APPENDIX 'A' GEOTECHNICAL REPORT

AECOM Canada Ltd.

GENERAL STATEMENT

NORMAL VARIABILITY OF SUBSURFACE CONDITIONS

The scope of the investigation presented herein is limited to an investigation of the subsurface conditions as to suitability for the proposed project. This report has been prepared to aid in the evaluation of the site and to assist the engineer in the design of the facilities. Our description of the project represents our understanding of the significant aspects of the project relevant to the design and construction of earth work, foundations and similar. In the event of any changes in the basic design or location of the structures as outlined in this report or plan, we should be given the opportunity to review the changes and to modify or reaffirm in writing the conclusions and recommendations of this report.

The analysis and recommendations presented in this report are based on the data obtained from the borings and test pit excavations made at the locations indicated on the site plans and from other information discussed herein. This report is based on the assumption that the subsurface conditions everywhere are not significantly different from those disclosed by the borings and excavations. However, variations in soil conditions may exist between the excavations and, also, general groundwater levels and conditions may fluctuate from time to time. The nature and extent of the variations may not become evident until construction. If subsurface conditions differ from those encountered in the exploratory borings and excavations, are observed or encountered during construction, or appear to be present beneath or beyond excavations, we should be advised at once so that we can observe and review these conditions and reconsider our recommendations where necessary.

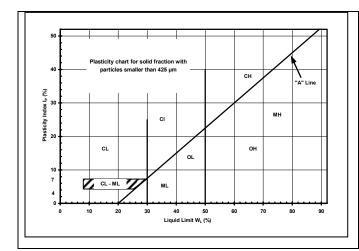
Since it is possible for conditions to vary from those assumed in the analysis and upon which our conclusions and recommendations are based, a contingency fund should be included in the construction budget to allow for the possibility of variations which may result in modification of the design and construction procedures.

In order to observe compliance with the design concepts, specifications or recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated, we recommend that all construction operations dealing with earth work and the foundations be observed by an experienced soils engineer. We can be retained to provide these services for you during construction. In addition, we can be retained to review the plans and specifications that have been prepared to check for substantial conformance with the conclusions and recommendations contained in our report.

EXPLANATION OF FIELD & LABORATORY TEST DATA

					UMA	USCS		Laborator	y Classification Crite	eria
		Descripti	on		Log Symbols	Classification	Fines (%)	Grading	Plasticity	Notes
		CLEAN GRAVELS	Well graded sandy gravels or no fi	s, with little	2727	GW	0-5	C _U > 4 1 < C _C < 3		
	GRAVELS (More than 50% of coarse	(Little or no fines)	Poorly grade sandy gravels or no fi	s, with little	77	GP	0-5	Not satisfying GW requirements		Dual symbols if 5-
SILS	fraction of gravel size)	DIRTY GRAVELS	Silty gravels, grave			GM	> 12		Atterberg limits below "A" line or W _P <4	12% fines. Dual symbols if above "A" line and
COARSE GRAINED SOILS		(With some fines)	Clayey grave sandy gr			GC	> 12		Atterberg limits above "A" line or W _P <7	4 <w<sub>P<7</w<sub>
ARSE GR.		CLEAN SANDS	Well grade gravelly sand: or no fi	s, with little	0.0	SW	0-5	C _U > 6 1 < C _C < 3		$C_U = \frac{D_{60}}{D_{10}}$
/OO	SANDS (More than 50% of	(Little or no fines)	Poorly grade gravelly sand or no fi	s, with little	000	SP	0-5	Not satisfying SW requirements		$C_U = \frac{D_{60}}{D_{10}}$ $C_C = \frac{(D_{30})^2}{D_{10} x D_{60}}$
	coarse fraction of sand size)	DIRTY SANDS	Silty sa sand-silt n			SM	> 12		Atterberg limits below "A" line or W _P <4	
		(With some fines)	Clayey s sand-clay r			SC	> 12		Atterberg limits above "A" line or W _P <7	
	SILTS (Below 'A' line	W _L <50	Inorganic sil clayey fine sa slight pla	ands, with		ML				
	negligible organic content)	W _L >50	Inorganic sil plastic	•		МН				
SOILS	CLAYS	W _L <30	Inorganic cl clays, sandy low plasticity,	clays of		CL				
FINE GRAINED	(Above 'A' line negligible organic	30 <w<sub>L<50</w<sub>	Inorganic clay clays of m plastic	nedium		CI			Classification is Based upon Plasticity Chart	
FINE (content)	W _L >50	Inorganic cla plasticity, f			СН				
	ORGANIC SILTS & CLAYS	W _L <50	Organic s organic silty o plastic	lays of low		OL				
	(Below 'A' line)	W _L >50	Organic clay plastic			ОН				
Н	IIGHLY ORGA	NIC SOILS	Peat and oth organic			Pt		on Post fication Limit		r odour, and often s texture
		Asphalt			Till					
. •		Concrete			Bedrock fferentiated)				AE	COM
×	\boxtimes	Fill			Bedrock mestone)					

When the above classification terms are used in this report or test hole logs, the designated fractions may be visually estimated and not measured.



FRAC	CTION	SEIVE	SIZE (mm)	DEFINING R PERCENTAGE OF MINOR CO	BY WEIGHT
		Passing	Retained	Percent	Identifier
Gravel	Coarse	76	19	35-50	and
Graver	Fine	19	4.75	35-50	and
	Coarse	4.75	2.00	20-35	"y" or "ey" *
Sand	Medium	2.00	0.425	20-33	y or ey
	Fine	0.425	0.075	10-20	nomo
0.11. (10-20	some
	n-plastic) (plastic)	< 0.0)75 mm	1-10	trace

^{*} for example: gravelly, sandy clayey, silty

Definition of Oversize Material

COBBLES: 76mm to 300mm diameter BOULDERS: >300mm diameter

LEGEND OF SYMBOLS

Laboratory and field tests are identified as follows:

qu - undrained shear strength (kPa) derived from unconfined compression testing.

 T_{ν} - undrained shear strength (kPa) measured using a torvane

pp - undrained shear strength (kPa) measured using a pocket penetrometer.

L_v - undrained shear strength (kPa) measured using a lab vane.

 F_v - undrained shear strength (kPa) measured using a field vane.

γ - bulk unit weight (kN/m³).

SPT - Standard Penetration Test. Recorded as number of blows (N) from a 63.5 kg hammer dropped 0.76 m (free fall) which is required to drive a 51 mm O.D. Raymond type sampler 0.30 m into the soil.

DPPT - Drive Point Pentrometer Test. Recorded as number of blows from a 63.5 kg hammer dropped 0.76 m (free fall) which is required to drive a 50 mm drive point 0.30 m into the soil.

w - moisture content (W_L, W_P)

The undrained shear strength (Su) of a cohesive soil can be related to its consistency as follows:

Su (kPa)	CONSISTENCY
<12	very soft
12 – 25	soft
25 – 50	medium or firm
50 – 100	stiff
100 – 200	very stiff
200	hard

The resistance (N) of a non-cohesive soil can be related to compactness condition as follows

N – BLOWS/0.30 m	COMPACTNESS
0 - 4	very loose
4 - 10	loose
10 - 30	compact
30 - 50	dense
50	very dense

erly Underpass Detailed Design

Consulting Limited

		Waverley Underpass - Detailed Design UTM: 14U,5523569 m N,630934 m E, 7.6 m south				Consulting Ltd		PROJECT NO.: 60321	
		OR: Maple Leaf Drilling Ltd.				mm SSA/ HQ (ELEVATION (m): 234.0	
	LE TY		\triangleright	SPL	IT SPC	BULK	NO RI	ECOVERY CORE	<i>.</i>
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TEST ** Becker ** O Dynamic Cone O SPT (Standard Pen To (Blows/300mm)) 20 40 60 8 Total Unit Wt (kN/m²) 17 18 19 24 Plastic MC Liquit 20 40 60 8	+ Torvane +	COMMENTS	NO.
0	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	SAND (FILL)- silty, gravelly - light brown, moist - CRUSHED LIMESTONE- - ASPHALT AND CONCRETE-							23
1									23
2		CLAY - trace silt - brown mottled grey, firm to stiff, moist						 	2
3		 high plasticity trace oxidation trace silt inclusions (<6 m in dia.) trace sulphate 							2
4		- brown to brown mottled grey below 4.7 m		7					2
5			X	S1 G2	4			SPT Blows: (1,2,2) 100 % Recovery	2
6		- firm below 6.2 m							2
7				G3					2
3		- grey, soft below 7.7 m		S4	3	•		SPT Blows: (2,1,2) 100 % Recovery	2
9		- trace till inclusions below 9.2 m	X	S5	3	•		SPT Blows: (1,1,2) 100 % Recovery	2
10		A=CO14				OGGED BY: Saba		COMPLETION DEPTH: 25.91	
		AECOM				EVIEWED BY: Ze		COMPLETION DATE: 4/13/16 Pag	

		Waverley Underpass - Deta : UTM: 14U,5523569 m N,6						Consulti O south			erley St	reet		ESTHOLE NO: TH16- (ROJECT NO.: 603211	
		TOR: Maple Leaf Drilling Ltd						mm SS/				•		LEVATION (m): 234.0	
	LE T	· · · · · · · · · · · · · · · · · · ·	SHELBY TUBE		SPI	IT SPO	120 ION		BULK	OUTIN		NO			
J/ AIVII		II L STORE	Шонгерт торе		<u> </u>	1	T	PENETRAT		·c	JNDRAINEI				Т
DEPTH (m)	SOIL SYMBOL	SOIL DES	CRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	◆ SF 0 : 16 1	# Bec Dynami T (Standa (Blows/3 0 40 Total U (kN/	cker ¥ c Cone ◇ rd Pen Te 300mm) 60 8 Jnit Wt ■ 'm³)	est) ♦ 60 100 0 21	+ : _ _ _ P	Torvane X QU/2 X Lab Vane Tocket Per Field Vane (kPa)	+ : : : :. \(\triangle \)	COMMENTS	i i
10															2
11					Т6			•							2
12		- some till inclusions, very soft be	elow 12.3 m	X	S7	2	•							SPT Blows: (1,1,1) 100 % Recovery	2
13		Glacial Till (SILT)- some sand to trace to some clay - light grey, very dense, moist to			,										2
14		- low plasticity	wet	X	S8	71			•					SPT Blows: (15,21,50) 44 % Recovery	2
15				*	S9	50/ 51mm				>> -				SPT Blows: (50/51) 33 % Recovery	2
16 17	000000000000000000000000000000000000000			***	S10	50/ 51mm				**				SPT Blows: (50/51) 66 % Recovery	2
18)0000000000000000000000000000000000000				G11										2
19		LIMESTONE - very fine to fine g - creamish white - R3 - medium strong - laminated with fine grained SH/ - sub-horizontal bedding fracture			S12	50/ 51mm		•		**				SPT Blows: (50/51) 10 % Recovery	2
20		- sub-nonzontal bedding fracture - close to moderately closed space - no evidence of water flow (class - stepped to undulating, smooth t - pinkish grey and white	s 2)		OI.									C1 Recovery: 100 %	
		A=CO	A.4					GGED B						LETION DEPTH: 25.91 n	<u>n</u>
		AECO!	<i>[</i> Y]				RE'	/IEWED		eyad S ER: Z	hukri		COMP	LETION DATE: 4/13/16	

_OCA	TION:	Waverley Underpass - Detailed Design UTM: 14U,5523569 m N,630934 m E, 7.6 m south of				illon Consulting Ltd. , 10.0 south east of Waverle		ESTHOLE NO: TH16-0 ROJECT NO.: 6032114	
		TOR: Maple Leaf Drilling Ltd.				125 mm SSA/ HQ Coring		EVATION (m): 234.08	}
SAMP	LE T	/PE GRAB SHELBY TUBE	\geq	SPL	JT SPC	ON BULK	✓ NO RECOVE	RY CORE	
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TESTS UNDF	RAINED SHEAR STRENGTH + Torvane + × QU/2 × □ Lab Vane □ △ Pocket Pen. △ ❖ Field Vane ❖ (kPa)	COMMENTS	NOIFAVALL
20		- close to widely spaced, undulating, rough, close to gapped				20 40 60 80 100	50 100 150 20		21
		fractures		C2				C2 RQD: 66% C2 Recovery: 100%	
21		- creamish grey - laminated with fine grained dark grey SHALE	1						2
22		- planar fractures		C3				C3 RQD: 23% C3 Recovery: 86%	2
23		- very close to closed spacing, close to gapped, clean - stepped to undulating, smooth to rough fractures							2
24		- R2 - weak - gapped to open, evidence of water flow (class 3)		C4				C4 RQD: 15% C4 Recovery: 100%	2
25		- creamish white - R5 - very strong - sub-horizontal bedding fracture - close to moderately closed spacing, gapped to open, clean - no evidence of water flow (class 2) - undulating to planar		C5				C5 RQD: 41% C5 Recovery: 100%,	2
26		- prominent joint set between 25.4 to 25.6 m (20 to 45 degrees at core axis) END OF TEST HOLE AT 25.9 m IN BEDROCK		-				UCS=107.7 MPa	
_∪		Notes: 1. Power Auger Refusal at 18.3 m in Glacial TILL. 2. HQ coring below 18.3 m. 3. No sloughing was observed upon drilling completion. 4. No seepage was observed upon drilling completion.							2
27		5.Test hole backfilled with bentonite up to 1.0 m and plugged with auger cutting to ground surface.							2
28									2
29									2
••									
30						LOGGED BY: Saba Ibrahim	COMPI	<u> </u> _ETION DEPTH: 25.91 m	
		A=COM				REVIEWED BY: Zeyad Shuk		ETION DATE: 4/13/16	
						PROJECT ENGINEER: Zeya	ad Shukri	Page	3

		Waverley Underpass - Detaile : UTM: 14U,5523572 m N,630						Consulting Ltd. 5 south east of Wa	verley	Street		STHOLE NO: TH16-0 ROJECT NO.: 603211	
CONT	RACT	ΓOR: Maple Leaf Drilling Ltd.		N	1ETH	HOD:	125	mm SSA/ HQ Cori	ng		EL	EVATION (m): 233.5	8
SAMP	LE T	YPE GRAB	SHELBY TUBE			IT SPO		BULK		∠ NO R			
DEPTH (m)	SOIL SYMBOL	SOIL DESC	RIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	0	PENETRATION TESTS	0 .	HNED SHEAR S' + Torvane + × QU/2 × □ Lab Vane [△ Pocket Pen. Field Vane (kPa)	- □ △	COMMENTS	CIF
0		SAND (FILL)- some silt to silty, grav	elly					20 40 00 00 10		; ;			+
-1		\- light brown, loose, moist - ASPHALT AND CONCRETE-	,										2:
-2		CLAY - trace silt, trace oxidation											23
3		 grey, firm to stiff, moist high plasticity trace silt inclusions (<6 mm in dia.) trace oxidation below 3.2 m 			,								2
4		TIDES ONGERON S.Z III		X	S13	7	•					SPT Blows: (2,3,4) 55 % Recovery	2
5		- trace sulphate below 4.7 m			T14								2
6		- trace silt inclusions (<12 mm in dia	.) below 6.2 m		S15	3						SPT Blows: (1,1,2)	2
7		- soft below 6.9 m										100 % Recovery	2
8					T16								2
9		- trace till inclusion below 8.6 m			G17			•					2
10							1.0	CCED DV. Saha lh-			•	ETION DEPTH: 22.48 n	2
		A=COA	A					GGED BY: Saba Ibra VIEWED BY: Zeyad				ETION DEPTH: 22.48 n ETION DATE: 4/14/16	.1
		AECUN	'				_	OJECT ENGINEER:			OOIVIF L	Page	

		Waverley Underpass - Detailed Design UTM: 14U,5523572 m N,630943 m E, 6.5 m south of			NT: D track						/erle	/ Stre	et		ESTHOLE NO: TH16-0 ROJECT NO.: 6032114	
		FOR: Maple Leaf Drilling Ltd.			IOD:										EVATION (m): 233.58	
SAMF	PLE T	YPE GRAB SHELBY TUBE			IT SPC			Bl	JLK		J		NO RE			
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	◆ SP 0 2 16 1;	Dyna T (Stanger (Blow) 0 40	ecker mic C dard F s/300	₩ one ⇔ Pen Te mm) 0 8 Wt ■	est) ♦		+ To X (□ Lal △ Pool ♣ Fiel	HEAR ST rvane + QU/2 × o Vane □ ket Pen. A d Vane € kPa)] 	COMMENTS	NOITA// = I =
10 -11		- some till inclusions below 10.7 m	X	S18	5	•									SPT Blows: (0,2,3) 100 % Recovery	22
-12		- trace angular gravel, very soft to soft below 11.6 m														2:
-13	000000000000000000000000000000000000000	Glacial Till (SILT)- some sand, some gravel, trace to some clay - light grey, compact, moist - low plasticity		G19												2
14	000000000000000000000000000000000000000	- very dense, wet below 13.8 m		S21	50/ 102mn					->>	•				SPT Blows: (34,50/102) 39 % Recovery	2
15				G22 S23	50/	•				» √	>				SPT Blows: (75,50/51) 44 % Recovery	2
16		- boulders, cobbles from 16.2 to 19.2 m		G24 C1A											C1A RQD: NA C1A Recovery: 29 %	2
17				C1B											C1B RQD: NA C1B Recovery: 57 %	2
18	90000000000000000000000000000000000000			C2											C2 RQD: NA C2 Recovery: 67 %	2
20		- LIMESTONE - Non-Intact		C3											C3 RQD: 0.0% C3 Recovery: 60%	2
		A=CO44					GED								ETION DEPTH: 22.48 m	1
		A ECOM					/IEWE DJECT							OIVIPL	LETION DATE: 4/14/16 Page	

