## **APPENDIX 'A' - GEOTECHNICAL INVESTIGATION REPORT**

### LOGAN AVENUE PAVEMENT GEOTECHNICAL INVESTIGATION REPORT

The geotechnical report is provided to aid in the Contractor's evaluation of the existing pavement structure and/or soil conditions. The information presented is considered accurate at the locations shown on the Drawings and at the time of drilling. However, variations in pavement structure and/or soil conditions may exist between test holes and fluctuations in groundwater levels can be expected seasonally and may occur as a result of construction activities. The nature and extent of variations may not become evident until construction commences.

## **GEOTECHNICAL INVESTIGATION REPORT**

Appendix A Geotechnical Investigation February 2, 2016

# Appendix A GEOTECHNICAL INVESTIGATION



#### ORIGINAL SHEET - ISO 8.5x11 H - v14.06



Stantec Consulting Ltd. Suite 500, 311 Portage Avenue Winnipeg MB Canada R3B 2B9 Tel. 204.489.5900 Fax. 204.453.9012 www.stantec.com Legend TESTHOLE

## Notes

- IMAGE SOURCE: GOOGLE MAPS
- SITE: LOGAN AVENUE FROM KEEWATIN STREET TO BLAKE STREET

#### Client/Project

CITY OF WINNIPEG 2016 REGIONAL STREET RENEWAL PROGRAM WINNIPEG, MB Figure No. 1 Title TESTHOLE LOCATION PLAN



#### ORIGINAL SHEET - ISO 8.5x11 H - v14.06



Stantec Consulting Ltd. Suite 500, 311 Portage Avenue Winnipeg MB Canada R3B 2B9 Tel. 204.489.5900 Fax. 204.453.9012 www.stantec.com Legend TESTHOLE

## Notes

- IMAGE SOURCE: GOOGLE MAPS
- SITE: LOGAN AVENUE FROM KEEWATIN STREET TO LOGAN STREET

#### Client/Project

CITY OF WINNIPEG 2016 REGIONAL STREET RENEWAL PROGRAM WINNIPEG, MB Figure No. 2 Title

TESTHOLE LOCATION PLAN

#### TABLE 1 2016 REGIONAL STREET RENEWAL PROGRAM LOGAN AVENUE FROM KEEWATIN STREET TO BLAKE STREET GEOTECHNICAL INVESTIGATION

		Paveme	ent Surface	Paveme	ent Structure		Sample	Moisture		Particle Si	ze Analysis			Atterberg Lim	its
Testhole ID	Testhole Location	Туре	Thickness (mm)	Туре	Thickness (mm)	Sample Description	Depth (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH01	Logan Avenue 25.5 m East of Northeast corner of Keewatin Street and Logan Avenue 4.5 m South of North curb	Asphalt Concrete	245 190	-	-	-	-	-	-	-	-	-	-	-	-
TH02	Logan Avenue 4.5 m North of South curb from property lines 1688 and 1692 Logan Avenue	Asphalt Concrete	250 340	-	-	-	-	-	-	-	-	-	-	-	-
TH03	Logan Avenue 8.5 m North of South curb from property lines 1668 and 1672 Logan Avenue	Asphalt Concrete	240 350	-	-	-	-	-	-	-	-	-	-	-	-
TH04	Logan Avenue 4.5 m North of South curb from property lines 1656 and 1660 Logan Avenue	Asphalt Concrete	180 335	-	-	-	-	-	-	-	-	_	_	-	-
TH05	Logan Avenue 8.5 m North of South curb from property lines 1644 and 1648 Logan Avenue	Asphalt Concrete	205 430	-	-	Silt	0.9	18	0.1	9.7	76.2	14.0	24	17	7
TH06	Logan Avenue 4.5 m North of South curb from property lines 1628 and 1632 Logan Avenue	Asphalt Concrete	200 370	-	-	-	-	-	-	-	-	-	-	-	-
TH07	Logan Avenue 8.5 m North of South curb from property lines 1616 and 1620 Logan Avenue	Asphalt Concrete	200 410	-	_	-	-	-	-	-	-	-	-	-	-
TH08	Logan Avenue 4.5 m North of South curb, 0.5 m West from property lines 1600 and 1604 Logan Avenue	Asphalt Concrete	220 385	-	-	-	-	-	-	-	-	-	-	-	-
TH09	Logan Avenue 8.5 m North of South curb from property lines 1580 and 1584 Logan Avenue	Asphalt Concrete	245 320	-	-	-	-	-	_	-	-	-	-	-	-
TH10	Logan Avenue 4.5 m North of South curb from property lines 1558 and 1562 Logan Avenue	Asphalt Concrete	190 385	-	-	-	-	-	-	-	-	-	-	-	-
TH11	Logan Avenue 4.5 m North of South curb, 0.5 m West from property lines 1546 and 1550 Logan Avenue	Asphalt Concrete	225 275	-	-	-	-	-	-	-	-	-	-	-	-
TH12	Logan Avenue 4.5 m North of South curb from property lines 1534 and 1538 Logan Avenue	Asphalt Concrete	215 345	-	-	Clay Fill	0.9	30	2.6	18.2	24.9	54.3	70	24	46



