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APPENDIX 'A' GEOTECHNICAL REPORT





2013 LOCAL STREET RENEWALS PARR STREET MCADAM AVENUE TO RUPERTSLAND AVENUE GEOTECHNICAL INVESTIGATION

Prepared for

MMM GROUP LIMITED 111 – 93 LOMBARD AVENUE WINNIPEG, MANITOBA R3B 3B1

Prepared by

THE NATIONAL TESTING LABORATORIES LIMITED
199 HENLOW BAY
WINNIPEG, MANITOBA
R3Y 1G4





THE NATIONAL TESTING LABORATORIES LIMITED
LIMITED Established in 1923

Project No.MMM-1307	Drawn by: NB	Figure: 1
Date: August 2, 2013	Reviewed by: GL	Scale: NTS

Testhole Location Plan 2013 Local Street Renewals Parr Street McAdam Ave. to Rupertsland Ave.



TABLE 1 2013 LOCAL STREET RENEWALS PARR STREET, MCADAM AVENUE TO RUPERTSLAND AVENUE GEOTECHNICAL INVESTIGATION

Testhole ID	Testhole Location		Pavement Surface		Pavement Structure Material		Sample	Moisture Content	Particle Size Analysis				Atterberg Limits		
Testriole ID	resultitle Location	Туре	Thickness (mm)	Туре	Thickness (mm)	Description	Depth (m)	(%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH1	22 m north from northwest corner of Parr Street & McAdam Avenue 1 m from west curb	Concrete	140	-	-	Clayey Silt	0.6	16	0.0	3.2	69.5	27.3	21	17	4
TH2	19 m south from southwest corner of Parr Street & Smithfield Avenue 1 m from west curb	Concrete	150	-	-	-	-	-	-	-	-	-	-	-	-
TH3	18 m north from northeast corner of Parr Street & Smithfield Avenue 1 m from east curb	Concrete	160	-	-	Clay	0.6	35	0.5	4.5	8.3	86.7	93	22	71
TH4	29 m south from southeast corner of Parr Street & Rupertsland Avenue 1 m from east curb	Concrete	170	-	-	-	-	-	-	-	-	-	-	-	-

Project Name: 2013 Local Street Renewals

Project Location: Parr Street, McAdam Avenue to Rupertsland Avenue

Client: MMM Group Limited

Drilling Contractor: Active Drilling and Piling Drilling Method: 125 mm Solid Stem Auger

Testhole Location: 22 m north from northwest corner of Parr Street & McAdam Avenue, 1 m from west curb



Depth (m) Symbol		Description		Particle Size Distribution						● Water Content (%) PL LL				
	0,		Sa	Gra	avel %)	Sand (%)	Silt (%)	Clay (%)		-	50		100	
_		Concrete		N 20	1.20.0	s mess	2 2 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	a va in m		 			I	
-		Clay Fill - black, stiff, moist, medium plasticity - trace organic material	BS	8		(* 1)(* 1),1(*)		A 804 805 600		●29			 	
-		- trace organic material - trace medium sand	BS	3				2 501 505 tod		●26		200 200		
5 -		Clayey Silt - tan, soft, moist, low plasticity								 	 	-	-+-	
-		- trace fine to medium sand	BS	0	.0	3.2	69.5	27.3	8	6	 			
				12.212		12 TOT (CASA)		na ana ana ana		 	ļ 		i L	
0 -			BS	8						<u> </u> 21	 	* * * * * * * * * * * * * * * * * * * *	I	
_									 					
			BS	8						23				
_		Clay - brown, firm, moist, high plasticity		W 400		18 458 8000 I	0 × 10 × 10 × 10 × 10 × 10 × 10 × 10 ×	O EX 8'4 68		 		XX XX		
5 -		Stown, min, moist, mgm placetory	BS	8						 ●33	 			
_				* **		(a. pra 1676)		3 804 804 804						
			BS	8				0 507 505 507 0 509 508 50		●34	4			
) –			BS							+	 - 		- 	
-	////////	No groundwater seepage or soil sloughing was obe Testhole was terminated at a depth of 2.1 m.			ро	n co	mple	tion	of dri	1	1			

Project Location: Parr Street, McAdam Avenue to Rupertsland Avenue

Client: MMM Group Limited

Drilling Contractor: Active Drilling and Piling Drilling Method: 125 mm Solid Stem Auger

Project Name: 2013 Local Street Renewals

Testhole Location: 19 m south from southwest corner of Parr Street & Smithfield Avenue, 1 m from west curb



Depth (m)	Symbol	Description	● Water Content (%)				
	0 4 4 0	Concrete		25 50	75	100	
				100 000 N 100 100 N	es no est so s		
-		Clay Fill	BS	•26			
		black, firm, moist, medium plasticitysome fine to coarse sand	BS	i i		İ	
		- trace coarse gravel	163			Î	
				i i	Ï	i i	
0.5 -		Clayey Silt - tan, soft, moist, low plasticity		+		-+-	
-			BS	•17			
ź							
-							
-		Clay	BS	•34			
1.0 -		- brown, firm, moist, high plasticity - trace fine gravel below 1.5 m			Î Î	_ i _	
1.0		- stiff below 1.7 m					
-]]			
-			BS	●39		I I	
-							
-					10 10 10 10 10 10 10 10 10 10 10 10 10 1		
1.5 -			BS	<u> </u> <u> </u>	- -	- <u>l</u> -	
-							
-							
-			BS	●36		I I	
-				(10 mm m) 10 mm m	THE REST OF S		
2.0 -			BS	+ -	 18		
-		No groundwater connect or sail also white annual the same of the s	J	1 1	<u>T</u>		
9		 No groundwater seepage or soil sloughing was observed during or u Testhole was terminated at a depth of 2.1 m. 	ipon completion o	or arilling.			
-							

Project Name: 2013 Local Street Renewals

Project Location: Parr Street, McAdam Avenue to Rupertsland Avenue

Client: MMM Group Limited

Drilling Contractor: Active Drilling and Piling Drilling Method: 125 mm Solid Stem Auger

Testhole Location: 18 m north from northeast corner of Parr Street & Smithfield Avenue, 1 m from east curb



Depth (m)	Symbol	Description		Sample Type	Particle Size Distribution				● Water Content (%) PL LL				
	0,		ပ်		Gravel (%)	Sand (%)	Silt (%)	Clay (%)		1		LL T	20
		Concrete			(10)	(70)	(70)	(70)	25	50	75	10	0
-				Ē	v porcion o			s was not noted		· · · · · · ·			jana i [
		Clay Fill - black, firm, moist, medium plasticity	В	3S				8 804 KH 6060A	●14	·			[[
1		some fine to coarse sandsome fine to coarse gravelsome silt	В	38				200 000 1400		●33 			
0.5 -		Clay - black, stiff, moist, high plasticity							 +	- +-		 	
-		some silttrace fine graveltrace organic materialgrey below 0.6 m	В	38	0.5	4.5	8.3	86.7		●35			
-		- grey below 0.0 m			s parama a			a ana ana anana		Î		 I	ļ L
-			В	38] 	•33		 	
1.0 -											- - -		
-			В	3S	* ******			* 818 for 61804		●33			
_													
1.5 -			В	3S						29	-	 	
9		Clayey Silt - tan, soft, moist, low plasticity				* 100 100 0		* BOX FOR FORO					
			В	3S				a too too too t	 • 2	2			
					e atendra a	u na ene e		10 10 10 100 E					ļ [
2.0 -			В	38					+ • 2	2		- 1	
e		 No groundwater seepage or soil sloughing was observe. Testhole was terminated at a depth of 2.1 m. 	ed during o	or	upo	n cor	mplet	tion o	f drilli	ng.			

