Template Version: C420160226 - RW

APPENDIX 'A' GEOTECHNICAL REPORT



To Vilko Maroti, P. Eng. From Robert Brown, P. Eng.

Company WSP Canada Group Limited Telephone +1 (204) 488-2997

By Email Daniel.Suh@wsp.com Fax +1 (204) 489-8261

Project No. WX18381 Pages 19

Date 11 December 2017

Copies

Geotechnical Investigation

Chief Peguis Greenway Extension

Subject 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

WX18381 WSP - Chief Peguis Greenway Extension Active Transport.docx Amec Foster Wheeler Environment & Infrastructure A Division of AMEC Foster Wheel Americas Limited 440 Dovercourt Drive Winnipeg, Manitoba Canada R3Y 1N4 Geotechnical Investigation Chief Peguis Greenway Winnipeg, Manitoba Page 2 of 6

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

Asphalt Pavement and Concrete Pavement

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,

Geotechnical Investigation Chief Peguis Greenway Winnipeg, Manitoba Page 3 of 6

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

Geotechnical Investigation Chief Peguis Greenway Winnipeg, Manitoba Page 4 of 6

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

Geotechnical Investigation Chief Peguis Greenway Winnipeg, Manitoba Page 5 of 6

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. Preapproved 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.

Geotechnical Investigation Chief Peguis Greenway Winnipeg, Manitoba Page 6 of 6

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

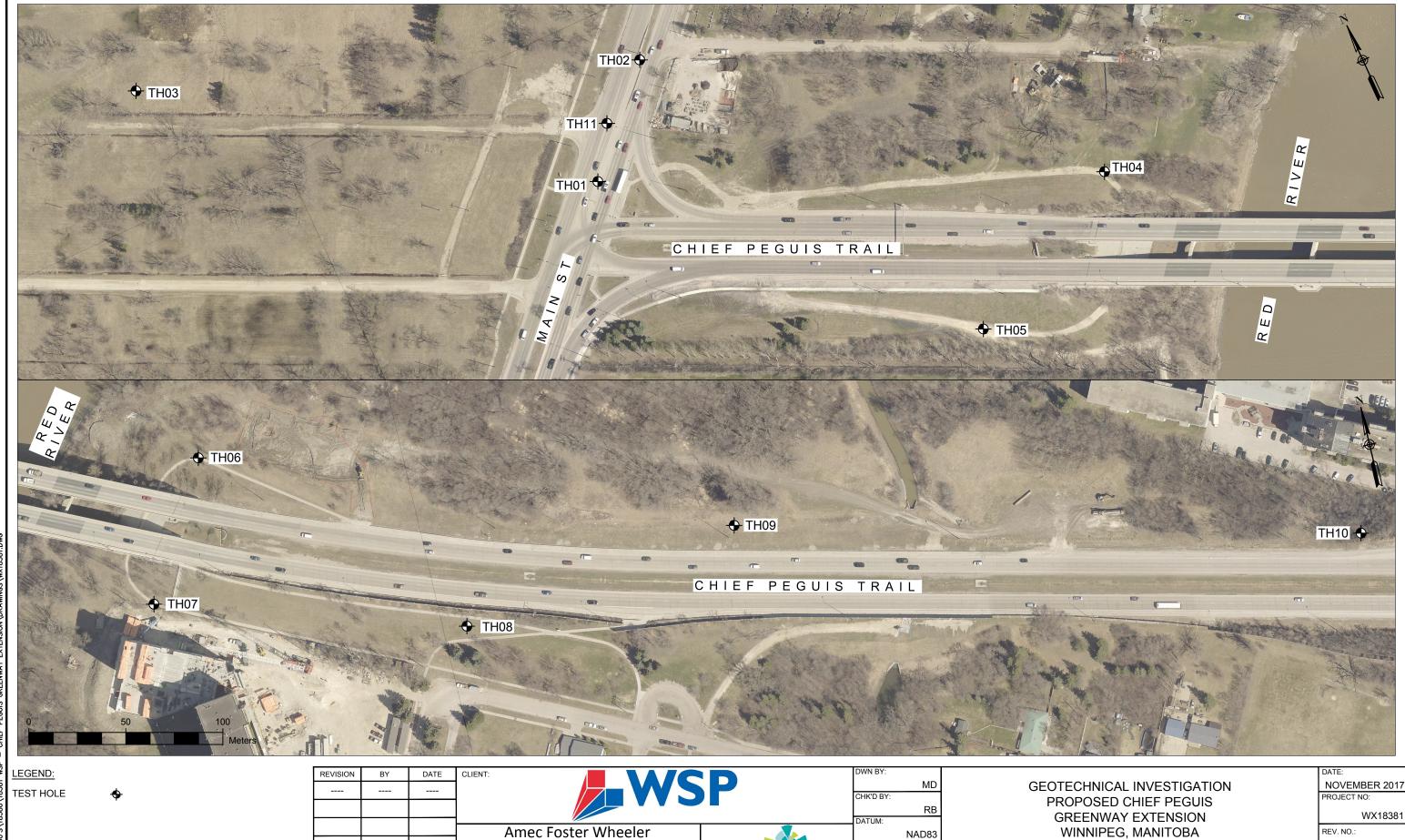
Attachments: Figure 1 – Test Hole Location Plan

