

APPENDIX 'A'

GEOTECHNICAL REPORT



Quality Engineering | Valued Relationships

Morrison Hershfield
2015 Local Streets Package (PW File #: 15-R-01)

Prepared for:

Morrison Hershfield
25 Scurfield Blvd, Unit 1
Winnipeg, MB R3Y 1G4
Attention: Ron Bruce

Distribution:

Ron Bruce, P.Eng.

Project Number:

0035 017 00

Date:

January 20, 2015
Final Report



Quality Engineering | Valued Relationships

January 20, 2015

Our File No. 0035 017 00

Ron Bruce, P.Eng.
Morrison Hershfield
25 Scurfield Blvd, Unit 1
Winnipeg, MB R3Y 1G4

**RE: Sub-Surface Investigation Report for
2015 Local Streets Package (PW File #: 15-R-01)**

TREK Geotechnical Inc. is pleased to submit our report for the sub-surface investigations for the 2015 Local Streets Package (PW File #: 15-R-01).

Please contact the undersigned if you have any questions. Thank you for the opportunity to serve you on this assignment.

Sincerely,

TREK Geotechnical Inc.

Per:

A handwritten signature in blue ink, appearing to read "Nelson John Ferreira".

Nelson John Ferreira, M. Sc., P. Eng.
Geotechnical Engineer, Principal
Tel: 204.975.9433 ext. 103

cc: Sylvio Precourt C.E.T. (TREK Geotechnical)

Revision History

Revision No.	Author	Issue Date	Description
0	SP	January 20, 2015	Final Report

Authorization Signatures

Prepared By:


Sylvio L. Precourt, C.E.T.
Senior Engineering Technologist

Reviewed By:



Nelson John Ferreira, M. Sc., P.Eng.
Geotechnical Engineer



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1.0 Introduction

This report summarizes the results of the sub-surface investigation completed for the 2015 Local Street Package (PW File #: 15-R-01). Information regarding the asphalt, concrete, road base for the existing road and the soil stratigraphy beneath the pavement structure is provided.

2.0 Sub-Surface Investigation and Laboratory Program

A total of 20 test holes were drilled along Scurfield Blvd. and Berry St. as part of the sub-surface investigation. The test holes drilled at each location are listed in Table 1 and are shown on Figures 01 and Figure 02.

Table 1. List of Test Holes Drilled at Each Location

Street Location	Test Hole
Scurfield Blvd., between Waverley St. and Dovercourt Dr.	TH14-01 to TH14-12
Berry St., between Sargent Ave. and Wellington Ave.	TH14-01 to TH14-08

The sub-surface investigation was conducted between December 5th and 8th 2014. The test holes were drilled to a depth of 3 m below top of road surface. Test holes were drilled by Paddock Drilling Ltd. with an MP8 truck mounted drill rig equipped with 125 mm diameter solid stem augers. The pavement structure (asphalt and/or concrete) was cored by Paul Bevel, B.Sc. of TREK Geotechnical Inc. (TREK) using a portable coring drill press equipped with a hollow 150 mm diameter diamond core drill bit. The sub-surface conditions were observed during drilling and were visually classified by Sylvio Precourt, C.E.T. of TREK Geotechnical Inc. (TREK). Other pertinent information such as groundwater and drilling conditions were also recorded during the sub-surface investigation.

Disturbed (auger cuttings) samples retrieved during the sub-surface investigation were transported to TREK's material testing laboratory for further testing. Pavement core samples were also retrieved and logged at TREK's material testing laboratory. The laboratory testing program consisted of moisture content determination on all samples, and Atterberg limits and grain size analysis (hydrometer method) on select samples.

Information gathered for each street is included in separate appendices (Appendix A & B). The information provided in the Appendices includes test hole logs, laboratory testing summary tables and results, and photos of the asphalt and concrete cores.

Test hole locations shown on Figures 01 and Figure 02 are based on measured distances from the nearest address and/or edge of pavement.

Figures



NOTES:
1. Stationing noted based on assumed datum of 0+00.00 starting at intersection of Dovercourt Dr. and Scurfield Blvd.

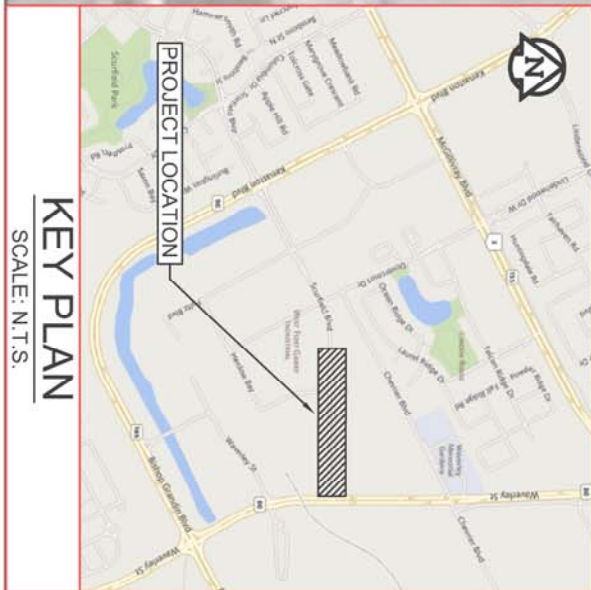


FIGURE 01
TEST HOLE LOCATIONS
SCURFIELD BOULEVARD

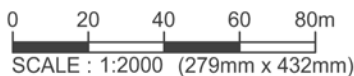
8 1/2" x 11"

PLOT: 20/01/2015 2:21:28 PM

FILE NAME: FIG 0002 2015-01-20 Site Plan_D_SP 0035 017 00 BERRY.dwg



KEY PLAN
SCALE: N.T.S.



SCALE: 1:2000 (279mm x 432mm)

LEGEND

TEST HOLE

NOTES:

1. Stationing noted based on assumed datum of 0+00.00 starting at intersection of Sargent Ave. and Berry St.

FIGURE 02
TEST HOLE LOCATIONS
BERRY STREET

Appendix A

Scurfield Blvd., between Waverley St. and Dovercourt Dr.



Sub-Surface Log

Test Hole TH14-01

1 of 1

Client: Morrison Hershfield Project Number: 0035 017 00
 Project Name: City of Winnipeg Local Streets Package 15-R-01 Location: Scurfield Blvd. - between Dovercourt Dr. and Waverley St.
 Contractor: Paddock Drilling Ltd. Ground Elevation: Top of Pavement
 Method: 125mm Solid Stem Auger, Acker MP8 Truck Mount Date Drilled: 5 December 2014

Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) Split Barrel (SB) Core (C)

Particle Size Legend: Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m ³)						Undrained Shear Strength (kPa)					
					16	17	18	19	20	21	Test Type					
					Particle Size (%)											
					0	20	40	60	80	100						
					PL MC LL											
					0	20	40	60	80	100	0	50	100	150	200	250
0.0 - 0.1		CONCRETE - (193 mm thick)		C01												
0.1 - 0.45		SAND (FILL) - clayey, silty, trace gravel (<15mm diam.), dark grey, frozen, moist when thawed, poorly graded, intermediate plasticity.		G1												
0.45 - 0.6		CLAY (FILL) - sandy, some silt - dark grey - frozen, moist and soft when thawed - intermediate plasticity		G2												
0.6 - 1.0		CLAY - silty, trace silt inclusions (<5 mm diam.) - mottled brown / grey - frozen to 0.9 m, moist and firm when thawed - high plasticity		G3												
1.0 - 1.1		- 100 mm thick silt seam, at 0.9 m, trace oxidation, brown, moist, soft, low plasticity.		G3A												
1.1 - 1.5				G4												
1.5 - 1.7				G5												
1.7 - 2.0		- soft to firm below 1.7 m.		G6												
2.0 - 2.5				G7												
2.5 - 3.0				G8												

END OF TEST HOLE AT 3.05 m IN CLAY

Notes:

- 1) No seepage or sloughing observed.
- 2) Test hole was backfilled with auger cuttings up to 0.45 m depth, 150 mm bentonite, 150 mm sand, 150 mm cold patch asphalt to surface.
- 3) Test hole located on eastbound lane, 1.2m north from south curb, at #85 Scurfield Blvd.

Logged By: Syl Precourt Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 0001 2015-01-20 SCURFIELD.BLDV.0.E.SP.0035.017.00.GPJ TREK GEOTECHNICAL GDT 20/1/15



Sub-Surface Log

Test Hole TH14-02

1 of 1

Client: Morrison Hershfield Project Number: 0035 017 00
 Project Name: City of Winnipeg Local Streets Package 15-R-01 Location: Scurfield Blvd. - between Dovercourt Dr. and Waverley St.
 Contractor: Paddock Drilling Ltd. Ground Elevation: Top of Pavement
 Method: 125mm Solid Stem Auger, Acker MP8 Truck Mount Date Drilled: 5 December 2014

Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) Split Barrel (SB) Core (C)

Particle Size Legend: Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m ³)						Undrained Shear Strength (kPa)					
					16	17	18	19	20	21	Test Type					
					Particle Size (%)											
					0	20	40	60	80	100						
					PL MC LL 0 20 40 60 80 100											
					0	20	40	60	80	100	0	50	100	150	200	250
0.0		CONCRETE (195 mm thick)		C02												
0.0 - 0.45		CLAY (FILL) - silty, sandy, trace gravel (<15 mm diam.), dark grey, frozen, wet and firm when thawed, intermediate plasticity		G9												
0.45 - 0.6		CLAY (FILL) - silty - dark grey - frozen, moist and firm when thawed - high plasticity		G10												
0.6 - 1.1		CLAY - silty - mottled brown / grey - frozen to 1.1 m, moist and firm when thawed, moist below - high plasticity		G11												
1.1 - 1.4				G12												
1.4 - 1.6				G13												
1.6 - 1.8				G14												
1.8 - 2.0				G15												
2.0 - 2.6				G16A												
2.6 - 2.9		- 75 mm thick silt seam at 2.6 m, brown, moist, soft, low plasticity.		G16												
2.9 - 3.05		- soft to firm below 2.9 m.		G16												

END OF TEST HOLE AT 3.05 m IN CLAY

Notes:

- 1) No seepage or sloughing observed.
- 2) Test hole was backfilled with auger cuttings up to 0.45 m depth, 150 mm bentonite, 150 mm sand, 150 mm cold patch asphalt to surface.
- 3) Test hole located on westbound lane, 1.2m south from north curb, at #75 Scurfield Blvd.

Logged By: Syl Precourt Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 0001 2015-01-20 SCURFIELD BLVD. 0.E.SP.0035 017 00.GPJ TREK GEOTECHNICAL GDT 20/1/15



Sub-Surface Log

Test Hole TH14-03

1 of 1

Client: Morrison Hershfield Project Number: 0035 017 00
 Project Name: City of Winnipeg Local Streets Package 15-R-01 Location: Scurfield Blvd. - between Dovercourt Dr. and Waverley St.
 Contractor: Paddock Drilling Ltd. Ground Elevation: Top of Pavement
 Method: 125mm Solid Stem Auger, Acker MP8 Truck Mount Date Drilled: 5 December 2014

Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) Split Barrel (SB) Core (C)

Particle Size Legend: Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m ³)						Undrained Shear Strength (kPa)					
					16	17	18	19	20	21	Test Type					
					Particle Size (%)											
					0	20	40	60	80	100						
					PL MC LL 0 20 40 60 80 100											
					0	20	40	60	80	100	0	50	100	150	200	250
0.0		CONCRETE (191 mm thick)		C03												
0.0		CLAY (FILL) - silty, sandy, trace gravel, black, frozen, wet and soft when thawed, intermediate plasticity	G	G17												
0.5		CLAY (FILL) - silty, trace sand, trace gravel - dark grey - frozen to 0.9 m, moist and firm when thawed, moist below - high plasticity	G	G18												
0.8		- stiff below 0.8 m, when thawed	G	G19												
1.0		CLAY - silty, silt inclusion (<15 mm diam.) - dark grey - moist, firm to stiff - high plasticity	G	G20												
1.5			G	G21												
2.0		- 100 mm thick silt seam at 2.0 m, brown, dry, very stiff, low plasticity.	G	G22												
2.5			G	G23												
3.0		- firm below 2.6 m.	G	G24												

END OF TEST HOLE AT 3.05 m IN CLAY

Notes:

- 1) No seepage or sloughing observed.
- 2) Test hole was backfilled with auger cuttings up to 0.45 m depth, 150 mm bentonite, 150 mm sand, 150 mm cold patch asphalt to surface.
- 3) Test hole located on eastbound land, 1.2m north from south curb, at #62 Scurfield Blvd. (west end of building)

Logged By: Syl Precourt Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 0001 2015-01-20 SCURFIELD.BLDV.0.E.SP.0035.017.00.GPJ TREK GEOTECHNICAL GDT 20/1/15



Sub-Surface Log

Test Hole TH14-04

1 of 1

Client: Morrison Hershfield Project Number: 0035 017 00
 Project Name: City of Winnipeg Local Streets Package 15-R-01 Location: Scurfield Blvd. - between Dovercourt Dr. and Waverley St.
 Contractor: Paddock Drilling Ltd. Ground Elevation: Top of Pavement
 Method: 125mm Solid Stem Auger, Acker MP8 Truck Mount Date Drilled: 5 December 2014

Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) Split Barrel (SB) Core (C)

Particle Size Legend: Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m ³)						Undrained Shear Strength (kPa)					
					16	17	18	19	20	21	Test Type					
					Particle Size (%)											
					0	20	40	60	80	100						
					PL MC LL 0 20 40 60 80 100											
					0	20	40	60	80	100	0	50	100	150	200	250
0.0 - 0.15		CONCRETE (215 mm thick)		C04												
0.15 - 0.45		CLAY (FILL) - silty, trace sand - brown - frozen to 0.8 m, wet and soft when thawed, wet below - intermediate plasticity - mottled dark grey / brown and firm below 0.3 m, when thawed		G25												
0.45 - 0.6				G26												
0.6 - 1.1		CLAY - silty - mottled grey / brown - moist, stiff - high plasticity - firm below 1.1 m		G27												
1.1 - 1.5				G28												
1.5 - 1.7		- 150 mm thick silt seam at 1.5 m, brown, soft, low plasticity, moist.		G29												
1.7 - 2.0		- below 1.7 m, soft		G29A												
2.0 - 2.2				G30												
2.2 - 2.5				G31												
2.5 - 2.8																
2.8 - 3.0				G32												

END OF TEST HOLE AT 3.05 m IN CLAY

Notes:

- 1) No seepage or sloughing observed.
- 2) Test hole was backfilled with auger cuttings up to 0.45 m depth, 150 mm bentonite, 150 mm sand, 150 mm cold patch asphalt to surface.
- 3) Test hole located on westbound lane, 1.2m south from north curb, at #59 Scurfield Blvd.