Date Drilled: July 24, 2013

Depth of Testhole: 2.1 m

Logged by: Sothea Bun

Reviewed by: German Leal

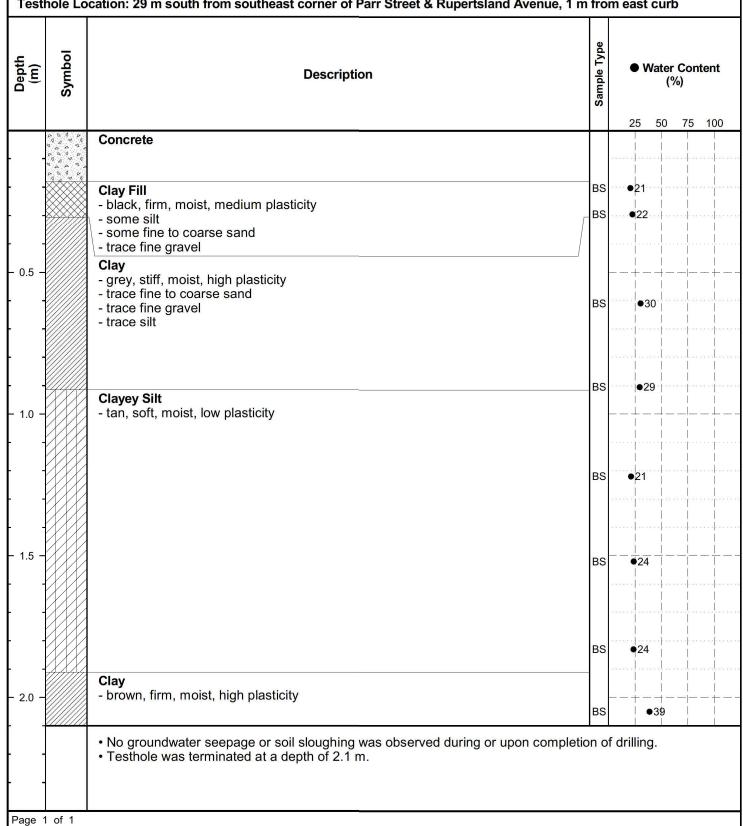
Project Name: 2013 Local Street Renewals

Project Location: Parr Street, McAdam Avenue to Rupertsland Avenue

Client: MMM Group Limited

Drilling Contractor: Active Drilling and Piling Drilling Method: 125 mm Solid Stem Auger

Testhole Location: 29 m south from southeast corner of Parr Street & Rupertsland Avenue, 1 m from east curb







Core sample from Testhole TH1



Core sample from Testhole TH2





Core sample from Testhole TH3



Core sample from Testhole TH4



PARTICLE SIZE ANALYSIS **ASTM D422**

PROJECT: 2013 Local Street Renewals

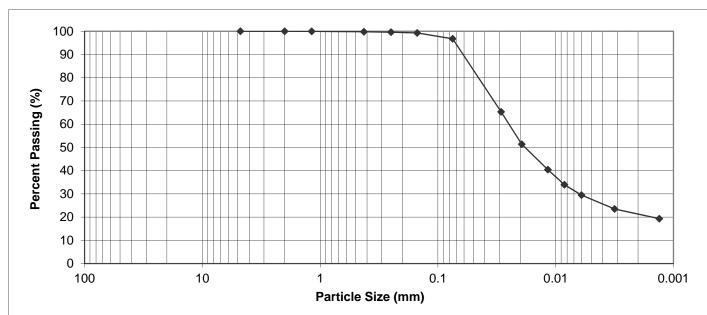
McAdam Ave to Rupertsland Ave

Parr Street

MMM Group Limited 111 - 93 Lombard Avenue Winnipeg, MB R3B 3B1

PROJECT NO.: MMM-1307 Attention: Wally Jackson

SAMPLED BY: Sothea Bun DATE RECEIVED: July 24, 2013 SAMPLE ID: TH1 at 0.6 m **TESTED BY: Nathan Boenders**



PARTICLE	PERCENT	PART	ICLE	PERCENT
SIZE	PASSING	SIZ	ΖE	PASSING
37.50 mm	100.0	1.18	mm	100.0
25.00 mm	100.0	0.425	mm	99.8
19.00 mm	100.0	0.250	mm	99.6
16.00 mm	100.0	0.150	mm	99.3
12.50 mm	100.0	0.075	mm	96.8
9.50 mm	100.0	0.005	mm	27.3
4.75 mm	100.0	0.002	mm	20.9
2.00 mm	100.0	0.001	mm	NT*
	Sand, %			

		Sand, %				
Gravel, % 75 to 4.75 mm	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm	Silt, % <0.075 to 0.005 mm	Clay, % <0.005 mm	Colloids, % < 0.001 mm
0.0	0.0	0.2	3.0	69.5	27.3	NT*

NT* Sample not tested for colloids

August 7, 2013 REVIEWED BY: German E. Leal, B.Sc., P. Eng



PARTICLE SIZE ANALYSIS ASTM D422

MMM Group Limited 111 - 93 Lombard Avenue Winnipeg, MB R3B 3B1 PROJECT: 2013 Local Street Renewals

Parr Street

McAdam Ave to Rupertsland Ave

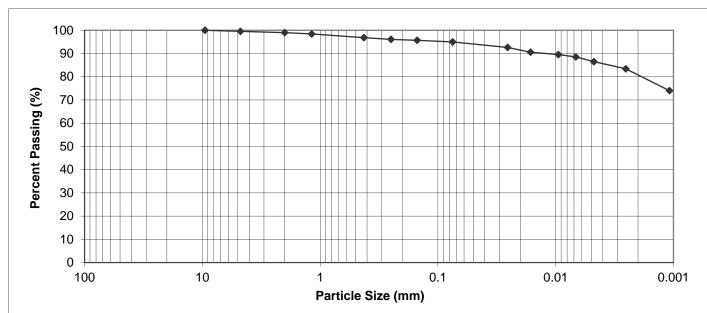
Attention: Wally Jackson PROJECT NO.: MMM-1307

SAMPLED BY: Sothea Bun

SAMPLE ID: TH3 at 0.6 m

DATE RECEIVED: July 24, 2013

TESTED BY: Nathan Boenders



_							
	PART	ΓICLE	PERCENT		PART	ICLE	PERCENT
	SI	ZE	PASSING		SIZ	ΖE	PASSING
	37.50	mm	100.0		1.18	mm	98.4
	25.00	mm	100.0		0.425	mm	96.8
	19.00	mm	100.0		0.250	mm	96.1
	16.00	mm	100.0		0.150	mm	95.7
	12.50	mm	100.0		0.075	mm	95.0
	9.50	mm	100.0		0.005	mm	86.7
	4.75	mm	99.5		0.002	mm	79.9
L	2.00	mm	99.0		0.001	mm	NT*
Ī			Sand, %	-			
	Gravel %				Silt %	Clay %	Colloide %

