion. - Test hole was backfilled with auger cuttings and bentonite.					3

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LOGGED BY: DC	COMPLETION DEPTH: 2.1 m
REVIEWED BY: RB	COMPLETION DATE: 4 December 2017
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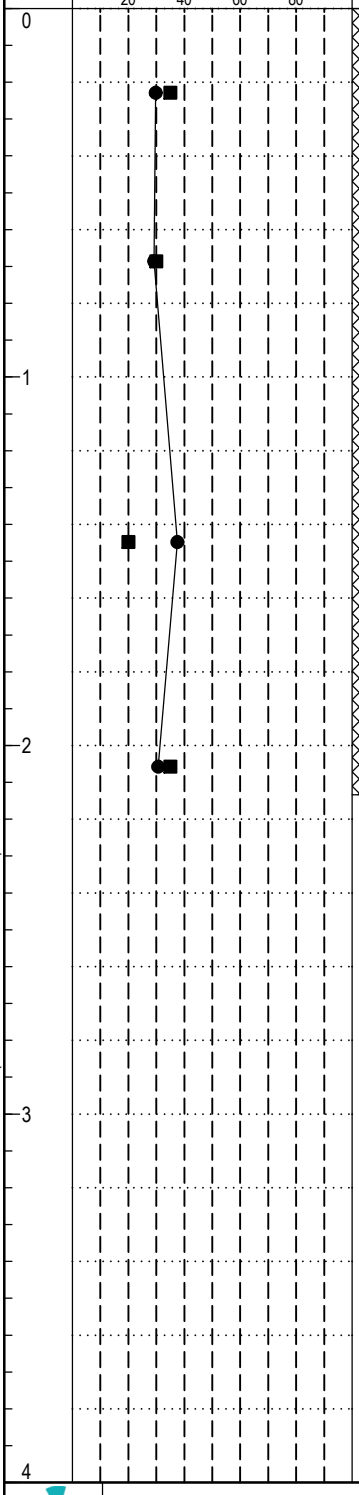
PROJECT: Chief Pegius Trail Greenway Extension	DRILLED BY: Maple Leaf Drilling Ltd.	BORE HOLE NO: **TH09**
CLIENT: WSP Canada Group Limited	DRILL TYPE: Track Mounted Geoprobe 7822DT	PROJECT NO: WX18381
LOCATION: Chief Pegius at Kildonan Bridge	DRILL METHOD: 125 mm SSA	ELEVATION:

SAMPLE TYPE: Shelby Tube; No Recovery; SPT (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Drill Cuttings; Grout; Slough; Sand



Depth (m)	SOIL SYMBOL	MUSCS	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	Depth (m)
0			CLAY (FILL) - silty, trace sand, trace gravel, high plastic, moist, stiff, grey, occasional silt inclusions, occasional roots to 0.1m		1			0
1		CH			2			1
2					3			2
3					4			3
4			TEST HOLE TERMINATED AT 2.1m BELOW GRADE. NOTES: - No sloughing was observed during drilling. - No seepage was observed during drilling. - Test hole remained open to 2.1m with no groundwater accumulation within 5 minutes of completion. - Test hole was backfilled with auger cuttings and bentonite.					

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LOGGED BY: DC	COMPLETION DEPTH: 2.1 m
REVIEWED BY: RB	COMPLETION DATE: 4 December 2017
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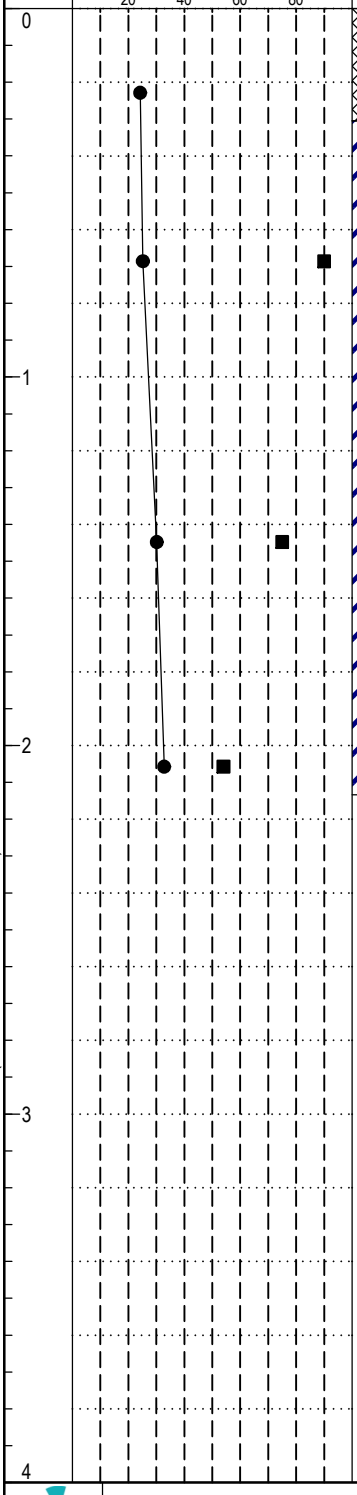
WX18381 - CPT GREENWAY EXTENSION.GPJ 17-12-11 09:17 PM (GEOTECHNICAL - REVISED)