Logged By: Syl Precourt Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 0001 2015-01-20 SCURFIELD.BLDV.0.E.SP.0035.017.00.GPJ TREK GEOTECHNICAL GDT 20/1/15



Sub-Surface Log

Test Hole TH14-05

1 of 1

Client: Morrison Hershfield Project Number: 0035 017 00
 Project Name: City of Winnipeg Local Streets Package 15-R-01 Location: Scurfield Blvd. - between Dovercourt Dr. and Waverley St.
 Contractor: Paddock Drilling Ltd. Ground Elevation: Top of Pavement
 Method: 125mm Solid Stem Auger, Acker MP8 Truck Mount Date Drilled: 5 December 2014

Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) Split Barrel (SB) Core (C)

Particle Size Legend: Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m ³)						Undrained Shear Strength (kPa)					
					16	17	18	19	20	21	Test Type					
					Particle Size (%)											
					0	20	40	60	80	100						
					PL MC LL 0 20 40 60 80 100											
					0	20	40	60	80	100	0	50	100	150	200	250
0.0 - 0.1		CONCRETE (212 mm thick)		C05												
0.1 - 0.45		CLAY (FILL) - silty, sandy, trace gravel (<10mm diam.) - brown - frozen, moist and firm when thawed - intermediate plasticity	<input checked="" type="checkbox"/>	G33	●											
0.45 - 1.7		CLAY - silty, trace sand, trace silt inclusions (<10 mm diam.) - dark grey - frozen to 1.1 m, moist and firm when thawed, moist below - high plasticity - stiff below 1.1 m	<input checked="" type="checkbox"/>	G34	●											
1.7 - 1.8		- 50 mm thick silt seam at 1.7 m, brown, moist, soft, low plasticity.	<input checked="" type="checkbox"/>	G35	●											
1.8 - 2.0		- brown, soft to firm, high plasticity, trace silt inclusions (< 5mm diam.) below 1.8 m.	<input checked="" type="checkbox"/>	G36	●								⊕			
2.0 - 2.1			<input checked="" type="checkbox"/>	G37	●								⊕			
2.1 - 2.2			<input checked="" type="checkbox"/>	G38	●											
2.2 - 2.3			<input checked="" type="checkbox"/>	G39	●								⊕	△		
2.3 - 2.4			<input checked="" type="checkbox"/>	G40	●								⊕	△		

END OF TEST HOLE AT 3.05 m IN CLAY

Notes:

- 1) No seepage or sloughing observed.
- 2) Test hole was backfilled with auger cuttings up to 0.45 m depth, 150 mm bentonite, 150 mm sand, 150 mm cold patch asphalt to surface.
- 3) Test hole located on eastbound land, 1.2m north from south curb, at #50 Scurfield Blvd.

Logged By: Syl Precourt Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG - LOGS 0001 2015-01-20 SCURFIELD BLVD. 0_E.SP_0035 017 00.GPJ TREK GEOTECHNICAL GDT - 20/1/15



Sub-Surface Log

Test Hole TH14-06

1 of 1

Client: Morrison Hershfield Project Number: 0035 017 00
 Project Name: City of Winnipeg Local Streets Package 15-R-01 Location: Scurfield Blvd. - between Dovercourt Dr. and Waverley St.
 Contractor: Paddock Drilling Ltd. Ground Elevation: Top of Pavement
 Method: 125mm Solid Stem Auger, Acker MP8 Truck Mount Date Drilled: 5 December 2014

Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) Split Barrel (SB) Core (C)

Particle Size Legend: Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m ³)						Undrained Shear Strength (kPa)			
					16	17	18	19	20	21	Test Type			
					Particle Size (%)									
					0	20	40	60	80	100				
					PL MC LL 0 20 40 60 80 100									
					0 20 40 60 80 100						0 50 100 150 200 250			
0.0 - 0.1		CONCRETE (216 mm thick)		C06										
0.1 - 0.45		CLAY (FILL) - silty, some sand - dark brown - frozen, moist and soft when thawed - intermediate plasticity		G41										
0.45 - 0.8		- 100 mm thick silt seam at 0.8 m, grey, soft, low plasticity, moist, when thawed		G42										
0.8 - 1.0		CLAY - silty, trace silt inclusions - mottled black / brown - frozen to 1.1 m, moist and firm when thawed, moist below - high plasticity		G43 G43A										
1.0 - 1.5				G44 G45										
1.5 - 2.0				G46										
2.0 - 2.2		- 100 mm thick silt seam at 2.1 m, mottled grey / brown, moist, firm, low plasticity.		G47										
2.2 - 2.9		- brown below 2.2 m		G47A										
2.9 - 3.05		- soft to firm below 2.9 m		G48										

END OF TEST HOLE AT 3.05 m IN CLAY

Notes:

- 1) No seepage or sloughing observed.
- 2) Test hole was backfilled with auger cuttings up to 0.45 m depth, 150 mm bentonite, 150 mm sand, 150 mm cold patch asphalt to surface.
- 3) Test hole located on westbound lane, 1.2m south from north curb, at #51 Scurfield Blvd.

Logged By: Syl Precourt Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG - LOGS 0001 2015-01-20 SCURFIELD BLVD. 0_E.SP_0035 017 00.GPJ TREK GEOTECHNICAL GDT - 20/1/15



Sub-Surface Log

Test Hole TH14-07

1 of 1

Client: Morrison Hershfield Project Number: 0035 017 00
 Project Name: City of Winnipeg Local Streets Package 15-R-01 Location: Scurfield Blvd. - between Dovercourt Dr. and Waverley St.
 Contractor: Paddock Drilling Ltd. Ground Elevation: Top of Pavement
 Method: 125mm Solid Stem Auger, Acker MP8 Truck Mount Date Drilled: 5 December 2014

Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) Split Barrel (SB) Core (C)
 Particle Size Legend: Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m ³)						Undrained Shear Strength (kPa)					
					16	17	18	19	20	21	Test Type					
					Particle Size (%)											
					0	20	40	60	80	100						
					PL MC LL 0 20 40 60 80 100											
					0	20	40	60	80	100	0	50	100	150	200	250
0.0		CONCRETE (187 mm thick)		C07												
0.0		CLAY (FILL) - silty, sandy, trace gravel (<15 mm diam.), brown, frozen, moist and firm when thawed, intermediate plasticity	<input checked="" type="checkbox"/>	G49												
0.0		CLAY - silty, trace silt inclusions (<10 mm diam.), trace oxidation - dark grey - frozen to 0.9 m, moist and firm when thawed, moist below - high plasticity	<input checked="" type="checkbox"/>	G50												
0.5		- stiff below 0.8 m	<input checked="" type="checkbox"/>	G51												
1.0			<input checked="" type="checkbox"/>	G52												
1.5		- firm below 1.4 m	<input checked="" type="checkbox"/>	G53												
2.0			<input checked="" type="checkbox"/>	G54												
2.0		- soft to firm, trace silt inclusions (< 20 mm diam.) below 2.0 m	<input checked="" type="checkbox"/>	G55												
2.5																
3.0		- soft below 2.9 m	<input checked="" type="checkbox"/>	G56												

END OF TEST HOLE AT 3.05 m IN CLAY

Notes:

- 1) No seepage or sloughing observed.
- 2) Test hole was backfilled with auger cuttings up to 0.45 m depth, 150 mm bentonite, 150 mm sand, 150 mm cold patch asphalt to surface.
- 3) Test hole located on eastbound land, 1.2m north from south curb, at #40 Scurfield Blvd.

Logged By: Syl Precourt Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 0001 2015-01-20 SCURFIELD BLVD. 0_E.SP_0035 017 00.GPJ TREK GEOTECHNICAL GDT 20/1/15



Sub-Surface Log

Test Hole TH14-08

1 of 1

Client: Morrison Hershfield **Project Number:** 0035 017 00
Project Name: City of Winnipeg Local Streets Package 15-R-01 **Location:** Scurfield Blvd. - between Dovercourt Dr. and Waverley St.
Contractor: Paddock Drilling Ltd. **Ground Elevation:** Top of Pavement
Method: 125mm Solid Stem Auger, Acker MP8 Truck Mount **Date Drilled:** 5 December 2014

Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) Split Barrel (SB) Core (C)

Particle Size Legend: Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m ³)						Undrained Shear Strength (kPa)					
					16	17	18	19	20	21	Test Type					
					Particle Size (%)											
					0	20	40	60	80	100						
					0	20	40	60	80	100	0	50	100	150	200	250
0.0 - 0.05		CONCRETE (192 mm thick)		C08												
0.05 - 0.45		CLAY (FILL) - silty, sandy, trace gravel, brown, frozen, wet and soft when thawed, intermediate plasticity		G57												
0.45 - 1.1		CLAY - silty, silt inclusions (<25 mm diam.) - dark grey - frozen to 1.1 m, moist and stiff when thawed, moist below - high plasticity		G58												
1.1 - 2.1		- firm below 1.1 m		G59												
2.1 - 2.2		- 75 mm silt seam at 2.1 m, brown, moist, soft, low plasticity		G60												
2.2 - 2.3		- mottled grey / brown, firm below 2.2 m		G61												
2.3 - 2.4				G62												
2.4 - 2.5				G63												
2.5 - 2.6				G63A												
2.6 - 2.7																
2.7 - 2.8																
2.8 - 2.9																
2.9 - 3.0				G64												

END OF TEST HOLE AT 3.05 m IN CLAY

Notes:

- 1) No seepage or sloughing observed.
- 2) Test hole was backfilled with auger cuttings up to 0.45 m depth, 150 mm bentonite, 150 mm sand, 150 mm cold patch asphalt to surface.
- 3) Test hole located on westbound lane, 1.2m south from north curb, at #25 Scurfield Blvd.

Logged By: Syl Precourt **Reviewed By:** N.J Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG - LOGS 0001 2015-01-20 SCURFIELD BLVD. 0_E.SP_0035 017 00.GPJ TREK GEOTECHNICAL GDT - 20/1/15



Sub-Surface Log

Test Hole TH14-09

1 of 1

Client: Morrison Hershfield **Project Number:** 0035 017 00
Project Name: City of Winnipeg Local Streets Package 15-R-01 **Location:** Scurfield Blvd. - between Dovercourt Dr. and Waverley St.
Contractor: Paddock Drilling Ltd. **Ground Elevation:** Top of Pavement
Method: 125mm Solid Stem Auger, Acker MP8 Truck Mount **Date Drilled:** 5 December 2014

Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) Split Barrel (SB) Core (C)

Particle Size Legend: Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m ³)		Particle Size (%)		Undrained Shear Strength (kPa)	
					16	17	18	19	20	21
0.0 - 0.1		CONCRETE (200 mm thick)		C09						
0.1 - 0.45		CLAY (FILL) - silty, trace sand, trace gravel (<15 mm diam.), brown, frozen, moist and firm when thawed, intermediate plasticity		G65						
0.45 - 0.8		CLAY - silty - dark grey, - frozen to 0.9 m, moist and firm when thawed, moist below - high plasticity		G66						
0.8 - 1.0		- very stiff below 0.8 m		G67						
1.0 - 1.5		SILT - trace to some clay - light brown - moist, firm - low to intermediate plasticity		G68						
1.5 - 1.7		- soft below 1.7 m		G69						
1.7 - 2.5		SILT - trace to some clay - light brown - moist, firm - low to intermediate plasticity		G70						
2.5 - 2.9		CLAY - silty - mottled grey / brown - moist, firm - high plasticity		G71						
2.9 - 3.05		- soft below 2.9 m		G72						

END OF TEST HOLE AT 3.05 m IN CLAY

Notes:

- 1) No seepage or sloughing observed.
- 2) Test hole was backfilled with auger cuttings up to 0.45 m depth, 150 mm bentonite, 150 mm sand, 150 mm cold patch asphalt to surface.
- 3) Test hole located on eastbound land, 6.5m north from south curb, at #22 Scurfield Blvd.

Logged By: Syl Precourt **Reviewed By:** N.J Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG - LOGS 0001 2015-01-20 SCURFIELD BLVD. 0_E.SP_0035 017 00.GPJ TREK GEOTECHNICAL GDT - 20/1/15



Sub-Surface Log

Test Hole TH14-10

1 of 1

Client: Morrison Hershfield Project Number: 0035 017 00
 Project Name: City of Winnipeg Local Streets Package 15-R-01 Location: Scurfield Blvd. - between Dovercourt Dr. and Waverley St.
 Contractor: Paddock Drilling Ltd. Ground Elevation: Top of Pavement
 Method: 125mm Solid Stem Auger, Acker MP8 Truck Mount Date Drilled: 5 December 2014

Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) Split Barrel (SB) Core (C)

Particle Size Legend: Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m ³)						Undrained Shear Strength (kPa)					
					16	17	18	19	20	21	Test Type					
					Particle Size (%)											
					0	20	40	60	80	100						
					PL _____ MC _____ LL _____ 0 20 40 60 80 100											
					0	20	40	60	80	100	0	50	100	150	200	250
0.0		CONCRETE (185 mm thick)		C10												
0.0		CLAY (FILL) - silty, sandy, trace gravel (<10 mm diam.), brown, frozen, wet and soft when thawed, intermediate plasticity		G73		●										
0.5		CLAY - silty - dark grey - frozen to 0.9 m, moist and firm when thawed, moist below - high plasticity		G74		●										
0.8		- stiff below 0.8 m		G75		●										
1.0				G76		●							◆			
1.5				G77		●							◆			
2.0				G78		●							◆	△		
2.5				G79		●							◆	△		
3.0				G80		●							◆	△		

END OF TEST HOLE AT 3.05 m IN CLAY

Notes:

- 1) No seepage or sloughing observed.
- 2) Test hole was backfilled with auger cuttings up to 0.45 m depth, 150 mm bentonite, 150 mm sand, 150 mm cold patch asphalt to surface.
- 3) Test hole located on westbound lane, 1.2m south from north curb, at #19 Scurfield Blvd. (east end of building)

Logged By: Syl Precourt Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG - LOGS 0001 2015-01-20 SCURFIELD BLVD. 0_E.SP_0035 017 00.GPJ TREK GEOTECHNICAL GDT - 20/1/15



Sub-Surface Log

Test Hole TH14-11

1 of 1

Client: Morrison Hershfield Project Number: 0035 017 00
 Project Name: City of Winnipeg Local Streets Package 15-R-01 Location: Scurfield Blvd. - between Dovercourt Dr. and Waverley St.
 Contractor: Paddock Drilling Ltd. Ground Elevation: Top of Pavement
 Method: 125mm Solid Stem Auger, Acker MP8 Truck Mount Date Drilled: 5 December 2014

Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) Split Barrel (SB) Core (C)

Particle Size Legend: Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m ³)						Undrained Shear Strength (kPa)					
					16	17	18	19	20	21	Test Type					
					Particle Size (%)											
					0	20	40	60	80	100						
					PL MC LL											
					0	20	40	60	80	100	0	50	100	150	200	250
0.0 - 0.45		CONCRETE (184 mm thick)		C11												
0.45 - 0.65		CLAY (FILL) - silty, sandy, trace gravel (<10 mm diam.), - brown - frozen, moist and firm when thawed - high plasticity		G81												
0.65 - 1.1		CLAY - silty - dark grey - frozen to 0.9 m, moist and firm when thawed, moist below - intermediate plasticity		G82												
1.1 - 1.5		- stiff below 1.1 m		G83												
1.5 - 2.0		- firm below 1.5 m		G84												
2.0 - 2.4				G85												
2.4 - 2.5		- 50 mm thick silt seam at 2.4 m, brown, moist, soft, low plasticity - mottled grey / brown, firm to soft below 2.5 m		G86												
2.5 - 3.0				G87												
3.0 - 3.05				G88												

END OF TEST HOLE AT 3.05 m IN CLAY

Notes:

- 1) No seepage or sloughing observed.
- 2) Test hole was backfilled with auger cuttings up to 0.45 m depth, 150 mm bentonite, 150 mm sand, 150 mm cold patch asphalt to surface.
- 3) Test hole located on eastbound land, 1.2m north from south curb, at #2 Scurfield Blvd.