		Waverley Underpass - Detailed Design : UTM: 14U,5523572 m N,630943 m E, 6.5 m south of					Consulting 5.5 south 6			Nav	erlev	Stre	et		<u>ESTHOLE NO: TH16-</u> ROJECT NO.: 603211	
		ΓOR: Maple Leaf Drilling Ltd.					mm SSA								_EVATION (m): 233.5	
	LE T	· · · · · · · · · · · · · · · · · · ·			IT SPC					11 1	·		NO R			-
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	0	PENETRATIO # Beck Dynamic PT (Standar (Blows/3 20 40 Total Ur (kN/r 17 18 Plastic MC 20 40	ker * c Cor d Pe 00mr 60 nit W n³)	é ne ◇ n Tes m) 80			+ To × 0 □ Lat △ Pocl ④ Fiel (HEAR ST orvane + QU/2 × O Vane E ket Pen. d Vane (kPa)	_ _	COMMENTS	Z C
20		LIMESTONE - very fine to fine grained - pinkish yellow and grey - R3 - medium strong - sub-horizontal bedding fracture, close to widely spaced, closed and clean, no evidence of water flow (class 2), planar, smooth to rough fractures - non- intact zone from 21.1 to 21.3 m, R1 to R2 - very weak to weak, greyish white		C4			20 40		80						C4 RQD: 70% C4 Recovery: 80% C5 RQD: 0.0% C5 Recovery: 100 %	2
-22		 non- intact hard CLAY SHALE and fractured LIMESTONE between 21.3 to 21.6 m creamish white and grey, R3 - medium strong laminated with fine grained SHALE and hard dark grey CLAY close to moderately closed spaced, closed to gapped and clean to infilled with hard clay (class 2) rough and undulating fractures 		C6											C6 RQD: 54% C6 Recovery: 95 %	2
-23		END OF TEST HOLE AT 22.5 m IN BEDROCK Notes: 1. Power Auger Refusal at 16.2 m in Glacial TILL. 2. HQ coring below 16.2 m. 3. No sloughing was observed upon drilling completion. 4. No seepage was observed upon drilling completion.														2
24		5.Test hole backfilled with bentonite up to 1.0 m below ground level and with auger cutting to the ground surafce.														2
25 26																2
27																2
28																2
29																2
30						LC	OGGED BY	<u>′: s</u>	aba	brah	nim		10	COMPI	LETION DEPTH: 22.48 r	2 2 n
		A=COM				_	VIEWED								LETION DATE: 4/14/16	

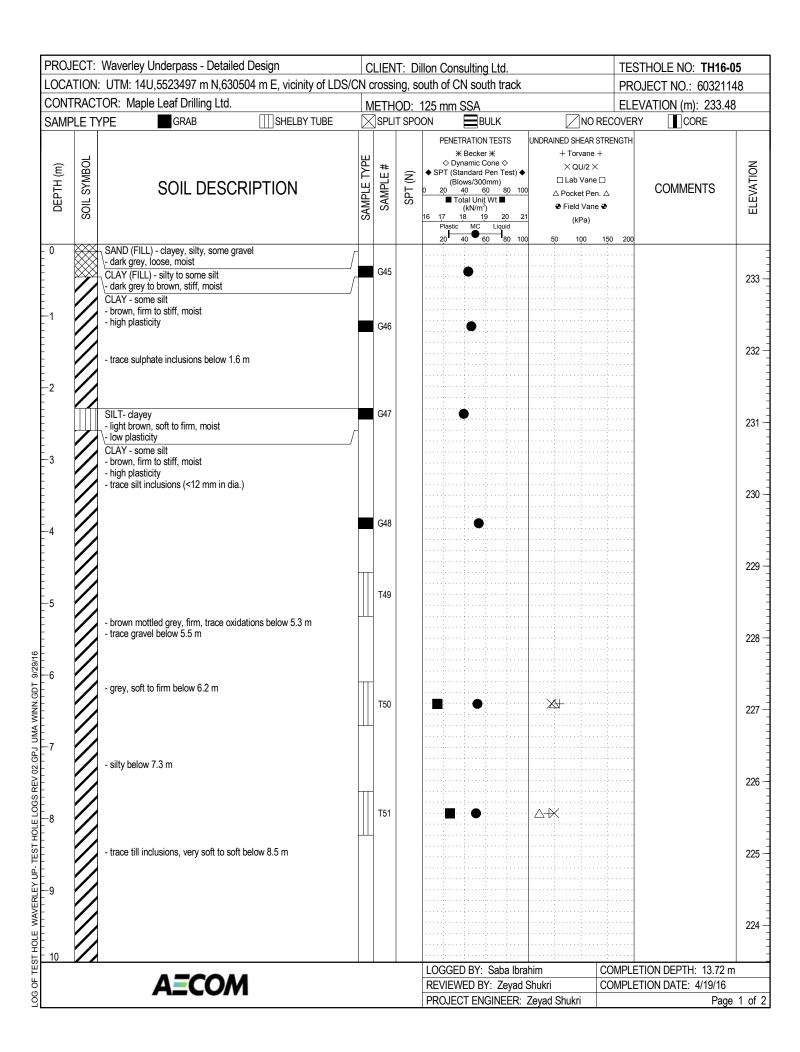
		Waverley Underpass - Detaile UTM: 14U,5523582 m N,630						Consultir north we			rley S	treet			STHOLE NO: TH16- ROJECT NO.: 603211	
CONT	RACT	FOR: Maple Leaf Drilling Ltd.		M	IETH	OD:	125	mm SSA	/ HQ	Corin	g				EVATION (m): 233.8	
SAMF	PLE TY	PE GRAB	SHELBY TUBE			T SPO			BULK		J		NO RE			
DEPTH (m)	SOIL SYMBOL	SOIL DESC	RIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	◆ S 0	■ Total Ur (kN/n	er ₩ Cone < d Pen To 00mm) 60 8 nit Wt ■ 19 2 Liqu	> est) ◆ 80 100 0 21		+ Ton X QI □ Lab △ Pocke ♣ Field (kl	IEAR STI vane + U/2 × Vane □ vane ₹ Vane ₹	7	COMMENTS	i C
0		SAND (FILL)- some silt, some grave	el to gravelly					20 40						30 200		
·1		- light brown, loose, moist CLAY (FILL) - silty to some silt, trace - dark brown, firm, moist - high to intermediate plasticity	e to some sand													2
2		CLAY - trace silt - grey, firm to stiff, moist - high plasticity														2
3		- brown mottled grey, trace silt inclus 3.1 m	sions (< 12 mm in dia.) below	X	S25	5	•								SPT Blows: (1,2,3) 100 % Recovery	2
4																2
5					G26											2
6		- trace oxidation below 6.1 m		X	S27	3	•								SPT Blows: (1,1,2) 100 % Recovery	2
7		- grey below 7.4 m														2
3		- soft below 7.7 m			G28											2
9					T29											2
10		- some silt below 7.8 m						<u> </u>	<u> </u>	<u> </u>		<u> </u>	} · · · · · · ·	<u> </u>		2
		A = 00 L	4	•				GGED BY							ETION DEPTH: 27.48 r	n
		A=CON	1				RE	VIEWED E	3Y: Ze			Shukr		OMPL	ETION DATE: 4/19/16	

_OCA	TION	· · · · · · · · · · · · · · · · · · ·	N,630892 m E, 5.3 m north of					Consulting Ltd orth west of		rley Street		ESTHOLE NO: TH16-0 ROJECT NO.: 6032114	
CONT	RAC	TOR: Maple Leaf Drilling	Ltd.					nm SSA/ HQ	Corin	g		_EVATION (m): 233.88	3
SAMF	LE T	YPE GRAB	SHELBY TUBE	\geq	SPL	IT SPO	ON	BULK			NO RECOVE	ERY CORE	
DEPTH (m)	SOIL SYMBOL	SOIL DE	ESCRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	◆ SP 0 2 16 1;	Total Unit Wt (kN/m³) 7 18 19		UNDRAINED SHE + Torva X QU, □ Lab V △ Pocket Field V (kPa)	ane + /2 × /ane □ Pen. △ /ane �	COMMENTS	i i
10													
11		- trace till inclusions below 11	m		G30			•					2
12		- very soft to soft below 11.6 - some silt inclusions below 1											2
40		SILT- clayey \(-\text{light brown, very soft, moist} \) \(-\text{low plasticity} \) \(CLAY - \text{trace silt, trace to son} \)			S31		•	•				SPT Blows: (2,2,5) 100 % Recovery	2
13	000000	- grey, soft, moist - high plasticity Glacial Till (SILT)- some grav - light grey, very dense, moist - low plasticity	el, some sand, trace clay t		G32								
14	00000	ion placticity		\times	S33	100/ 152mm			>>			SPT Blows: (100/152) 33 % Recovery	2
15	000000				G34		•						2
	00000	- boulders, cobbles with till m	atrix helow 16 m		S35	50/ 102mm			>>			SPT Blows: (45,50/102) 61 % Recovery	2
16	00000	boulders, cossider with the	adia bolow 10 III		C1							C1 RQD: NA C1 Recovery: 44 %	
17	00000												2
18		- reddish brown, gravelly belo	w 18.1 m		C2							C2 RQD: NA C2 Recovery: 94 %	2
	000000				C3							C3 RQD: NA C3 Recovery: 79%	2
19	000000				C4							C4 RQD: NA C4 Recovery: 44%	
20	John M						<u> </u>		. <u> </u>				2
		A = C	244				_	GED BY: Sat				LETION DEPTH: 27.48 m	1
		A=C	<i>)[</i> [[RE\	IEWED BY: Z	eyad S	shukri	COMPI	LETION DATE: 4/19/16	

		Waverley Underpass - Detailed Design UTM: 14U,5523582 m N,630892 m E, 5.3 m north of 0				Dillon Consulting Ltd. TESTHOLE NO: TH16-03 7.9 north west of Waverley Street PROJECT NO.: 60321148	
		ΓOR: Maple Leaf Drilling Ltd.				125 mm SSA/ HQ Coring ELEVATION (m): 233.88	
	PLE T				T SPC		
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	PENETRATION TESTS	NOIT V/O ID
20				C5		C5 RQD: NA C5 Recovery: 20%	
-21	9 9	- C6 RQD: NA - C6 Recovery: 100% LIMESTONE - very fine to fine grained - greyish white to creamish grey and white		C6 C7A C7B		C7A RQD: NA C7A Recovery: 100 % C7B RQD: 52%	2
-22		- R2 to R3 - weak to medium strong - laminated with fine grained SHALE - sub-horizontal bedding fractures, extermelly closed to closed spaced, close to open, clean, evidence of water flow (class 3)	1	C8		C7B Recovery: 100 % C8 RQD: 67% C8 Recovery: 89 %	2
		- CLAY SHALE infilling between 22.25 to 22.5 m		C9		C9 RQD: 30% C9 Recovery: 100 %	2
23		- light grey and white, R5 - very strong - non intact to moderately closed spaced, close to open, clean - no evidence of water flow (class 3) - undulating to planar, smooth to rough fractures		C10		C10 RQD: 44%	
24		- non intact to widely closed spaced below 24.5 m	1			C10 Recovery: 93 %, UCS=145.1 MPa	2
25		- prominent joint set between 24.9 to 25.2 m (10 to 25 degrees at core axis), open and clean (class 3)		C11		C11 RQD: 66% C11 Recovery: 91 %	2
26		- closed to moderately spaced, close to open, clean below 26 m					2
-27				C12		C12 RQD: 73% C12 Recovery: 100 %	2
-28		END OF TEST HOLE AT 27.5 m IN BEDROCK NOTES: 1. Power Auger Refusal at 15.8 m in Glacial TILL. 2. HQ coring below 15.8 m. 3. Seepage observed below 9.0 m upon drilling completion. 4. No sloughing was observed upon drilling completion. 5. Test hole backfilled with bentonite up to 1 m below ground surface and plurated with overs out thing to ground outgood.					2
29		surface and plugged with auger cutting to ground surface.					2
30							2
		A =CO44				LOGGED BY: Saba Ibrahim COMPLETION DEPTH: 27.48 m	_
		A ≡ COM				REVIEWED BY: Zeyad Shukri COMPLETION DATE: 4/19/16 PROJECT ENGINEER: Zeyad Shukri Page 3	_

	averley Underpass - Detailed						Consulting L			TE	STHOLE NO: TH16-	04
	TM: 14U,5523519 m N,630	502 m E, vicinity of LDS	/CN c	ross	ing, n	orth c	of CN north	track		PF	OJECT NO.: 603211	48
	R: Maple Leaf Drilling Ltd.	TTD = 4					nm SSA				EVATION (m): 233.3	6
SAMPLE TYPE		SHELBY TUBE			T SPC	ON	BUL			O RECOVE		
BACKFILL TYP	PE BENTONITE	GRAVEL	Щ	SLO	UGH		GRO			UTTINGS	SAND	1
SOIL SYMBOL	SOIL DES	CRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	◆ SP 0 2 16 1;		(ne	⊕ Field V	ne + 2 × ane □ Pen. △ ane �	COMMENTS	ELEVATION
- 0	SAND (FILL) - some gravel, s	ome silt, some clay, rootlets							30 100	130 20		
-1	- brown, loose, moist CLAY (FILL) - silty - dark grey to brown, firm to s	tiff, moist		G36								233 -
2	CLAY - silty, organics - dark grey to black, soft to fin - high plasticity CLAY - some silt - brown, stiff, moist - high plasticity - trace silt inclusions (<12 mm			G37			•					232 -
3	- firm to stiff, trace oxidation b			G38								231 -
4				G39								229 -
-5	- brown mottled grey, firm, tra	ce sulphate below 4.6 m		T40			•		×Δ+			228 -
LOG OF TEST HOLE WAVERLEY UP- TEST HOLE LOGS REV 02.6PJ UMA WINN GDT 9/29/16	- soft to firm below 5.9 m			T41			•	1	X +			227 -
E LOGS REV 02. GPJ	- grey, soft below 7.4 m - soft to very soft below 7.8 m			T42								226 -
LEY UP. TEST HOLE				G43			•					225 -
SST HOLE WAVER!												224 -
표 표	A=COA	4				_	GED BY: S				ETION DEPTH: 10.67 r	n
90	A=CON	1					IEWED BY:		Snukri Zeyad Shukri	CONIPL	ETION DATE: 4/19/16 Page	1 of 2
									- ,		. ugc	

		erley Underpass - Detailed						Consu						TES	STHOLE NO: TH16-0)4
		<i>I</i> I: 14U,5523519 m N,6305	02 m E, vicinity of LDS	/CN d	rossi	ng, n	orth (of CN	nort	h track				PRO	OJECT NO.: 603211	48
		Maple Leaf Drilling Ltd.	- FID					<u>nm S</u>							VATION (m): 233.36	3
SAMPLE T		GRAB	SHELBY TUBE			T SPO	ON		BU				NO REC			
BACKFILL	TYPE	BENTONITE	GRAVEL	Щ	SLO	UGH		Ŀ	GI	ROUT			CUTTIN	GS	SAND	
DEPTH (m) SOIL SYMBOL	SLOTTED PIEZOMETER	SOIL DESC	CRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	◆ SF 0 2 16 1	◇ Dyna PT (Stand (Blows 20 40 ■ Tota	ecker mic Co dard F s/300r 60 I Unit ' N/m³) 19	# one ♦ Pen Test) ♦ Pen Test) ♦ Wt ■ 20 2	<u>0</u> 2	+ Torv X QL □ Lab \ △ Pocke ♣ Field \ (kF	I/2 × /ane □ t Pen. △ Vane �		COMMENTS	ELEVATION
- 10		- trace till inclusions below 10.2	? m		G44											223 -
-11		END OF TEST HOLE AT 10.6: NOTES: 1. Groundwater was observed completion. 2. Sloughing was observed at 3 drilling completion. 3. Installed 25 mm diameter sta (SP16-04) to 6.5 m below grou casagrande tip and flush moun	at 1.5 m upon drilling 8.0 m below ground upon andpipe piezometer nd surface with 0.3 m t at ground surafce.													222 -
- - - - - - - 13		Test hole backfilled with sloup to 6.5, silica sand up to 5.8 plugged with bentonite to 2.75 and finished with auger cutting 5. Groundwater monitoring: April 29, 2016 at Elv. 230.20 May 13, 2016 at Elv. 230.60	m below ground surface, m below ground surface to ground surface. m													221 -
- - - - - -14		- June 18, 2016 at Elv. 231.02 - June 24, 2016 at Elv. 231.08 - July 18, 2016 at Elv. 231.08 r - August 30, 2016 at Elv. 230.9	m n													220 -
- - - - - - - 15																219 -
16																218 -
SUNIM AWD 1-17																217 -
18 10 10 10 10 10 10 10 10 10 10 10 10 10																215 -
106 OF TEST HOLE WAVERLEY UP- TEST HOLE LOGS REV 02.040 WINN, GDT 9/20/16																214 -
20							1.0	2052	D) (<u> </u>	<u> </u>		100	N 45' -	TION DEDTIL 12 CT	
= 		A=COM	l				_			Saba Ibra ': Zeyad					ETION DEPTH: 10.67 m ETION DATE: 4/19/16	1
50			I							. Zeyau SINEER:		Shukri		,,vii LC		2 of 2