P L	RОЛ ОСА	ECT TION	TH01TESTCity of Winnipeg2016 Regional Street Renewal Program2016 Regional Street Renewal ProgramLogan Avenue from Keewatin Street to BlakeDATE January 14, 2016DRILLING CO. Maple	Stree	I t E	DATUN ELEVA	Ι ΓΙΟΝ				NOR EAS	THIN TING	G		31230	
			DATE January 14, 2010 DRIELING CO. LYaph			LES	🗆 Insi	itu She	ar Vane	(kPa)	🗖 То				es (kPa)	
DEPTH (m)	SOIL TYPE	SYMBOL		ш	ĒR	URE T (%)			enetrome OkPa		ı) )kPa	15	0kPa	20	0kPa	H (ft)
DEPT	SOIL	SOIL S'	SOIL DESCRIPTION	ТҮРЕ	NUMBER	MOISTURE CONTENT (%)	₩ <sub>P</sub> ⊢	-0	• Si	oisture ( andard		tion Te	st, N Va	lue	30 90	DEPTH (ft)
- 0	AS		ASPHALT													0
	со		CONCRETE													-
	-		FILL: brown clay with some silt and some sand, trace gravel													- 2
	FL			GS		24			0							-
- 1 -	-	$\bigotimes$	Soft tan SILT (ML) - trace gravel	XGS		21			0							-
	ML		- trace sand - some clay	GS		20			•							- 4
	-			GS		20			•							_
			Stiff brown fat CLAY (CH)													
- 2 -	СН			GS		35				0						- 6
-				GS		49					o					-
	-		TESTHOLE LOCATION: 25.5 m East of Northeast corner of Keewatin Street and Logan Avenue, 4.5 m South of North curb.													- 8
	-		<ul> <li>No groundwater seepage or soil sloughing was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 2.1 m.</li> </ul>													-
- 3 -	-															- 10
	-															
																12
	Pie	zome	<ul> <li>GS - Grab Sample SPT - Standard Penetration Test ST - Shelby Tube PT - Piston Tube VT - Shear Va</li> <li>Bentonite Drill Cuttings Sand Slou</li> </ul>		. –	ogged by		tor Aba nan Lea			Q		Sta	ant	tec	