Figures 2 to 12 – Test Hole Logs

Figure 13 - Photo of TH11 Core

Certificate of Authorization
Amec Foster Wheeler Environment &
Infrastructure, a Division of Amec Foster
Wheeler Americas Limited

No. 6017 Date: 11 Dec. 2017



UTM Zone 14 U

AS SHOWN

amec foster wheeler FIGURE NO:

FIGURE 1

TEST HOLE LOCATION PLAN

Environment & Infrastructure
440 DOVERCOURT DRIVE

WINNIPEG, MANITOBA R3Y 1N4

PHONE: 204.488.2997 FAX:204.489.8261

0.) IODC/10700/0200/10700/ 40700/ 10700/ 10700/ 10700/ 10700/ 10700/ 10700/ 10700/ 10700/ 10700/ 10700/ 10700/

				<u> </u>							
	CT: Chief Pegius		y Exte		RILLED BY: Maple		. =0=	-		HOLE NO: TH01	
	T: WSP Canada	<u> </u>			RILL TYPE: Track I	· ·	be 7822DT	_		ECT NO: WX18381	
	ION: Chief Pegil	US at Kildonan B	ridge	No Recovery	RILL METHOD: 125		ıb Sample		=LEV <i>F</i> Split-Pe	ATION: n	
	E TYPE ILL TYPE	Bentonite		Pea Gravel	Drill Cuttin		<u>.</u>		Slough	Sand	
	ILL IYPE ▲ UNCONFINED COMPF			Pea Graver		gs []GIO	out	<u>ши</u> ч	l	<u></u> Sanu	1
Depth (m)	100 200 3 ■ POCKET PENETROI 100 200 3 PLASTIC M.C.	000 400 METER (kPa) ■ 000 400	MUSCS		SOIL DESCRIP		SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	Depth (m)
- CPT GREENWAY EXTENSION.GPJ 17-12-11 09:17 PM (GEOTECHNICAL - REVISED) - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1			GP	GRAVEL (FILL) coarse grained, \limestone) CLAY - silty, tra black/grey, occ - frozen to 0.6m - moist, very sti - stiff below 2.0 TEST HOLE TE NOTES: - No sloughing No seepage w - Test hole rem accumulation w - Test hole was	ff, brown below 0.6m	RELOW GRADE. drilling. rilling. ith no groundwater npletion. cuttings and bento	ed, fine to crushed led	1 2 3			- - - - - - - - - - - - - - - - - - -
or Greenway extensio											- - -
4						LOGGED BY: D	DC		OMPL	 ETION DEPTH: 2.1 m	<u> </u>
8381	Amec			ironment & Infi	rastructure	REVIEWED BY:		_		ETION DET 111. 2.1111 ETION DATE: 4 December 20	17
WX18381		Wini	nipeg,	Manitoba		Figure No. 2					1 of 1
										<u> </u>	