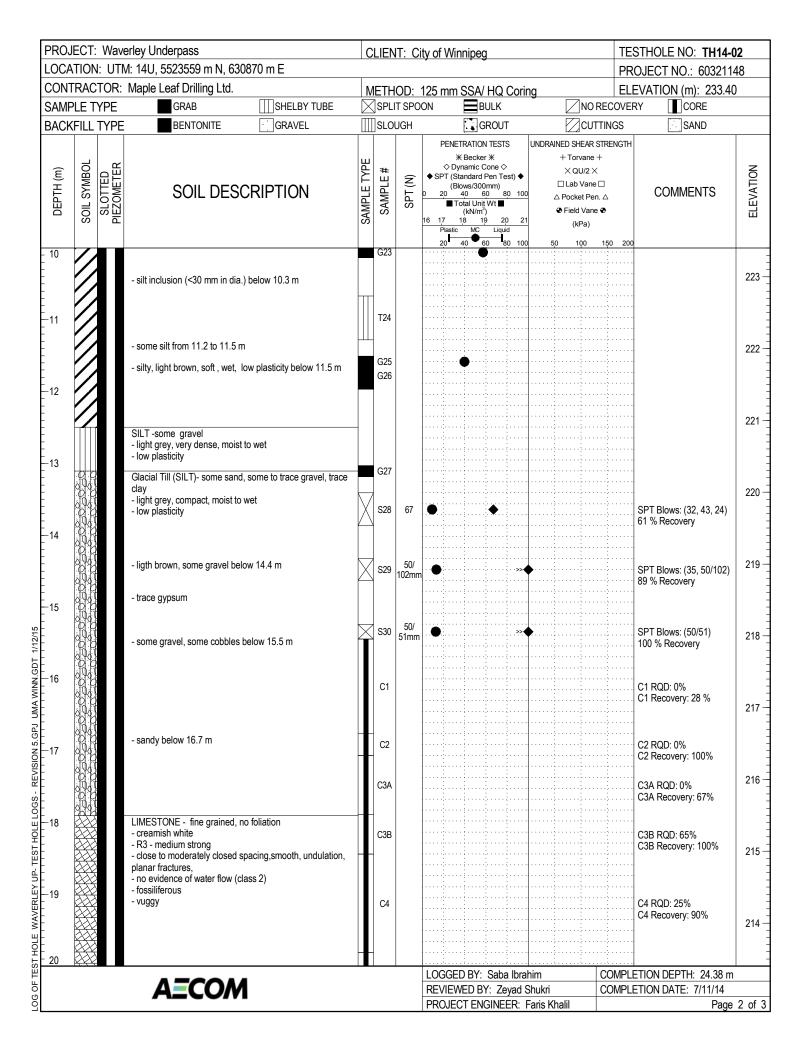


		Waverley Underpass - Detailed Design UTM: 14U,5523497 m N,630504 m E, vicinity of LDS/				on Consulting Ltd. TESTHOLE NO: To the of CN south track PROJECT NO.: 60	
		OR: Maple Leaf Drilling Ltd.				25 mm SSA ELEVATION (m): 2	
	PLE TY	, ,			IT SPC		
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	PENETRATION TESTS	S
10		- some till inclusions, very soft below 10.7 m		G52 G53			22
-12 -13		SILT- clayey - light grey, very soft, moist - low plasticity Glacial Till (SILT)- some sand, some gravel, trace clay		G54			2
-14		- light grey, compact, moist - low plasticity END OF TEST HOLE AT 13.7 m in GLACIAL TILL NOTES:		G55			2
		Groundwater was observed at 9.75 m upon drilling completion. No sloughing was observed upon drilling completion. Test hole backfilled with bentonite up to 1.0 m below ground level and with auger cutting to the ground surafce.					2
15							2
17							2
18							2
19							2
20							2
		A=COM				LOGGED BY: Saba Ibrahim COMPLETION DEPTH: 13 REVIEWED BY: Zeyad Shukri COMPLETION DATE: 4/1	

			erley Underpass		С	LIEN	NT: C	ity of	Winnipeg				TE	ESTHOLE NO: TH14-	01
			M: 14U, 5523653 m N, 630)934 m E									PF	ROJECT NO.: 603211	148
			Maple Leaf Drilling Ltd.						mm SSA					LEVATION (m): 232.5	0
SAMF			GRAB	SHELBY TUBE			IT SPO	ON	BULK				RECOVE		
BACK	FILL	TYPE	BENTONITE	GRAVEL	Щ	SLO	UGH		GROU	Т	1	∠/JCU	TTINGS	SAND	
DEPTH (m)	SOIL SYMBOL	SLOTTED PIEZOMETER	SOIL DESC	CRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	◆ SF 0 2 16 1;	■ Total Unit Wt ■ (kN/m³)	> est) • 80 100	[+ Torvane X QU/2 ≥ Lab Van Pocket Pe Field Van (kPa)	× e□ en. △ ne &	COMMENTS	ELEVATION
- 0			GRAVEL (FILL) - some sand, - light grey, moist	some limestones					0 40 60	80 100	50	100	150 20		
- - - - - -			- well graded, CLAY (FILL) - trace to some s organic, trace oxidation - black, soft to firm, moist	ilt, trace rootless, trace		G1			•						232
ļ'			CLAY - silty, trace sand - light brown, firm, moist - high plasticity			G2									231 -
2 2 			- some to trace silt, silt inclusion grey and brown below 2 m	ons < 6 mm in dia., mottled		G3									230
-3 -3 - - -			- trace oxidation			T4			•						229 -
-4 -4 - - - - -			- dark brown below 4 m - soft to firm below 4.5 m			G5			1 0	10	0.3				228 -
1 1/12/15						G6									227 -
GPJ UMA WINN.GD		Ţ	- grey - some silt below 6 m - soft, silt inclusion (12 mm in a trace gravel below 6.7 m	dia.) below 6.4 m		T7									226 -
OGS - REVISION 5.			- silt inclusion (20 mm in dia.),	trace gravel (angular 25		G8 G9									225
UP- TEST HOLE LC			mm in dia) - very soft below 8.3 m			G10			•						224 -
LOG OF TEST HOLE WAVERLEY UP. TEST HOLE LOGS - REVISION 5.GPJ. UMA WINN.GDT 1/12/15			- moist to wet below 9.7 m			T11					ΔX+				223 -
SE IS			4 = 60 = 1	•			1	LOC	GED BY: Sab	a Ibra	him		COMPL	LETION DEPTH: 13.18 m	1 <u> </u>
GOF			A=COM	I				REV	(IEWED BY: Z	eyad S	Shukri			LETION DATE: 7/9/14	
ŏ				_				PRO	JECT ENGINE	ER: I	Faris Kh	alil		Page	1 of 2

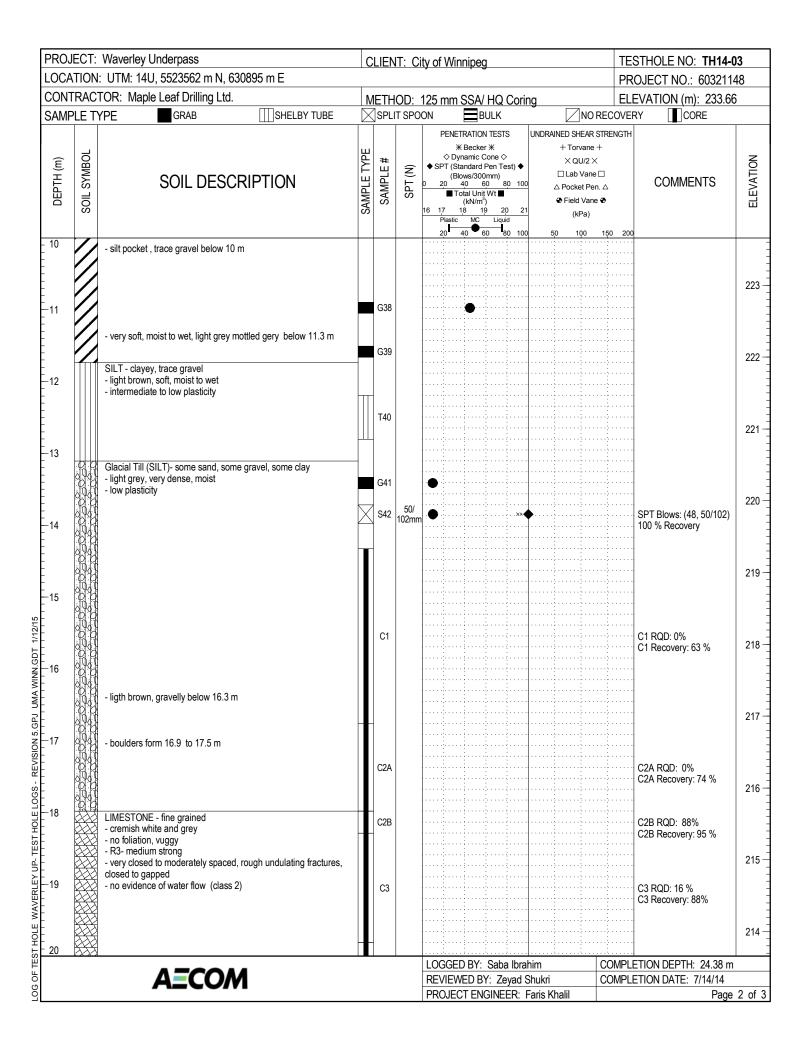
PROJ	ECT:	Wav	erley Underpass		С	LIEN	IT: C	ity of	Winn	ipeg					TES	STHOLE NO: TH14-0)1
LOCA	TION	I: UTI	M: 14U, 5523653 m N, 630	934 m E											PR	OJECT NO.: 603211	48
CONT	RAC	TOR:	Maple Leaf Drilling Ltd.		N	1ETH	OD:	125	mm S	SA					ELE	EVATION (m): 232.50)
SAMP	LE T	YPE	GRAB	SHELBY TUBE	_		T SPO	ON		BULI			N	O REC	COVER	RY CORE	
BACK	FILL	TYPE	BENTONITE	GRAVEL		SLO	UGH		[GRO	UT		⊠c	UTTIN	IGS	SAND	
DEPTH (m)	SOIL SYMBOL	SLOTTED PIEZOMETER	SOIL DESC	CRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	◆ SF 0 2 16 1	X B ◇ Dyna PT (Stan (Blow 20 40 ■ Tota (H	I Unit Wt (N/m³) 19	e ♦ Test) ♦	0	+ Torva + Torva × QU// □ Lab Va △ Pocket I ♣ Field Va (kPa	ne + 2 × ane □ Pen. △ ane �		COMMENTS	ELEVATION
- 10 - - - - -11			- silty below 10.4 m			G12											222 -
-12 -13			Glacial Till (SILT) - some clay, - light grey, very dense, moist t - low plasticity	o wet,		G14 S15	50/ 76mm					•				SPT Blows: (34, 50/76) 100% Recovery	220 -
- - - - - - -14			END OF TEST HOLE AT 13.2 NOTES: 1. Power Auger Refusal at 13.2. Seepage was observed at 4.3. No sloughing was observed 4. Installed 25 mm diameter st (SP14-01) to 11 m below ground from the state of	2 m in Glacial TILL. m upon drilling completion. upon drilling completion. andpipe piezometer nd surface with 0.3 m													219 -
- 15 - 15 - 16			casagrande tip and flush mour 5. Test hole backfilled with ber sand up to 9.5 m below ground bentonite to 0.3 m below ground surface 6. Groundwater monitoring: - Aug. 12, 2014 at Elv. 225.1 m - Sep. 03, 2014 at Elv. 224.9 m - Sep. 19, 2014 at Elv. 226.6 m - Oct. 17, 2014 at Elv. 226.6 m - Nov. 06, 2014 at Elv. 226.6 m - Nov. 20, 2014 at Elv. 226.5 m - Dec. 06, 2014 at Elv. 226.4 m	ntonite up to 11 m, silica d surface, plugged with and surface and finished with e. 1. 1. 1. 1. 1.													218
100 MANAGE 100 M			- Dec. 18, 2014 at Elv. 226.4 m														216
18																	214
- 20																	213
4			A=COA4	1						BY: Sa						ETION DEPTH: 13.18 m	
2			A=COM	l						D BY:			'halil		JMPLE	ETION DATE: 7/9/14	2 04 0
اك								KK(IJ⊑UI	ENGIN	NEEK:	rans K	ııgıll			Page	2 of 2

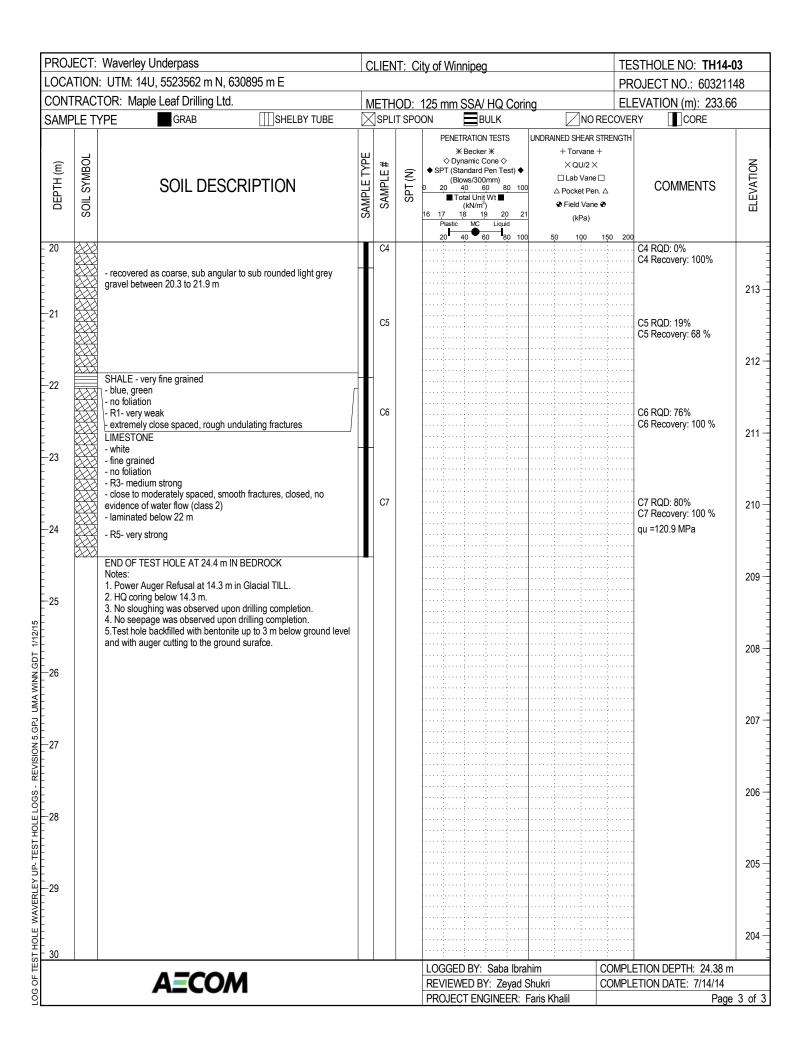
			erley Underpass		С	LIEN	IT: C	ty of Winnipeg		TES	STHOLE NO: TH14-()2
			Л: 14U, 5523559 m N, 63	0870 m E						PR	OJECT NO.: 6032114	48
			Maple Leaf Drilling Ltd.					125 mm SSA/ HQ Corir			EVATION (m): 233.40)
SAMF			GRAB	SHELBY TUBE			IT SPO	_		RECOVER		
BACK	FILL	TYPE	BENTONITE	GRAVEL		SLO	UGH	GROUT	С∪т	TINGS	SAND	
DEPTH (m)	SOIL SYMBOL	SLOTTED PIEZOMETER	SOIL DES	CRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	PENETRATION TESTS	Tricket Per Trield Vane (kPa)	+ □ ı. ∆	COMMENTS	ELEVATION
_ 0			- GRAVEL (FILL)		\perp			20 40 00 00 100				_
- - - - - -1			- CLAY (FILL)- trace silt - black, soft to firm, moist - intermediate plasticity - pieces of gravel, boulders, (233 —
2 2 			CLAY - trace silt, trace oxidat - brown, firm to stiff, moist - high plasticity	ion		G16						231
3 3			- firm below 2.4 m - silt inclusions (<6 mm in dia) below 3.1 m								230
- 4 4 						G17			Δ*			229 —
N.GDT 1/12/15						G19		•				228 -
5.GPJ UMA WINN			- grey mottled brown, soft to below 6.0 m	firm, silt inclusion (<10 mm)		G20						227 -
OGS - REVISION			- grey, soft below 7 m									226
Y UP- TEST HOLE L		Ā				T21						225
LOG OF TEST HOLE WAVERLEY UP. TEST HOLE LOGS - REVISION 5.GPJ. UMA WINN GDT 1/12/15			- trace gravel below 9 m			G22						224
SEL.			4=00:	_				LOGGED BY: Saba Ibra	him	COMPLE	ETION DEPTH: 24.38 m	
GOF			A=CON	1				REVIEWED BY: Zeyad S		COMPLE	ETION DATE: 7/11/14	
٩								PROJECT ENGINEER: 1	Faris Khalil		Page	1 of 3