		Sand, %				
Gravel, % 75 to 4.75 mm	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm	Silt, % <0.075 to 0.005 mm	Clay, % <0.005 mm	Colloids, % < 0.001 mm
0.5	0.5	2.2	1.8	8.3	86.7	NT*

NT* Sample not tested for colloids

August 7, 2013 REVIEWED BY: German E. Leal, B.Sc., P. Eng





2013 LOCAL STREET RENEWALS FRASERS GROVE WOODVALE STREET TO HENDERSON HIGHWAY GEOTECHNICAL INVESTIGATION

Prepared for

MMM GROUP LIMITED 111 – 93 LOMBARD AVENUE WINNIPEG, MANITOBA R3B 3B1

Prepared by

THE NATIONAL TESTING LABORATORIES LIMITED
199 HENLOW BAY
WINNIPEG, MANITOBA
R3Y 1G4





THE NATIONAL TESTING LABORATORIES LABORATORIES
LIMITED Established in 1923

Project No.MMM-1307	Drawn by: NB	Figure: 1		
Date: August 2, 2013	Reviewed by: GL	Scale: NTS		

Testhole Location Plan 2013 Local Street Renewals Frasers Grove Woodvale St. to Henderson Hwy.



TABLE 1 2013 LOCAL STREET RENEWALS (FRASERS GROVE BETWEEN WOODVALE STREET AND HENDERSON HIGHWAY) GEOTECHNICAL INVESTIGATION

Testhole ID	Testhole Location	Pavemer	nt Surface	Pavement Mat	Structure erial	Sample Sample				icle Size	Analys	sis	Α	tterberg L	imits	
Testriole ID	restrible Education	Туре	Thickness (mm)	Туре	Thickness (mm)	Description	Depth (m)	(%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index	
TH1	1 m west from property line between 108 & 112 Frasers Grove	Frasers Grove Asphalt 25 Granular Fill 95 Clay Fill 0.6 2 ^c	OF Clay Fill (Clay Fill 0.6	Clay Fill 0.6 21	21	4.6	11.4	27.6	56.4	62	17	45			
	1 m north from south curb	Concrete	135	Gianulai Fili	33	J	0.0	21	7.0	11.4	27.0	30.4	02	17	45	
TH2	TH2 1 m east from property line between 120 & 124 Frasers Grove	Asphalt	25	_	_	_	_	_		_			_			
1112	1 m north from south curb	Concrete	135	_	_											
TH3	2 m east from property line between 128 & 132 Frasers Grove	Asphalt	25	_	_	_	_		_	_	_	_	_	_	_	_
1110	1 m north from south curb	Concrete	125													
TH4	7.5 m west from property line between 148 & 152 Frasers Grove	Asphalt	30		_	Clay	0.9	32	0.0	0.5	12.6	86.9	83	25	58	
	1 m north from south curb	Concrete	130			Olay	0.5	52	0.0	0.5	12.0	00.5	00	20	58	
TH5	7 m east from property line between 160 & 164 Frasers Grove	Asphalt	20		_		_	_	_	_	_	_	_	_	_	
1113	1 m north from south curb		_				_									
TH6	6 m west from property line between 168 & 172 Frasers Grove	Asphalt	30	_	_	_					_			_		-
	1 m north from south curb	Concrete	110										-			

Project Name: 2013 Local Street Renewals

Project Location: Frasers Grove, Woodvale Street to Henderson Highway

Client: MMM Group Limited

Drilling Contractor: Active Drilling and Piling Drilling Method: 125 mm Solid Stem Auger

Testhole Location: 1 m west from property line between 108 & 112 Frasers Grove, 1 m from south curb



(m)	Symbol	Description	Sample Type		Partic Distri	le Size bution	e 1	•	Water	%)	
			Sa	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	2	-	75	100
	0000	Asphalt	/						1	l l	1
-		Concrete		9 2015 911	is in eas t		S PE EN PRO	. erere e	10 100 1	100 mg 100 mg	
_	0000	Granular Fill		* *******	40 DE CENT		* 804 to 4 Call				.ļ
		- 30 mm maximum aggregate size	BS					●4	į	į	į
1		Clay Fill - brown, firm, moist, high plasticity	BS	0.00000			2 500 500 5000		23	manufan se	
-		- trace organic material									-
0.5 -		- trace fine to coarse sand - trace fine gravel					ļ			 	 - -
0.0		- silty							į	į	į
-			BS	4.6	11.4	27.6	56.4	 	21	-l	
-				* *******			* XI 15X 1535				-
				10 2000 0 2004			000 000 000				I
									1		I
-		Clav	BS	* * * * * * *	63 DE REE A			•	22		+
1.0 -		Clay - black, firm, moist, high plasticity			<u> </u>		ļ				
		- brown below 1.8 m									
-											
-			BS	1 (0.14)			* KIN KIN COL		●34		
											1
				or acceptable			A 1007 1001 A1000				I
-				* 400.400.4	- 10x 2000 x	* *** ******	- KIN 874 696			*** *** ***	
1.5 -			BS		ļ				●30		<u> </u>
			ВЗ						■30		ļ
Ī				* ****			* NOT TO S * COO.		10000		1
-				* 150.00							
				e saisise			2 500 500 5000				
			BS						▶26	Î	İ
-				* 20040		e na mana		DESCRIPTION OF			
2.0 -					ļ						-+-
			BS					9	25	Î	Î
e		 No groundwater seepage or soil sloughing was observed during testhole was terminated at a depth of 2.1 m. 	ng o	r upo	n coi	mplet	tion c	of drill	ing.		_
-											

Date Drilled: July 24, 2013

Depth of Testhole: 2.1 m

Logged by: Sothea Bun

Reviewed by: German Leal

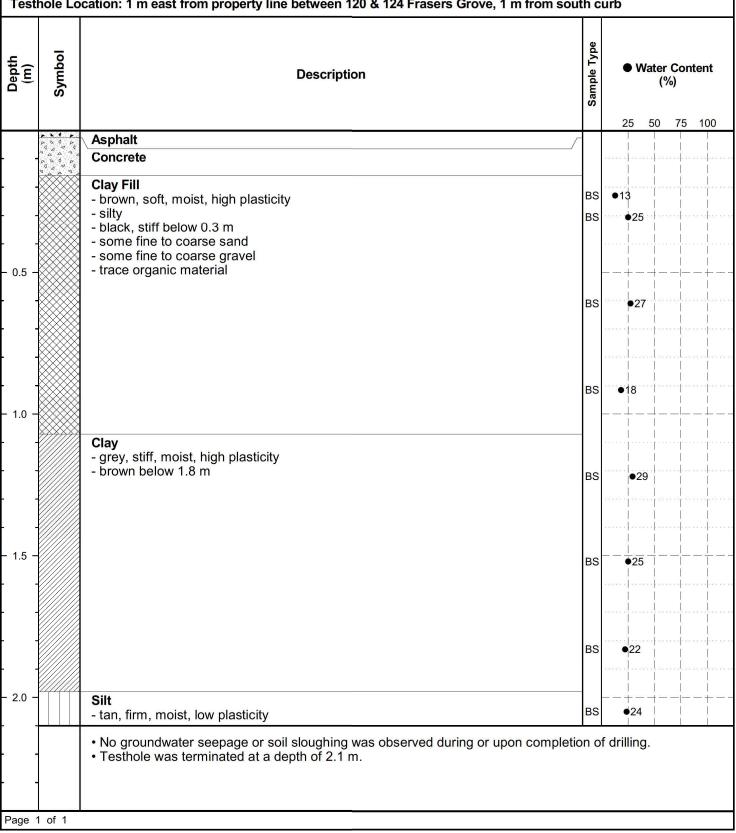
Project Name: 2013 Local Street Renewals