PROJ	ECT: Chief Pegi	us Trail Gree	enway	Exte	nsion	DRILLE	ED BY: M	aple Le	af Drilling Ltd.			E	BORE	HOLE NO: TH02	
CLIEN	NT: WSP Canada	a Group Limi	ted			DRILL	TYPE: Tr	ack Mo	unted Geopro	be 7822D	Γ	F	PROJE	ECT NO: WX18381	
LOCA	TION: Chief Peg	jius at Kildon	an Bri	dge		DRILL	METHOD:	125 n	nm SSA					ATION:	
SAMF	PLE TYPE	Shelby T	ube		No Recove	ery	SPT			ab Sample			Split-Pe		
BACK	FILL TYPE	Bentonite	,		Pea Grave	l	Drill (Cuttings	Gro	out			Slough	Sand	
Depth (m)	A UNCONFINED COM 100 200 POCKET PENETR 100 200 PLASTIC M.C	300 400 OMETER (kPa) ■ 300 400	SOIL SYMBOL	MUSCS			S DESC	OIL RIPT	ION		SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	Depth (m)
WX18381 - CPT GREENWAY EXTENSION.GPJ 17-12-11 09:17 PM (GEOTECHNICAL - REVISED)		60 80		GP CH	- mottled br TEST HOLI NOTES: No slough Test hole accumulatic	FILL) - 90 ned, dan v, trace s sh brown el, very s casional own, occ TERMI ing was ge was o remained on within was back	omm thick, to the property of	astic, m brown l brown l brown l brown l castic mastic, m	v 1.4m 1.4m LOW GRADE. Iling. ing. no groundwater etion. ittings and bento	elow 2.0m		1 2 3			- - - - - - - - - - - - - - - - - - -
(TENSION.GPJ 17-12-1															-
CPT GREENWAY EX												1 -			- -
-188	Amec Foster Wheeler Environment & Infras								LOGGED BY: [-		ETION DEPTH: 2.1 m	17
X1X	Winnipeg, Manitoba							-	REVIEWED BY: Figure No. 3	. KB			UIVIPL	ETION DATE: 4 December 20	17 1 of 1
≤									i igui c INO. 3					rage	ı Ul l

-		Γ: Chief					Exte	nsion	+	LED BY: N	•				-		HOLE NO: TH03	
		WSP Ca											oprobe 782	2DT	-		ECT NO: WX18381	
_		N: Chief	Pegi				dge			L METHOD							ATION:	
		TYPE			nelby 1			No Recov		⊠SP1			Grab Sampl	е		Split-Pe		
BAC	-	L TYPE			entonit		1	Pea Grav	el	Drill	Cuttings		Grout	J		Slough	Sand	
Depth (m)		POCKET PE	00 ; ENETRO	300 A DMETER (300 A	400	ᆜᅥ	MUSCS			DESC	SOIL SRIPT	ION		SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	Depth (m)
- - - - - - - - -	- froze									sand, trace ight brown s prown below	0.6m	igh plastic, ons and len	dark grey to		2			- - - - - - - - - -
WX18381 - CPT GREENWAY EXTENSION. GPJ 17-12-11 09:17 PM (GEOTECHNICAL - REVISED)	- stiff be TEST H NOTES - No slo - No see - Test h accumu - Test he									MINATED AT s observed observed di ed open to 2 in 5 minutes ickfilled with	during dri uring drill 2.1m with of comp	lling. ing. no groundv letion.	water		4			- - - - - - - - - - - - - -
CPT GREENWAY EXTENSION.GPJ 17-12-1																		- - - - -
91-(Amed	Fost	er W	heeler	Env	ironment 8	Infras	structure	-	LOGGED B			-		ETION DEPTH: 2.1 m	47
X183	Amec Foster Wheeler Environment & Infrastructu Winnipeg, Manitoba							-	REVIEWED			<u> </u>	OMPL	ETION DATE: 4 December 20				
``												Figure No. 4	4				Page	1 of 1