P	ROJI	ECT	TH02TESTCity of Winnipeg2016 Regional Street Renewal Program2016 Regional Street Renewal ProgramLogan Avenue from Keewatin Street to Blake			DATUM	ſ					NOI		G	1233		
D	RILI	LING	DATE January 14, 2016 DRILLING CO. Maple	e Lea	f Dr	illing	Ltd.		DRI	ILLIN	G M	ETHO	D_125	mm	SSA		
DEPTH (m)	SOIL TYPE	L SYMBOL	SOIL DESCRIPTION	TYPE S	AMP NUMBER	MOISTURE S CONTENT (%)		cket P	enetro 50kPa W <sub>L</sub>		(kPa 100	)) )kPa	15	0kPa		es (kPa) 0kPa ⊣	DEPTH (ft)
ā	SC	SOIL			Z	MO						Penetra	ation Te	berg Lin st, N Va 50 7		09	
- 0	AS		ASPHALT					10	20	30	4	0					
- 	со		CONCRETE														-
	FL		FILL: brown clay with some silt and some sand, trace gravel														- 2
		X		MGS		20			•								
- 1 -			Soft tan SILT (ML) - trace gravel - trace sand	X GS		20			0		· · · · · · · · · · · · · · · · · · ·						
	ML		- some clay	X GS		19			0								- 4
	-			X GS		19			0		· · · · · · · · · · · · · · · · · · ·						
			Stiff brown fat CLAY (CH)														
•	СН			X GS		40					c	>					6
- 2 -				GS		47						о					
-	-		TESTHOLE LOCATION: 4.5 m North of South curb from property lines 1688 and 1692 Logan Avenue.														-  -  -
	-		NOTE: Testhole moved to Eastbound median lane due to City of Winnipeg underground services.														- 8  -  -
- 3 -	-		<ul> <li>No groundwater seepage or soil sloughing was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 2.1 m.</li> </ul>														- - - - 10
- - - -																	
	San	nple 7	Image: GS - Grab Sample         SPT - Standard Penetration Test           ST         Shalbu Tuba         PT         Picton Tuba         VT         Share Value	<u>  </u>	. –	ogged by		stor Ab				1		<u> </u>		<u></u>	12
	Pie: Bac	zome :kfill	ST - Shelby Tube PT - Piston Tube VT - Shear Var ter Type: Bentonite Drill Cuttings Sand		R	eviewed	by: Gei	man L	eal			Ć		Sta	ant	ec	2

PI LO	RОЛ ОСА	ECT ATION	<b>TH03 TEST</b> City of Winnipeg 2016 Regional Street Renewal Program Logan Avenue from Keewatin Street to Blake DATE January 14, 2016 DRILLING CO. Maple	Stree	t E	DATUM	і ГІОN				NOF EAS	THIN TING	G	<u>1233</u> SSA		
DEPTH (m)	SOIL TYPE	SYMBOL	SOIL DESCRIPTION		AMP		🗆 Insi	itu She cket Pe 5(	ar Vane	(kPa) eter (kPa	<b>D</b> To	orvane		Sample		
- <b>0</b>		Ň	ASPHALT	<b> -</b>	NN	MOI	1	0	• S	tandard	Penetra	ition Te	berg Lir st, N Va 50 7		09	
	AS		CONCRETE	_												-
- - - - 1 -		<i>p</i> <b>B</b> 5	Soft tan SILT (ML) - trace gravel - trace sand - some clay	XGS XGS		16 21		o	0							- 2
- - - -	ML			X GS		21			0							- <b>4</b> <b>4</b> 
	СН		Stiff brown fat CLAY (CH)	XGS XGS		21 46			<b>)</b>		O					- - - 6 -
-			TESTHOLE LOCATION: 8.5 m North of South curb from property lines 1668 and 1672 Logan Avenue.	X GS		52						0				-
			NOTE: Testhole moved to Westbound median lane due to Hydro underground services.													- 8 - - -
- 3 - - 3 -			<ul> <li>No groundwater seepage or soil sloughing was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 2.1 m.</li> </ul>													- - - 10 -
																- 12
	Sample Type: GS - Grab Sample SPT - Standard Penetration Test       Logged by: Nestor Abarca         ST - Shelby Tube       PT - Piston Tube       VT - Shear Vane Test         Piezometer       Bentonite       Drill Cuttings       Sand         Backfill Type:       Drill Cuttings       Sand       Slough												Sta	ant	ec	