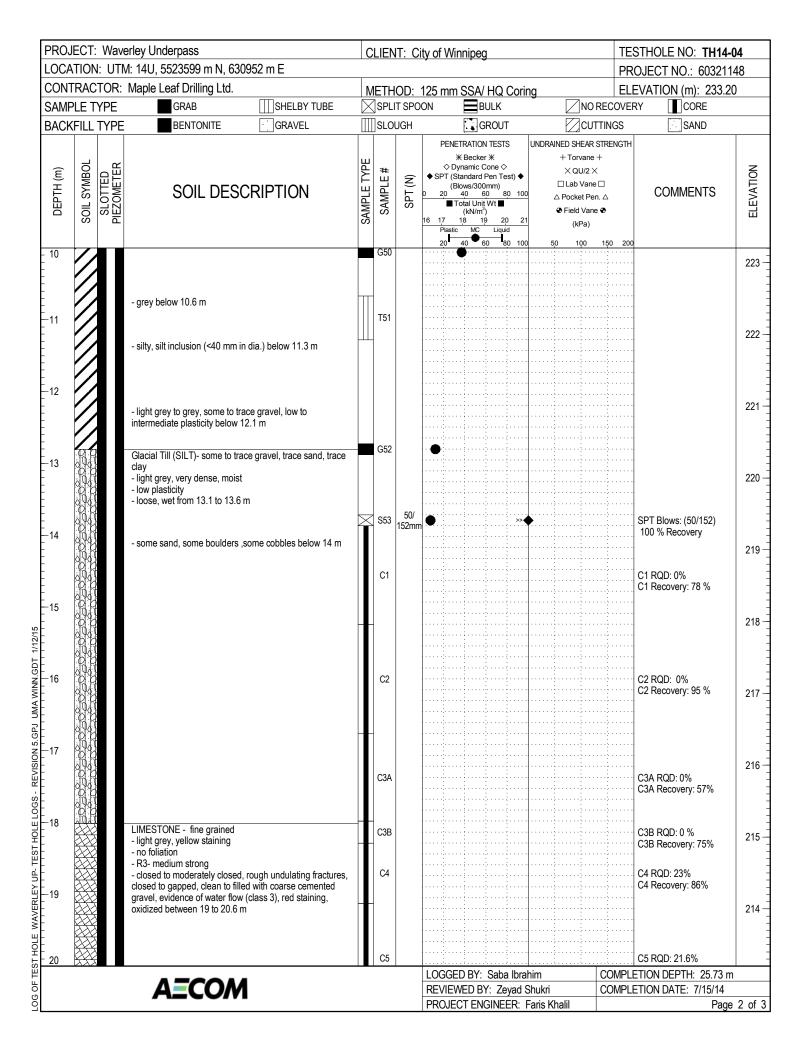
PRO	JECT: \	Wave	erley Underpass		(CLIEN	NT: C	ity of	Winn	nipeg					TE	STHOLE NO: TH14-	02
LOCA	ATION:	UTN	1: 14U, 5523559 m N, 6308	70 m E				-							PF	ROJECT NO.: 603211	48
CON	TRACT	OR:	Maple Leaf Drilling Ltd.		N	/ETH	IOD:	125 r	nm S	SA/	HQ C	orin	g		EL	EVATION (m): 233.4	0
SAMI	PLE TY	PE	GRAB	SHELBY TUBE	\triangleright	SPL	IT SPO	ON		BL					RECOVE	RY CORE	
BAC	KFILL T	YPE	BENTONITE	GRAVEL		SLO	UGH		[GF	ROUT			⊠cπ.	TTINGS	SAND	
DEPTH (m)	SOIL SYMBOL	PIEZOMETER	SOIL DESC	RIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	◆ SP 0 2 16 17	Opna T (Star (Blov 0 40 ■ Tota (18 Plastic	Becker amic Co ndard P vs/300r 0 60 al Unit \ kN/m³)	# one ♦ en Test) mm) 0 80 Wt ■ 20	•	+ : _ _ _	D SHEAR Torvane X QU/2 > Lab Vane cocket Pe Field Vane (kPa)	< e □ n. △	COMMENTS	ELEVATION
-21 -22 -23			- altered yellow and red below 2 - extremely close to moderately planar fractures - evidence of water flow (class 3 - laminated below 21.2 m - close spaced to moderately cloplanner fractures, - no evidence of water flow (class - no evidence of water flow of evidence of water flow (class - no evidence of water flow of evidence of water flow of evidence of water flow of evidence of water flow (class - no evidence of water flow of	closed spaced, smooth)	-	C5 C6										C5 RQD: 43% C5 Recovery: 98% C6 RQD: 29% C6 Recovery: 75 %	213 - 212 - 211 -
			END OF TEST HOLE AT 24.4 m Notes: 1. Power Auger Refusal at 15.4 2. HQ coring below 15.4 m. 3. Seepage observed at 3.0 m u 4. Installed 25 mm diameter sta	m in Glacial TILL.													209 -
2			(SP14-02) to 23.5 m below groucasagrande tip and flush mount 5.Test hole backfilled with silica ground surface, bentonite up to auger cutting to ground surface 6. Prominent sub-vertical fractur axis), closed to gapped, smooth water flow (class 3) between 17 7. Groundwater monitoring: - Aug. 12, 2014 at Elv. 225.20 m Sep. 03, 2014 at Elv. 225.0 m.	at ground surface. sand up to 22 m below 1.5 m and plugged with e (180 degrees to core undulating, evidence of 9 to 18.4 m.													208 -
			- Sep. 19, 2014 at Elv. 225.5 m. - Oct. 17, 2014 at Elv. 225.8 m. - Nov. 06, 2014 at Elv. 225.7 m - Nov. 20, 2014 at Elv. 225.6 m - Dec. 06, 2014 at Elv. 225.4 m - Dec. 18, 2014 at Elv. 225.4 m														206 -
29																	205 -
<u>}</u> ∐-]					204
<u> </u>																1	
<u> </u>						1		LOG	GED	BY:	Saba II	brah	im		COMPI	LETION DEPTH: 24.38 m	<u> </u>
5			A=COM								: Zeya					ETION DATE: 7/11/14	
												aris Khal	il			3 of 3	

PROJECT	T: Waverley Underpass	CI	LIEN	T: Ci	ity of Winnipeg TESTHOLE NO: TH14-03	3
LOCATIO	N: UTM: 14U, 5523562 m N, 630895 m E				PROJECT NO.: 60321148	
	CTOR: Maple Leaf Drilling Ltd.	M	ETH	OD:	125 mm SSA/ HQ Coring ELEVATION (m): 233.66	
SAMPLE	TYPE GRAB SHELBY TUBE	\square	SPLI	T SPO	ON BULK NO RECOVERY CORE	
DEPTH (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	PENETRATION TESTS	ELEVATION
- 0	-GRAVEL (FILL)				20 40 00 00 00 00 100 200	
-1	- CLAY (FILL)-trace silt - black, soft to firm, moist - intermediate plasticity - pieces of gravel, boulders, concrete from 0.6 to 1.5 m					233 -
2	CLAY - some silt, trace oxidation - dark brown, firm to stiff, moist - intermediate to high plasticity - silt inclusion (<12 mm in dia.) - brown mottled grey below 2.1 m		G31		• • • • • • • • • • • • • • • • • • • •	232
-3	- brown, high plasticity, firm below 3.7 m		T32			231 -
-4	- dark brown below 4.6 m					229
6 6	- firm , trace gypsum below 5.2 m		G33			228
7	- soft to firm, dark brown, trace gravel below 7 m		T34			227
8 8	- grey, soft, silt inclusion (6-30 mm in dia.) below 7.6 m		G36			226 -
106 OF 1EST HOLE WAVERIETY UP- 1EST HOLE LOGS- REVISION 9.GPJ UMA WINN, CDJ 9 9 9 9 9 9 9 9 9			T37			225
		Щ				224 –
10 20	A=COM				LOGGED BY: Saba Ibrahim COMPLETION DEPTH: 24.38 m REVIEWED BY: Zeyad Shukri COMPLETION DATE: 7/14/14 PROJECT ENGINEER: Faris Khalil Page 1	l of 3





PROJ	ECT:	Wave	erley Underpass		C	LIEN	IT: Ci	ty of	Winnipe	g				-	TESTHOLE	NO: TH14- ()4
			M: 14U, 5523599 m N, 63	0952 m E											PROJECT N	O.: 603211	48
			Maple Leaf Drilling Ltd.						mm SSA		orin	g			ELEVATION)
SAMF			GRAB	SHELBY TUBE			T SPO	ON		BULK				O RECO		CORE	
BACK	FILL	TYPE	BENTONITE	GRAVEL		SLO	UGH			GROUT			⊠cı	UTTINGS	3	SAND	
DEPTH (m)	SOIL SYMBOL	SLOTTED PIEZOMETER	SOIL DES	CRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	◆ SF 0 2 16 1	PENETRATIO ** Becket Dynamic of December 1 (Standard (Blows/30 40)) Total United (KN/m) 7 18 18 19 19 19 19 19 19 19 19 19 19 19 19 19	er # Cone \$ I Pen Test Omm) 60 80 it Wt \$ 3) 19 20 Liquid		 	+ Torvar X QU/2 ☐ Lab Va Pocket F Field Va (kPa)	2 × une □ Pen. △ ane �)	COM	MENTS	ELEVATION
- 0			-GRAVEL (FILL)		+				20 40	50 80	100	50	100	150			000
-1 1			- CLAY (FILL)-trace silt - black, soft to firm, moist - intermediate plasticity - pieces of gravel, boulders, c	concrete from 0.6 to 1.5 m													233 —
- 2 			CLAY - trace oxidation - brown, firm, moist - high plasticity			G43											231 —
3			- soft to firm between 2.4 to 3 - brown mottled light brown, s below 3 m			G44											230 —
-4 -4 			- dark brown, silt inclusion (<	10 mm in dia.) below 4.5 m													229
DT 1/12/15						T45											228 -
6.6PJ UMA WINN.G			- grey mottled brown below 6	m		G46											227 -
E LOGS - REVISION		Ţ	- soft below 7.3 m			G47											226 -
JP. TEST HOLE			- silt pocket at 8.3 m														225 — - - - -
LOG OF TEST HOLE WAVERLEY UP. TEST HOLE LOGS - REVISION 5.GPJ UMA WINN.GDT 1/12/15			- trace gravel below 8.8 m - some silt to silty, light grey to	o grey below 9.1 m		G49											224
Ĭ			A = CO 1	•	•				GGED BY:						PLETION DEF		
G OF			A=CON	1					/IEWED B					COM	PLETION DAT		
의								PRO	DJECT EN	IGINEE	R: F	aris Kh	alil			Page	1 of 3



PROJ	ECT:	Wave	erley Underpass		(CLIEN	NT: C	ity of	Winnipeg		TE	STHOLE NO: TH14-0)4
LOCA	MOIT	I: UTN	M: 14U, 5523599 m N, 630)952 m E				-			PR	OJECT NO.: 603211	48
CONT	RAC	TOR:	Maple Leaf Drilling Ltd.		N	METH	HOD:	125 ı	mm SSA/ HQ Corir			EVATION (m): 233.20)
SAMF	LE T	YPE	GRAB	SHELBY TUBE			IT SPC	OON	BULK		RECOVE	RY CORE	
BACK	FILL	TYPE	BENTONITE	GRAVEL		SLC	UGH		GROUT	Спл	TINGS	SAND	
DEPTH (m)	SOIL SYMBOL	SLOTTED PIEZOMETER	SOIL DES	CRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	◆ SF 0 2 16 1	Plastic MC Liquid	UNDRAINED SHEAR: + Torvane × QU/2 × □ Lab Vane △ Pocket Per • Field Vane (kPa)	+ : □ n. △	COMMENTS	ELEVATION
- 20					1			2	40 60 80 100	50 100	150 200	C5 Recovery: 71 %	
- - - - - - 21			SHALE - blue / green - fine grained - no foliation - R1- very weak			C6						. C6 RQD: 0% . C6 Recovery: 56 %	213 —
- - 22			- close spacing LIMESTONE - fine grained - creamish white and grey - no foliation - R3- medium strong - moderately closed too widel features, clean, no evidence of	of water flow (class 2)		C7						C7 RQD: 23% C7 Recovery: 81 %	211 -
23 23			- gapped fractures(180 degre undulating , clean between 2' - gapped fractures(180 degre undulating , clean between 2'	es to core axis), rough		C8						C8 RQD: 60% C7 Recovery: 100 %	210 -
-24 - - - - -			- gapped fractures(180 degre undulating , clean between 24	es to core axis), rough 1.2 to 25 m								C9 RQD: 26%	209 -
-25 			- R5- very strong			- 09						C7 Recovery: 100 % qu= 114.9 MPa	208 -
202 OF 1EST HOLE WAVERCLEY UP- 1EST HOLE LOGS - REVISION 5.670 UMA WINN. 6D1 171.715			END OF TEST HOLE AT 25.7 NOTES: 1. Power Auger Refusal at 13 2. HQ coring below 13.8 m. 3. Seepage observed at 3.0 n 4. Installed 25 mm diameter s (SP14-04) to 23.5 m below gr	.8 m in Glacial TILL. n upon drilling completion. tandpipe piezometer									207 -
C NOISING - 27			casagrande tip and flush mou 5. Test hole backfilled with sili ground surface, bentonite up auger cutting to ground surfar 6. Groundwater monitoring: - Aug. 12, 2014 at Elv. 225.2 - Sep. 03, 2014 at Elv. 225.0	ca sand up to 23.6 m below to 1 m and plugged with ce. m.	v								206 -
28			- Sep. 19, 2014 at Elv. 225.6 - Sep. 19, 2014 at Elv. 225.6 - Oct. 17, 2014 at Elv. 225.4 - Nov. 06, 2014 at Elv. 225.4 - Nov. 20, 2014 at Elv. 225.4 - Dec. 06, 2014 at Elv. 225.2 - Dec. 18, 2014 at Elv. 225.2	m. n. n. n. n.									205 -
													204 -
<u> </u>			A = CO 1						GGED BY: Saba Ibral			ETION DEPTH: 25.73 m	
000			A=CON	I					/IEWED BY: Zeyad S		COMPL	ETION DATE: 7/15/14	0 - (0
∃I								PK(DJECT ENGINEER: F	-arıs Knalıl		Page	3 of 3

PROJEC	T:	Waverley Underpass	С	LIEN	IT: Ci	ity o	f W	inni	peg							TE	STHOLE NO: TH14-0	5
		: UTM: 14U, 5523582 m N, 631025 m E				_										PF	ROJECT NO.: 6032114	18
		TOR: Maple Leaf Drilling Ltd.			OD:		mn								7		EVATION (m):	
SAMPLE DEPTH (m)	O INIDOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	T SPO (N) LdS	◆ S 0	◇ E SPT (S (E 20	ETRA # Be Oynar Stance Blows 40 Total (kl 18	ATION ecker mic C dard F s/300i 60 Unit N/m³)	one (Pen Tomm) 0 { Wt Liqu	> est) 4 80 10	21	4	NED S + To X C □ Lat \(\text{Pock} \) The Field (I	HEAR S rvane H QU/2 X Vane [set Pen. d Vane	□ . △ �	COMMENTS	DЕРТН
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA - REVISION 1.6PJ UMA WINN, GDT 1/12/15 The state of the state		CLAY (FILL) - silty, some sand - brown to dark brown, firm, moist - intermediate to high plasticity - black below 0.9 m CLAY - trace silt, trace oxidation - dark brown, firm, moist - high plasticity - silty, brown mottled light brown, soft from 1.5 m to 1.7 m - some silt, stiff to firm below 1.7 m END OF TEST HOLE AT 3.05 m IN CLAY. NOTES: 1. Hole open to 1.4 m immediately following drilling. 2. Seepage was observed at 1.2 m and from 2.4 m to 2.7 m. 3. Test hole backfilled with auger cuttings upon drilling completion.		G54 G55			20	40			BO 10		55		1000	150 20	Gravel: 0.0%, Sand: 12.9%, Silt: 23.4%, Clay: 63.7%	1
70 00 05 TEST HOL		AECOM				RE	VIE	WE	D BY	′: Ze	a Ibr eyad ER:	Shu	kri	nalil			ETION DEPTH: 3.05 m ETION DATE: 10/23/14 Page	1 of 1