PROJ	JEC	T: C	hief	Pe	egiu	ıs	Tra	il G	ree	nwa	ay I	Exter	nsion		DRI	LLED	BY: I	Maple Le	eaf Drillin	ng Ltd.			I	BORE	HOLE NO: THO	ļ	
CLIEN								•						-							e 7822D	Γ	I	PROJI	ECT NO: WX183	31	
LOCA				ef P	egi	ius					3ric	lge							mm SSA						ATION:		
SAMF							=-		у Ті					Recove			SP				Sample			Split-Pe			
BACK									onite				Pea	Grave			☑Dri	l Cuttings	i	Grou	t	1	<u> </u>	Slough	∵ :]Sa	ınd	1
Depth (m)		PLAS	KET F	200 PENE 200	ETRO	300	TER	400	a) II		SOIL STIMBUL	MUSCS				С		SOIL CRIPT	ION			SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMEN	TS	Depth (m)
0		 	 	1	 	T	 				\bigotimes	GP	GRAV coarse	/EL (F e grair	TLL) - ned, (- 230m damp,	nm thicl compa	k, some s ct (inferre	sand, poo ed), light	orly grade brown (lir	d, fine to mestone)						-
-			 	 	 		 	 	 				GLAY grey, - froze	occas	ional	ce sand silt ind	d, trace clusions	gravel, h and len	nigh plast ses	ic, dark b	prownish		1				-
-				+	.j - - - -	·		·					- mois	t, very	y stiff	, black	c below	0.6m					2				- - -
-1 - -	CH - n									СН															-1 - -		
-	- "										- mott	led bro	own,	occas	ional o	kidized in	clusions	below 1.4	4m		3				- - -		
- - -2 -			•	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	. .	1 - 1 - 1 - 1 - 1	 	. - - - - -	l. 						E TEF	RMINA	ATED A	T 2.1m E	BELOW G	SRADE.			4				- - -2 -
WX18381 - CPT GREENWAY EXTENSION.GPJ 17-12-11 09:17 PM (GEOTECHNICAL - REVISED)										- No s - Test accun	loughi eepag hole r nulatio	ge wa rema on wit	as obsoined o thin 5 r	erved di pen to i minutes	of comp	ling. no grou letion.	ndwater nd benton	ite.						- - -			
-12-11 09:17 PM (GEO																											- -3 -
EXTENSION.GPJ 17			 		 		 	 																			- - -
- CPT GREENWAY	Amas Fastan Milas La Fastan and C																	T	I OCCE) DV: D				OMD	ETION DEDTIL 2.4		-
8381.	Amec Foster Wheeler Environment & Infi Winnipeg, Manitoba								Infra	astru	cture	-		D BY: DO 'ED BY:			-		ETION DEPTH: 2.1 ETION DATE: 4 De)17						
WX 7										Win	nip	eg,	Manito	ba				- H	Figure N				1				1 of 1

		_	I					
	ECT: Chief Pegius Trail	•		: Maple Leaf Drilling Ltd.		+	HOLE NO: TH05	
	IT: WSP Canada Group			: Track Mounted Geoprobe 7822D	Т		ECT NO: WX18381	
-	TION: Chief Pegius at k			IOD: 125 mm SSA		-	ATION:	
	<u>=</u>	nelby Tube		SPT (N) Grab Sample		Split-Pe		
BACK		entonite	Pea Gravel	Drill Cuttings Grout	<u> </u>	Slough	Sand I	1
Depth (m)	PLASTIC M.C. LIQU	400 (kPa) ■ 400 SSQNW	DES	SOIL SCRIPTION	SAMPLE TYPE	SPT (N)	COMMENTS	Depth (m)
0 - -	20 40 00 1	GP	coarse grained, damp, com	hick, trace sand, poorly graded, fine to npact (inferred), light brown (limestone) ace gravel, high plastic, dark brownish ons		1		-
- - -			- frozen to 0.6m - moist, very stiff below 0.6			3		- - -
- 1 -		CH						- - -1 -
- - -			- greyish brown below 1.4n	n		1		- - -
- - -2 -			TEST HOLE TERMINATED	D AT 2.1m BELOW GRADE.		5		- 2 -
CHNICAL - REVISED)			accumulation within 5 minu	d during drilling. to 2.1m with no groundwater				-
- CPT GREENWAY EXTENSION.GPJ 17-12-11 09:17 PM (GEOTECHNICAL - REVISED)								- - -3 -
TENSION.GPJ 17-12								- - -
PT GREENWAY EXT								- - -
21-0	Amos Fost	er Wheeler Envi	ronment & Infrastructur	LOGGED BY: DC			ETION DEPTH: 2.1 m	
WX18381	AITIEC FUSIO	Winnipeg,		REVIEWED BY: RB		COMPL	ETION DATE: 4 December 20	
≨				Figure No. 6			Page	1 of 1