PI Lo	RОЛ ЭСА	ECT TIOI	TH04 TEST City of Winnipeg 2016 Regional Street Renewal Program Logan Avenue from Keewatin Street to Blake	Stree	r t E	DATUN ELEVA	Ι ΓΙΟΝ				NOR EAS	ГING	G		31230	
D	RILI	LING	DATE January 15, 2016 DRILLING CO. Maple													
		Ы		S	AMP					ne (kPa) neter (kPa		rvane c	on Grab	Sample	es (kPa)	
H (m	TYPΕ	SYMBOL		ш	ШШ	URE Т (%)		50	0kPa	10	OkPa	15	0kPa	20	0kPa	Н (ff)
DEPTH (m)	SOIL TYPE	SOIL S'	SOIL DESCRIPTION	ТҮРЕ	NUMBER	DISTI TEN	W <sub>P</sub>	w	W <sub>L</sub>	Moisture	Content	& Atter	bera Lin	nits		DEPTH (ft)
	0,	S			z	MOISTURE CONTENT (%)		0	•	Standard	Penetra	tion Te	st, N Va	lue		
- 0	AS		ASPHALT				1	0	20	30 4	0 5	0 6	50 7	08	0 90	0
-	AS	PL	CONCRETE													-
=	со	A A A A	CONCRETE													-
-																-
			FILL: brown clay with some silt and some sand,	-												- 2
=	FL	$\bigotimes$	trace gravel													-
-		$\bigotimes$		GS		22			0							-
- 1 -			Soft tan SILT (ML)	GS		23			0							-
-			- trace gravel - trace sand													E
-			- some clay	XGS		23			0							- 4
-																-
	ML															_
-				X GS		22			0							-
-																-
-				GS		24			0							- 6
- 2 -	GU		Stiff brown fat CLAY (CH)													-
-	СН			GS		48					0					-
-			TESTHOLE LOCATION: 4.5 m North of South curb from property lines 1656 and 1660 Logan													-
-			Avenue.													- 8
																- 0
-			• No groundwater seepage or soil sloughing was observed during or upon completion of drilling.													-
-			• Testhole terminated at a depth of 2.1 m.													-
=																L
- 3 -																- 10
-																-
-																-
-																F
																-
	San	nple	Fype: GS - Grab Sample SPT - Standard Penetration Test	<u>  </u> по Т-	<u>ـ</u>	ogged by		tor Aba				<u>ہ</u>	~ -			12
	Pie: Bac	zome kfill	ST - Shelby Tube PT - Piston Tube VT - Shear Var ter Type: Bentonite Drill Cuttings Sand		R	eviewed	by: Gerr	man Lea	al		Q		Sta	ant	tec	

P L	ROЛ ОСА	ECT TIOI	TH05TESTCity of Winnipeg2016 Regional Street Renewal ProgramN Logan Avenue from Keewatin Street to BlakeDATEJanuary 14, 2016DRILLING CO.	Stree	t E	DATUM	Ι ΓΙΟΝ					NO EA	RTHI STINC	ū _			
			DATE January 14, 2010 DRIELING CO. IMaph		AMP		🗆 Ins	itu She	ear Va	ane (l	kPa)	T D			b Sample		)
DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	ТҮРЕ	NUMBER	MOISTURE CONTENT (%)	W <sub>P</sub>	W	0kPa $W_L$	Moi Sta	10 sture (	0kPa Conter Peneti	nt & Att ration ⊺	50kPa erberg L Fest, N V	imits ⁄alue	00kPa	DEPTH (ft)
- 0	AS		ASPHALT					10	20	30	, 4	10	50	60	70 8	30 9	0
	со		CONCRETE														- - - - - 2
			Soft tan SILT (ML) - trace gravel	XGS		22			0								
- 1 -	ML		<ul> <li>trace sand</li> <li>some clay</li> <li>Particle Size Analysis at 0.9 m: 0.1% Gravel, 9.7%</li> <li>Sand, 76.2% Silt, 14.0% Clay</li> </ul>	XGS		18		E.	<b>)</b>								
				XGS		19			o								- <b>4</b>  -  -
				XGS		20			0								-
- 2 -	СН		Firm brown fat CLAY (CH)	XGS		34					o						- 6 -
			TESTHOLE LOCATION: 8.5 m North of South	GS		39					с	<b>)</b>			,		
	-		curb from property lines 1644 and 1648 Logan Avenue.														- 8
	-		<ul> <li>No groundwater seepage or soil sloughing was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 2.1 m.</li> </ul>														-
- 3 -	-																-  -  -10
	Sar	nple	Type: GS - Grab Sample SPT - Standard Penetration Test			.ogged by	/: Nes	tor Aba	arca								12
	Pie	zome	ST - Shelby Tube PT - Piston Tube VT - Shear Va		+	eviewed						Ć		St	ant	tec	2