Logged By: Syl Precourt Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG - LOGS 0001 2015-01-20 SCURFIELD BLVD. 0_E.SP_0035 017 00.GPJ TREK GEOTECHNICAL GDT - 20/1/15



Sub-Surface Log

Test Hole TH14-12

1 of 1

Client: Morrison Hershfield **Project Number:** 0035 017 00
Project Name: City of Winnipeg Local Streets Package 15-R-01 **Location:** Scurfield Blvd. - between Dovercourt Dr. and Waverley St.
Contractor: Paddock Drilling Ltd. **Ground Elevation:** Top of Pavement
Method: 125mm Solid Stem Auger, Acker MP8 Truck Mount **Date Drilled:** 5 December 2014

Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) Split Barrel (SB) Core (C)

Particle Size Legend: Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m ³)						Undrained Shear Strength (kPa)					
					16	17	18	19	20	21	Test Type					
					Particle Size (%)											
					0	20	40	60	80	100						
					PL _____ MC _____ LL _____ 0 20 40 60 80 100											
					0	20	40	60	80	100	0	50	100	150	200	250
0.0		CONCRETE (197 mm thick)		C12												
0.0 - 0.45		CLAY (FILL) - silty, trace gravel, light brown, frozen, moist and firm when thawed, intermediate plasticity		G89		●										
0.45 - 0.6				G90												
0.6 - 3.05		CLAY - silty - dark grey - frozen to 0.9 m, moist and firm when thawed, moist below - high plasticity - stiff below 0.9 m - trace silt inclusions (<15 mm diam.) below 1.8 m - 50 mm thick silt seam at 2.1 m, brown, soft, low plasticity, moist. - below 2.2 m, mottled grey / brown, soft to firm		G91		●										
				G92		●										
				G93			●							⊕		
				G94			●							⊕		
				G95			●							⊕	△	
				G95A			●									
				G96A			●							⊕	△	
				G96			●							⊕	△	

END OF TEST HOLE AT 3.05 m IN CLAY

Notes:

- 1) No seepage or sloughing observed.
- 2) Test hole was backfilled with auger cuttings up to 0.45 m depth, 150 mm bentonite, 150 mm sand, 150 mm cold patch asphalt to surface.
- 3) Test hole located on westbound lane, 1.2m south from north curb, #5 Scurfield Blvd.

Logged By: Syl Precourt **Reviewed By:** N.J Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG - LOGS 0001 2015-01-20 SCURFIELD BLVD. 0_E.SP_003501700.GPJ TREK GEOTECHNICAL GDT_20/1/15



2015 Local Streets Package (PW File #: 15-R-01)
 Sub-Surface Investigation
 Scurfield Blvd. between Waverley St. and Dovercourt Drive

Test Hole No.	Test Hole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)		Moisture Content (%)	Grain Size Analysis				Atterberg Limits		
		Type	Thickness (mm)	Type	Thickness (mm)		Top (m)	Bottom (m)		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Plastic	Liquid	Plasticity Index
TH14-05	Eastbound land, 1.2m north from south curb, at #50 Scurfield Blvd.	N/A	-	Concrete	212											
						Clay (Fill)	0.2	0.3	13							
						Clay (Fill)	0.5	0.6	26							
						Clay	0.8	0.9	31							
						Clay	1.1	1.2	26							
						Clay	1.4	1.5	26							
						Silt	1.7	1.7	37							
						Clay	2.0	2.1	52							
				Clay	2.9	3.0	52									
TH14-06	Westbound lane, 1.2m south from north curb, at #51 Scurfield Blvd.	N/A	-	Concrete	216											
						Clay (Fill)	0.2	0.3	37							
						Clay (Fill)	0.5	0.6	31	0	10	21	69	21	67	47
						Clay (Fill)	0.8	0.9	31							
						Silt	0.8	0.9	30							
						Clay	1.1	1.2	32							
						Clay	1.4	1.5	33							
						Clay	1.7	1.8	42							
				Clay	2.0	2.1	45									
				Silt	2.1	2.2	39									
				Clay	2.9	3.0	51									
TH14-07	Eastbound land, 1.2m north from south curb, at #40 Scurfield Blvd.	N/A	-	Concrete	187											
						Clay (Fill)	0.2	0.3	37							
						Clay	0.5	0.6	35							
						Clay	0.8	0.9	31							
						Clay	1.1	1.2	26							
						Clay	1.4	1.5	29							
						Clay	1.7	1.8	39							
						Clay	2.0	2.1	41							
				Clay	2.9	3.0	53									
TH14-08	Westbound lane, 1.2m south from north curb, at #25 Scurfield Blvd.	N/A	-	Concrete	192											
						Clay (Fill)	0.2	0.3	38							
						Clay	0.5	0.6	40							
						Clay	0.8	0.9	45							
						Clay	1.1	1.2	38							
						Clay	1.4	1.5	40							
						Clay	1.7	1.8	35							
						Clay	2.0	2.1	44							
				Silt	2.1	2.2	36									
				Clay	2.9	3.0	51									



Project No. 0035 017 00
Client Morrison Hershfield
Project Local Streets Package 15-R-01, Scurfield Blvd

Sample Date 05-Dec-14
Test Date 05-Jan-15
Technician Daniel Wiebe

Test Pit	TH14-01	TH14-01	TH14-01	TH14-01	TH14-01	TH14-01
Depth (m)	0.2 - 0.3	0.5 - 0.6	0.8 - 0.9	0.9 - 1.1	1.1 - 1.2	1.4 - 1.5
Sample #	G01	G02	G03	G03A	G04	G05
Tare ID	W55	W71	D38	A38	F24	F85
Mass of tare	8.4	8.3	8.3	8.4	8.5	8.6
Mass wet + tare	475.6	366.3	400.5	492.5	473.7	471.6
Mass dry + tare	405.7	296.0	288.6	367.4	336.5	333.1
Mass water	69.9	70.3	111.9	125.1	137.2	138.5
Mass dry soil	397.3	287.7	280.3	359.0	328.0	324.5
Moisture %	17.6%	24.4%	39.9%	34.8%	41.8%	42.7%

Test Pit	TH14-01	TH14-01	TH14-01	TH14-02	TH14-02	TH14-02
Depth (m)	1.7 - 1.8	2.0 - 2.1	2.9 - 3.0	0.2 - 0.3	0.5 - 0.6	0.8 - 0.9
Sample #	G06	G07	G08	G09	G10	G11
Tare ID	F152	F70	C28	N91	W64	H14
Mass of tare	8.3	8.4	8.4	8.5	8.2	8.2
Mass wet + tare	402.9	408.5	463.2	431.1	412.1	418
Mass dry + tare	266	270.4	303.8	332.5	309	309.2
Mass water	136.9	138.1	159.4	98.6	103.1	108.8
Mass dry soil	257.7	262.0	295.4	324.0	300.8	301.0
Moisture %	53.1%	52.7%	54.0%	30.4%	34.3%	36.1%

Test Pit	TH14-02	TH14-02	TH14-02	TH14-02	TH14-02	TH14-02
Depth (m)	1.1 - 1.2	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1	2.6 - 2.7	2.9 - 3.0
Sample #	G12	G13	G14	G15	G16A	G16
Tare ID	Z28	F95	W91	H33	P85	Z12
Mass of tare	8.5	8.1	8.7	8.4	8.4	8.5
Mass wet + tare	373.8	381.0	477.8	503.1	419.1	466.7
Mass dry + tare	277.8	282.0	366.0	350.8	299.4	312.7
Mass water	96.0	99.0	111.8	152.3	119.7	154.0
Mass dry soil	269.3	273.9	357.3	342.4	291.0	304.2
Moisture %	35.6%	36.1%	31.3%	44.5%	41.1%	50.6%



Project No. 0035 017 00
Client Morrison Hershfield
Project Local Streets Package 15-R-01, Scurfield Blvd

Sample Date 05-Dec-14
Test Date 05-Jan-15
Technician Daniel Wiebe

Test Pit	TH14-03	TH14-03	TH14-03	TH14-03	TH14-03	TH14-03
Depth (m)	0.2 - 0.3	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5	1.7 - 1.8
Sample #	G17	G18	G19	G20	G21	G22
Tare ID	Z61	W101	Z127	E74	D2	F86
Mass of tare	8.4	8.5	8.3	8.6	8.8	8.6
Mass wet + tare	452.9	353.9	416.9	388.8	379.9	442.7
Mass dry + tare	359.4	268.4	314.8	284.8	288.4	337.3
Mass water	93.5	85.5	102.1	104.0	91.5	105.4
Mass dry soil	351.0	259.9	306.5	276.2	279.6	328.7
Moisture %	26.6%	32.9%	33.3%	37.7%	32.7%	32.1%

Test Pit	TH14-03	TH14-03	TH14-04	TH14-04	TH14-04	TH14-04
Depth (m)	2.0 - 2.1	2.9 - 3.0	0.2 - 0.3	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2
Sample #	G23	G24	G25	G26	G27	G28
Tare ID	A23	E104	H79	F45	H46	N96
Mass of tare	8.5	8.4	8.4	8.4	8.3	8.4
Mass wet + tare	360	443.3	479	392.6	374.1	412.5
Mass dry + tare	276.9	295.2	364.6	309.4	281.3	298.8
Mass water	83.1	148.1	114.4	83.2	92.8	113.7
Mass dry soil	268.4	286.8	356.2	301.0	273.0	290.4
Moisture %	31.0%	51.6%	32.1%	27.6%	34.0%	39.2%

Test Pit	TH14-04	TH14-04	TH14-04	TH14-04	TH14-04	TH14-05
Depth (m)	1.4 - 1.5	1.5 - 1.6	1.7 - 1.8	2.0 - 2.1	2.9 - 3.0	0.2 - 0.3
Sample #	G29	G29A	G30	G31	G32	G33
Tare ID	E12	N10	H99	Z59	F88	D21
Mass of tare	8.5	8.4	8.4	8.4	8.3	8.4
Mass wet + tare	426.1	442.3	484.1	443	397.7	383
Mass dry + tare	293.8	323.8	318.9	292.5	263.3	339.1
Mass water	132.3	118.5	165.2	150.5	134.4	43.9
Mass dry soil	285.3	315.4	310.5	284.1	255.0	330.7
Moisture %	46.4%	37.6%	53.2%	53.0%	52.7%	13.3%



Project No. 0035 017 00
Client Morrison Hershfield
Project Local Streets Package 15-R-01, Scurfield Blvd

Sample Date 05-Dec-14
Test Date 05-Jan-15
Technician Daniel Wiebe

Test Pit	TH14-05	TH14-05	TH14-05	TH14-05	TH14-05	TH14-05
Depth (m)	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5	1.7 - 1.7	2.0 - 2.1
Sample #	G34	G35	G36	G37	G38	G39
Tare ID	Z18	E109	P28	Z119	F21	Z126
Mass of tare	8.4	8.6	8.5	8.4	8.5	8.5
Mass wet + tare	407.6	362	397.4	519.9	344.1	467.1
Mass dry + tare	326.5	277.8	317	413.2	253.9	311.3
Mass water	81.1	84.2	80.4	106.7	90.2	155.8
Mass dry soil	318.1	269.2	308.5	404.8	245.4	302.8
Moisture %	25.5%	31.3%	26.1%	26.4%	36.8%	51.5%

Test Pit	TH14-05	TH14-06	TH14-06	TH14-06	TH14-06	TH14-06
Depth (m)	2.9 - 3.0	0.2 - 0.3	0.5 - 0.6	0.8 - 0.9	0.8 - 0.9	1.1 - 1.2
Sample #	G40	G41	G42	G43	G43A	G44
Tare ID	N67	K12	Z92	E108	N41	F33
Mass of tare	8.4	8.4	8.9	8.7	8.4	8.4
Mass wet + tare	411.2	403.5	437.4	385.0	380.6	435.0
Mass dry + tare	273.7	295.9	336.6	295.1	295.5	330.8
Mass water	137.5	107.6	100.8	89.9	85.1	104.2
Mass dry soil	265.3	287.5	327.7	286.4	287.1	322.4
Moisture %	51.8%	37.4%	30.8%	31.4%	29.6%	32.3%

Test Pit	TH14-06	TH14-06	TH14-06	TH14-06	TH14-06	TH14-07
Depth (m)	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1	2.1 - 2.2	2.9 - 3.0	0.2 - 0.3
Sample #	G45	G46	G47	G47A	G48	G49
Tare ID	P10	A5	W22	E44	P25	K18
Mass of tare	8.4	7.9	8.3	8.5	8.4	8.4
Mass wet + tare	492.7	443.9	479.9	370.9	481.4	400.2
Mass dry + tare	373.5	315.1	334.6	269.1	322.1	295.4
Mass water	119.2	128.8	145.3	101.8	159.3	104.8
Mass dry soil	365.1	307.2	326.3	260.6	313.7	287.0
Moisture %	32.6%	41.9%	44.5%	39.1%	50.8%	36.5%