PROJ	ECT:	Waverley Underpass	С	LIEN	IT: Ci	ity o	Wir	nipe	g						TE	STHOLE NO: TH14-0	06			
LOCA	TION	: UTM: 14U, 5523587 m N, 631095 m E													PROJECT NO.: 60321148					
		TOR: Maple Leaf Drilling Ltd.			OD:		mm									EVATION (m):				
DEPTH (m)	SOIL SYMBOL T	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N) LdS	◆S 0	⇒ Dy PT (St (Bld 20 ■ Tc	RATIO Beckenamic andaro ows/30 40 otal Un (kN/m	er # Cone Pen 1 0mm) 60 it Wt 1)	TS cest) 4 80 10) 00 21		NED SH + Tor × Q □ Lab Δ Pock P Field	HEAR S vane H U/2 × Vane [et Pen. I Vane	□ . △ �	COMMENTS	DEPTH			
0		SAND and GRAVEL (FILL) - light brown, dry to moist CLAY (FILL)- silty - light grey to grey, firm, moist					20	40	60	80 11		50		φο	150 200		-			
-		- high plasticity - high some silt		G58													-			
-		- brown, firm to stiff, moist - high plasticity															-			
715		- silt pocket, soft to firm, trace oxidation below 1.5 m		G59													1-			
0N 1.GPJ UMA WINN,GDT 1/12/15		Cin positor, con lo ilini, acco ostacion positi no ili		G60										· · · · · · · · · · · · · · · · · · ·			2-			
- WITH LAB DATA -REVISION		- silty, soft below 2.4 m		G61			•										- - - -			
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA -REVISI A A A A B A A B B		END OF TEST HOLE AT 3.05 m IN CLAY. NOTES: 1. Hole open to 2.9 m immediately following drilling. 2. No seepage was observed upon drilling completion. 3. Water level measured at 1.8 m below ground surface immediately following drilling. 4. Test hole backfilled with auger cuttings upon drilling completion.															3			
0G OF TEST HOLE WAVE		AECOM				RE'	/IEW	ED E	Y: Z	oa Ibr	Shu	kri	- 191			ETION DEPTH: 3.05 m ETION DATE: 10/23/14	-			
<u>ـــــا</u> کـ						rk	JJĽ(,ı ⊏l\	אווטו	EER:	ran	s Kn	ıdıll		Page 1 of 1					

PROJ	ECT:	Waverley Underpass	CLIENT: City of Winnipeg													TE	TESTHOLE NO: TH14-07						
		: UTM: 14U, 5523614 m N, 631190 m E												PROJECT NO.: 60321148									
		TOR: Maple Leaf Drilling Ltd.			OD:		mm									ELEVATION (m):							
SAMP	LE T	YPE GRAB SHELBY TUBE	\perp	SPLI	T SPO	ON			Βl							ECOVE	RY CORE						
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	16	◇ D PT (S (E 20	# Beynam Standa Blows/ 40 Fotal (kN 18	cker nic Co ard P /300r 60	one ≎ den Te mm)) 8 Wt ■ Liqu	est) • 30 10	0] _	+ Ton X QI □ Lab Pocke Field (kl	vane + J/2 X Vane E et Pen. Vane •] 	COMMENTS	DEPTH					
0		GRAVEL and SAND (FILL) - some clay												'		150 200							
- - -		CLAY (FILL) - silty - light grey and grey-black, firm, moist - intermediate plasticity									· · · · · · · · · · · · · · · · · · ·							- - -					
-		CLAY AND SILT- organic, silty, some sand - black, firm, moist - intermediate plasticity		G62			-	•	+ · · · ·								Gravel: 0.0%, Sand: 19.6%, Silt: 36.1%, Clay:	-					
- -1		SILT - clayey - light grey, firm, moist, \(\gamma\)- low plasticity															44.2%, AASHTO classification (A-7-6)	1 —					
-		CLAY - some silt - grey, firm, moist, - high plasticity		G63														-					
JN.GDT 1/12/15		- trace silt inclusions (< 6 mm in dia.), brown, firm to stiff below 1.5 m		G64							* · · · · · · · · · · · · · · · · · · ·							- - - -					
ISION 1.GPJ UMA WINN.GDT 1/12/15				304														2 					
- WITH LAB DATA -REV				G65														- - - -					
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA -REVISI		END OF TEST HOLE AT 3.05 m IN CLAY. NOTES: 1. Hole open to 3.05 m immediately following drilling. 2. No sloughing was observed upon drilling completion. 3. Seepage was observed at 0.9 m and 1.5 m below ground																3 — - -					
HOLE WAVERLEY UP - PI		surface. 4. Test hole backfilled with auger cuttings upon drilling completion.																- - - - -					
LEST 4						LO	GGF	D B	Y: :	Saba	a Ibra	ahim			(COMPLI	I ETION DEPTH: 3.05 m						
POF	A ECOM					-											ETION DATE: 10/23/14						
ğ		, J J J J J				REVIEWED BY: Zeyad Shukri PROJECT ENGINEER: Faris Khalil											Page 1 of 1						

PROJ	ECT:	Waverley Underpass	CLIENT: City of Winnipeg												TESTHOLE NO: TH14-08								
		: UTM: 14U, 5523551 m N, 630836 m E														PROJECT NO.: 60321148							
		TOR: Maple Leaf Drilling Ltd.			OD:		mm							7	ELEVATION (m):								
SAMP	LE T	YPE GRAB SHELBY TUBE		SPLI	T SPO	ON			BUL	.K	1			NOF	RECOVE	RY CORE							
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	16	⇒ D PT (S (B 20	* Heckynamic tandari lows/3 40 Total U (kN/18 40 40 40 40 40 40 40 40 40 40 40 40 40	ker # C Con d Per 00mn 60 nit Wi m³)	e ♦ n Test n) 80 t ■	t) •		+To X(□Lai △Poc ♣Fie	orvane + QU/2 × b Vane [ket Pen. ld Vane kPa)	□ . Δ	COMMENTS	ОЕРТН						
0		CLAY (FILL) - silty, sandy					:	+0		- 60	100			100	150 200								
- - - - - - -		- grey, moist		G66												Gravel: 0.0%, Sand: 23.4%, Silt: 27.5%, Clay: 49.1%	- - - - - - 1—						
-		CLAY - silty - light grey, soft, moist - low to intermediate plasticity		307													- - -						
3DT 1/12/15		- brown, firm to stiff, moist, high plasticity below 1.5 m															- - -						
EVISION 1.GPJ UMA WINN.GDT 1/12/15		- silty from 2 m to 2.2 m - trace oxidation below 2 m - silt inclusion (<12 mm in dia.) below 2.1 m		G68													2 — - - -						
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA -REVISI		END OF TEST HOLE AT 3.05 m IN CLAY. NOTES: 1. Hole open to 3.05 m immediately following drilling.		G69													- - - - 3- -						
ST HOLE WAVERLEY UP - PHASE A		No sloughing was observed upon drilling completion. Seepage observed at 2.4 during drilling. Water level measured at 2.9 m immediately following drilling. Test hole backfilled with auger cuttings upon drilling completion.															- - - - -						
뿌 埁		A=CO44			LOGGED BY: Saba Ibrahim REVIEWED BY: Zeyad Shukri										COMPLETION DEPTH: 3.05 m COMPLETION DATE: 10/23/14								
000		A=COM										hukri aris K	halil	+	COMPL								
ات						1.17	UJL	∪ı ⊑	IION	ALC:	и. Г	ans N	ulalli			гage	Page 1 of 1						

PROJECT:	Waverley Underpass	С	LIEN	T: Ci	ity c	f V	Vin	nipe	eg								TES	STHC	DLE N	IO: T	H14-0	9
	I: UTM: 14U, 5523533 m N, 630753 m E								_								PR	OJEC	CT NO	D.: 60	32114	8
	TOR: Maple Leaf Drilling Ltd.			OD:		m									1			EVAT				
DEPTH (m) SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N) LdS	• \$ 0	\$PT 20	** Dyr (Sta (Blo 4 ■ To	ws/30 tal Ur (kN/n	ON Toker # Cord Per 00ming 60 mit Wm³)	ESTS ne <> n Tes m) 80 /t 20 Liquid	st) ♦	1]	HED SH + Tor × Q □ Lab . Pock • Field (k	NO F HEAR S vane - U/2 X Vane et Pen Vane Pa)	STREN		(- -	CORE MENT	S	ОЕРТН
- - - - - - - - - - - - -	CLAY (FILL) - silty, some organic - black and light grey, firm, moist - some sand below 0.9 m		G70																			- - - - - 1—
HLAB DATA -REVISION 1.GPJ UMA WINN.GDT 1/12/15	CLAY - brown mottled grey, firm to stiff, moist - high plasticity - silty, soft from 1.7 m to 1.9 m - trace oxidation below 2.13 m - silt inclusion (< 6 mm in dia.) from 2.1 m 2.3 m		G72																			2 — - - - - - -
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA - REVISI	END OF TEST HOLE AT 3.05 m IN CLAY. NOTES: 1. No sloughing was observedupon drilling completion. 2. Seepage was observed at 1.2 m and 1.52 m during drilling. 3. Test hole backfilled with auger cuttings upon drilling completion.		G73																			3 —
-0G OF TEX	AECOM				RE	VII	EW	ED E	BY:	Ze		him Shuk Faris		alil						ΓΗ: 3.0 Ε: 10/2	23/14	1 of 1

PROJECT	: Waverley Underpass	CLIENT: City of Winnipeg													TE	TESTHOLE NO: TH14-10						
	N: UTM: 14U, 5523516 m N, 630610 m E				_											PROJECT NO.: 60321148						
	CTOR: Maple Leaf Drilling Ltd.			OD:		mn										ELEVATION (m):						
DEPTH (m) SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	◆ S 0		ETR/ # B Dyna Stand Blow 40 Tota (k 18	ATION ecker mic C dard I s/300 6 Il Unit tN/m ³	Cone (Pen T Pen T Omm) 60 Wt II)	TS cest) 80	◆ 100 21	UNDRAINED SHEAR STR + Torvane + × QU/2 × □ Lab Vane □ Δ Pocket Pen. Δ ♣ Field Vane ♣ (kPa)					COMMENTS	ОЕРТН				
1	CLAY (FILL) - silty - black to light grey, firm, moist - low to intermediate plasticity		G74															- - - - - -				
	CLAY - organic, silty to some silt, some sand - black, soft to firm, moist to wet, - low plasticity - grey, firm below 1.4 m		G75				•										Gravel: 0.0%, Sand: 14.1%, Silt: 33.5%, Clay: 52.4%	- - -				
0N 1.6PJ UMA WINN GDT 1/12/15	SILT - some clay - brown, soft, moist to wet - low plasticity CLAY- some to trace silt - grey mottled brown, firm to stiff, moist, - high plasticity		G76															- - - -				
HIAB DATA-REVISION 1.GPJ UM	- silt inclusions (<6 mm in dia.) below 2.4 m																	2 — - - - -				
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA -REVISI	END OF TEST HOLE AT 3.05 m IN CLAY. NOTES: 1. Hole open to 3.05 m immediately following drilling. 2. Sloughing was observed at 1.8 m. 3. Seepage was observed at 1.1 m and below 1.5 m. 4. Test hole backfilled with auger cuttings upon drilling completion.		G77															3				
LEST 4	A=CO44				-				Sab						_		ETION DEPTH: 3.05 m					
000	AECOM											nukri aris K	(halil		C	OMPLE	ETION DATE: 10/23/14 Page	1 of 1				

PROJ	ECT:	Waverley Underpass	С	LIEN	IT: C	ity c	of V	Vinr	ipe	1							TES	STHOLE NO: 1	ГН14-1	1
_		: UTM: 14U, 5523574 m N, 630822 m E															PRO	OJECT NO.: 6	032114	-8
-		TOR: Maple Leaf Drilling Ltd.			OD:		m											VATION (m):		
SAMF	LET	YPE GRAB SHELBY TUBE		SPLI	T SPO	ON			В	ULK					NOI	REC	OVER	CORE	:	
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	0	\$PT 20	₩ E Dyna (Star (Blow 4! Tota 18	RATION Becker amic (Indard ws/300) (Indard ws/300) (Indard Ws/	r ₩ Cone Pen 1 Omm) 60 t Wt ■	⇒ Test) 4 80 1	000		+To X 0 □ Lat △ Poct ♣ Fiel	HEAR S rvane S QU/2 × Q	+ < :□ n. △		COMMEN [*]	ΓS	DЕРТН
0		TOPSOIL																		
-		SAND and GRAVEL (FILL) - light brown, moist to wet CLAY (FILL) - organic, sandy, trace wood - black, firm, moist to wet		G78			•													- - - - - -
-				G79																1-
-		SILT - some clay - light grey, soft, moist - low plasticity		G80				•												_
0N 1.GPJ UMA WINN.GDT 1/12/15		CLAY - trace silt - brown mottled grey, firm to stiff, moist, - high plasticity																		- - - - 2 —
LAB DATA -REVISION 1.GF		- trace silt inclusions (< 12 mm in dia.) below 2.3 m		G81																- - - -
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA -REVISI		END OF TEST HOLE AT 3.05 m IN CLAY. NOTES: 1. Hole open to 3.05 m immediately following drilling. 2. No sloughing was observed upon drilling completion. 3. Seepage was observed at 1.1 m. 4. Test hole backfilled with auger cuttings upon drilling																		3 - - - -
ST HOLE WAVERLEY UP - P		Test note backfilled with auger cuttings upon drilling completion.																		- - - -
Ĭ		A = 60 14									a Ibi							TION DEPTH: 3		
000	A ECOM										eyac					CON	MPLE	ETION DATE: 10		1
۲I						14	ΚUJ	EC.	ĽΝ	אווט	:EK:	rа	ris K	nalil		1			⊬age	1 of 1

PROJ	ECT:	Waverley Underpass	С	LIEN	IT: C	ity o	Wir	nnip	eg							TES	STHOLE NO: TH14-1	2
LOCA	TION	: UTM: 14U, 5523563 m N, 630774 m E				-,											OJECT NO.: 6032114	
CONT	RAC	TOR: Maple Leaf Drilling Ltd.	N	1ETH	OD:	125	mm	SSA	4							ELE	EVATION (m):	
SAMP	LE T	YPE GRAB SHELBY TUBE		SPLI	T SPO	ON			BUI	LK			[∠ NC	REC	COVER	RY CORE	
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	◆S 0	⇒ Dy PT (Si (Bl 20 ■ T	TRATI K Beck Inamid Itandai Ilows/3 40 Iotal U (kN/) 18	ker X c Coord Pe 600m 60 Init W m³)	ne <>ne Tes n Tes m) 80/t ==	st) • 100	0	+ ·	SHEAF Torvan QU/2 .ab Var ocket P ield Va (kPa)	e+ × ne□ ren. △ ne &	ENGTH 0 200	COMMENTS	ОЕРТН
0		GRAVEL (FILL) - light brown, moist								:			-					_
-		iight blown, moist					<u>.</u>			:								_
-		CLAY (FILL) - some gravel, trace to some silt, trace oxidation - grey, firm, moist		G82														- - -
-				002			<u>.</u>			;								-
										;								-
-1		CLAY - organic, some silt, trace gravel, trace oxidation - black, firm, moist, - pieces of wood from 0.9 m to 1.2 m																1 –
-				G83			•							:				-
-							<u>.</u>											-
		SILT																-
N.GDT 1/12/		- light brown, soft, moist, - low plasticity		G84														- - -
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA -REVISION 1.GPJ UMA WINN.GDT 1/12/15		CLAY - trace to some silt - brown mottled grey, soft to stiff, moist, - high plasticity - silt pocket from 1.8 m to 2 m																2 -
SION 1.G				G85						;			.;		;			-
A -REVIS				G05														-
AB DAT		- trace oxidation below 2.5 m																-
HH-		- silty, soft to firm below 2.75 m				ļ.,.,	<u>:</u>			:								-
ELOGS							ļ			!								-
-3 -3		END OF TEST HOLE AT 3.05 m IN CLAY. NOTES:				ļ	ļ			!								3 -
SE - 1E		Hole open to 1.74 m immediately following drilling. No seepage was observed upon drilling completion.				1				!		ļ						-
PHA - PHA		Test hole backfilled with auger cuttings upon completion.																-
ERLEY (_
WAVE										:								-
																		-
SE.		A=6644			1	-		D B\							_		ETION DEPTH: 3.05 m	
90 00		A=COM										Shukr			CC	OMPLE	ETION DATE: 10/23/14	1 -5 1
۲L						rk	UJE(υL	ΙVG	NFF	:K:	Faris	r\nali	I			Page	1 of 1