Pl Le	RОЛ ОСА	ECT TION	TH06TESTCity of Winnipeg2016 Regional Street Renewal Program2016 Regional Street Renewal ProgramLogan Avenue from Keewatin Street to BlakeDATEJanuary 14, 2016DRILLING CO.Maple	Stree	E t E	DATUM LEVA	ι ΓΙΟΝ				NOR EAST			<u>1233</u>		
DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	ζς TYPE	NUMBER	MOISTURE S CONTENT (%)	△ Poo	ket Pe 50 ₩	netrom DkPa ₩L → N ● S	<b>//oisture (</b> Standard	a) )kPa Content	tion Tes	kPa erg Lin t, N Va	200 nits lue	0kPa ⊣	DEPTH (ft)
- - -	AS CO		ASPHALT													
- 1 -	FL		FILL: brown clay with some silt and some sand, trace gravel Soft tan SILT (ML)	XGS XGS		26 27			0							- <b>2</b>
- - - -	ML		<ul> <li>trace gravel</li> <li>trace sand</li> <li>some clay</li> </ul>	XGS XGS		24			0							- <b>4</b> - - - -
- 2 - -	-		TESTHOLE LOCATION: 4.5 m North of South	XGS XGS		24			o							- 6 - - -
- - - -	-		curb from property lines 1628 and 1632 Logan Avenue. NOTE: Testhole moved to Eastbound median lane due to City of Winnipeg underground services.													- - - - -
- 3 -	-		<ul> <li>No groundwater seepage or soil sloughing was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 2.1 m.</li> </ul>													- - - - -
			Type: GS - Grab Sample SPT - Standard Penetration Test ST - Shelby Tube PT - Piston Tube VT - Shear Va		F -	ogged by eviewed		tor Abai nan Lea			-			ant		- 12
	Pie: Bac	zome kfill	ter Type: Bentonite Drill Cuttings Sand Slou	gh		c ric wea	oy. Gen						τι	1111	.ec	-

Pl L(	ROJE OCA	ECT TIO	<b>TH07 TEST</b> City of Winnipeg 2016 Regional Street Renewal Program Logan Avenue from Keewatin Street to Blake	Stree	I t E	DATUM	ί ΓΙΟΝ					NOI EAS	RTHIN STING			31230	
D	RILL I	.INC	DATE January 14, 2016 DRILLING CO. Maple			-											
(		ОГ		S.	AMP		□ Ins △ Poo		ear Va enetro				orvane	on Gra	o Sampl	es (kPa)	
TH (m	TΥΡΕ	SYMBOL	SOIL DESCRIPTION	μ	ER	URE T (%)		5	50kPa		100	)kPa	15	50kPa	20	)0kPa	DEPTH (ft)
DEPTH (m)	SOIL TYPE	SOIL S	SUL DESCRIPTION	TYPE	NUMBER	MOISTURE CONTENT (%)	₩ <sub>P</sub>	W	₩ <sub>L</sub>	Mois	ture (	Conten	t & Atte	rberg L	imits		DEPT
		Ň			2	₽Ö	1	10	• 20	Stan 30				est, N V 60		80 9	0
- 0	AS		ASPHALT														
-		<i>р</i> Ц	CONCRETE														
-		A 14 A															
	CO	A 4 4															
-			FILL: brown clay with some silt and some sand,	$\left  \right $													- 2
-	FL	$\bigotimes$	trace gravel	GS		12		0									
-		$\left  \right\rangle$	Soft tan SILT (ML)	XGS		22			0								
- 1 -			- trace gravel														-
-			- trace sand - some clay														4
-				GS		22			0								
	L.																-
-	ML			GS		27				0							
-																	
-				GS		22			0								- 6
- 2 -																	
-	-		TESTHOLE LOCATION: 8.5 m North of South	GS		24			0								
-			curb from property lines 1616 and 1620 Logan														-
-			Avenue.														- 8
			NOTE: Testhole moved to Westbound median lane due to Hydro underground services.														
-									•••••								
-			• No groundwater seepage or soil sloughing was observed during or upon completion of drilling.														
- 3 -	-		• Testhole terminated at a depth of 2.1 m.														10
-																	- 10  -
-																	-
-																	
	San	nple	Type: GS - Grab Sample SPT - Standard Penetration Test		L	ogged by	: Nes	tor Ab	arca			1				<u>                                      </u>	12
	Piez Bac	zome kfill	ST - Shelby Tube PT - Piston Tube VT - Shear Va ter Type: Bentonite Drill Cuttings Sand		R	eviewed	by: Ger	man Le	eal			Ć		St	an	teo	2