Project Location: Frasers Grove, Woodvale Street to Henderson Highway

Client: MMM Group Limited

Drilling Contractor: Active Drilling and Piling Drilling Method: 125 mm Solid Stem Auger

Testhole Location: 1 m east from property line between 120 & 124 Frasers Grove, 1 m from south curb



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TESTING
LABORATORIES
LIMITED
Exhibits in 1923

Date Drilled: July 24, 2013

Depth of Testhole: 2.1 m

Logged by: Sothea Bun

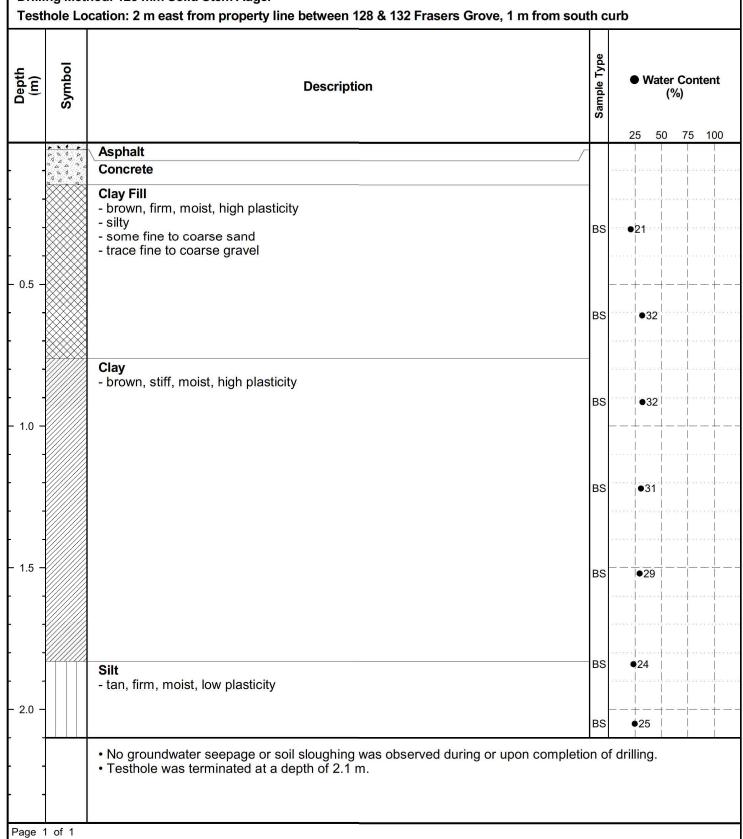
Reviewed by: German Leal

Project Name: 2013 Local Street Renewals

Project Location: Frasers Grove, Woodvale Street to Henderson Highway

Client: MMM Group Limited

Drilling Contractor: Active Drilling and Piling Drilling Method: 125 mm Solid Stem Auger



Project Name: 2013 Local Street Renewals

Project Location: Frasers Grove, Woodvale Street to Henderson Highway

Client: MMM Group Limited

Drilling Contractor: Active Drilling and Piling Drilling Method: 125 mm Solid Stem Auger

Testhole Location: 7.5 m west from property line between 148 & 152 Frasers Grove, 1 m from south curb



(m)	Symbol	Description	Sample Type	j		le Size		● Water Content (%) PL LL				
			"	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	25	50		100	
		Asphalt	_						1		I	
-		Concrete		w port and t	a mesa s	1 10 10 10	I WE LIVE BOOK			or eal va		
-		Clay Fill	BS	8 CH - C - C				•15		E-10 E-10 E-10		
_		brown, firm, moist, high plasticitysilty	BS				1 50 50 540	- •21				
		some fine to coarse sandtrace fine to coarse gravel										
		1807									 	
0.5 -		Clay - grey, stiff, moist, high plasticity						+-	- + -	-	-+-	
_		- trace fine to medium sand - some silt	BS	,				•	33			
_		- brown below 1.7 m				e ex exec	* KI EK CAS					
				u maranea i			s and and entry.		l			
									1		1	
•			BS	0.0	0.5	12.6	86.9	10	32		1	
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-												
			D0				KIL KA CICA				ex expens	
			BS					•	32		I I	
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1.5 -			BS					 	30 30		$-\frac{I}{I}$	
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							a ana ana arang					
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-			BS			of the contribution	a and the shales	 •:	30	DE NOTE AND	I	
-				× 100 × 100 ×		a na mana	es es esc.					
2.0 -		Silt						+-	-	-	-+	
8		- tan, firm, moist, low plasticity	BS					•24	1	Ī	Ĭ	
9		 No groundwater seepage or soil sloughing was observed duri Testhole was terminated at a depth of 2.1 m. 	ng o	r upo	n cor	mplet	ion of	drillin	g.			



Date Drilled: July 24, 2013

Depth of Testhole: 2.1 m

Logged by: Sothea Bun

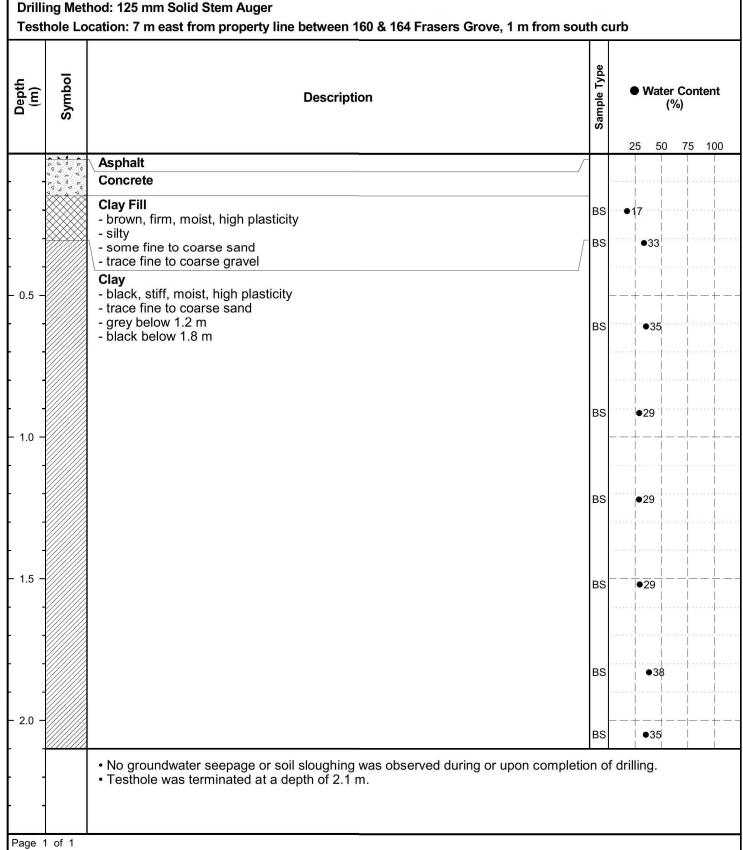
Reviewed by: German Leal

Project Name: 2013 Local Street Renewals

Project Location: Frasers Grove, Woodvale Street to Henderson Highway

Client: MMM Group Limited

Drilling Contractor: Active Drilling and Piling Drilling Method: 125 mm Solid Stem Auger