PROJEC	T: Chief Pegius Trail Gree	enway Exter	nsion	DRILLED BY: Maple	Leaf Drilling Ltd.		BORI	E HOLE NO: TH06	
CLIENT:	WSP Canada Group Limit	ted		DRILL TYPE: Track I	Mounted Geoprobe 7822	DT	PRO	JECT NO: WX18381	
LOCATIO	ON: Chief Pegius at Kildon	an Bridge		DRILL METHOD: 125	5 mm SSA		ELEV	ATION:	
SAMPLE	TYPE Shelby To	ube	☑No Recove	ery SPT (N)	Grab Sample	[∭Split-P	en Core	
BACKFIL	L TYPE Bentonite	• [Pea Grave	l Drill Cuttin	gs Grout	[Slough	Sand	
	UNCONFINED COMPRESSION (kPa) 100 200 300 400 ■ POCKET PENETROMETER (kPa) ■ 100 200 300 400 PLASTIC M.C. LIQUID	SOIL SYMBOL MUSCS		SOIL DESCRIF		SAMPLE TYPE	SAMPLE NO SPT (N)	COMMENTS	Depth (m)
	20 40 60 80	~	grey, occas 0.1m	ional to frequent silt inclu abundant silt inclusions	, high plastic, moist, very st sions, occasional roots to		2		- - - - - - - - - -
TECHNICAL - REVISED)			NOTES: - No slough - No seepag - Test hole i accumulation	E TERMINATED AT 2.1m ing was observed during ge was observed during o remained open to 2.1m w on within 5 minutes of cor was backfilled with auger	drilling. Irilling. ith no groundwater npletion.		4		- - -2 - - - -
3601	4	.							+
3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3									3
17-1									L
WX18381 - CPT GREENWAY EXTENSION.GPJ 17-12-11 09:17 PM (GEOTECHNICAL - REVISED)									- - -
0	Amos Factor MI	nooler Fra	ronmort 0	Infractructure	LOGGED BY: DC		COMP	LETION DEPTH: 2.1 m	
1838	Amec Foster Wi	neeıer Envi Winnipeg,∣		mmasuucture	REVIEWED BY: RB		COMP	LETION DATE: 4 December 20	
\$		pcg,			Figure No. 7			Page	1 of 1

PROJEC	CT: Chief Pegiu	ıs Trail Greenway	Exte	nsion	DRILLE	ED BY: Maple	Leaf Drillin	g Ltd.		В	ORE	HOLE NO: TH07	
CLIENT	: WSP Canada	Group Limited						eoprobe 7822D	Γ	P	ROJE	ECT NO: WX18381	
LOCATI	ION: Chief Pegi	us at Kildonan Br	idge		DRILL	METHOD: 12	5 mm SSA			E	LEVA	ATION:	
SAMPLE	E TYPE	Shelby Tube		No Recove	ery	SPT (N)		Grab Sample		∭s	plit-Pe		
	ILL TYPE	Bentonite		Pea Grave	l	Drill Cuttin	igs	Grout		∭SI	lough	Sand	1
	■ POCKET PENETRO	300 400	MUSCS			SOII DESCRIF			SAMPLE TYPE	SAMPLE NO	SPT (N)	COMMENTS	Depth (m)
			СН	CLAY - silty very stiff, groots to 0.1	rey, occa m	and, trace grave sional to frequer	I, high plasti It silt inclusio	c, moist, stiff to		2			- - - - - - - - -
2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3				TEST HOLI NOTES: - No slough - No seepa - Test hole accumulatio	E TERMI ing was ge was o remained on within	e inclusions belo NATED AT 2.1nr observed during of dopen to 2.1m w 5 minutes of cor stilled with auger	n BELOW Gl drilling. drilling. vith no groun mpletion.	dwater		4			-2
4	Amed	Foster Wheele Winn		ironment & Manitoba	Infrast	ructure	_	ED BY: RB		_		ETION DEPTH: 2.1 m ETION DATE: 4 December 20	
			ı ə,				Figure No). გ				Page	1 of 1