P. L	RОЛ ОСА	ECT TIOI	TH08TESTCity of Winnipeg2016 Regional Street Renewal ProgramN Logan Avenue from Keewatin Street to Blake 3A DATE January 14, 2016DRILLING CO. Maple	Stree	t E	DATUM	Ι ΓΙΟΝ					NO EAS	RTHI STIN	G			12300	
D			DATE January 14, 2010 DRILLING CO. IMaple		AMP	-	🗆 Ins	itu She	ar Va	ine (kP	Pa)	П т					s (kPa)	
DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	ТҮРЕ	NUMBER	MOISTURE CONTENT (%)			OkPa WL		100	kPa		150kP			kPa	DEPTH (ft)
	0	SC			z	COMC		0	• 20			Penetr		Test, N 60		e	) 9(	0
- 0	AS		ASPHALT															
	со		CONCRETE															-
			FILL: brown clay with some silt and some sand,	-														2
		$\bigotimes$	trace gravel	GS	6	30				0								-
- 1 -	FL		* * *	XGS	 	30				0								-
	-		Soft tan SILT (ML) - trace gravel	XGS		22			0									- 4
	ML		- trace sand - some clay	XGS	6	21			0									-
	СН		Stiff brown fat CLAY (CH)	GS		34				<	>							
	ML			GS		28				0								- 6
- 2 -	СН		Stiff brown fat CLAY (CH)	GS		43						o						-
-	-		TESTHOLE LOCATION: 4.5 m North of South curb, 0.5 m West from property lines 1600 and 1604 Logan Avenue.															- 8
	-		NOTE: During coring activities, wooden rail tie was observed underneath the asphalt. Testhole moved 0.5 m west from original location.															
- 3 -	-		<ul> <li>No groundwater seepage or soil sloughing was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 2.1 m.</li> </ul>															- 10
- - -	-																	- 12
I			Type: GS - Grab Sample SPT - Standard Penetration Test ST - Shelby Tube PT - Piston Tube VT - Shear Var			ogged by eviewed		tor Aba man Lea				(		St	ta	nt	ec	
	Pie Bac	zome	Type: Bentonite Drill Cuttings Sand	gh	H								∕		LU			-