Project No. 0035 017 00
Client Morrison Hershfield
Project Local Streets Package 15-R-01, Scurfield Blvd

Sample Date 05-Dec-14
Test Date 05-Jan-15
Technician Daniel Wiebe

Test Pit	TH14-07	TH14-07	TH14-07	TH14-07	TH14-07	TH14-07
Depth (m)	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1
Sample #	G50	G51	G52	G53	G54	G55
Tare ID	E71	E90	Z68	P19	W14	N07
Mass of tare	8.6	8.5	8.5	8.5	8.3	8.5
Mass wet + tare	427.6	491.8	410.2	487.2	386.0	466.3
Mass dry + tare	318.6	378.2	328.7	378.4	280.0	333.4
Mass water	109.0	113.6	81.5	108.8	106.0	132.9
Mass dry soil	310.0	369.7	320.2	369.9	271.7	324.9
Moisture %	35.2%	30.7%	25.5%	29.4%	39.0%	40.9%

Test Pit	TH14-07	TH14-08	TH14-08	TH14-08	TH14-08	TH14-08
Depth (m)	2.9 - 3.0	0.2 - 0.3	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5
Sample #	G56	G57	G58	G59	G60	G61
Tare ID	N92	N44	M16	Z128	N62	Z34
Mass of tare	8.4	8.6	8.3	8.4	8.5	8.5
Mass wet + tare	399.5	338.0	383.3	363.0	500.6	378.6
Mass dry + tare	263.9	246.9	276.8	253.8	366.5	272.5
Mass water	135.6	91.1	106.5	109.2	134.1	106.1
Mass dry soil	255.5	238.3	268.5	245.4	358.0	264.0
Moisture %	53.1%	38.2%	39.7%	44.5%	37.5%	40.2%

Test Pit	TH14-08	TH14-08	TH14-08	TH14-08	TH14-09	TH14-09
Depth (m)	1.7 - 1.8	2.0 - 2.1	2.1 - 2.2	2.9 - 3.0	0.2 - 0.3	0.5 - 0.6
Sample #	G62	G63	G63A	G64	G65	G66
Tare ID	F141	F129	E81	D20	E80	E79
Mass of tare	8.4	8.4	8.5	8.4	8.5	8.6
Mass wet + tare	381.1	356.2	399.3	417.4	360.2	424.8
Mass dry + tare	284.8	249.9	296.2	279.2	309.0	317.9
Mass water	96.3	106.3	103.1	138.2	51.2	106.9
Mass dry soil	276.4	241.5	287.7	270.8	300.5	309.3
Moisture %	34.8%	44.0%	35.8%	51.0%	17.0%	34.6%



Project No. 0035 017 00
Client Morrison Hershfield
Project Local Streets Package 15-R-01, Scurfield Blvd

Sample Date 05-Dec-14
Test Date 05-Jan-15
Technician Daniel Wiebe

Test Pit	TH14-09	TH14-09	TH14-09	TH14-09	TH14-09	TH14-09
Depth (m)	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1	2.9 - 3.0
Sample #	G67	G68	G69	G70	G71	G72
Tare ID	N09	W13	H41	N08	W77	E129
Mass of tare	8.6	8.4	8.3	8.5	8.5	8.2
Mass wet + tare	462.3	406.1	456.5	501.1	378.6	467.3
Mass dry + tare	357.7	319.0	382.0	409.4	267.4	314.3
Mass water	104.6	87.1	74.5	91.7	111.2	153.0
Mass dry soil	349.1	310.6	373.7	400.9	258.9	306.1
Moisture %	30.0%	28.0%	19.9%	22.9%	43.0%	50.0%

Test Pit	TH14-10	TH14-10	TH14-10	TH14-10	TH14-10	TH14-10
Depth (m)	0.2 - 0.3	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5	1.7 - 1.8
Sample #	G73	G74	G75	G76	G77	G78
Tare ID	E28	W90	W81	W72	K4	F149
Mass of tare	8.3	8.4	8.7	8.8	8.4	8.3
Mass wet + tare	404.3	484.4	350.8	440.6	397.8	354.7
Mass dry + tare	317.1	374.2	271.7	342.8	289.0	254.4
Mass water	87.2	110.2	79.1	97.8	108.8	100.3
Mass dry soil	308.8	365.8	263.0	334.0	280.6	246.1
Moisture %	28.2%	30.1%	30.1%	29.3%	38.8%	40.8%

Test Pit	TH14-10	TH14-10	TH14-11	TH14-11	TH14-11	TH14-11
Depth (m)	2.0 - 2.1	2.9 - 3.0	0.2 - 0.3	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2
Sample #	G79	G80	G81	G82	G83	G84
Tare ID	W12	E12	E111	N02	N21	W88
Mass of tare	8.3	8.5	8.6	8.4	8.5	8.6
Mass wet + tare	408.1	396.3	369.3	381.5	352.7	442.2
Mass dry + tare	278.7	259.2	308.1	293.2	276.3	345.9
Mass water	129.4	137.1	61.2	88.3	76.4	96.3
Mass dry soil	270.4	250.7	299.5	284.8	267.8	337.3
Moisture %	47.9%	54.7%	20.4%	31.0%	28.5%	28.6%



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**Moisture Content Report
 ASTM D2216-98**

Project No. 0035 017 00
Client Morrison Hershfield
Project Local Streets Package 15-R-01, Scurfield Blvd

Sample Date 05-Dec-14
Test Date 05-Jan-15
Technician Daniel Wiebe

Test Pit	TH14-11	TH14-11	TH14-11	TH14-11	TH14-12	TH14-12
Depth (m)	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1	2.9 - 3.0	0.2 - 0.3	0.5 - 0.6
Sample #	G85	G86	G87	G88	G89	G90
Tare ID	N105	N85	F5	W70	D15	Z66
Mass of tare	8.4	8.3	8.5	8.5	8.5	8.4
Mass wet + tare	388.8	407.7	442.2	397.1	525.8	413.9
Mass dry + tare	301.2	305.8	307.3	259.0	473.6	340.6
Mass water	87.6	101.9	134.9	138.1	52.2	73.3
Mass dry soil	292.8	297.5	298.8	250.5	465.1	332.2
Moisture %	29.9%	34.3%	45.1%	55.1%	11.2%	22.1%

Test Pit	TH14-12	TH14-12	TH14-12	TH14-12	TH14-12	TH14-12
Depth (m)	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1	2.1 - 2.2
Sample #	G91	G92	G93	G94	G95	G95A
Tare ID	P37	E75	P01	N75	F97	P39
Mass of tare	8.5	8.6	8.4	8.4	8.4	8.8
Mass wet + tare	397.5	411.3	402.5	426.1	457.2	442.4
Mass dry + tare	305.5	322.2	299.5	301.4	310.6	317
Mass water	92.0	89.1	103.0	124.7	146.6	125.4
Mass dry soil	297.0	313.6	291.1	293.0	302.2	308.2
Moisture %	31.0%	28.4%	35.4%	42.6%	48.5%	40.7%

Test Pit	TH14-12	TH14-12				
Depth (m)	2.2 - 2.3	2.9 - 3.0				
Sample #	G96A	G96				
Tare ID	F91	A19				
Mass of tare	8.2	8.6				
Mass wet + tare	447.3	499.9				
Mass dry + tare	295.4	335.9				
Mass water	151.9	164.0				
Mass dry soil	287.2	327.3				
Moisture %	52.9%	50.1%				



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**Atterberg Limits
 ASTM D4318**

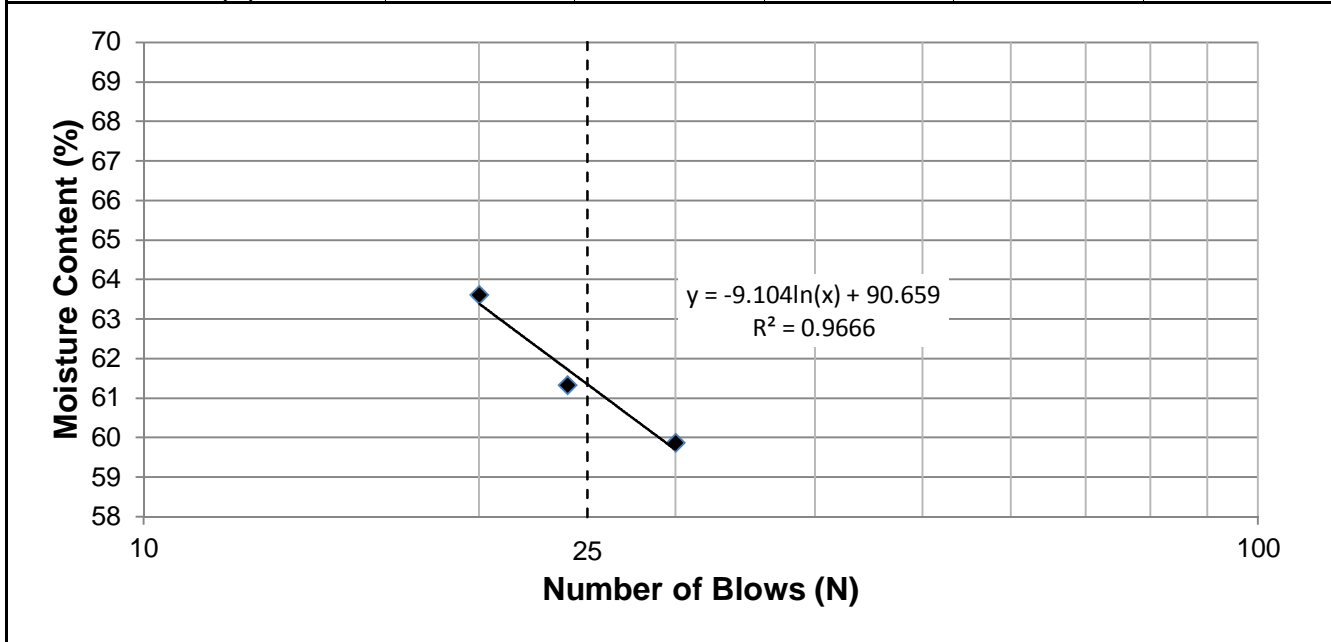
Project No. 0035-017-00
Client Morrision Hershfield
Project Local Streets Package 15-R-01, Scurfield Blvd

Test Hole TH14-01
Sample # G02
Depth (m) 0.5 - 0.6
Sample Date 5-Dec-14
Test Date 14-Jan-15
Technician Daniel Wiebe

Liquid Limit	61
Plastic Limit	20
Plasticity Index	41

Liquid Limit

Trial #	1	2	3	4	5
Number of Blows (N)	20	30	24		
Mass Wet Soil + Tare (g)	27.083	24.235	24.735		
Mass Dry Soil + Tare (g)	22.017	20.402	20.702		
Mass Tare (g)	14.052	14.000	14.126		
Mass Water (g)	5.066	3.833	4.033		
Mass Dry Soil (g)	7.965	6.402	6.576		
Moisture Content (%)	63.603	59.872	61.329		



Plastic Limit

Trial #	1	2	3	4	5
Mass Wet Soil + Tare (g)	20.557	20.560			
Mass Dry Soil + Tare (g)	19.511	19.466			
Mass Tare (g)	14.175	14.094			
Mass Water (g)	1.046	1.094			
Mass Dry Soil (g)	5.336	5.372			
Moisture Content (%)	19.603	20.365			



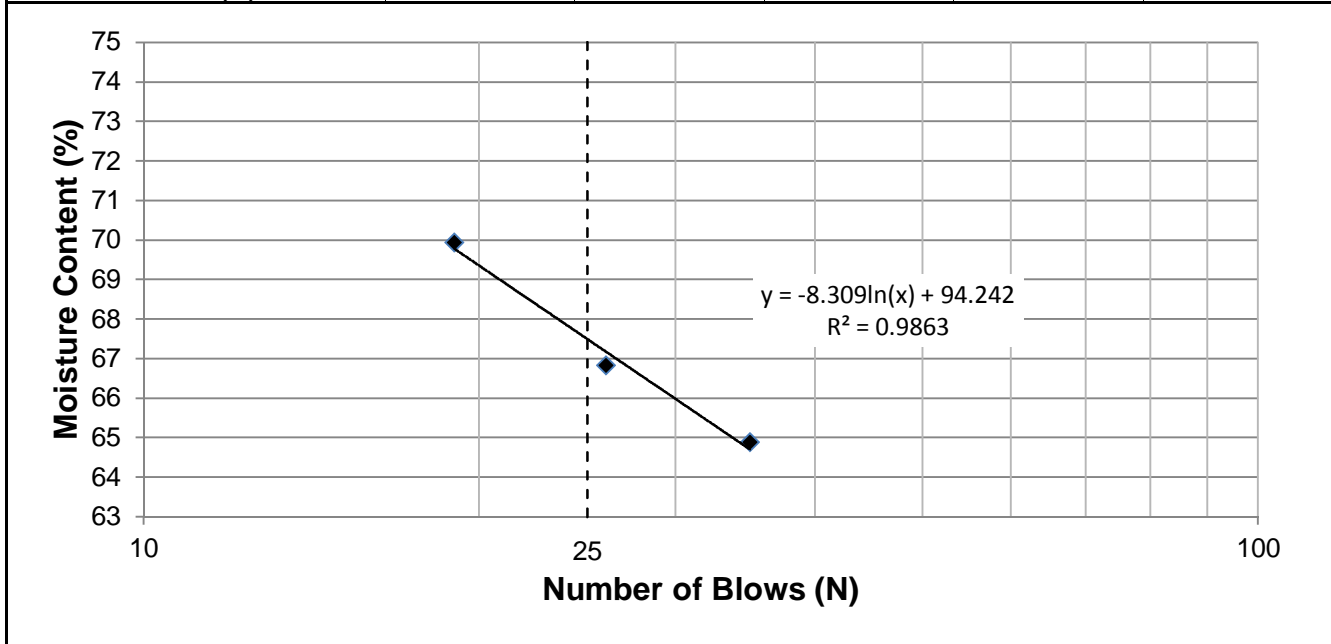
Project No. 0035 017 00
Client Morrision Hershfield
Project Local Streets Package 15-R-01, Scurfield Blvd