PROJEC	CT: Chief Pegius Trail Green	way Extension	DRILLED BY: Maple	Leaf Drilling Ltd.		BORE	HOLE NO: TH08	
CLIENT:	: WSP Canada Group Limite	d	DRILL TYPE: Track I	Mounted Geoprobe 7822D	Γ	PROJ	ECT NO: WX18381	
LOCATI	ION: Chief Pegius at Kildonar	n Bridge	DRILL METHOD: 12	5 mm SSA		ELEV	ATION:	
SAMPLE	E TYPE Shelby Tub	e No Re		Grab Sample		Split-Pe		
	ILL TYPE Bentonite	Pea G	ravel Drill Cuttin	gs 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	SOIL SYMBOL MUSCS	SOII DESCRIF		SAMPLE TYPE	SPT (N)	COMMENTS	Depth (m)
		CH Very stif	FILL) - silty, trace sand, trace f, grey, occasional silt inclusi nt silt inclusions below 1.4m	gravel, high plastic, moist, ons, occasional roots to 0.1m		2		- - - - - - - - -
(GEOTECHNICAL - REVISED)		TEST H NOTES - No slo - No see - Test h accumu	onal oxidized inclusions belo OLE TERMINATED AT 2.1m gughing was observed during page was observed during oble remained open to 2.1m welation within 5 minutes of corolle was backfilled with auger	BELOW GRADE. drilling. drilling. ith no groundwater mpletion.		1		- - -2 - - - -
M9 717 PM								-3 -
								_
WX18381 - CPT GREENWAY EXTENSION. GPJ 17-12-11 09:17 PM (GEOTECHNICAL - REVISED)								- - - -
0 - 2	Amos Esster Miles	olor Environment	2 Infractruatura	LOGGED BY: DC		COMPL	ETION DEPTH: 2.1 m	
(1838	Amec Foster Whe	eier ⊑nvironmen /innipeg, Manitob		REVIEWED BY: RB		COMPL	ETION DATE: 4 December 20	
š			-	Figure No. 9			Page	1 of 1

PROJ	EC	Γ: C	hie	ef F	eg	ius	s T	rai	l G	ree	enwa	ay E	Exte	nsion		DRILLE	D BY:	Maple L	eaf Dril	ling Ltd	d.		I	BORE	HOLE NO): TH0 !	9	
CLIEN					_							,			_						obe 7822[DT	-		ECT NO:			
LOCA	TIO	N:	Chi	ef	Pe	giı	ıs	at I	Kilo	don	an E	3rid	lge			ORILL I	METHO	D: 125	mm SS	A			ı	ELEV	ATION:			
SAMP	LE	TYF	PΕ					Sł	nelb	у Ті	ube			✓ No Reco	very	y	⊠s	PT (N)		⊟ G	rab Sample			Split-Pe	n	C		
BACK								_		onite				Pea Grav	vel			rill Cutting	s	G	rout			Slough		∷iSa	and	
Depth (m)		JNCO 100 POC 100 PLA	KET	20 PEI 20) NETI	ROM 3 C.	00 ME1 00	ΓER	<u>400</u>	a) II		SOIL STIMBUL	MUSCS				DES	SOIL CRIP				SAMPLE TYPE	SAMPLE NO	SPT (N)	cc	OMMEN	TS	Depth (m)
WX18381 - CPT GREENWAY EXTENSION.GPU 17-12-11 09:17 PM (GEOTECHNICAL - REVISED) A PLANT CALL CALL CALL CALL CALL CALL CALL CAL		200		4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(4) 4(<u>80 </u>				СН	TEST HO NOTES: - No sloug - No seep - Test hole accumular - Test hole	LE ghin age e re	TERMII ng was obermained n within is	NATED Observed Soserved I open to 5 minute	AT 2.1m I during control during con	BELOW rilling. illing. h no gro pletion. zuttings a	GRADE undwate	E. er tonite.		3					
381 - (Amec Foster Wheeler Environment							11 &	nfrastr	ucture		LOGGE				-		ETION DEF			147							
X18:	Amec Foster Wheeler Environment & Infrast Winnipeg, Manitoba							_		REVIE\ Figure		r. KB		+	UIVIPL	ETION DAT	⊏: 4 De		1 of 1									
S																			i iyure i	10. 10							i aye	1 01 1