Pl L	ROЛ ОСА	ECT TIOI	TH09TESTCity of Winnipeg2016 Regional Street Renewal Program2016 Regional Street Renewal ProgramV Logan Avenue from Keewatin Street to BlakeDATE January 14, 2016DRILLING CO. Maple	Stree	I t E	DATUM	ί ΓΙΟΝ					NO EA	STIN	IING IG		_1233 SSA		
DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	TYPE	NUMBER	MOISTURE CONTENT (%)	₩p ⊢	ket Pe	enetro 0kPa ₩L I	meter Mois Stan	ture (	a) OkPa Conter Peneti	nt & A ration	150	kPa erg Lir :, N Va	nits alue	0kPa 	DEPTH (ft)
- 0	AS	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	ASPHALT CONCRETE	_			1	0	20	30	4	10	50	60	7	70 8	09	
- 1 -			Soft tan SILT (ML) - trace gravel - trace sand - some clay	XGS XGS		22			0									- 2 - - - -
	ML			XGS XGS		22			0 0									- <b>4</b> 
- 2 -	СН		Stiff brown fat CLAY (CH) TESTHOLE LOCATION: 8.5 m North of South	XGS XGS		23 50			0				0					- 6
			<ul> <li>No groundwater seepage or soil sloughing was observed during or upon completion of drilling.</li> </ul>															- - - 8 - -
- 3 -			• Testhole terminated at a depth of 2.1 m.															- - - - - - - - - - - -
	Pie	zome	Type: GS - Grab Sample SPT - Standard Penetration Test ST - Shelby Tube PT - Piston Tube VT - Shear Va ter Type: Bentonite CDrill Cuttings Sand ASlou		. –	ogged by eviewed		tor Aba man Le:							Sta	ant	ec	12

P L	ROJI OCA	ECT TION	TH10TESTCity of Winnipeg2016 Regional Street Renewal Program2016 Regional Street Renewal Program4 Logan Avenue from Keewatin Street to BlakeDATE January 15, 2016DRILLING CO. Maple	Stree	I I I I I I	DATUN	ί				NOF EAS	DJECT RTHING TING D_125	G		312306	<u>6</u>
DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	S, TYPE	NUMBER	MOISTURE A CONTENT (%)	△ Poo	ket Pe 5( ₩ ⊖	• Sta	ter (kPa 100 bisture ( andard	a) )kPa Content Penetra	15 & Atter ation Te	0kPa berg Lir st, N Va	200 mits alue	es (kPa) 0kPa ⊣ 60 90	DEPTH (ft)
	AS CO		ASPHALT CONCRETE													- 0    
- 1 -	-		FILL: brown clay with some silt and some sand, trace gravel	XGS XGS		14		o	O							- 2
	FL			XGS		23			0							- <b>4</b> <b>4</b>
- 2 -	ML		Soft tan SILT (ML) - trace gravel - trace sand - some clay	XGS		23			0							- - 6 -
- - -	- -		TESTHOLE LOCATION: 4.5 m North of South curb from property lines 1558 and 1562 Logan Avenue. NOTE: Testhole moved to Eastbound median lane			23			0							- - - - 8
- 3 -	-		<ul> <li>due to City of Winnipeg underground services.</li> <li>No groundwater seepage or soil sloughing was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 2.1 m.</li> </ul>													- - - - - - 10
· · ·																
	Pie	zome	Cype: GS - Grab Sample SPT - Standard Penetration Test ST - Shelby Tube PT - Piston Tube VT - Shear Va ter Type: Bentonite Drill Cuttings Sand		+	ogged by		tor Aba			Q		Sta	ant	tec	- 12