Test Hole TH14-06
Sample # G42
Depth (m) 0.5 - 0.6
Sample Date 12-May-14
Test Date 13-Jan-15
Technician Daniel Wiebe

Liquid Limit	67
Plastic Limit	21
Plasticity Index	47

Liquid Limit

Trial #	1	2	3	4	5
Number of Blows (N)	26	35	19		
Mass Wet Soil + Tare (g)	23.863	23.137	22.679		
Mass Dry Soil + Tare (g)	19.959	19.642	19.109		
Mass Tare (g)	14.117	14.255	14.005		
Mass Water (g)	3.904	3.495	3.570		
Mass Dry Soil (g)	5.842	5.387	5.104		
Moisture Content (%)	66.826	64.878	69.945		



Plastic Limit

Trial #	1	2	3	4	5
Mass Wet Soil + Tare (g)	20.225	20.085			
Mass Dry Soil + Tare (g)	19.204	18.971			
Mass Tare (g)	14.171	13.828			
Mass Water (g)	1.021	1.114			
Mass Dry Soil (g)	5.033	5.143			
Moisture Content (%)	20.286	21.661			



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**Atterberg Limits
 ASTM D4318**

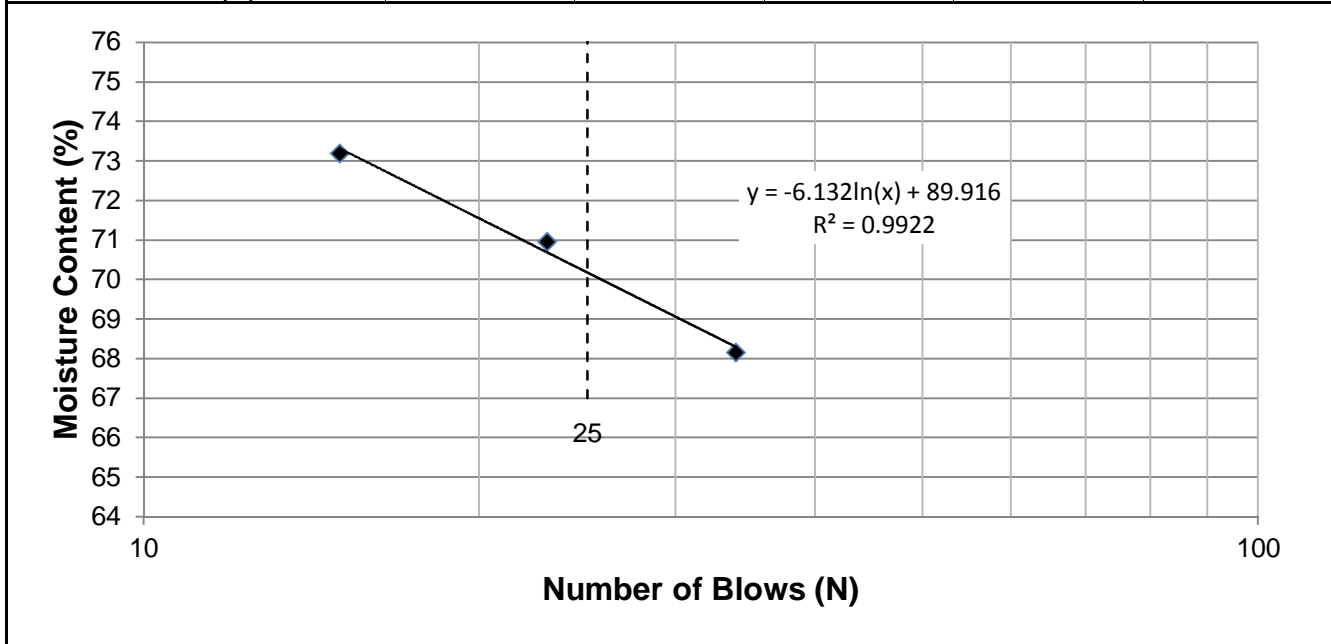
Project No. 0035 017 00
Client Morrision Hershfield
Project Local Streets Package 15-R-01, Scurfield Blvd

Test Hole TH14-09
Sample # G67
Depth (m) 0.8 - 0.9
Sample Date 5-Dec-14
Test Date 13-Jan-15
Technician Daniel Wiebe

Liquid Limit	70
Plastic Limit	23
Plasticity Index	48

Liquid Limit

Trial #	1	2	3	4	5
Number of Blows (N)	15	34	23		
Mass Wet Soil + Tare (g)	23.124	23.648	24.032		
Mass Dry Soil + Tare (g)	19.215	19.767	19.900		
Mass Tare (g)	13.874	14.073	14.076		
Mass Water (g)	3.909	3.881	4.132		
Mass Dry Soil (g)	5.341	5.694	5.824		
Moisture Content (%)	73.189	68.159	70.948		



Plastic Limit

Trial #	1	2	3	4	5
Mass Wet Soil + Tare (g)	20.139	21.081			
Mass Dry Soil + Tare (g)	18.994	19.879			
Mass Tare (g)	13.928	14.515			
Mass Water (g)	1.145	1.202			
Mass Dry Soil (g)	5.066	5.364			
Moisture Content (%)	22.602	22.409			



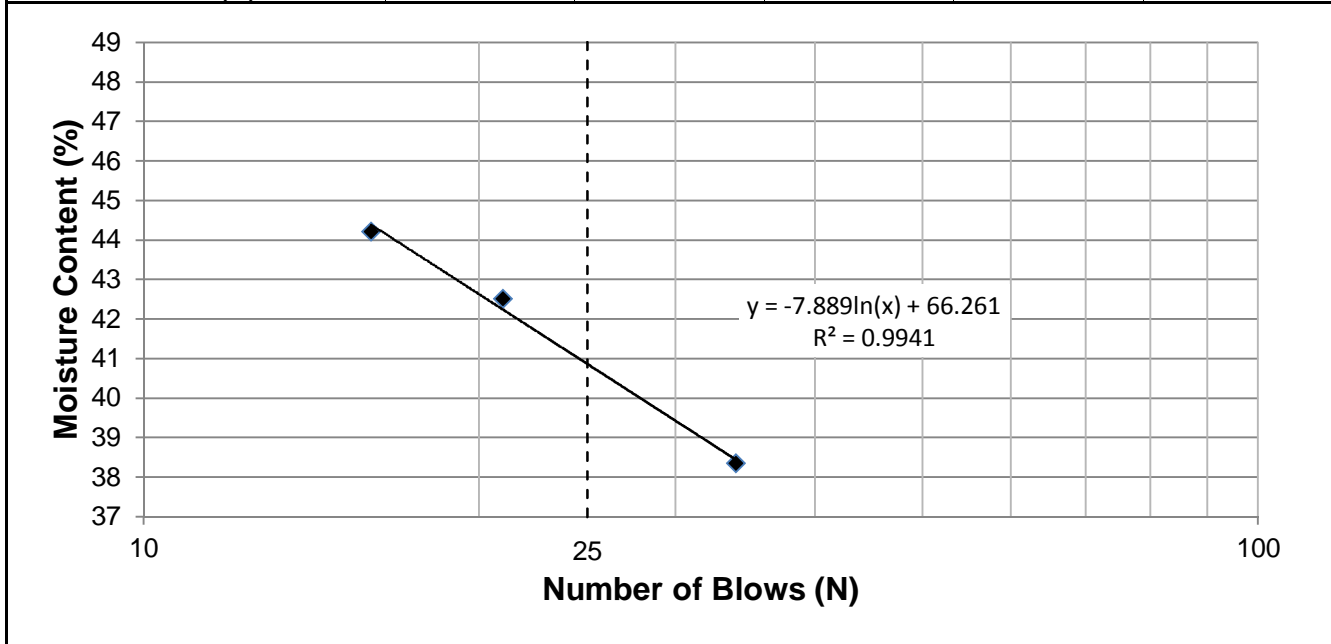
Project No. 0035 017 00
Client Morrision Hershfield
Project Local Streets Package 15-R-01, Scurfield Blvd

Test Hole TH14-12
Sample # G90
Depth (m) 0.5 - 0.6
Sample Date 5-Dec-14
Test Date 14-Jan-15
Technician Daniel Wiebe

Liquid Limit	41
Plastic Limit	16
Plasticity Index	25

Liquid Limit

Trial #	1	2	3	4	5
Number of Blows (N)	21	34	16		
Mass Wet Soil + Tare (g)	24.124	23.954	23.136		
Mass Dry Soil + Tare (g)	21.155	21.266	20.417		
Mass Tare (g)	14.170	14.256	14.268		
Mass Water (g)	2.969	2.688	2.719		
Mass Dry Soil (g)	6.985	7.010	6.149		
Moisture Content (%)	42.505	38.345	44.219		



Plastic Limit

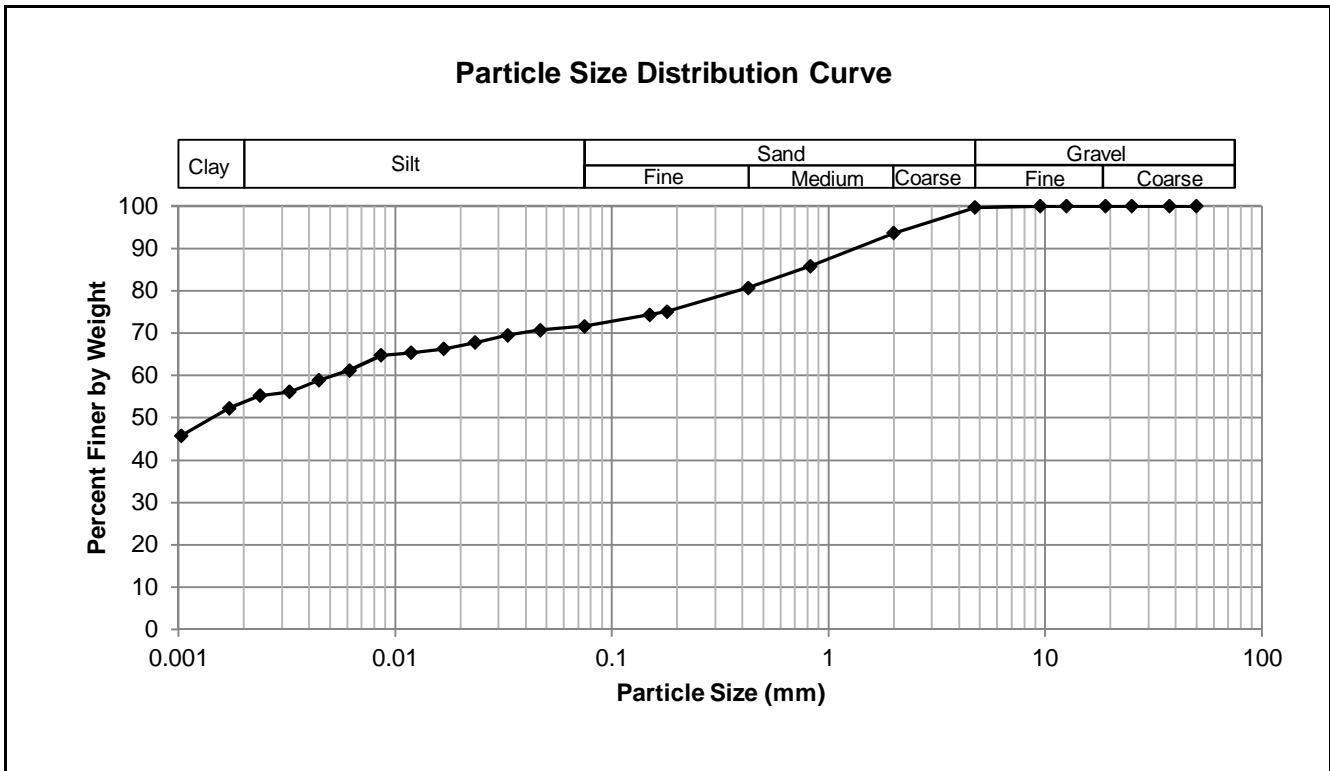
Trial #	1	2	3	4	5
Mass Wet Soil + Tare (g)	20.426	20.493			
Mass Dry Soil + Tare (g)	19.559	19.637			
Mass Tare (g)	14.130	14.157			
Mass Water (g)	0.867	0.856			
Mass Dry Soil (g)	5.429	5.480			
Moisture Content (%)	15.970	15.620			



Project No. 0035 017 00
Client Morrison Hershfield
Project Local Streets Packages 15-R-01, Scurfield Blvd

Test Hole TH14-01
Sample # G02
Depth (m) 0.5 - 0.6
Sample Date 5-Dec-14
Test Date 14-Jan-15
Technician Junhui Wu/Daniel Wiebe

Gravel	0.3%
Sand	28.0%
Silt	18.1%
Clay	53.6%



Gravel		Sand		Silt and Clay	
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	99.66	0.0750	71.67
37.5	100.00	2.00	93.62	0.0468	70.73
25.0	100.00	0.825	85.83	0.0331	69.54
19.0	100.00	0.425	80.69	0.0234	67.76
12.5	100.00	0.180	75.08	0.0167	66.27
9.50	100.00	0.150	74.35	0.0118	65.38
4.75	99.66	0.075	71.67	0.0086	64.78
				0.0062	61.22
				0.0044	58.84
				0.0033	56.15
				0.0024	55.27
				0.0017	52.29
				0.0010	45.75

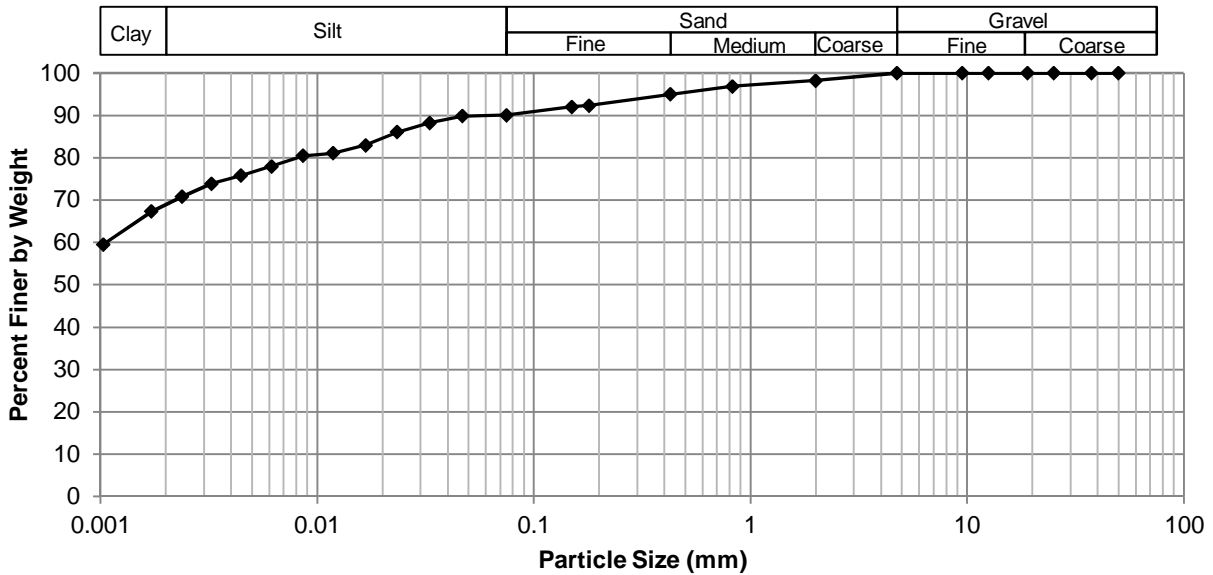


Project No. 0035 017 00
Client Morrison Hershfield
Project Local Streets Packages 15-R-01, Scurfield Blvd