Date Drilled: July 24, 2013

Depth of Testhole: 2.1 m

Logged by: Sothea Bun

Reviewed by: German Leal

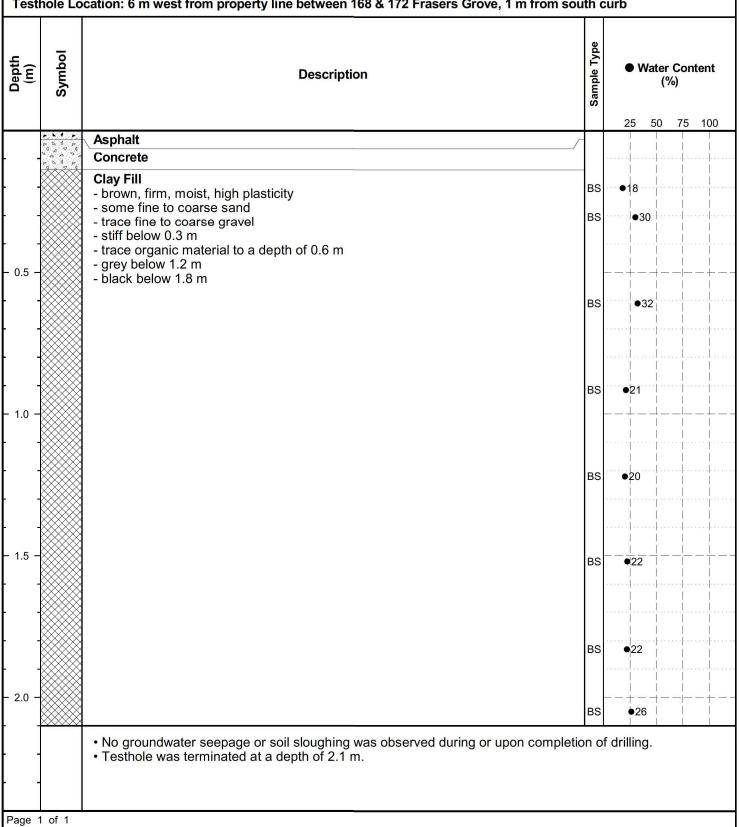
Project Name: 2013 Local Street Renewals

Project Location: Frasers Grove, Woodvale Street to Henderson Highway

Client: MMM Group Limited

Drilling Contractor: Active Drilling and Piling Drilling Method: 125 mm Solid Stem Auger

Testhole Location: 6 m west from property line between 168 & 172 Frasers Grove, 1 m from south curb







Core sample from Testhole TH1



Core sample from Testhole TH2





Core sample from Testhole TH3



Core sample from Testhole TH4





Core sample from Testhole TH5



Core sample from Testhole TH6



PARTICLE SIZE ANALYSIS ASTM D422

Woodvale St to Henderson Hwy

PROJECT: 2013 Local Street Renewals

Frasers Grove

MMM Group Limited 111 - 93 Lombard Avenue Winnipeg, MB R3B 3B1

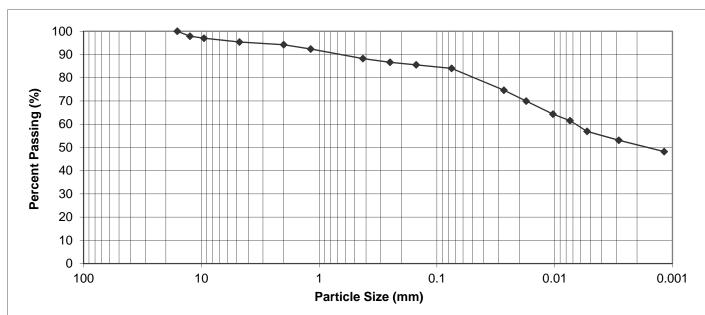
Attention: Wally Jackson PROJECT NO.: MMM-1307

SAMPLED BY: Sothea Bun

SAMPLE ID: TH1 at 0.6 m

DATE RECEIVED: July 24, 2013

TESTED BY: Nathan Boenders



PART	ICLE	PERCENT	PART	ICLE	PERCENT
SIZ	ĽΕ	PASSING	SIZ	ΖE	PASSING
37.50	mm	100.0	1.18	mm	92.3
25.00	mm	100.0	0.425	mm	88.2
19.00	mm	100.0	0.250	mm	86.6
16.00	mm	100.0	0.150	mm	85.5
12.50	mm 97.9		0.075	mm	84.0
9.50	mm	97.0	0.005	mm	56.4
4.75	mm	95.4	0.002	mm	50.6
2.00	2.00 mm		0.001	mm	NT*
		Sand. %			

ı			Sand, %			01 01	
	Gravel, % 75 to 4.75 mm	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm	Silt, % <0.075 to 0.005 mm	Clay, % <0.005 mm	Colloids, % < 0.001 mm
	4.6	1.2	6.0	4.2	27.6	56.4	NT*

NT* Sample not tested for colloids

August 7, 2013 REVIEWED BY: German E. Leal, B.Sc., P. Eng



PARTICLE SIZE ANALYSIS **ASTM D422**

MMM Group Limited 111 - 93 Lombard Avenue Winnipeg, MB R3B 3B1

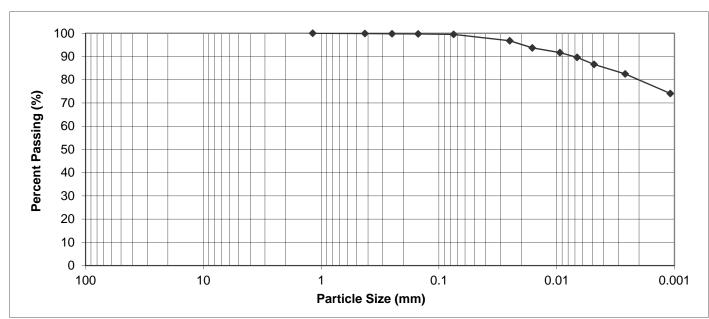
PROJECT: 2013 Local Street Renewals

Frasers Grove

Woodvale St to Henderson Hwy

PROJECT NO.: MMM-1307 Attention: Wally Jackson

SAMPLED BY: Sothea Bun SAMPLE ID: TH4 at 0.9 m DATE RECEIVED: July 24, 2013 **TESTED BY: Nathan Boenders**



PARTICLE	PERCENT	PART	ICLE	PERCENT
SIZE	PASSING	SIZ	ΖE	PASSING
37.50 mm	100.0	1.18	100.0	
25.00 mm	100.0	0.425	mm	99.9
19.00 mm	100.0	0.250	mm	99.8
16.00 mm	100.0	0.150	mm	99.7
12.50 mm	100.0	0.075	mm	99.5
9.50 mm	100.0	0.005	mm	86.9
4.75 mm	100.0	0.002	mm	79.1
2.00 mm	100.0	0.001	mm	NT*
	Sand %			