Pl Le	ROЛ ОСА	ECT TION	TH11TESTCity of Winnipeg2016 Regional Street Renewal Program2016 Regional Street Renewal ProgramLogan Avenue from Keewatin Street to BlakeDATE January 15, 2016DRILLING CO. Maple	Stree	I st E	DATUN ELEVA	1 ГІОN				NOR EAS	DJECT THING TING 125	G		31230	
			DATE Sundary 12, 2010 DATE NO CO. IMaple			LES	🗆 Insi	tu She	ar Vane netrome	(kPa)	🗖 To				es (kPa)	
DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	ТҮРЕ	NUMBER	MOISTURE CONTENT (%)	Wp	W	• Sta	b <b>isture (</b> andard	OkPa Content Penetra	& Atter	st, N Va	nits lue	0kPa ⊣ 30 90	DEPTH (ft)
- 0 - -	AS		ASPHALT CONCRETE						20 3						80 90	0
	CO		FILL: brown clay with some silt and some sand, trace gravel													- - 2
	FL	$\bigotimes$		GS		14		0								-
- 1 -	-			GS		25			O							-
-			Soft tan SILT (ML) - trace gravel	GS		24			0							- 4
	ML		- trace sand - some clay	GS		23			0							-
-	IVIL			GS		20			0							- - 6 -
- 2 -				GS		22			o							-
-	-		TESTHOLE LOCATION: 4.5 m North of South curb, 0.5 m West from property lines 1546 and 1550 Logan Avenue.													8
	-		NOTE: Testhole moved to Eastbound median lane due to Hydro and City of Winnipeg underground services. During coring activities, wooden rail tie was observed below the asphalt. Testhole moved 0.5													-
- 3 -	-		<ul><li>m from original location.</li><li>No groundwater seepage or soil sloughing was</li></ul>													- 10
-	-		<ul><li>observed during or upon completion of drilling.</li><li>Testhole terminated at a depth of 2.1 m.</li></ul>													-
																- 12
	Pie	zomet	<ul> <li>GS - Grab Sample SPT - Standard Penetration Test ST - Shelby Tube PT - Piston Tube VT - Shear Van ter Type: Bentonite Drill Cuttings Sand Sloup</li> </ul>		<u>ـ</u>	ogged by		tor Abai nan Lea			Q		Sta	ant	tec	

TH12       TESTHOLE       RECORD         CLIENT       City of Winnipeg       DATUM													EASTING				
		YMBOL	SOIL DESCRIPTION		AMP	LES	$\Box \text{ Insitu Shear Vane (kPa)} \\ \triangle \text{ Pocket Penetrometer (kPa)}$					Torvane on Grab Samples (kPa)					
DEPTH (m)	SOIL TYPE			ТҮРЕ	NUMBER	MOISTURE CONTENT (%)	W <sub>P</sub>	w	0kPa $W_L$ $\bullet$ 20	Mois	<b>ture (</b> dard	Peneti	nt & Atte	50kPa erberg L fest, N V 60	imits ⁄alue	0kPa ⊣ 30 9	DEPTH (ft)
- 0	AS		ASPHALT						20	30	4		50		/0 c		0
	cc		CONCRETE														-
			FILL: brown clay with some silt and some sand, trace gravel	Mag		22											- 2
- 1 -	FL		Particle Size Analysis at 0.9 m: 2.6% Gravel, 18.2% Sand, 24.9% Silt, 54.3% Clay	XGS XGS		32 30			F		)						
																	- 4
	-			GS		29				o							
- 2 -	MI		Soft tan SILT (ML) - trace gravel - trace sand	XGS		27				o							-
			- some clay Stiff brown fat CLAY (CH)	GS		22			0								- 6 - -
	CH		TESTHOLE LOCATION: 4.5 m North of South curb from property lines 1534 and 1538 Logan Avenue.	GS		37					o						-
	-		<ul> <li>No groundwater seepage or soil sloughing was observed during or upon completion of drilling.</li> <li>Testhole terminated at a depth of 2.1 m.</li> </ul>														- 8 - - - -
- 3 -																	- 10
																	12
	Pie	zome	Type: GS - Grab Sample SPT - Standard Penetration Test ST - Shelby Tube PT - Piston Tube VT - Shear Van ter Type: Bentonite Drill Cuttings Sand	. –	Logged by: Nestor Abarca Reviewed by: German Leal						Stantec						





Photo 1 – Core sample from Testhole TH01



Photo 2 – Core sample from Testhole TH02





Photo 3 – Core sample from Testhole TH03



Photo 4 – Core sample from Testhole TH04





Photo 5 – Core sample from Testhole TH05



Photo 6 – Core sample from Testhole TH06





Photo 7 – Core sample from Testhole TH07



Photo 8 – Core sample from Testhole TH08





Photo 9 – Core sample from Testhole TH09



Photo 10 – Core sample from Testhole TH10





Photo 11 – Core sample from Testhole TH11



Photo 12 – Core sample from Testhole TH12