Test Hole TH14-06
Sample # G42
Depth (m) 0.5 - 0.6
Sample Date 5-Dec-14
Test Date 14-Jan-15
Technician Junhui Wu/Daniel Wiebe

Gravel	0.0%
Sand	9.9%
Silt	21.3%
Clay	68.8%

Particle Size Distribution Curve



Gravel		Sand		Silt and Clay	
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	100.00	0.0750	90.09
37.5	100.00	2.00	98.23	0.0468	89.81
25.0	100.00	0.825	96.90	0.0331	88.25
19.0	100.00	0.425	94.95	0.0234	86.07
12.5	100.00	0.180	92.32	0.0167	82.95
9.50	100.00	0.150	92.01	0.0118	81.08
4.75	100.00	0.075	90.09	0.0086	80.45
				0.0062	77.96
				0.0044	75.78
				0.0033	73.89
				0.0024	70.78
				0.0017	67.35
				0.0010	59.55

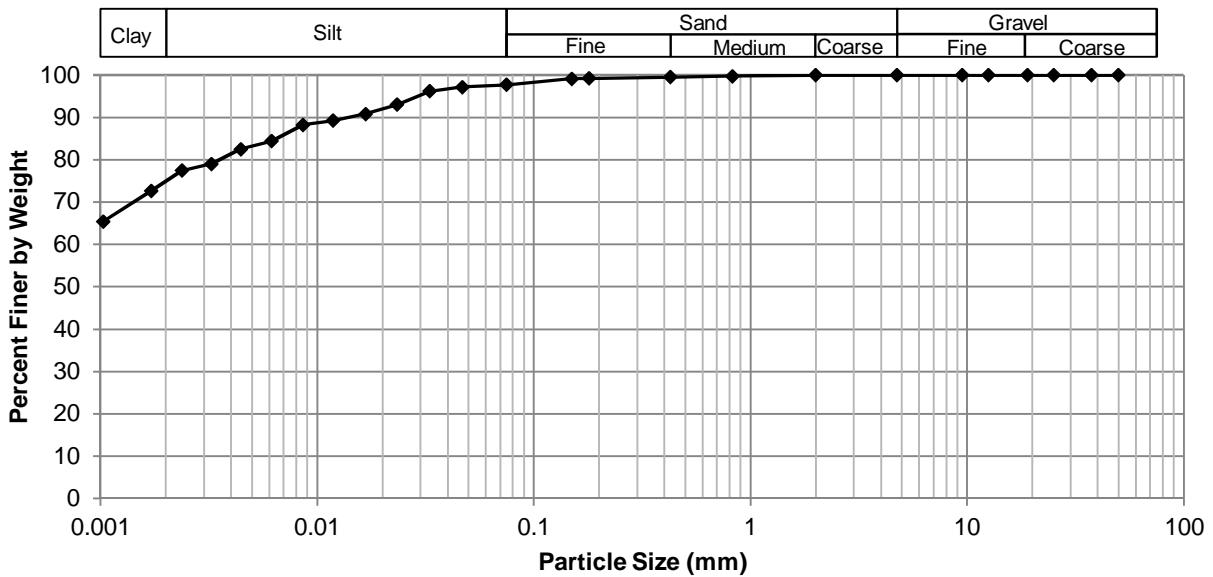


Project No. 0035 017 00
Client Morrison Hershfield
Project Local Streets Packages 15-R-01, Scurfield Blvd

Test Hole TH14-09
Sample # G67
Depth (m) 0.8 - 0.9
Sample Date 5-Dec-14
Test Date 14-Jan-15
Technician Junhui Wu/Daniel Wiebe

Gravel	0.0%
Sand	2.3%
Silt	22.9%
Clay	74.8%

Particle Size Distribution Curve



Gravel		Sand		Silt and Clay	
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	100.00	0.0750	97.67
37.5	100.00	2.00	100.00	0.0468	97.15
25.0	100.00	0.825	99.73	0.0331	96.19
19.0	100.00	0.425	99.52	0.0234	93.02
12.5	100.00	0.180	99.21	0.0167	90.80
9.50	100.00	0.150	99.13	0.0118	89.21
4.75	100.00	0.075	97.67	0.0086	88.26
				0.0062	84.44
				0.0044	82.54
				0.0033	79.03
				0.0024	77.45
				0.0017	72.69
				0.0010	65.39

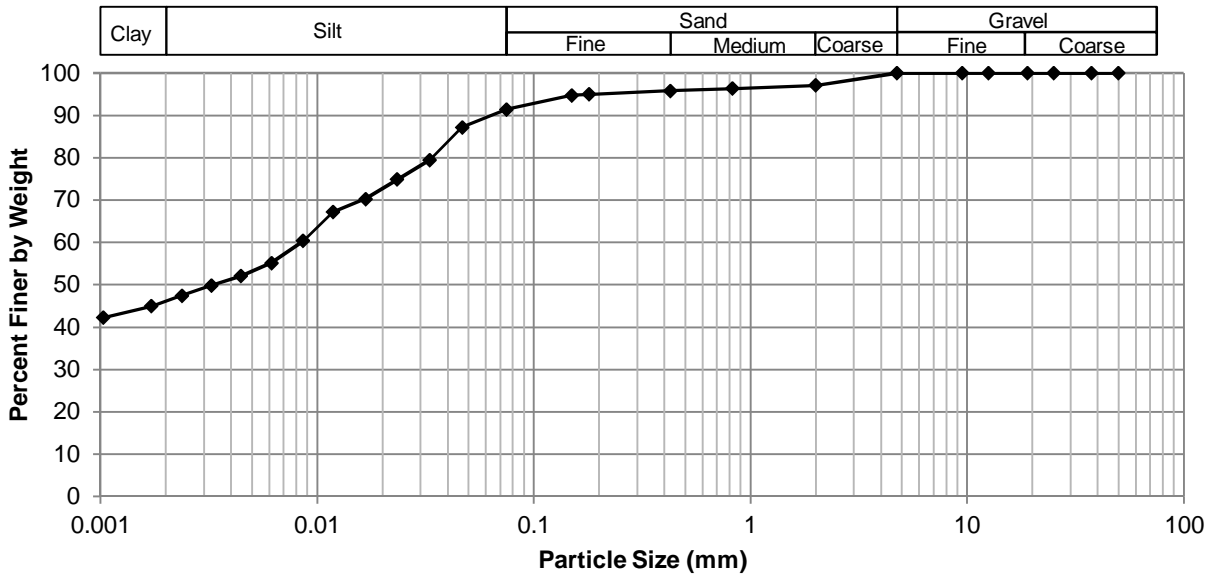


Project No. 0035 017 00
Client Morrison Hershfield
Project Local Streets Packages 15-R-01, Scurfield Blvd

Test Hole TH14-12
Sample # G90
Depth (m) 0.5 - 0.6
Sample Date 5-Dec-14
Test Date 14-Jan-15
Technician Junhui Wu/Daniel Wiebe

Gravel	0.0%
Sand	8.6%
Silt	45.4%
Clay	46.1%

Particle Size Distribution Curve



Gravel		Sand		Silt and Clay	
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	100.00	0.0750	91.42
37.5	100.00	2.00	97.09	0.0468	87.23
25.0	100.00	0.825	96.33	0.0331	79.52
19.0	100.00	0.425	95.78	0.0234	74.90
12.5	100.00	0.180	94.99	0.0167	70.27
9.50	100.00	0.150	94.79	0.0118	67.19
4.75	100.00	0.075	91.42	0.0086	60.41
				0.0062	55.17
				0.0044	52.08
				0.0033	49.91
				0.0024	47.45
				0.0017	44.99
				0.0010	42.21