PRO	JEC	T: C	hief	Peg	gius	s Tr	rail	Gre	env	way	Exter	nsion	DRIL	LED BY:	Maple Le	eaf Drillin	g Ltd.			BORE	HOLE NO: TH10		
CLIE				_	_								DRIL	_ TYPE:	Track Mo	ounted G	eoprobe 7	822DT		PROJ	ECT NO: WX18381		
LOCA	ATI(ON: (Chie	f Pe	giu	ıs a	at K	ildo	nar	Brio	dge		DRIL	_ METHO	D: 125 r	mm SSA				ELEV	ATION:		
SAM	PLE	TYP	E				She	elby	Tube	Э		No Reco			PT (N)	•	Grab Sar	mple		Split-Pe			
BAC						_		ntoni			ı	Pea Grav	el		rill Cuttings		Grout	<u> </u>	\square	Slough	Sand	1	
Depth (m)		PLAS	ET PE	:00 ENET :00	3 RON	00 METE 00	4(ER (k	00 :Pa) I 00		SOIL SYMBOL	MUSCS			DES	SOIL CRIPT	ION			SAMPLE NO	SPT (N)	COMMENTS	Death (m)	Depth (m)
- - - -					 	 					OH	ORGANIC plastic, fro CLAY - sil occasiona	zen, bro	wn, freque	ent roots a	nd wood p			1			-	
- - -1 -	CH -m										СН								2			- - -1 -	
-	- ma											- mottled g	rey/brov	wn below 1	l.4m				5			- - - -	
(GEOTECHNICAL - REVISED)	~2mi											~2mm thic TEST HOI NOTES: - No sloug - No seepa - Test hole accumulat	k) below E TERM hing was age was remain- ion withi	v 2.0m MINATED s observed observed ed open to in 5 minute	AT 2.1m B d during dril during dril o 2.1m with es of comp	ELOW GF illing. ling. n no groun letion.			4			-2 - - - - - -	
WX18381 - CPT GREENWAY EXTENSION.GPJ 17-12-11 09:17 PM (GEOTECHNICAL - REVISED)																						- -3 - - - - - -	
4		 	l	 	l L	 	 																
381-	Amec Foster Wheeler Environment & Infra							Infras	tructure		LOGGED	BY: DC ED BY: RB		_		ETION DEPTH: 2.1 m ETION DATE: 4 Decei	mhor 2017						
WX18.		'							W	inni	peg,	Manitoba				Figure No			+	JOIVIPL	LITON DATE. 4 DECE	Page 1 o	 of 1

PRO	JE(CT:	С	hie	f P	eg	jius	s T	rai	I G	Gree	en\	way l	Exte	ensior	1		DRI	LLEC	BY:	Maple	Leaf	Drillin	g Ltd.				E	BORE	HOLE	NO:	TH11		
CLIE				_	_	_	_	_	_	_	_	_	_								Track I			-		22DT		_		ECT NO			1	
LOC								_	_	_				dge							D: 150							-		ATION:				
SAM	IPLI	ΕТ	ΥP	E			_		Sł	nelb	эу Т	ube	е			lo Re	COVE	ery		SF	PT (N)			Gra	ab Sam	ole		∭İs	Split-Pe	en	[Core)	
BAC	KFI	ILL	ΤY	PE					Ве	ento	onite	е			F	Pea G	rave	el		Dr	ill Cuttin	gs		Gro	out			<u> </u>	lough		[San	d	
Depth (m)	-		POCH 100 100 100 PLAS 1- 20	KET	200	NET	ROM 3 C.	00 ME1 00	ΓER	(kPa 400	a) II		SOIL SYMBOL								OIL RIPT	'ION	I				SAMPLE TYPE	SAMPLE NO	SPT (N)		COMI	MENT	8	Depth (m)
WX18381 - CPT GREENWAY EXTENSION. GPJ 17-12-11 09:17 PM (GEOTECHINICAL - REVISED)					40 40 40 40 40 40 40 40 40 40 40 40 40 4					80 1 1 1 1 1 1 1 1 1					SPHAL ONCR													1						
4 A												10	CCEP	BY: [<u> </u>			10	UNIDI	ETION I	חבסדו	l· () 2 ~~												
8381	Amec Foster Wheeler Environment & In						Infra	astru	cture				ED BY:									ember 20)17											
WX18	Winnipeg, Manitoba								_	ure No									00		1 of 1													





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