		Sand, %				
Gravel, % 75 to 4.75 mm	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm	Silt, % <0.075 to 0.005 mm	Clay, % <0.005 mm	Colloids, % < 0.001 mm
0.0	0.0	0.1	0.4	12.6	86.9	NT*

NT* Sample not tested for colloids

August 7, 2013 REVIEWED BY: German E. Leal, B.Sc., P. Eng





2013 LOCAL STREET RENEWALS DUNROBIN AVENUE GOLSPIE STREET TO RALEIGH STREET GEOTECHNICAL INVESTIGATION

Prepared for

MMM GROUP LIMITED 111 – 93 LOMBARD AVENUE WINNIPEG, MANITOBA R3B 3B1

Prepared by

THE NATIONAL TESTING LABORATORIES LIMITED
199 HENLOW BAY
WINNIPEG, MANITOBA
R3Y 1G4





THE
NATIONAL
TESTING
<u>LABORATORIES</u>
<u>LIMITED</u>
Established in 1923

Project No.MMM-1307	Drawn by: NB	Figure: 1
Date: August 1, 2013	Reviewed by: GL	Scale: NTS

Testhole Location Plan 2013 Local Street Renewals Dunrobin Avenue Golspie Street to Raleigh Street



TABLE 1 2013 LOCAL STREET RENEWALS DUNROBIN AVENUE, GOLSPIE STREET TO RALEIGH STREET GEOTECHNICAL INVESTIGATION

Testhole ID	Testhole Location	Pavemer	nt Surface		t Structure erial	Sample	Sample	Moisture Content	Part	icle Size	Analys	sis	Atterberg Limits			
restriole iD	restrole Location	Туре	Thickness (mm)	Туре	Thickness (mm)	Description	Depth (m)	(%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index	
TH1	5 m west from property line between 610 & 614 Dunrobin Avenue	Asphalt	15	_	_	_	_	_	-	_	_	_		_	_	
1111	1 m from south curb	Concrete	150	,	-	-			,	-	-	-	_	'	-	
TH2	2 m west from property line between 622 & 626 Dunrobin Avenue	Asphalt	35	_		Clay	0.6	0.6 35	0.3	3.6	3.4	92.7	89	27	62	
1112	1 m from south curb	Concrete	165	,	-	Clay	0.0		55	0.5	5.0	3.4	32.1	09	21	02
TH3	6 m west from property line between 634 & 638 Dunrobin Avenue	Asphalt	20	_	_	Clay	0.6	36	0.1	1.5	8.4	90.0	88	26	62	
1113	1 m from south curb	Concrete	155	-	_	Clay	0.0	30	0.1	1.5	0.4	90.0			02	
TH4	9 m east from property line between 646 & 650 Dunrobin Avenue	Asphalt	30	_	_	_	_	_	_	_		_	_	_	_	
1114	1 m from south curb	Concrete	160	-	_				- 				-			
TH5	1 m east from property line between 656 & 662 Dunrobin Avenue	Asphalt	40	_	_	_	_	_		_	_	_	_		_	
1113	1 m from south curb	Concrete	150	-	_	_					_		_		_	
TH6	5 m west from property line between 680 & 686 Dunrobin Avenue	Asphalt	30				_	_	_	-	_	_	_		_	_
1110	1 m from south curb	Concrete	150	-	-											

THE NATIONAL TESTING LABORATORIES LIMITED Exhibits in 1923

Date Drilled: July 24, 2013

Depth of Testhole: 2.1 m

Logged by: Sothea Bun

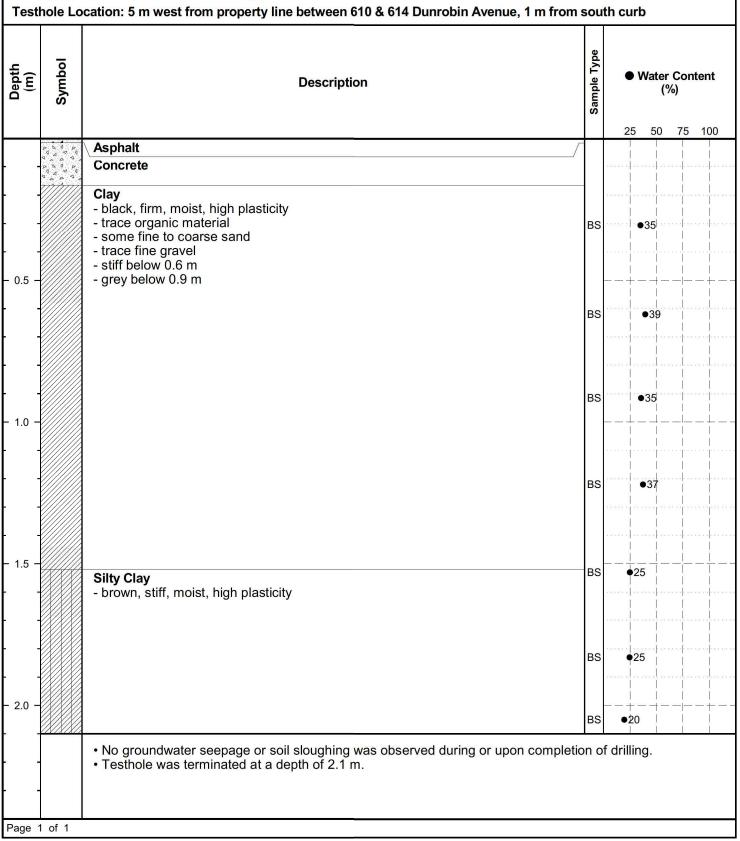
Reviewed by: German Leal

Project Name: 2013 Local Street Renewals

Project Location: Dunrobin Avenue, Golspie Street to Raleigh Street

Client: MMM Group Limited

Drilling Contractor: Active Drilling and Piling Drilling Method: 125 mm Solid Stem Auger



Project Name: 2013 Local Street Renewals

Project Location: Dunrobin Avenue, Golspie Street to Raleigh Street

Client: MMM Group Limited

Drilling Contractor: Active Drilling and Piling Drilling Method: 125 mm Solid Stem Auger

Testhole Location: 2 m west from property line between 622 & 626 Dunrobin Avenue, 1 m from south curb



Deptn (m)	Symbol	Description	Sample Type	,	Partic Distri				Water (°	%)	
			Sa	Gravel (%)	Sand (%)	Silt (%)	Clay (%)		PL 		†
	, , , ,		7	(70)	(70)	(70)	(70)	25	50	75	100
_		Concrete		v 2011.214 v	n ny esa e		1 202 207 2073			ne es la ver	
0.5 -		Clay - grey, firm, moist, high plasticity - trace organic material - trace fine to coarse sand - trace fine gravel - trace silt	BS	3		1 202 202	5 500 500 5400 5 500 500 5400		•36	500 500	
0.5		- brown below 1.8 m	BS	0.3	3.6	3.4	92.7	 	●35		1
-					10 mm x 10 4 mm						
1.0			BS						●35 	_	
			BS						●35		
1.5 -			BS		2 C2-1-3				•39	***	
-			BS						•44		
2.0 -			BS	 3					● 45		-
-		 No groundwater seepage or soil sloughing was ob Testhole was terminated at a depth of 2.1 m. 	served during o	r upo	n cor	mplet	tion o	f drillir	ng.		