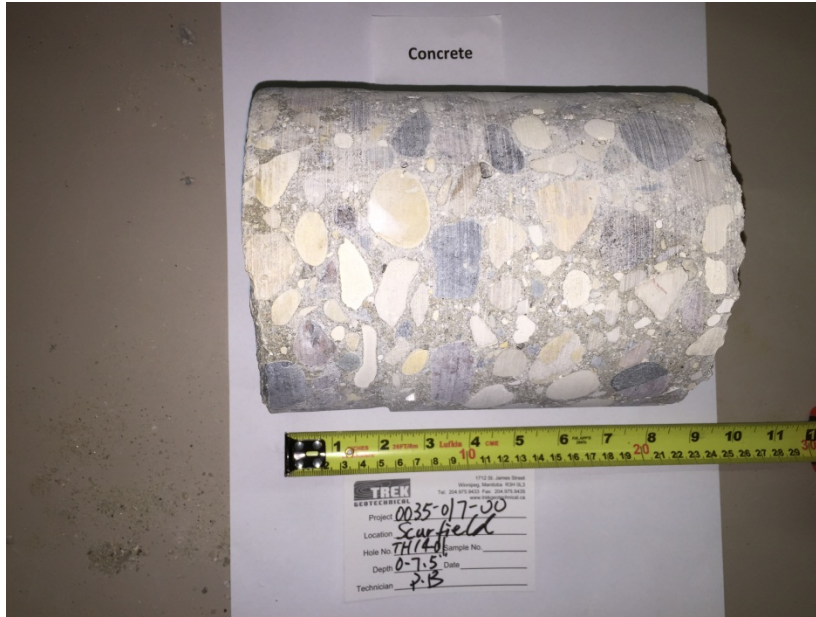


Photo 1: Concrete Core Sample From Test Hole TH14-01

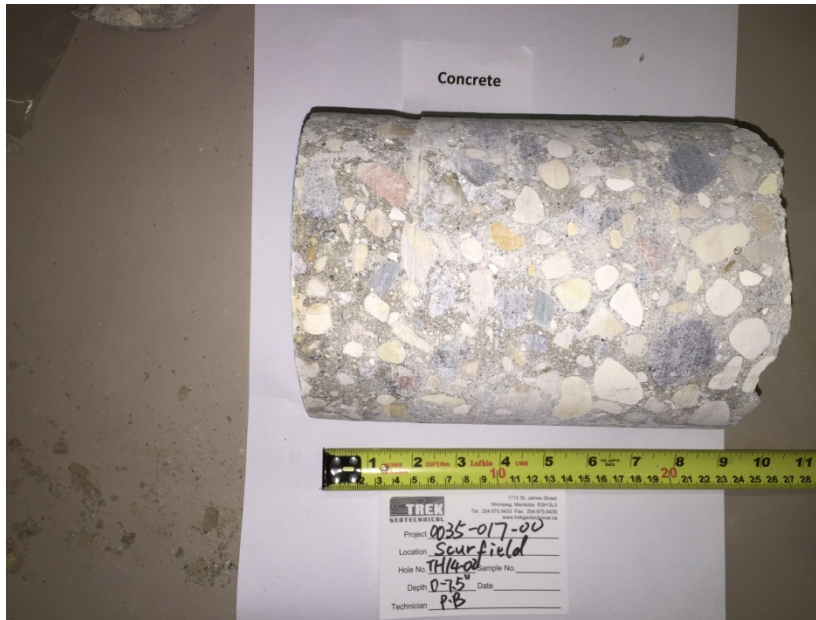


Photo 2: Concrete Core Sample From Test Hole TH14-02



Photo 3: Concrete Core Sample From Test Hole TH14-03



Photo 4: Concrete Core Sample From Test Hole TH14-4



Photo 5: Concrete Core Sample From Test Hole TH14-05



Photo 6: Concrete Core Sample From Test Hole TH14-06

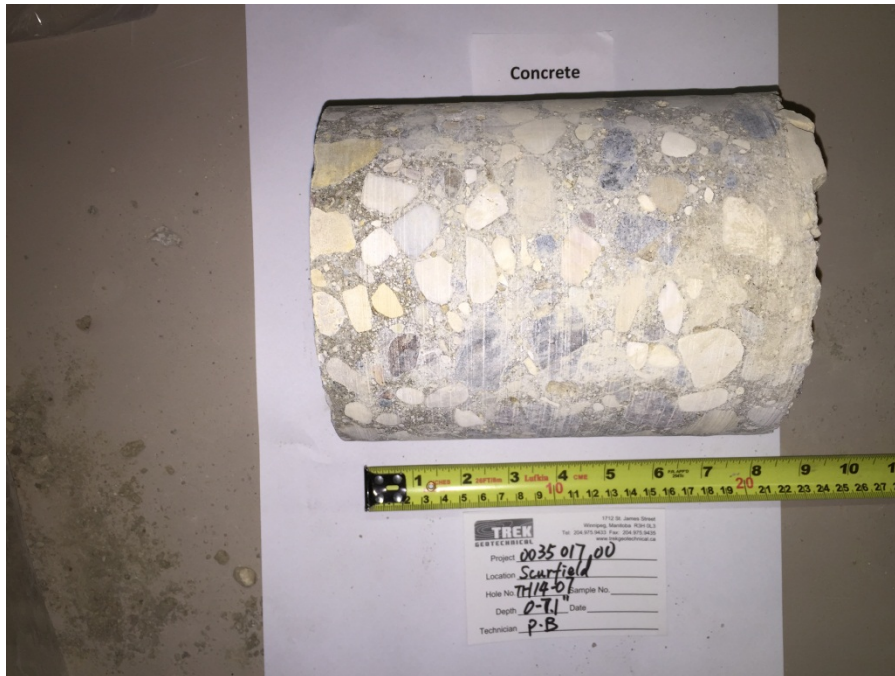


Photo 7: Concrete Core Sample From Test Hole TH14-07



Photo 8: Concrete Core Sample From Test Hole TH14-08

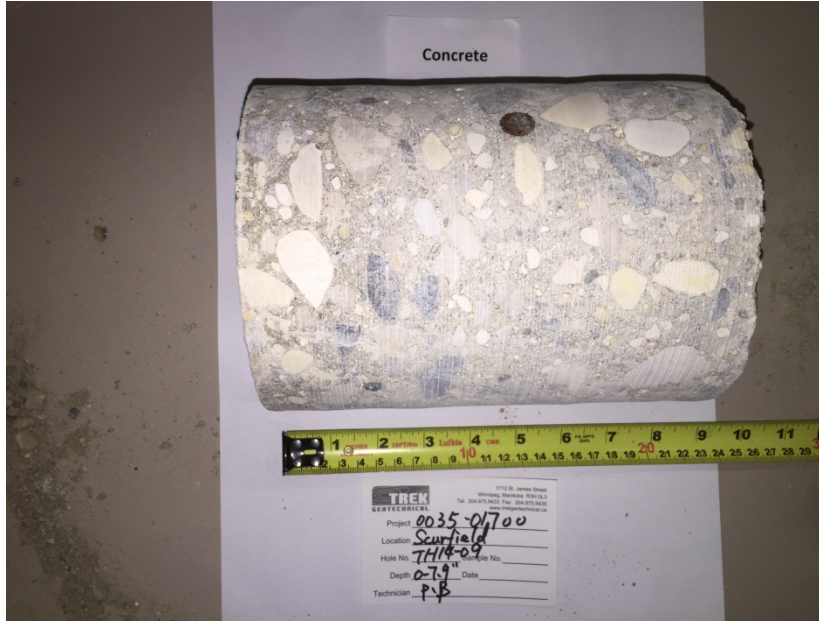


Photo 9: Concrete Core Sample From Test Hole TH14-09

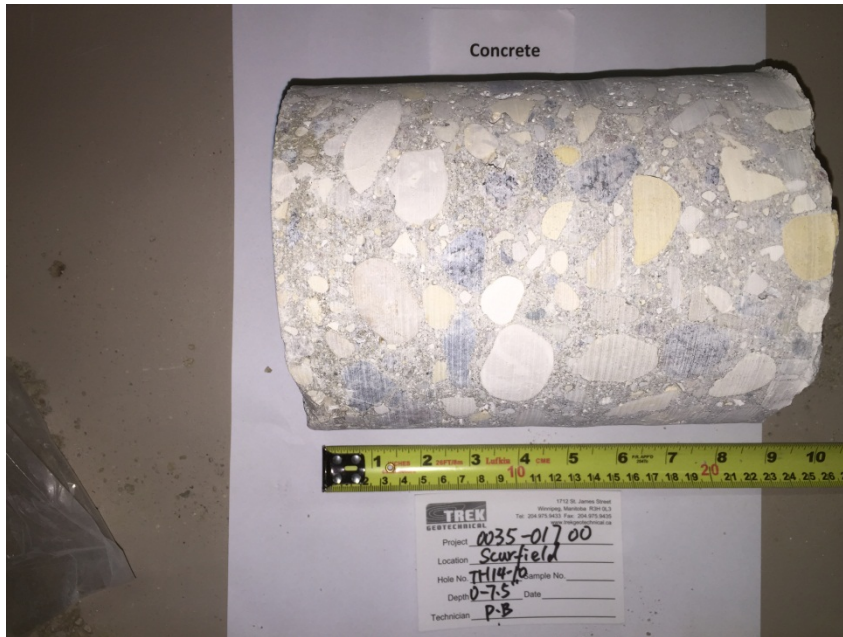


Photo 10: Concrete Core Sample From Test Hole TH14-10



Photo 11: Concrete Core Sample From Test Hole TH14-11

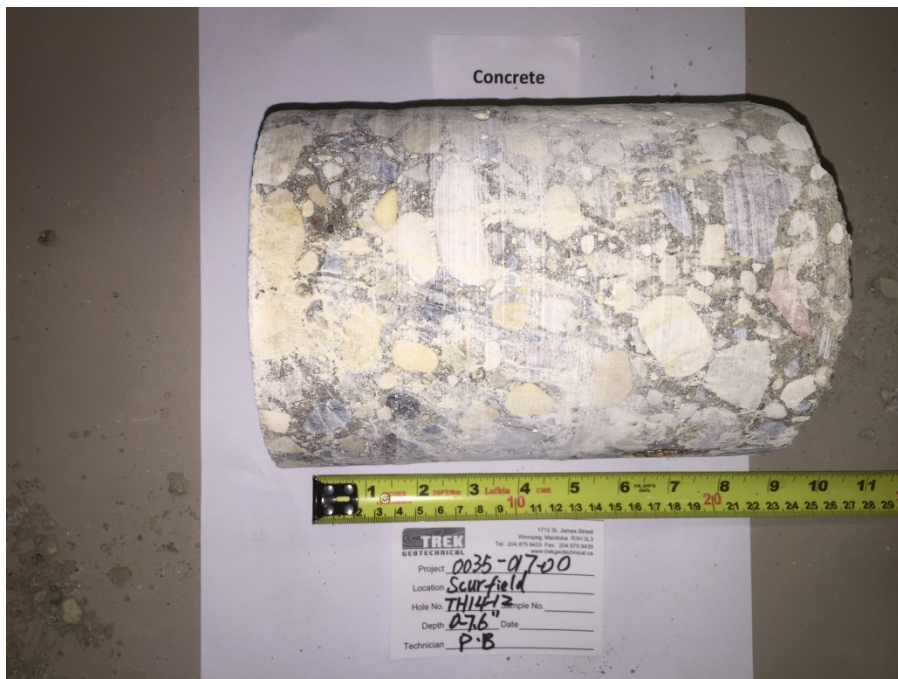


Photo 12: Concrete Core Sample From Test Hole TH14-12

Appendix B

Berry St., between Sargent Ave. and Wellington Ave.



Sub-Surface Log

Test Hole TH14-01

1 of 1

Client: Morrison Hershfield Project Number: 0035 017 00
 Project Name: City of Winnipeg Local Streets Package 15-R-01 Location: Berry St. - between Sargent Ave. and Wellington Ave.
 Contractor: Paddock Drilling Ltd. Ground Elevation: Top of Pavement
 Method: 125mm Solid Stem Auger, Acker MP8 Truck Mount Date Drilled: 8 December 2014

Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) Split Barrel (SB) Core (C)

Particle Size Legend: Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m ³)						Undrained Shear Strength (kPa)					
					16	17	18	19	20	21	Test Type					
					Particle Size (%)											
					0	20	40	60	80	100						
					PL _____ MC _____ LL _____ 0 20 40 60 80 100											
					0	20	40	60	80	100	0	50	100	150	200	250
0.0		ASPHALT - (25 mm thick)														
0.0		CONCRETE - (200 mm thick)		C01												
0.0		CLAY (FILL) - silty, trace sand, trace gravel (<15 mm diam.) - black, - frozen, moist and soft when thawed - high plasticity	<input checked="" type="checkbox"/>	G1												
0.5			<input checked="" type="checkbox"/>	G2												
0.8		ORGANIC CLAY (FILL) - silty - black, frozen, moist and firm when thawed, intermediate plasticity	<input checked="" type="checkbox"/>	G3												
1.0		CLAY - silty - grey - moist, stiff - high plasticity	<input checked="" type="checkbox"/>	G4												
1.5			<input checked="" type="checkbox"/>	G5												
2.0		- mottled grey / brown below 1.8 m	<input checked="" type="checkbox"/>	G6												
2.5			<input checked="" type="checkbox"/>	G7												
3.0		- firm below 2.4 m	<input checked="" type="checkbox"/>	G8												

END OF TEST HOLE AT 3.05 m IN CLAY

Notes:

- 1) No seepage or sloughing observed.
- 2) Test hole was backfilled with auger cuttings up to 0.45 m depth, 150 mm bentonite, 150 mm sand, 150 mm cold patch asphalt to surface.
- 3) Test hole located 25 m north of Sargent Ave, northbound lane, 2.0m west from east curb.(5528872m N 628585m E)

Logged By: Syl Precourt Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 0002 2015-01-20 BERRY STREET, O.D. SP. 0035 017 00.GPJ TREK GEOTECHNICAL.GDT. 20/1/15



Sub-Surface Log

Test Hole TH14-02

1 of 1

Client: Morrison Hershfield Project Number: 0035 017 00
 Project Name: City of Winnipeg Local Streets Package 15-R-01 Location: Berry St. - between Sargent Ave. and Wellington Ave.
 Contractor: Paddock Drilling Ltd. Ground Elevation: Top of Pavement
 Method: 125mm Solid Stem Auger, Acker MP8 Truck Mount Date Drilled: 8 December 2014

Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) Split Barrel (SB) Core (C)

Particle Size Legend: Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m ³)						Undrained Shear Strength (kPa)					
					16	17	18	19	20	21	Test Type					
					Particle Size (%)											
					0	20	40	60	80	100						
					PL _____ MC _____ LL _____ 0 20 40 60 80 100											
					0	20	40	60	80	100	0	50	100	150	200	250
0.00 - 0.05		ASPHALT - (45 mm thick)		C02												
0.05 - 0.10		CONCRETE - (170 mm thick)														
0.10 - 0.45		ORGANIC CLAY (FILL) - silty, trace to some sand, trace gravel (<15 mm diam.) - black, frozen, wet and soft when thawed - high plasticity - moist below 0.5 m	G	G9												
0.45 - 0.60		ORGANIC CLAY - silty - black, frozen, moist and soft when thawed, intermediate plasticity	G	G10												
0.60 - 0.85		SILT - clayey - light brown - wet, soft - low plasticity	G	G11												
0.85 - 1.00		CLAY - silty, silt inclusion (<10 mm diam.) - mottled grey / brown - moist, stiff - high plasticity	G	G12												
1.00 - 1.50		CLAY - silty, silt inclusion (<10 mm diam.) - mottled grey / brown - moist, stiff - high plasticity	G	G13												
1.50 - 2.00		CLAY - silty, silt inclusion (<10 mm diam.) - mottled grey / brown - moist, stiff - high plasticity	G	G14												
2.00 - 2.50		CLAY - silty, silt inclusion (<10 mm diam.) - mottled grey / brown - moist, stiff - high plasticity	G	G15												
2.50 - 3.00		CLAY - silty, silt inclusion (<10 mm diam.) - mottled grey / brown - moist, stiff - high plasticity	G	G16												

END OF TEST HOLE AT 3.05 m IN CLAY

Notes:

- 1) No seepage or sloughing observed.
- 2) Test hole was backfilled with auger cuttings up to 0.45 m depth, 150 mm bentonite, 150 mm sand, 150 mm cold patch asphalt to surface.
- 3) Test hole located 50 m north of Sargent Ave, northbound lane, 1.2m west from east curb.(5528896m N 6285855m E)

Logged By: Syl Precourt Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 0002 2015-01-20 BERRY STREET, O.D. SP. 0035 017 00.GPJ TREK GEOTECHNICAL GDT. 20/1/15



Sub-Surface Log

Test Hole TH14-03

1 of 1

Client: Morrison Hershfield Project Number: 0035 017 00
 Project Name: City of Winnipeg Local Streets Package 15-R-01 Location: Berry St. - between Sargent Ave. and Wellington Ave.
 Contractor: Paddock Drilling Ltd. Ground Elevation: Top of Pavement
 Method: 125mm Solid Stem Auger, Acker MP8 Truck Mount Date Drilled: 8 December 2014

Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) Split Barrel (SB) Core (C)

Particle Size Legend: Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m ³)						Undrained Shear Strength (kPa)					
					16	17	18	19	20	21	Test Type					
					Particle Size (%)											
					0	20	40	60	80	100						
					PL _____ MC _____ LL _____ 0 20 40 60 80 100											
					0	20	40	60	80	100	0	50	100	150	200	250
0.0		ASPHALT - (55 mm thick)		C03												
0.0		CONCRETE - (210 mm thick)														
0.45		CLAY (FILL) - silty, trace sand, trace gravel (<10 mm diam.) - black, frozen, wet and soft when thawed, moist below - intermediate plasticity		G17												
0.5				G18												
0.8		SILT - clayey - brown - moist, soft - low plasticity		G19												
1.0				G20												
1.5				G21												
1.8		CLAY - silty - dark grey - moist, very stiff - high plasticity		G22												
2.0		SILT - clayey - brown - moist, soft - low plasticity		G23												
2.5		CLAY - silty - mottled grey / brown - moist, firm - high plasticity														
3.0				G24												

END OF TEST HOLE AT 3.05 m IN CLAY

Notes:

- 1) No seepage or sloughing observed.
- 2) Test hole was backfilled with auger cuttings up to 0.45 m depth, 150 mm bentonite, 150 mm sand, 150 mm cold patch asphalt to surface.
- 3) Test hole located 100m north of Sargent Ave, northbound lane, 1.5m west from east curb.(5528956m N 628587m E)

Logged By: Syl Precourt Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 0002 2015-01-20 BERRY STREET, O.D. SP. 0035 017 00 GPJ TREK GEOTECHNICAL GDT. 20/1/15



Sub-Surface Log

Test Hole TH14-04

1 of 1

Client: Morrison Hershfield Project Number: 0035 017 00
 Project Name: City of Winnipeg Local Streets Package 15-R-01 Location: Berry St. - between Sargent Ave. and Wellington Ave.
 Contractor: Paddock Drilling Ltd. Ground Elevation: Top of Pavement
 Method: 125mm Solid Stem Auger, Acker MP8 Truck Mount Date Drilled: 8 December 2014

Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) Split Barrel (SB) Core (C)

Particle Size Legend: Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m ³)						Undrained Shear Strength (kPa)					
					16	17	18	19	20	21	Test Type					
					Particle Size (%)											
					0	20	40	60	80	100						
					PL MC LL											
					0	20	40	60	80	100	0	50	100	150	200	250
0.00 - 0.05		ASPHALT - (70 mm thick)														
0.05 - 0.10		CONCRETE - (190 mm thick)		C04												
0.10 - 0.45		SAND (FILL) - trace gravel (<20 mm diam.) - brown, frozen, moist when thawed, loose		G25	●											
0.45 - 0.65		CLAY (FILL) - silty, trace sand, trace gravel (<15 mm diam.) - black, frozen, moist and firm when thawed - intermediate plasticity		G26		●										
0.65 - 1.10		CLAY - silty - dark grey - frozen to 0.9 m, moist and firm when thawed, moist below - high plasticity		G27		●										
1.10 - 1.50		- stiff below 1.1 m		G28		●								◆		
1.50 - 1.80				G29		●								◆		
1.80 - 2.10		- mottled grey / brown below 1.8 m		G30		●								◆△		
2.10 - 2.40		- trace silt inclusions (<10 mm diam.) below 2.1 m		G31		●								◆△		
2.40 - 3.05		- firm below 2.4 m		G32		●								◆△		