PROJECT: Chief Pegius Trail Greenway Extension	DRILLED BY: Maple Leaf Drilling Ltd.	BORE HOLE NO: **TH10**
CLIENT: WSP Canada Group Limited	DRILL TYPE: Track Mounted Geoprobe 7822DT	PROJECT NO: WX18381
LOCATION: Chief Pegius at Kildonan Bridge	DRILL METHOD: 125 mm SSA	ELEVATION:

SAMPLE TYPE: Shelby Tube; No Recovery; SPT (N); Grab Sample; Split-Pen; Core

BACKFILL TYPE: Bentonite; Pea Gravel; Drill Cuttings; Grout; Slough; Sand



Depth (m)	SOIL SYMBOL	MUSCS	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	Depth (m)
0		OH	ORGANIC CLAY (FILL) - silty, trace sand, trace gravel, high plastic, frozen, brown, frequent roots and wood pieces		1			0
			CLAY - silty, trace sand, high plastic, moist, very stiff, grey, occasional silt inclusions and lenses		2			
1		CH	- mottled grey/brown below 1.4m		5			1
2			- occasional to frequent silt inclusions and laminations (up to ~2mm thick) below 2.0m		4			2
			TEST HOLE TERMINATED AT 2.1m BELOW GRADE. NOTES: - No sloughing was observed during drilling. - No seepage was observed during drilling. - Test hole remained open to 2.1m with no groundwater accumulation within 5 minutes of completion. - Test hole was backfilled with auger cuttings and bentonite.					3

WX18381 - CPT GREENWAY EXTENSION.GPJ 17-12-11 09:17 PM (GEOTECHNICAL - REVISED)

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LOGGED BY: DC	COMPLETION DEPTH: 2.1 m
REVIEWED BY: RB	COMPLETION DATE: 4 December 2017
Figure No. 11	Page 1 of 1

PROJECT: Chief Pegius Trail Greenway Extension	DRILLED BY: Maple Leaf Drilling Ltd.	BORE HOLE NO: **TH11**
CLIENT: WSP Canada Group Limited	DRILL TYPE: Track Mounted Geoprobe 7822DT	PROJECT NO: WX18381
LOCATION: Chief Pegius at Kildonan Bridge	DRILL METHOD: 150mm Core Barrel	ELEVATION:

SAMPLE TYPE: Shelby Tube | No Recovery | SPT (N) | Grab Sample | Split-Pen | Core

BACKFILL TYPE: Bentonite | Pea Gravel | Drill Cuttings | Grout | Slough | Sand

Depth (m)	▲UNCONFINED COMPRESSION (kPa)▲ 100 200 300 400 ■POCKET PENETROMETER (kPa)■ 100 200 300 400 PLASTIC M.C. LIQUID 20 40 60 80	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	Depth (m)
0			ASPHALT - 68mm thick CONCRETE - 225mm thick		1			0
1								1
2								2
3								3
4								4

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LOGGED BY: DC | COMPLETION DEPTH: 0.3 m
REVIEWED BY: RB | COMPLETION DATE: 4 December 2017
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WX18381 - CPT GREENWAY EXTENSION.GPJ 17-12-11 09:17 PM (GEOTECHNICAL - REVISED)

amec foster wheeler **Amec Foster Wheeler** **Environment & Infrastructure**		**Core Photograph, TH11** **Geotechnical Investigation** **Chief Peguis Greenway Extension** **Winnipeg, Manitoba**		
WSP CANADA GROUP LIMITED				
Drawn: RB	Scale: NTS	Date: Dec. 2017	Project No.: WX18381	Figure: 13