-		Waverley Underpass I: UTM: 14U, 5523544 m N, 630678 m E	C	CLIEN	NT: C	ity of	Winr	nipeç]						STHOLE NO: TH14-1 DJECT NO.: 6032114	
		TOR: Maple Leaf Drilling Ltd.	N	<u>/IET</u> F	HOD:	125	mm S	SSA						ELE	EVATION (m):	
SAM	IPLE T	YPE GRAB SHELBY			IT SPO			В	ULK			Z	NO RE			
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	◆ SR 0 2 16 1	Open Open	Becke amic C ndard vs/300 0 6 al Unit	r ₩ Cone ◇ Pen Te Omm) 60 8 Wt ■)	est) ♦ 0 100		+ Tor X QI □ Lab △ Pocke ♣ Field (ki	HEAR STR vane + U/2 × Vane □ et Pen. △ Vane ❤ Pa)		COMMENTS	ОЕРТН
0		TOPSOIL							:					200		_
-		SAND and GRAVEL (FILL) - light brown, moist														- - - -
- - - -1		CLAY (FILL) - silty, trace organics - black to brown, firm, moist, - intermediate to low plasticity		G86												- - - 1-
3DT 1/12/15		CLAY - trace silt - brown to dark brown, firm to stiff, moist, - high plasticity		G87												- - - -
SION 1.GPJ UMA WINN.		- silty, soft to firm, trace oxidation from 2 m to 2.3 m		G88												2 - 2 -
WITH LAB DATA -REVIS		- silt inclusion (< 6 mm in dia.) below 2.3 m		G89												- - - -
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA -REVISION 1.GPJ UMA WINN. GDT 1/12/15		END OF TEST HOLE AT 3.05 m IN CLAY. NOTES: 1. Hole open to 2.90 m immediately after drilling. 2. No seepage observed upon drilling completion. 3. Test hole backfilled with auger cuttings upon drilling completion.	9													3 — - - - -
EST HOLE WAVERLEY UF						10	3GED		Coh	, lhrob					ETION DEPTH: 3.05 m	- - -
1 OF 1		AECOM				_	/IEWE								ETION DEPTH: 3.05 m ETION DATE: 10/23/14	
00											aris K	halil				1 of 1

PROJ	ECT:	Waverley Underpass	С	LIEN	IT: C	ity (of V	Vinr	nipe	g							TES	STHOLE NO: TH14-1	14
LOCA	TION	: UTM: 14U, 5523606 m N, 630544 m E				,												OJECT NO.: 6032114	
		TOR: Maple Leaf Drilling Ltd.			OD:									,				EVATION (m):	
SAMP	LE T	YPE GRAB SHELBY TUBE	\square	SPLI	T SPO	ON				BULI	K				\angle N	O RE	COVER	RY CORE	
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	0	\$PT 20	₩ Dyn (Star (Blov 4 Tot (18 stic	RATIC Becker amic ndard ws/30 0 al Un kN/m 3 MC	Cone Pen 0mm 60 it Wt	Tesi	100 21		+ > □I △P	Torval < QU/2 _ab Val ocket I field Val (kPal	ne + 2 × ane □ Pen. ∠ ane �	·	COMMENTS	ОЕРТН
0		TOPSOIL				-	20	4	U	6U :	80	100		50	100	1	50 200		_
-		CLAY (FILL) - some silt, trace sand, trace gravel, trace oxidation - light grey and black, moist - intermediate plasticity		G90)											-
-		CLAY - trace silt, trace gypsum - brown, firm to stiff, moist, - high plasticity		C01															-
- - -1				G91 G92															- 1-
-				G92															-
T 1/12/15		- trace silt inclusion < 12 mm in dia. below 1.5 m		G94					•										-
0N 1.GPJ UMA WINN.GDT 1/12/15		- silty, light brown, low plasticity from 1.8 m to 2 m		G95															2-
VISION 1.GPJ				G96															-
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA -REVISI		END OF TEST HOLE AT 2.44 m IN CLAY. NOTES: 1. Hole open to 2.3 m immediately after drilling. 2. No seepage was observed upon drilling completion. 3.Test hole backfilled with auger cuttings upon completion.																	- - -
THOLE LOGS																			3-
- PHASE II - TE																	3		-
WAVERLEY UP																			-
TEST HOLE						1.0)GC	3FD	BY:	Se	ha	lbra	him			<u> </u>	OMPI F	ETION DEPTH: 2.44 m	_
00 OF		A ECOM				RE	EVII	EWE	ED B	Y:	Zey	ad S	Shukr		1	_		ETION DATE: 10/24/14	1 -5 1
۲L						14	ΚUJ	L	ı ⊏l\	יווטו/	NEE	r: 1	aris	rvnali	I			rage	1 of 1

PROJ	ECT:	Waverley Underpass	С	LIEN	IT: C	ty of	Win	nipe	7					TE	STHOLE NO: TH14-1	15
		: UTM: 14U, 5523571 m N, 630387 m E												PR	OJECT NO.: 603211	48
		TOR: Maple Leaf Drilling Ltd.			OD:										EVATION (m):	
SAMF	LE T	YPE GRAB SHELBY TUBE	\square	SPLI	T SPO	ON		В	ULK				∐NOΙ	RECOVE	RY CORE	
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	◆ Si 0 :: 16 1	♦ Dyr PT (Sta (Blo 20 4 To 7 1	Becke namic (ndard ws/30(0 (tal Uni (kN/m	r # Cone < Pen To Omm) 50 to t Wt 10 0 2 Liqu	est) • 30 100	0	+1 × □ La △ Po	SHEAR STORY OF THE PROPERTY OF	□ 1. △	COMMENTS	ОЕРТН
0		TOPSOIL					:	:	:	:		:	:			
-		CLAY (FILL) - some silt, trace gravel - black and grey, soft to firm, moist, - intermediate to high plasticity		G97												- - -
- - -		CLAY - trace silt - grey, firm, moist, - high plasticity		G98			•									- - -
- 1 -				G99				* * * * * * * * * * * * * * * * * * *								1-
-				G100												-
ON 1.GPJ UMA WINN.GDT 1/12/15		- silty, low plasticity, trace oxidation from 1.5 m to 1.7 m		G101 G102												-
-GPJ UMA WIN				G102												2-
A -REVISION 1		END OF TEST HOLE AT 2.44 m IN CLAY.														-
- WITH LAB DA		NOTES: 1. Hole open to 2.3 m immediately following drilling. 2. No seepage was observed upon drilling completion. 3. Test hole backfilled with auger cutting upon drilling completion.														-
- 3 - 3																3
P - PHASE II - T																-
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA -REVISI																-
4						1.0	205		· · · · ·					001/2	ETION DESTINATION	
JE TI		A=COM				_	GGED /IFW				ahim Shukr				ETION DEPTH: 2.44 m ETION DATE: 10/24/14	
90	AECOM										Faris			JOIVIFL		1 of 1

PROJEC	T:	Waverley Underpass	С	LIEN	IT: C	ity o	f W	nnip	eg						TE	STHOLE NO: TH14-1	16
		: UTM: 14U, 5523647 m N, 630668 m E							_						PR	OJECT NO.: 6032114	48
_		TOR: Maple Leaf Drilling Ltd.			OD:		mn						-			EVATION (m):	
DEPTH (m)	STIMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N) TYPE	♦ S		# Bellynam Standa Blows/ 40 Total (kN 18	cker: nic Co ard Po 300n 60 Unit V I/m³) 19	TESTS # one <> en Te nm) 8 Vt 20 Liqui	st) • 0 100 0 22	<u> </u>	RAINED + ' > DL		< : □ n. Δ		DEPTH
0 0 0 2 1/12/15 0 1/12/15 2 1		CLAY - silty, trace sand - brown, firm, moist, - high plasticity - light brown, soft below 1.5 m		G104 G105 G106 G107 G108			20	40	600	-1	0 100		50		150 200	Gravel: 0.0%, Sand: 5.5%, Silt: 29.0%, Clay: 65.5%, AASHTO classification (A-7-6)	1
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA -REVISION 1.0		END OF TEST HOLE AT 2.44 m IN CLAY. NOTES: 1. Hole open to 2.4 m immediately following drilling. 2. No seepage was observed upon drilling completion. 3. Test hole backfilled with auger cutting upon drilling completion.		G110													3
LOG OF TE		AECOM				RE	VIE	NED	BY	: Ze		him Shukr Faris		<u> </u>		ETION DEPTH: 2.44 m ETION DATE: 10/24/14 Page	1 of 1

PROJ	ECT:	Waverley Underpass	С	LIEN	IT: C	ity o	Wir	nipe	eg						TE	STHOLE NO: TH14-1	7
		: UTM: 14U, 5523683 m N, 630802 m E													PR	OJECT NO.: 6032114	48
		TOR: Maple Leaf Drilling Ltd.			OD:		mm							_		EVATION (m):	
SAMP	LE T	YPE ☐ GRAB ☐ SHELBY TUBE	$_{\perp} \boxtimes$	SPLI	T SPO	ON			BULI	\	1			NOR	ECOVE	RY CORE	
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	◆S 0	⇒ Dy PT (St (Bl/ 20 ■ To 7		er # Cone d Pen 00mm 60 hit Wt n³)	e <> Test)) 80	100 21		+ To X (□ La △ Poo ♣ Fie	orvane + QU/2 × b Vane [ket Pen. ld Vane ((kPa)	□ △	COMMENTS	ОЕРТН
0	}}}	TOPSOIL					20 :	40	60	80	100		υ :	100	150 200		
-	**************************************	CLAY (FILL) - trace sand, trace gravel, trace silt		G111													-
-	\bowtie	- black to grey, firm, moist, - intermediate to high plasticity		GIII			:	:	:	:			:	:			-
-		CLAY - silty, trace sand - grey, firm to stiff, moist - high plasticity		G112			•						3				-
- -1				G113			10									Gravel: 0.0%, Sand: 5.1%, Silt: 24.4%, Clay: 70.5%, AASHTO classification (A-7-6)	1-
-				G114			•)								oldsollication (** 1° 0)	- - -
ON 1.GPJ UMA WINN.GDT 1/12/15		- grey mottled brown from 1.5 m to 1.8 m		G115													- -
NIW - 2		- brown, trace oxidation from 1.8 m to 2.2 m		G116													2-
REVISION 1.GP		- some silt, grey below 2.2 m		G117													- - -
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA - REVISI		END OF TEST HOLE AT 2.44 m IN CLAY. NOTES: 1. Hole open to 2.4 m immediately following drilling. 2. No seepage was observed upon drilling completion. 3. Test hole backfilled with auger cutting upon drilling completion.															- - - -
- TEST HOLE LOGS																	3-
EY UP - PHASE I																	- -
HOLE WAVERLE																	- - -
ES TES	1				<u> </u>	LO	GGE	D BY	: Sa	ba II	brah	im	-		COMPLI	ETION DEPTH: 2.44 m	I
3 OF		AECOM				RE'	/IEV	/ED E	3Y: 7	Zeya	ad S	hukri				ETION DATE: 10/24/14	
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F	PROJ	IECT:	Waverley Underpass		CL	IEN	T: Ci	ity of	Winni	peg					TES	STHOLE NO: TH14-1	8
L	OCA	TION	: UTM: 14U, 5523429 m N, 6308	66 m E											PR	OJECT NO.: 6032114	.8
-			TOR: Maple Leaf Drilling Ltd.						nm S							EVATION (m):	
3	SAMF	LE T	YPE GRAB	SHELBY TUBE		SPLI	T SPO	ON		BUI	LK			NO RE	COVEF	RY CORE	
	DEPTH (m)	SOIL SYMBOL	SOIL DESCRI	PTION	SAMPLE TYPE	SAMPLE #	SPT (N)	◆ SP 0 20	Dynai T (Stand (Blows 0 40 ■ Total (k	ecker H mic Cord dard Pe s/300m 60 I Unit W N/m ³) 19	en Test) ◆ m) 80 10 //t ■ 20 2 Liquid	0	HED SHE + Torv X QU □ Lab \ △ Pocker Field \ (kP	rane + J/2 × /ane □ t Pen. △ Vane ❤ Pa)		COMMENTS	ОЕРТН
-	-1		TOPSOIL CLAY (FILL) - some gravel, some silt, to grey, firm to stiff, moist, - low to intermediate plasticity	race sand		G118 G119 G120											- - - - - - 1—
BPJ UMA WINN.GDT 1/12/15	2		SILT - clayey, some sand - light brown, soft, moist, - low plasticity			G121 G122			•							Gravel: 0.0%, Sand: 17.0%, Silt: 60.9%, Clay: 22.1%, AASHTO Classification (A-4)	2 — - - - - - - -
N 1.6			- grey mottled brown, firm, moist to wet, - high to intermediate plasticity			3123											-
- WITH LAB DATA -REVISIC	-3		- light to interfriedate prasticity SILT - clayey, some sand - light brown, soft, moist, - low plasticity CLAY- trace silt - grey mottled brown, firm to stiff, moist - high plasticity	to wet,		G124 G125											3
TEST HOLE LOGS	4		- silty below 3.8 m	AV		G126											- - - -
HOLE WAVERLEY UP - PHASE II	5		END OF TEST HOLE AT 3.96 m IN CL NOTES: 1. Hole open to 2.1 m upon drilling com 2. Seepage and sloughing were observance. 3. Test hole backfilled with auger cutting completion.	pletion. ved below 3 m.													4
F TE			A =COA4								aba Ibra					ETION DEPTH: 3.96 m	
0 90			A=COM								Zeyad NEER:		halil	C(OMPLE	ETION DATE: 10/24/14	1 of 1
ゴL								LLKC	viii (LING	NLEK.	ı alıs N	ıallı			raye	1 UI I

PROJ	ECT:	Waverley Underpass	С	LIEN	T: Ci	ty of	Wir	nipe	eg							TES	STHOLE NO: TH14-1	9
		: UTM: 14U, 5523343 m N, 630875 m E														PR	OJECT NO.: 6032114	18
		TOR: Maple Leaf Drilling Ltd.			OD:		mm										EVATION (m):	
DEPTH (m)	SOIL SYMBOL T	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SP1 (N) LdS	◆ SI 0 :	⇒ Dy PT (St (Bl) 20 ■ To 7 Plastic	TRATION BECK rnamic andar ows/30 40 otal UI (kN/r	er # Cone d Pen 00mm 60 nit Wt n³)	STS e ♦ Test 1) 80 20 iquid	100 21		AINED +1 × □L		X ne □ en. △	NGTH	RY ∏CORE COMMENTS	DЕРТН
0		TOPSOIL						+0	:	:	100		:	:	130	200		
- - - - -		CLAY (FILL) - trace gravel, trace silt, trace sand - black, firm to stiff, moist, - high plasticity		G127 G128														- - - - -
-1 -1		CLAY - trace silt - brown, firm, moist, - high plasticity		G129			•)										1 -
				G130														- - -
0N 1.GPJ UMA WINN.GDT 1/12/15		 grey mottled brown, silt inclusion < 6 mm in dia. below 1.5 m silty to some silt, low to intermediate plasticity from 1.5m to 1.7m 		G131				•										- - -
0N 1.GPJ UMA V				G132				•										2
DATA -REVISIO				G133														-
OGS - WITH LAB				G134														- - -
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA -REVISI		END OF TEST HOLE AT 3.0 m IN CLAY. NOTES: 1. Hole open to 2.7 m immediately following drilling. 2. No seepage was observed upon drilling completion. 3. Test hole backfilled with auger cutting upon drilling completion.																3
VERLEY UP - PHA		o. Tool hole backing with auger caunity upon unining completion.																- - -
EST HOLE WAV															Tas-		TION DESTINATION	-
9F 1E		A=COM				_		D BY /FD I				nim Shukri					ETION DEPTH: 3.05 m ETION DATE: 10/24/14	
90											aris l			1001	VII L.C.		1 of 1	

PROJ	ECT:	Waverley Underpass	С	LIEN	IT: C	ity o	Wir	nipe	<u> </u>					TE	STHOLE NO: TH14-2	20
LOCA	TION	: UTM: 14U, 5523235 m N, 630888 m E				-,									OJECT NO.: 603211	
CONT	RAC	TOR: Maple Leaf Drilling Ltd.			OD:		mm	SSA							EVATION (m):	
SAMP	LE T	YPE GRAB SHELBY TUBE	\boxtimes	SPLI	T SPO	ON			BULK		1		_ NO F	RECOVE	RY CORE	
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	◆S 0	→ Dy PT (St (Bld 20 ■ To	otal Uni (kN/m 18 1	er # Cone < Pen T Omm) 60 t Wt 1 3)	> est) • 80 100	<u>D</u>	+ To X □ La △ Poo ♣ Fie	SHEAR Sorvane - QU/2 × ab Vane cket Pen eld Vane (kPa)	□ n. Δ	COMMENTS	ОЕРТН
0		TOPSOIL					:	:	:			:	:			
- - - -		CLAY - some silt - grey, soft to firm, moist, - intermediate to high plasticity - trace silt below 0.5m		G135												-
-				G136												-
1 - -				G137												1-
ON 1.GPJ UMA WINN.GDT 1/12/15		- brown, trace silt inclusion < 6 mm in dia. below 1.5m - silty, light brown below 1.7 m		G138 G139												-
REVISION 1.GPJ UMA V				G140 G141												2
E LOGS - WITH LAB DATA - R		END OF TEST HOLE AT 2.44 m IN CLAY. NOTES: 1. Hole open to 2.4 m immediately following drilling. 2. No seepage was observed upon drilling completion. 3. Test hole backfilled with auger cutting upon drilling completion.														-
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA -REVISI A A A A B A A B B																3
EST HOLE WAVER																-
비		A=COM				-				a Ibra	ıhim Shukri				ETION DEPTH: 2.44 m ETION DATE: 10/24/14	
90		A_CO//I									Faris I			JOIVIE		1 of 1