Project Name: 2013 Local Street Renewals

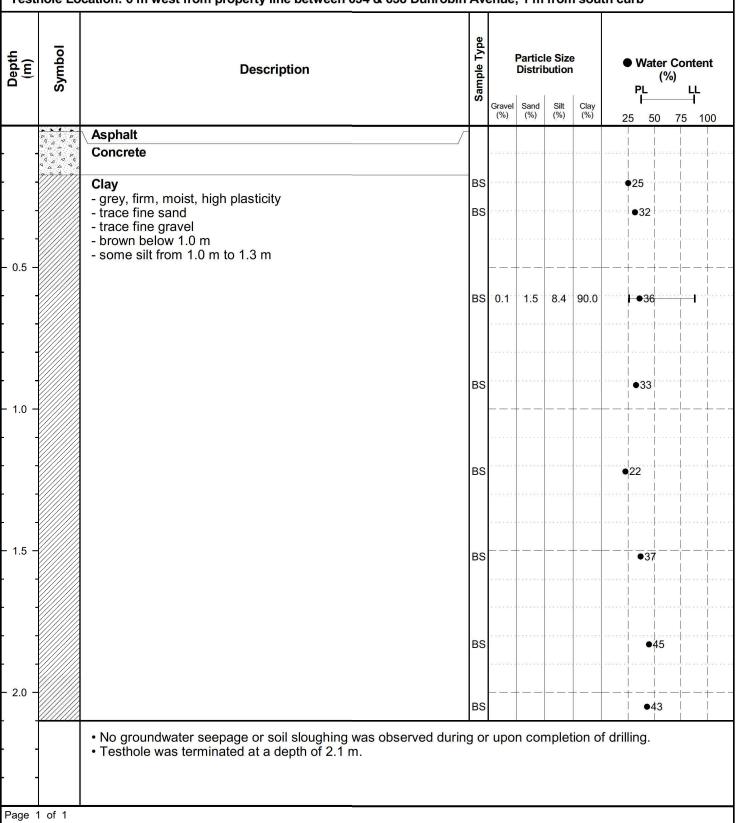
Project Location: Dunrobin Avenue, Golspie Street to Raleigh Street

Client: MMM Group Limited

Drilling Contractor: Active Drilling and Piling Drilling Method: 125 mm Solid Stem Auger

Testhole Location: 6 m west from property line between 634 & 638 Dunrobin Avenue, 1 m from south curb







Date Drilled: July 24, 2013

Depth of Testhole: 2.1 m

Logged by: Sothea Bun

Reviewed by: German Leal

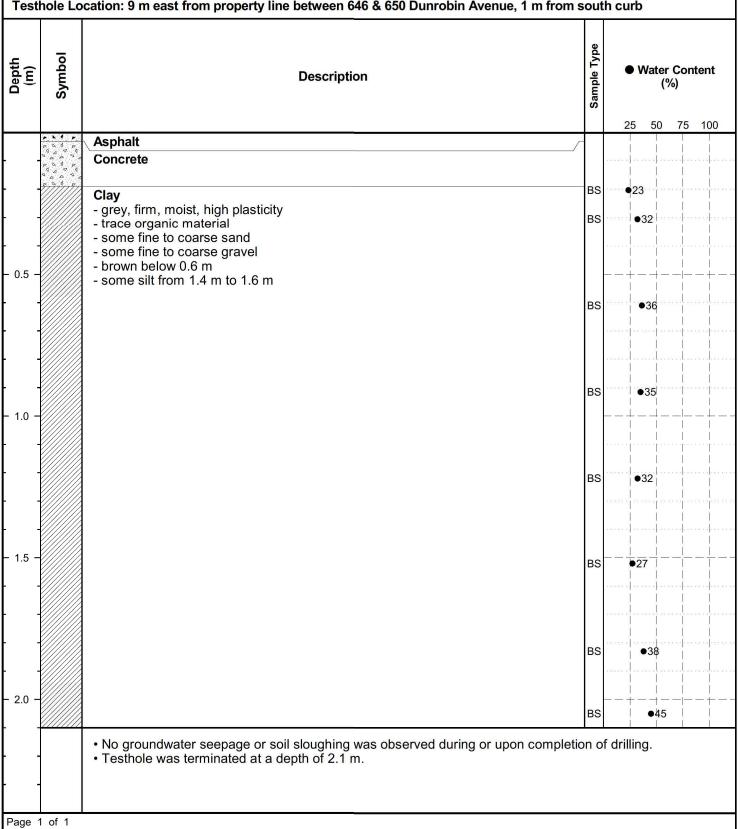
Project Name: 2013 Local Street Renewals

Project Location: Dunrobin Avenue, Golspie Street to Raleigh Street

Client: MMM Group Limited

Drilling Contractor: Active Drilling and Piling Drilling Method: 125 mm Solid Stem Auger

Testhole Location: 9 m east from property line between 646 & 650 Dunrobin Avenue, 1 m from south curb





Date Drilled: July 24, 2013

Depth of Testhole: 2.1 m

Logged by: Sothea Bun

Reviewed by: German Leal

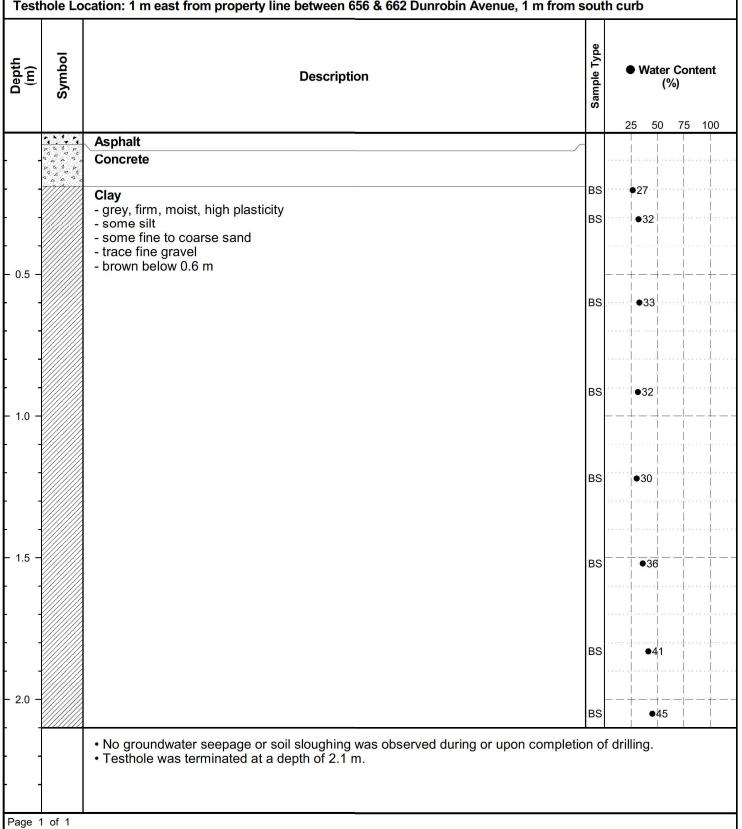
Project Name: 2013 Local Street Renewals

Project Location: Dunrobin Avenue, Golspie Street to Raleigh Street

Client: MMM Group Limited

Drilling Contractor: Active Drilling and Piling Drilling Method: 125 mm Solid Stem Auger

Testhole Location: 1 m east from property line between 656 & 662 Dunrobin Avenue, 1 m from south curb



Date Drilled: July 24, 2013

Depth of Testhole: 2.1 m

Logged by: Sothea Bun

Reviewed by: German Leal

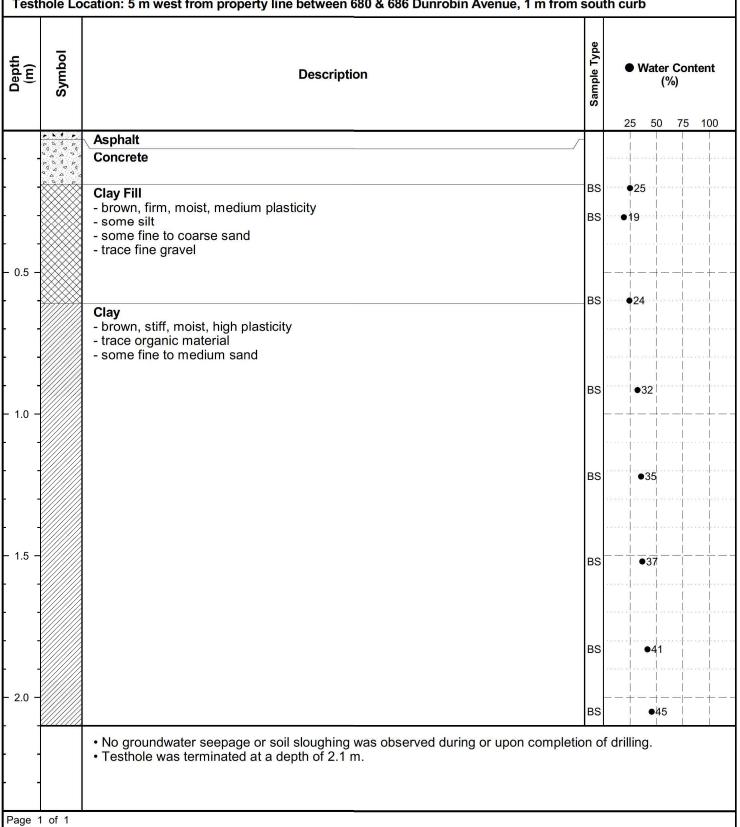
Project Name: 2013 Local Street Renewals

Project Location: Dunrobin Avenue, Golspie Street to Raleigh Street

Client: MMM Group Limited

Drilling Contractor: Active Drilling and Piling Drilling Method: 125 mm Solid Stem Auger

Testhole Location: 5 m west from property line between 680 & 686 Dunrobin Avenue, 1 m from south curb







Core sample from Testhole TH1



Core sample from Testhole TH2



Core sample from Testhole TH3



Core sample from Testhole TH4





Core sample from Testhole TH5



Core sample from Testhole TH6



PARTICLE SIZE ANALYSIS **ASTM D422**

PROJECT: 2013 Local Street Renewals

Dunrobin Avenue

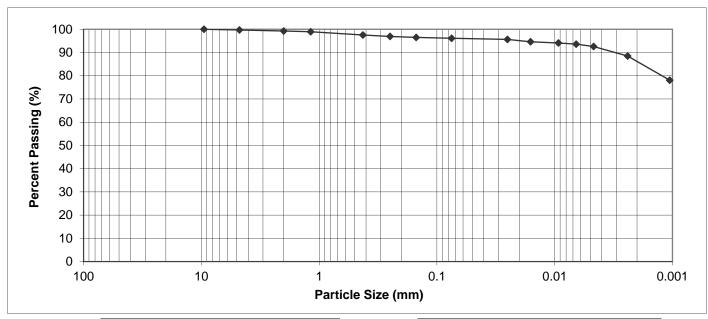
Golspie St to Raleigh St

MMM Group Limited 111 - 93 Lombard Avenue Winnipeg, MB R3B 3B1

PROJECT NO.: MMM-1307 Attention: Wally Jackson

SAMPLED BY: Sothea Bun DATE RECEIVED: July 24, 2013 SAMPLE ID: TH2 at 0.6 m

TESTED BY: Nathan Boenders



			_					
PART	TICLE	PERCENT		PART	ICLE	PERCENT		
SI	ZE	PASSING	PASSING		SIZE			
37.50	mm	100.0		mm	98.9			
25.00	mm	100.0		0.425	mm	97.5		
19.00	mm	100.0		0.250	mm	96.9		
16.00	6.00 mm 100.0			0.150	mm	96.5		
12.50	mm	100.0		0.075	mm	96.1		
9.50	mm	100.0		0.005	mm	92.7		
4.75	mm	99.7		0.002	mm	85.3		
2.00	mm	99.2		0.001	mm	NT*		
		Sand, %		5 111. 24				

Gravel, % 75 to 4.75 mm	Sand, %					
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm	Silt, % <0.075 to 0.005 mm	Clay, % <0.005 mm	Colloids, % < 0.001 mm
0.3	0.5	1.7	1.4	3.4	92.7	NT*

NT* Sample not tested for colloids

August 7, 2013 REVIEWED BY: German E. Leal, B.Sc., P. Eng



PARTICLE SIZE ANALYSIS ASTM D422

MMM Group Limited 111 - 93 Lombard Avenue Winnipeg, MB R3B 3B1 PROJECT: 2013 Local Street Renewals

Dunrobin Avenue

Golspie St to Raleigh St

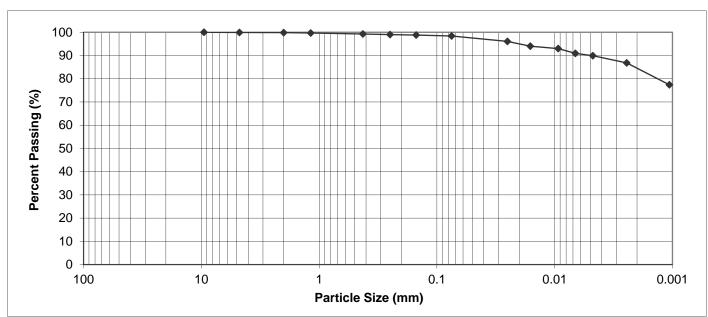
Attention: Wally Jackson PROJECT NO.: MMM-1307

SAMPLED BY: Sothea Bun

SAMPLE ID: TH3 at 0.6 m

DATE RECEIVED: July 24, 2013

TESTED BY: Nathan Boenders



PARTICLE	PERCENT	1	PARTI	CLE	PERCENT
SIZE	PASSING		SIZE		PASSING
37.50 mm	100.0	0.0 0.425 mm		99.7	
25.00 mm	100.0			99.2	
19.00 mm	100.0			99.0	
16.00 mm	100.0		0.150 mm 0.075 mm 0.005 mm 0.002 mm		98.8
12.50 mm	100.0				98.4
9.50 mm	100.0				90.0
4.75 mm	99.9				83.8
2.00 mm	99.8	99.8 0.001 mm		NT*	
	Sand %				

	Gravel, % 75 to 4.75 mm	Sand, %					
		Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm	Silt, % <0.075 to 0.005 mm	Clay, % <0.005 mm	Colloids, % < 0.001 mm
	0.1	0.1	0.6	0.8	8.4	90.0	NT*

NT* Sample not tested for colloids

August 7, 2013 REVIEWED BY: German E. Leal, B.Sc., P. Eng