		Waverley Underpass I: UTM: 14U, 5523227 m N, 631020 m E	С	LIEN	IT: C	ty of	Winr	nipeg]						STHOLE NO: TH14-2 * OJECT NO.: 6032114	
		TOR: Maple Leaf Drilling Ltd.	N	1ETH	OD:	125	nm S	SSA							EVATION (m):	
SAM	PLE T	YPE GRAB SHELBY TUBE			T SPO			В	ULK				NO RE	COVER		
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	◆ SF 0 2 16 1	⇔ Dyna PT (Star (Blow 0 4) ■ Tot (7 18	Becke amic C ndard ws/300 0 6 al Unit	r ₩ Cone ≎ Pen Te Omm) 60 8 t Wt ■ ') 9 2	est) • 30 100		+ Tor X Q □ Lab △ Pock ♣ Field (k	HEAR STF vane + U/2 × Vane □ et Pen. ∠ I Vane ⊕ (Pa)	7	COMMENTS	DEPTH
0		TOPSOIL							:	:						
-		CLAY (FILL) - some silt, trace organic - black, firm to stiff, moist - intermediate to high plasticity		G142												-
- - - -1		CLAY and SILT - some sand - light brown, soft to firm, moist, - intermediate plasticity		G143			•	.							Gravel: 0.0%, Sand: 13.3%, Silt: 42.8%, Clay: 43.9%, AASHTO Classification (A-7-6)	- - - 1-
- - -				G144												' - -
T 1/12/15		CLAY - trace silt - brown, moist - high plasticity		G145 G146												- - -
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA -REVISION 1.GPJ UMA WINN.GDT 1/12/15		- trace silt inclusion < 12 mm in dia., trace gravel below 1.7m		G147))))))							2-
A -REVISION 1.G				G148												
- WITH LAB DAT		END OF TEST HOLE AT 2.44 m IN CLAY. 1. Hole open to 2.4 m immediately following drilling. 2. No seepage was observed upon drilling completion. 3. Test hole backfilled with auger cutting upon drilling completion.														
SST HOLE LOGS																3 -
P-PHASE II - TE																- -
WAVERLEY UF																
HOLE																
4 EST						LOC	GED	BY	Saha	a Ibral	nim		<u> </u>	OMPI F	ETION DEPTH: 2.44 m	
3 OF		A=COM				RE\	/IEWE	D B	Y: Ze	yad S	hukri				ETION DATE: 10/24/14	
ğ						PRO)JEC	T EN	GINE	ER: F	aris K	halil			Page	1 of 1

PROJ	ECT:	Waverley Underpass	С	LIEN	T: C	ity of	Win	nipe						TE	STHOLE NO: TH14-2	22
		: UTM: 14U, 5523219 m N, 631078 m E												PR	OJECT NO.: 6032114	48
		TOR: Maple Leaf Drilling Ltd.			OD:		mm								EVATION (m):	
SAMF	LE T	YPE GRAB SHELBY TUBE	\boxtimes	SPLI	T SPO	ON			ULK				NOR	ECOVE	RY CORE	
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	◆ Si 0 :	Dyn PT (Sta (Blo 20 ■ To 7 1	ows/30 40 otal Un (kN/m	er # Cone < Pen T Omm) 60 t Wt 3) 9 2	> est) • 80 100	<u>D</u>	+To X0 □ La △ Poo ♣ Fie	orvane + QU/2 × b Vane [ket Pen. ld Vane ((kPa)	□ △	COMMENTS	ОЕРТН
0		TOPSOIL					:		:	:		:		130 200		
		CLAY (FILL)- some silt, trace gravel, trace oxidation - black to brown, firm to stiff, moist, - high plasticity		G149			•									-
-		CLAY - silty, trace sand - brown, firm, moist, - intermediate plasticity - silt pocket between 0.3 m and 1.2 m														-
-				G150			•								Gravel: 0.0%, Sand: 1.4%, Silt: 33.1%, Clay: 65.5%	-
- -1				G151												- 1-
-		- silt inclusion < 12 mm in dia. below 1.2 m		G152			•									-
-																-
1/12/1 -		- trace oxidation from 1.5 m to 2.1 m SILT - some clay to clayey		G153			•									-
ON 1.GPJ UMA WINN.GDT 1/12/15		- light brown, soft to firm, moist, - low plasticity		G154												2-
N 1.GPJ L		- very soft below 2.1 m														-
ra -revisio		END OF TEST HOLE AT 2.44 m IN SILT.		G155												-
TH LAB DAT		NOTES: 1. Hole open to 2.4 m immediately following drilling. 2. No seepage was observed upon drilling completion.														-
LOGS - WIT		3. Test hole backfilled with auger cutting upon drilling completion.														_
3 -3																3
ASE II - TE							ļ									-
EY UP - PI							: : :									-
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA -REVISI																-
된 4																-
ES 4		4=0011		<u> </u>	<u> </u>	LO	GGEI	BY:	Sab	a Ibra	ıhim			COMPLI	ETION DEPTH: 2.44 m	
GOF		AECOM				RE'	/IEW	ED B	Y: Z	eyad	Shukri				ETION DATE: 10/24/14	
9						PR	DJEC	T EN	GINE	ER:	Faris I	Khalil			Page	1 of 1

PROJ	ECT:	Waverley Underpass	С	LIEN	IT: C	ity o	Wir	nipe	q					TE	STHOLE NO: TH14-2	23
LOCA	TION	: UTM: 14U, 5523200 m N, 631272 m E													OJECT NO.: 603211	
CONT	RAC	TOR: Maple Leaf Drilling Ltd.			OD:		mm								EVATION (m):	
SAMP	LE T	YPE GRAB ∭SHELBY TUBE	\boxtimes	SPLI	T SPC	ON			BULK		1		∕ NO I	RECOVE	RY CORE	
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	◆S 0	→ Dy PT (St (Bld 20 ■ To	ows/30 40 otal Un (kN/m	Cone Cone Cone Cone Cone Cone Cone Cone	> fest) • 80 10	<u>0</u>	+1	CQU/2 X ab Vane cket Per eld Vane (kPa)	(□ n. Δ e ⊕	COMMENTS	DEPTH
0		TOPSOIL					20	40	60	80 10	0	50	100	150 200		
- - - -		CLAY - trace silt - grey, firm, moist, - high plasticity		G156												- - - - -
-		- trace gravel, dark grey from 0.7 m to 0.9 m		G158												-
- -1 -		SILT- clayey - light brown, soft, moist - low plasticity		G 130												1-
-				G159												- - -
ON 1.GPJ UMA WINN.GDT 1/12/15		CLAY - trace silt - brown mottled grey, firm, moist, - high plasticity - silt pocket below 1.75 m		G160			•									- -
NMA WIN		- silt inclusion < 12 mm in dia. below 1.8 m		G161												2-
-REVISION 1.0				G162												-
WITH LAB DATA		END OF TEST HOLE AT 2.44 m IN CLAY. NOTES: 1. Hole open to 2.4 m immediately following drilling. 2. No seepage was observed upon drilling completion. 3. Test hole backfilled with auger cutting upon drilling completion.														-
ST HOLE LOGS -																3-
- PHASE II - TE																- -
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA -REVISI A A A A B A A B B																-
HOLE 4							COE) PV	Coh	o lbr	him		į	COMPL	ETION DEPTH: 2.44 m	_
OF T		A=COM				_				a Ibra evad	anım Shukr	i			ETION DEPTH: 2.44 m ETION DATE: 10/24/14	
90											Faris			· · · · · ·		1 of 1

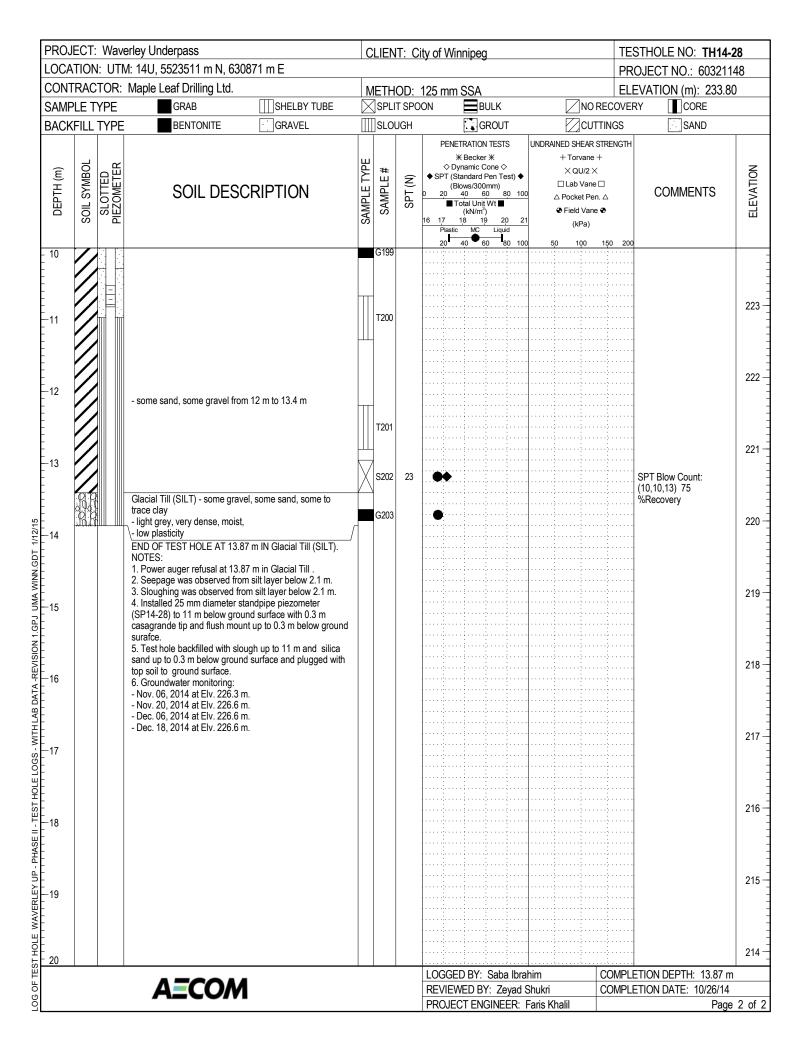
PROJ	ECT:	Waverley Underpass	С	LIEN	IT: C	ity of	Win	nipe						TE	STHOLE NO: TH14-2	24
		: UTM: 14U, 5523700 m N, 631092 m E												PR	OJECT NO.: 6032114	48
-		TOR: Maple Leaf Drilling Ltd.			OD:										EVATION (m):	
SAMF	LE T	YPE GRAB ∭SHELBY TUBE	$_{\perp}$ \boxtimes	SPLI	T SPO	ON		В	ULK				<u>∕</u> NO R	ECOVE	RY CORE	
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	◆ Si 0 :: 16 1	♦ Dyr PT (Sta (Blo 20 4 To 7 1	Becke namic (ndard ws/30(0 6 tal Unit	r # Cone < Pen T Omm) 50 t Wt 1) 9 2	> est) • 80 100	0	+1 × □L △ Po	CQU/2 X ab Vane [cket Pen. eld Vane ((kPa)	□ △	COMMENTS	ОЕРТН
0	}	TOPSOIL					20 -	:	:	:		:	:	130 200		
-		CLAY (FILL) - some silt, trace sand - black to grey, moist - intermediate plasticity CLAY and SILT - trace sand - brown, firm to stiff, moist,		G163												- - -
-		- intermediate plasticity		G164											Gravel: 0.0%, Sand:	- - -
- 1 -				G165											7.3%, Silt: 45.2%, Clay: 47.5%	1 -
-				G166												- - -
INN.GDT 1/12/15		CLAY - silty to some silt, trace oxidation - brown to light brown, soft to firm, moist, - high plasticity		G167			•									- -
- 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2				G168												2-
3 DATA -REVISIO		END OF TEST HOLE AT 2.44 m IN CLAY. NOTES:		G169												-
OGS - WITHLAE		Hole open to 2.4 m immediately following drilling. Seepage was observed below 2.3 m upon drilling completion. Test hole backfilled with auger cutting upon drilling completion.														- - -
- TEST HOLE LO									: : : : : :							3
UP - PHASE II																- -
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA-REVISION 1.6PJ UMA WINN.GDT 1/12/15																- - -
.sel4						10	GGED) RY·	Sah	a Ihra	him		1	COMPLI	LETION DEPTH: 2.44 m	
- HO		A=COM				_					Shukr	i			ETION DATE: 10/26/14	
90											Faris					1 of 1

PROJ	ECT:	Waverley Underpass	С	LIEN	NT: C	ity o	f Wir	nnipe	eg						TE	STHOLE NO: TH14-2	25
		: UTM: 14U, 5523746 m N, 631270 m E													PR	OJECT NO.: 6032114	48
		TOR: Maple Leaf Drilling Ltd.			IOD:		mm							7		EVATION (m):	
SAMP	LE T	YPE GRAB ∭SHELBY TUBE	$_{\perp}$ $\!$	SPL	IT SPC	ON			BULI	K				∫NO R	ECOVE	RY CORE	
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	16	⇒ Dy PT (Si (Bl 20 ■ T		ker # Cone d Pen 00mm 60 nit Wt m³)	e <> Test)	100		+To X (□ Lal △ Pocl ♣ Fiel (orvane + QU/2 × b Vane [ket Pen. ld Vane 6 kPa)	□ △	COMMENTS	ОЕРТН
0	}}}	TOPSOIL				 	20	40 :	60	80	100	5	:	100	150 200		
- - - -		CLAY (FILL) - some silt, trace sand - black to dark grey, firm, moist, - intermediate to high plasticity		G170													- - - -
		SILT - clayey, trace sand - light brown, moist, - intermediate plasticity		G171			•	-								Gravel: 0.0%, Sand: 8.1%, Silt: 60.0%, Clay:	-
- -1		- brown from 0.9 m to 1.5 m		G172												31.9%, AASHTO Classification (A-6)	1-
		- silt pocket, silt inclusion < 6 mm in dia. below 1.2 m															-
2/15		CLAY - trace silt		G173				•									-
ON 1.GPJ UMA WINN.GDT 1/12/15		- brown, firm to stiff, moist, - intermediate to high plasticity - trace oxidation at 1.7 m		G174													-
M - 2 - 2 - 2				G175													2 -
EVISION 1.G				G176													-
AB DATA -RE	//	END OF TEST HOLE AT 2.44 m IN CLAY. NOTES: 1. Hole open to 2.4 m immediately following drilling.															-
- 88 - WITH L		No seepage was observed upon drilling completion. Test hole backfilled with auger cutting upon drilling completion.															-
-3 -3																	3-
VSE II - TES							: : :										-
Y UP - PH/																	-
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA -REVISI A A A A B A A B B																	-
된 ,							:	:		;				:			-
SE T					<u> </u>	LO	GGE	D BY	: Sa	ba It	orah	im			COMPLI	ETION DEPTH: 2.44 m	
GOF		A=COM						VED I						(COMPLI	ETION DATE: 10/26/14	
ğ						PR	OJE(CT EI	NGIN	NEER	R: Fa	aris K	halil			Page	1 of 1

PROJ	ECT:	Waverley Underpass	С	LIEN	IT: C	ity o	f Wir	nipe	eg						TE	STHOLE NO: TH14-2	26
LOCA	TION	: UTM: 14U, 5523720 m N, 630895 m E														ROJECT NO.: 603211	
CONT	RAC	TOR: Maple Leaf Drilling Ltd.			OD:		mm	SSA	\							EVATION (m):	
SAMF	LE T	YPE GRAB SHELBY TUBE	\boxtimes	SPLI	T SPO	ON			BUL	<				NOF	RECOVE	RY CORE	
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	◆ S 0	⇒ Dy PT (Si (Bl 20 ■ T		er # Cone d Pen 00mm 60 nit Wt n³) 19	Test)	◆ 100 21		+To X C □ Late △ Pock ♣ Field	orvane - QU/2 X O Vane ket Pen d Vane kPa)		COMMENTS	ОЕРТН
0	}}}	TOPSOIL				-	20-	40 -	:	-80	100	5	0	100	150 20	0	
-		CLAY (FILL) - some silt, trace sand - dark to light grey, firm, moist, - high plasticity CLAY - trace silt		G177													-
-		- grey, firm to stiff, moist, - high plasticity															-
-				G178			•	•									-
<u>-</u> 1																	1-
-				G179													-
GDT 1/12/15		- grey mottled brown below 1.5 m		G180				•									-
ON 1.GPJ UMA WINN.GDT 1/12/15				G181													2-
EVISION 1.GP		- silty, trace oxidation below 2.1m		G182													-
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA -REVISI		END OF TEST HOLE AT 2.44 m IN CLAY. NOTES: 1. Hole open to 2.4 m immediately following drilling. 2. No seepage was observed upon drilling completion. 3. Test hole backfilled with auger cutting upon drilling completion.															-
NOLE LOGS - W		3. Test fole backlined with auger cutting upon drilling completion.															3-
ASE II - TEST F																	-
LEY UP - PH,																	-
HOLE WAVER																	-
4 4 SB						1	 CCE	D DV		he II	····			· ; · · · · ·	COMP	ETION DEPTH: 2.44 m	
OF 1		A=COM				-		D BY VED (ETION DEPTH: 2.44 m ETION DATE: 10/26/14	
00		A=50//I										aris K	halil		2 2 17 II L		1 of 1

PROJ	ECT:	Waverley Underpass	С	LIEN	NT: C	ity of	Win	nipe	q					TE	STHOLE NO: TH14-2	27
LOCA	TION	: UTM: 14U, 5523208 m N, 630727 m E				,		,,							OJECT NO.: 6032114	
		TOR: Maple Leaf Drilling Ltd.			IOD:										EVATION (m):	
SAMP	LE T	YPE GRAB SHELBY TUBE	\square	SPL	IT SPC	ON			BULK		1		∠ NO F	RECOVE	RY CORE	
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	◆ Si 0 :: 16 1	Opyroper (State (Blood (Bod (Bod (Bod (Bod (Bod (Bod (Bod (Becken amic (andard ws/30 40 tal Uni (kN/m	er # Cone < Pen T Omm) 60 t Wt I 3)	> est) • 80 10	0	+	Torvane - QU/2 X ab Vane ocket Pen ield Vane (kPa)	□ 1. △ ④	COMMENTS	ОЕРТН
0		GRAVEL and SAND (FILL) - some clay, some silt				-	20- 4	10	60	80 10	0	50	100	150 200		
- - - - - -		- light brown, dry to moist CLAY - silty, trace sand - grey, firm, moist, - high plasticity		G183		•										- - - - - -
- 1				G184			•								(G184): Gravel: 0.0%, Sand: 6.8%, Silt: 27.7%, Clay: 65.5%	1-
				G185			•	<u>.</u>								- - -
OT 1/12/15																- - -
WINN.GI		- light brown, trace oxidation from 1.8 m to 2 m		G186												-
₩D -2		- grey mottled brown below 2 m		G187												2-
REVISION 1.				Gior												-
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA -REVISION 1.GPJ UMA WINN GDT 1/12/15		END OF TEST HOLE AT 2.44 m IN CLAY. NOTES: 1. Hole open to 2.4 m immediately following drilling. 2. No seepage was observed upon drilling completion. 3. Test hole backfilled with auger cutting upon drilling completion.														- - -
HOLE LOGS - W		or rounds accoming the same grown and accoming the same gr														3-
HASE II - TEST																- - -
/ERLEY UP - F																-
THOLE WAY																- -
SH .		A = CO 14			1	_	GGE								ETION DEPTH: 2.44 m	
000		A=COM									Shuk			COMPL	ETION DATE: 10/26/14	
의						PR	SJEC	T EN	GINE	ER:	Faris	Khali			Page	1 of 1

				erley Underpass		С	LIEN	IT: C	ity of	Winnipeg				TE	STHOLE NO: TH14-2	28
				<i>I</i> I: 14U, 5523511 m N, 630	871 m E									PR	OJECT NO.: 6032114	48
				Maple Leaf Drilling Ltd.						nm SSA			7		EVATION (m): 233.80)
-	AMPL			GRAB	SHELBY TUBE	_	_	T SPO	ON	BUL			NOR			
BA	ACKE	·ILL	TYPE	BENTONITE	GRAVEL	Щ	SLO	UGH		GRO			CUTT		SAND	
\\)	DEPTH (m)	SOIL SYMBOL	SLOTTED PIEZOMETER	SOIL DESC	RIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	◆ SP 0 2	■ Total Unit W (kN/m³) 18 19	ne	X □ La △ Poi	Forvane + QU/2 × ab Vane □ cket Pen. eld Vane € (kPa)] 	COMMENTS	ELEVATION
- 0	2			TOPSOIL		-										-
- - - - - - 1				CLAY - trace gravel, trace silt - grey, firm, moist - high plasticity - some silt, intermediate plastic - trace sand, dark grey, soft to solution of the silphone sil	ity from 0.4 m to 0.6 m firm below 0.6 m		G188 G189 G190									233 —
-2 2	-			- low plasticity CLAY - silty - grey,firm to soft, moist - intemediate plasticity SILT - sandy, clayey			T191									232
- - - - - - 3	· · · · · · ·	<i></i>		- light brown, soft, wet to moist - low plasticity			G192			•					(Gravel: 0.0%, Sand: 24.1%, Silt: 55.3%, Clay: 20.6%	231
-				- brown mottled grey, firm, moi: - high plasticity - trace silt inclusion (< 6 mm in			G193									230 -
NN 1.GPJ UMA WINN.GDT 1/12/15							T194			•		* * 2	<u> </u>			229
LOG OF TEST HOLE WAVERLEY UP - PHASE II - TEST HOLE LOGS - WITH LAB DATA - REVISION				- grey mottled brown, trace oxid	dation from 6.1 m to 7.6 m		G195									228 -
10LE LOGS - WITH			\	- grey, soft to firm from 7 m to 8	3.2 m		G196			+					Gravel: 0.0%, Sand: 0.0%, Silt: 20.7%, Clay: 79.3%, AASHTO Classification (A-7-6)	227
PHASE II - TEST H							T197					**				226
WAVERLEY UP - P				- trace silt inclusion (< 6 mm in - soft to firm below 9.14 m	dia.) from 9.1 m to 10.7 m		G198									225 —
HOLE														·		224 —
10 TEST	0 /								LOG	GED BY: S	aha Ihra	him	1	COMPL	<u> </u> ETION DEPTH: 13.87 m	_
. OF				A=COM						IEWED BY:					ETION DATE: 10/26/14	
00				<i>-</i>	1					JECT ENGI					Page	1 of 2



PROJ	ECT:	Wav	erley Underpass		С	LIEN	IT: Ci	ty of	Winni	peg					TES	THOLE NO:	TH14-2	<u>'</u> 9
LOCA	TION	I: UTI	M: 14U, 5523602 m N, 6308	369 m E				•							PRC	DJECT NO.: 6	032114	1 8
CONT	TRAC'	TOR:	Maple Leaf Drilling Ltd.						nm S	SA					ELE	VATION (m):	233.42	
SAMF	LE T	YPE	GRAB	SHELBY TUBE		_	T SPO	ON		BULK				NO REC		Y CORI	Ē	
BACK	FILL	TYPE	BENTONITE	GRAVEL		SLO	UGH			GROUT	Γ			CUTTING	GS	SANI)	
DEPTH (m)	SOIL SYMBOL	SLOTTED PIEZOMETER	SOIL DESC	RIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	◆ SP 0 2 16 1;		ATION TESTS ecker ₩ mic Cone ♦ dard Pen Te s/300mm) 60 8 Unit Wt ■ N/m³) 19 20 MC Liqui 60 8	est) ♦ 30 100	2	+ Torva X QU/ □ Lab V △ Pocket ♣ Field V (kPa	/2 X /ane □ : Pen. △ /ane � a)		COMMEN	TS	ELEVATION
- 0 - - - - - - - - 1			CLAY (FILL) - silty, sandy, trace - black, moist when thawed, fro: - firm below 0.76 m	e gravel zen to 0.76 m		G204						50	0 100		200			233
-			wet at 1.4 m								: : :	<u>.</u>						232
2 2 			CLAY - some silt - brown mottled grey, moist, firm - high plasticity	n		T205			•			*						231 -
-3 - - - - - - - - - - -			- silty, trace silt inclusions (< 6 n	nm in dia.) below 3.1 m		G207												230 -
2/15						T208												229 -
LOG OF TEST HOLE WAVERLEY UP - PHASE III- TEST HOLE LOGS - GPJ UMA WINN.GGT 1/12/1			- soft below 6.1 m			G210												227 -
7-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1		¥	- grey below 7 m			T211												226 -
WERLEY UP - PHASE II						G212 G213												225 -
HOLE WA																		224 -
上 <u>10</u>								LOC	GEDI	BY: Must	afa A	lkiki		CO	MPI F	TION DEPTH: 1	5.79 m	
PO C			A=COM					REV	/IEWEI	D BY:						TION DATE: 12		
Ö										ENGINE	ER: I	Faris Kh	nalil					1 of 2

PROJ	ECT:	Wave	erley Underpass		С	LIEN	IT: Ci	ty of	Winnipeg				TE	STHOLE NO: TH14-2	29
LOCA	TION	I: UTI	M: 14U, 5523602 m N, 630)869 m E									PR	OJECT NO.: 603211	48
CONT	RAC	TOR:	Maple Leaf Drilling Ltd.		N	1ETH	IOD:	125 r	nm SSA				EL	EVATION (m): 233.42	2
SAMP	LE T	YPE	GRAB	SHELBY TUBE	\geq	SPL	IT SPO	ON	BULK			NOR	ECOVE	RY CORE	
BACK	FILL	TYPE	BENTONITE	GRAVEL		SLO	UGH		GROUT			CUTT	INGS	SAND	
DEPTH (m)	SOIL SYMBOL	SLOTTED PIEZOMETER	SOIL DESC	CRIPTION	SAMPLE TYPE	SAMPLE#	SPT (N)	◆ SP 0 2 16 17	■ Total Unit Wt ■ (kN/m³)	t) ◆ 100 21	X C □ Lab △ Pock ❤ Field (H	rvane + QU/2 × O Vane □ Ket Pen. d Vane € KPa)) 	COMMENTS	ELEVATION
- 10 			SILT - some clay to clayey - grey, soft, moist to wet Glacial Till (SILT) - some clay, - light grey, compact, wet, - low plasticity	some sand, trace gravel		T214 G215 G217	22				**			SPT Blow Count: (3,8,14) Recovery 94%	223 - 222 - 221 -
—14 —15			- light brown, dense below 13	7 m		S218 G219		•	•					SPT Blow Count: (15,24,22) Recovery 72%	220 -
61/21/1 109: WINN. GD C			- very dense below 15.3 m END OF TEST HOLE AT 15.7 NOTES: 1. Power auger refusal at 15.7 2. No sloughing was observed at level.	79 m in Glacial Till. I during drilling. 1.4 to1.5 m below ground		S220 S221	50/ 102mm 50/ 102mm			>>				SPT Blow Count: (13,50/102) Recovery 100% SPT Blow Count: (50/102) Recovery 100%	218 -
20- 			3. Installed 25 mm diameter s (SP14-29) to 15.7 m below gr casagrande tip and flush mou 5. Test hole backfilled with sil ground surface, bentonite up silica sand to ground surface. 6. Groundwater monitoring: - Dec. 06, 2014 at Elv. 225.2 r - Dec. 18, 2014 at Elv. 225.6 r	ound surface with 0.3 m nt at ground surafce. ica sand up to 14 m below to 0.3 m and plugged with n.											216 -
100 OF 10															215 -
20								Inc	GED BY: Musta	ıfa Alkik	i		COMPI	ETION DEPTH: 15.79 m	1
5			A=COM						TEWED BY:	arult				ETION DATE: 12/1/14	
3				•					JECT ENGINEE	R: Fari	s Khalil				2 of 2

PROJECT	: Waverley Underpass	CL	JEN	T: Ci	ty of	Win	nipeg	1					TE	STHOLE NO: TH14-3	30
	N: UTM: 14U, 5523626 m N, 631117 m E												PR	OJECT NO.: 6032114	48
	CTOR: Maple Leaf Drilling Ltd.			OD:								7		EVATION (m):	
DEPTH (m) SOIL SYMBOL	SOIL DESCRIPTION	ш	SAMPLE #	SPO (N) LdS	◆ SF 0 2 16 1	PENETI	BRATION Becker amic C ndard I ws/300 0 6 tal Unit (kN/m³ 8 19 MC	NTEST T Cone Pen Te Imm) 0 8 Wt) Liqu	est) •	1	HTG X (La △ Poo Prie	SHEAR ST prvane + QU/2 × b Vane C ket Pen. eld Vane ((kPa)] △ ••	COMMENTS	DEPTH
0	SAND (FILL) - some gravel, trace cobble - brown, moist, frozen					20 4	0 6	0 -8	30 100		50	100	150 200		- - -
	CLAY AND SILT, some sand, trace sulphates - brown, firm, moist, - low plasticity		G226				•							Gravel: 0.0%, Sand : 16.8%, Silt: 37.4 %, Clay: 45.9%	1—
-2			G227												2 — 2 — - -
3			G228												3-
GENIAM WINN GENERAL TO THE COLOR OF THE COLO			G229												4 — - - - - - -
LOG OF TEST HOLE WAVERLEY UP - PHASE III - TEST HOLE LOGS - GFJ UMA WINNIGD T	END OF TEST HOLE AT 4.6 m IN CLAY AND SILT. NOTES: 1. No sloughing was observed upon drilling completion. 2. Seepage observed at 3.7 m. 3. Test hole backfilled with auger cuttings and silica sand, and sealed with bentonite at surface.		JLLT												5
6 6 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	AECOM				RE\	/IEW	ED B	Y:		luzniak Faris k				ETION DEPTH: 4.57 m ETION DATE: 12/2/14 Page	1 of 1

PROJECT	: Waverley Underpass	CL	JEN	T: Ci	ty of	Winr	nipeg						TES	STHOLE NO: TH14-3	31
	N: UTM: 14U, 5523623 m N, 631090 m E												PR	OJECT NO.: 6032114	48
	CTOR: Maple Leaf Drilling Ltd.			OD:								_		EVATION (m):	
SAMPLE	YPE ☐ GRAB ☐ SHELBY TUBE		SPLI	T SPO		PENETI	RATION Becker	I TEST	S	UNDRA	AINED S		RECOVER TRENGTH	RY TORE	
DEPTH (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	16 1	♦ Dyn PT (Sta (Blow 20 4 Tot 7 18	amic C ndard I ws/300 0 6 tal Unit (kN/m ³	Cone Cone Cone Cone Teamm) Wt Cone End Team Cone End Team Cone End Team Cone Cone Cone Cone Cone Cone Cone Cone	est) ♦ 0 100	1	X0 □ Lai △ Poc ⊕ Fie	QU/2 X b Vane [ket Pen. ld Vane kPa)	□ △	COMMENTS	DEPTH
0	SAND (FILL) - gravelly, some cobble, trace organics - brown, frozen														-
			G222												- - - -
-1	CLAY - silty, trace sand - brown, firm, moist, - high plasticity														1-
-2		(G223			•		 							2 -
91274	SILT - clayey - brown, very soft, moist to wet, - intermediate plasticity		G224												3-
DE LOGSGPJ UMA WINN.GD			G225												4-
LOG OF TEST HOLE WAVEKLEY UP - PHASE III - TEST HOLE LOGS - GFJ UMA WINN GDT TY	END OF TEST HOLE AT 4.6 m IN SILT. NOTES: 1. No sloughing was observed upon drilling completion. 2. Seepage was observed at 3.7 m. 3. Test hole backfilled with cuttings and silica sand, and sealed with bentonite at surface.														5— 5— 5—
OF 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	AECOM				RE\	/IEWE	ED B	/ :		luznial Faris k				ETION DEPTH: 4.57 m ETION DATE: 12/2/14 Page	1 of 1

PRO	JECT:	Waverley Underpass		С	LIEN	NT: C	ity of	Winn	nipeg						TES	STHOLE NO: TH14-3	32
		: UTM: 14U, 5523594 m N, 6309	979 m E												PR	OJECT NO.: 6032114	48
		TOR: Maple Leaf Drilling Ltd.				IOD:								7		EVATION (m):	
SAME	PLE T	YPE GRAB	SHELBY TUBE	\square	SPL	IT SPC	ON		В	ULK		ı		NO RE		RY CORE	
DEPTH (m)	SOIL SYMBOL	SOIL DESCR	IPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	◆ SF 0 2 16 1	◇ Dyna PT (Star (Blov 20 40 ■ Tota (7 18	Becker amic C ndard I vs/300 0 6 al Unit kN/m ³	cone ♦ Pen Te mm) 0 8 Wt ■)	est) ♦ 0 100		+ Tor X C □ Lab △ Pock ♣ Field (H	HEAR STR rvane + QU/2 × o Vane □ set Pen. △ d Vane � kPa)		COMMENTS	DEPTH
0		SAND (FILL) - gravelly, trace cobble, t	race organics						<u> </u>				:	100 15	0 200		
- - - -		CLAY (FILL) - some gravel															- - - -
-		- grey, moist, frozen									· 						-
- 1 -																	1-
- - -																	-
- 2 -		- cobble (200 mm in dia., angular) at 2	m		G230												2-
- - - - -		- brown to grey, moist, firm - high plasticity - trace sulphates															-
N.GDT 1/12/15					G231				•								3-
NIMA WIN 14 AND																	4-
SE III- TEST HOLE		END OF TEST HOLE AT 4.6 m IN CL/NOTES: 1. Seepage was observed at 2.0 m. 2. Sloughing was observed at 2.0 m.			G232												-
LOG OF TEST HOLE WAVERLEY UP - PHASE III- TEST HOLE LOGS - GPJ UMA WINN GDT 1/12/15		Test hole backfilled with cuttings an with bentonite at surface.	u silica sand, and sealed														5
롸																	
TEST:		. =				1	LOC	GED	BY:	Aaro	n Kal	uzniał	(C	OMPLE	ETION DEPTH: 4.57 m	
G OF		A=COM					RE\	/IEWE	D B	/ :						ETION DATE: 12/2/14	
의							PRO	JJEC1	EN(JINE	ER: I	Faris k	(halil			Page	1 of 1