END OF TEST HOLE AT 3.05 m IN CLAY

Notes:

- 1) No seepage or sloughing observed.
- 2) Test hole was backfilled with auger cuttings up to 0.45 m depth, 150 mm bentonite, 150 mm sand, 150 mm cold patch asphalt to surface.
- 3) Test hole located 150m north of Sargent Ave, southbound lane, 1.2m east from west curb.(5529016m N 628582m E)

Logged By: Syl Precourt Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 0002 2015-01-20 BERRY STREET, O.D. SP. 0035 017 00.GPJ TREK GEOTECHNICAL GDT. 20/1/15



Sub-Surface Log

Test Hole TH14-05

1 of 1

Client: Morrison Hershfield Project Number: 0035 017 00
 Project Name: City of Winnipeg Local Streets Package 15-R-01 Location: Berry St. - between Sargent Ave. and Wellington Ave.
 Contractor: Paddock Drilling Ltd. Ground Elevation: Top of Pavement
 Method: 125mm Solid Stem Auger, Acker MP8 Truck Mount Date Drilled: 8 December 2014

Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) Split Barrel (SB) Core (C)

Particle Size Legend: Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m ³)						Undrained Shear Strength (kPa)					
					16	17	18	19	20	21	Test Type					
					Particle Size (%)											
					0	20	40	60	80	100						
					PL MC LL											
					0	20	40	60	80	100	0	50	100	150	200	250
0.00 - 0.05		ASPHALT - (35 mm thick)		C05												
0.05 - 0.10		CONCRETE - (165 mm thick)														
0.10 - 0.45		CLAY (FILL) - silty, trace sand, trace gravel (<20 mm diam.) - black, frozen, moist and firm when thawed, intermediate plasticity	<input checked="" type="checkbox"/>	G33												
0.45 - 0.65		ORGANIC CLAY (FILL) - silty - black - frozen, moist and firm when thawed - intermediate plasticity	<input checked="" type="checkbox"/>	G34												
0.65 - 1.10		CLAY - silty - mottled grey / brown - frozen to 0.9 m, moist and firm when thawed, moist below - high plasticity	<input checked="" type="checkbox"/>	G35												
1.10 - 1.40		- very stiff below 1.1 m	<input checked="" type="checkbox"/>	G36												
1.40 - 1.60		- stiff below 1.4 m	<input checked="" type="checkbox"/>	G37												
1.60 - 1.80			<input checked="" type="checkbox"/>	G38												
1.80 - 2.00			<input checked="" type="checkbox"/>	G39												
2.00 - 2.90		- soft below 2.9 m	<input checked="" type="checkbox"/>	G40												

END OF TEST HOLE AT 3.05 m IN CLAY

Notes:

- 1) No seepage or sloughing observed.
- 2) Test hole was backfilled with auger cuttings up to 0.45 m depth, 150 mm bentonite, 150 mm sand, 150 mm cold patch asphalt to surface.
- 3) Test hole located 200m north of Sargent Ave, northbound lane, 1.5m west from east curb.(5529060m N 628590m E)

Logged By: Syl Precourt Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 0002 2015-01-20 BERRY STREET, O.D. SP. 0035 017 00.GPJ TREK GEOTECHNICAL.GDT. 20/1/15



Sub-Surface Log

Test Hole TH14-06

1 of 1

Client: Morrison Hershfield **Project Number:** 0035 017 00
Project Name: City of Winnipeg Local Streets Package 15-R-01 **Location:** Berry St. - between Sargent Ave. and Wellington Ave.
Contractor: Paddock Drilling Ltd. **Ground Elevation:** Top of Pavement
Method: 125mm Solid Stem Auger, Acker MP8 Truck Mount **Date Drilled:** 8 December 2014

Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) Split Barrel (SB) Core (C)

Particle Size Legend: Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m ³)						Undrained Shear Strength (kPa)					
					16	17	18	19	20	21	Test Type					
					Particle Size (%)											
					0	20	40	60	80	100						
					PL _____ MC _____ LL _____ ----- ----- ----- ----- -----											
					0	20	40	60	80	100	0	50	100	150	200	250
0.00 - 0.05		ASPHALT - (95 mm thick)														
0.05 - 0.15		CONCRETE - (185 mm thick)		C06												
0.15 - 0.45		CLAY (FILL) - silty, trace sand, trace gravel (<10 mm diam.) - dark grey, frozen, wet and soft when thawed, high plasticity		G41												
0.45 - 0.80		CLAY - silty, trace sand - dark grey - frozen to 0.8 m, moist and firm when thawed, moist below - high plasticity		G42												
0.80 - 1.20		- very stiff below 0.8 m		G43												
1.20 - 1.50		- stiff below 1.2 m		G44												
1.50 - 1.80				G45												
1.80 - 2.10				G46												
2.10 - 2.40				G47												
2.40 - 2.70				G48												
2.70 - 3.05		- firm below 2.7 m														

END OF TEST HOLE AT 3.05 m IN CLAY

Notes:

- 1) No seepage or sloughing observed.
- 2) Test hole was backfilled with auger cuttings up to 0.45 m depth, 150 mm bentonite, 150 mm sand, 150 mm cold patch asphalt to surface.
- 3) Test hole located 250m north of Sargent Ave, southbound lane, 1.2m east from west curb.(5529102m N 628585m E)

Logged By: Syl Precourt **Reviewed By:** N.J Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG LOGS 0002 2015-01-20 BERRY STREET, O.D. SP. 0035 017 00.GPJ TREK GEOTECHNICAL.GDT. 20/1/15



Sub-Surface Log

Test Hole TH14-07

1 of 1

Client: Morrison Hershfield Project Number: 0035 017 00
 Project Name: City of Winnipeg Local Streets Package 15-R-01 Location: Berry St. - between Sargent Ave. and Wellington Ave.
 Contractor: Paddock Drilling Ltd. Ground Elevation: Top of Pavement
 Method: 125mm Solid Stem Auger, Acker MP8 Truck Mount Date Drilled: 8 December 2014

Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) Split Barrel (SB) Core (C)

Particle Size Legend: Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m ³)		Particle Size (%)		Undrained Shear Strength (kPa)								
					16	17	18	19	20	21	0	50	100	150	200	250	
0.0 - 0.1		ASPHALT - (55 mm thick)															
0.1 - 0.2		CONCRETE - (215 mm thick)		C07													
0.2 - 0.45		CLAY (FILL) - silty, trace sand, trace gravel (<10 mm diam.) - black - frozen, moist and firm when thawed - intermediate plasticity		G49													
0.45 - 0.6				G50													
0.6 - 1.1		SILT - clayey - brown - frozen to 0.9 m, moist and firm when thawed, moist below - low plasticity - soft below 1.1 m		G51													
1.1 - 1.3				G52													
1.3 - 1.5				G53													
1.5 - 2.1		CLAY - silty - mottled grey / brown - moist, very stiff - high plasticity		G54													
2.1 - 2.2		- 75 mm thick silt seam, brown, moist, soft, low plasticity		G55													
2.2 - 3.05		- mottled brown / grey and firm below 2.1 m		G56													

END OF TEST HOLE AT 3.05 m IN CLAY

Notes:

- 1) No seepage or sloughing observed.
- 2) Test hole was backfilled with auger cuttings up to 0.45 m depth, 150 mm bentonite, 150 mm sand, 150 mm cold patch asphalt to surface.
- 3) Test hole located 350m north of Sargent Ave, northbound lane, 1.5m west from east curb.(5529153m N 628593m E)

Logged By: Syl Precourt Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 0002 2015-01-20 BERRY STREET, O.D. SP. 0035 017 00 GPJ TREK GEOTECHNICAL GDT. 20/1/15



Sub-Surface Log

Test Hole TH14-08

1 of 1

Client: Morrison Hershfield Project Number: 0035 017 00
 Project Name: City of Winnipeg Local Streets Package 15-R-01 Location: Berry St. - between Sargent Ave. and Wellington Ave.
 Contractor: Paddock Drilling Ltd. Ground Elevation: Top of Pavement
 Method: 125mm Solid Stem Auger, Acker MP8 Truck Mount Date Drilled: 8 December 2014

Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) Split Barrel (SB) Core (C)

Particle Size Legend: Fines Clay Silt Sand Gravel Cobbles Boulders

Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	Bulk Unit Wt (kN/m ³)						Undrained Shear Strength (kPa)					
					16	17	18	19	20	21	Test Type					
					Particle Size (%)											
					0	20	40	60	80	100						
					PL MC LL											
					0	20	40	60	80	100	0	50	100	150	200	250
		ASPHALT - (123 mm thick)		C08												
		CONCRETE - (90 mm thick)														
		CLAY (FILL) - silty, trace sand, trace gravel (<15 mm diam.) - black, frozen, wet and soft when thawed, high plasticity	G	G57												
0.5		SILT - clayey, trace sand - brown - frozen, moist and soft when thawed - low plasticity	G	G58												
			G	G59												
1.0			G	G60												
		CLAY - silty - dark grey - moist, very stiff - high plasticity	G	G61												
1.5		SILT - clayey, trace sand - brown - moist, soft - low plasticity	G	G62												
			G	G63												
2.0		CLAY - silty - grey - moist, stiff - high plasticity	G	G64												
2.5																
		- firm, trace silt inclusions (<5 mm diam.) below 2.3 m														
3.0																

END OF TEST HOLE AT 3.05 m IN CLAY

Notes:

- 1) No seepage or sloughing observed.
- 2) Test hole was backfilled with auger cuttings up to 0.45 m depth, 150 mm bentonite, 150 mm sand, 150 mm cold patch asphalt to surface.
- 3) Test hole located 350m of Sargent Ave, southbound lane, 1.2m east from west curb.(5529192m N 628587m E)

Logged By: Syl Precourt Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 0002 2015-01-20 BERRY STREET, O.D. SP. 0035 017 00 GPJ TREK GEOTECHNICAL GDT 20/11/15



Project No. 0035 017 00
Client Morrison Hershfield
Project Local Streets Package 15-R-01, Berry Street

Sample Date 08-Dec-14
Test Date 08-Jan-15
Technician Daniel Wiebe

Test Pit	TH14-01	TH14-01	TH14-01	TH14-01	TH14-01	TH14-01
Depth (m)	0.2 - 0.3	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5	1.7 - 1.8
Sample #	G01	G02	G03	G04	G05	G06
Tare ID	E115	E16	D12	H25	F41	F99
Mass of tare	8.7	8.4	8.3	8.3	8.4	8.6
Mass wet + tare	489.5	373.8	361.4	400.4	379.4	357.3
Mass dry + tare	419.9	299.6	251.0	289.7	282.8	258.2
Mass water	69.6	74.2	110.4	110.7	96.6	99.1
Mass dry soil	411.2	291.2	242.7	281.4	274.4	249.6
Moisture %	16.9%	25.5%	45.5%	39.3%	35.2%	39.7%

Test Pit	TH14-01	TH14-01	TH14-02	TH14-02	TH14-02	TH14-02
Depth (m)	2.0 - 2.1	2.9 - 3.0	0.2 - 0.3	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2
Sample #	G07	G08	G09	G10	G11	G12
Tare ID	W110	W01	Z60	E34	F50	N97
Mass of tare	8.6	8.4	8.3	8.6	8.7	8.4
Mass wet + tare	428.3	393.3	553.4	379.1	397.7	546.8
Mass dry + tare	300.9	260.4	451.1	264.9	302.2	445.4
Mass water	127.4	132.9	102.3	114.2	95.5	101.4
Mass dry soil	292.3	252.0	442.8	256.3	293.5	437.0
Moisture %	43.6%	52.7%	23.1%	44.6%	32.5%	23.2%

Test Pit	TH14-02	TH14-02	TH14-02	TH14-02	TH14-03	TH14-03
Depth (m)	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1	2.9 - 3.0	0.2 - 0.3	0.5 - 0.6
Sample #	G13	G14	G15	G16	G17	G18
Tare ID	F81	F29	H65	A6	F12	Z56
Mass of tare	8.4	8.3	8.3	8.0	8.5	8.5
Mass wet + tare	452.6	461.7	455.4	444.9	582.0	428.7
Mass dry + tare	368.6	320.3	328.8	289.9	495.4	342.3
Mass water	84.0	141.4	126.6	155.0	86.6	86.4
Mass dry soil	360.2	312.0	320.5	281.9	486.9	333.8
Moisture %	23.3%	45.3%	39.5%	55.0%	17.8%	25.9%



Project No. 0035 017 00
Client Morrison Hershfield
Project Local Streets Package 15-R-01, Berry Street

Sample Date 08-Dec-14
Test Date 08-Jan-15
Technician Daniel Wiebe

Test Pit	TH14-03	TH14-03	TH14-03	TH14-03	TH14-03	TH14-03
Depth (m)	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1	2.9 - 3.0
Sample #	G19	G20	G21	G22	G23	G24
Tare ID	N71	E89	C21	E98	H12	Z89
Mass of tare	8.6	8.7	8.5	8.6	8.5	8.3
Mass wet + tare	468.2	602.9	494.6	484.8	484	379.9
Mass dry + tare	392.5	498.3	407.8	379	389.1	252.1
Mass water	75.7	104.6	86.8	105.8	94.9	127.8
Mass dry soil	383.9	489.6	399.3	370.4	380.6	243.8
Moisture %	19.7%	21.4%	21.7%	28.6%	24.9%	52.4%

Test Pit	TH14-04	TH14-04	TH14-04	TH14-04	TH14-04	TH14-04
Depth (m)	0.2 - 0.3	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5	1.7 - 1.8
Sample #	G25	G26	G27	G28	G29	G30
Tare ID	D42	N58	W18	P30	W42	W65
Mass of tare	8.6	8.4	8.3	8.3	8	8.1
Mass wet + tare	615.4	359.3	365.6	391.2	416.6	400.2
Mass dry + tare	565	254.5	270.2	284.1	311.3	286
Mass water	50.4	104.8	95.4	107.1	105.3	114.2
Mass dry soil	556.4	246.1	261.9	275.8	303.3	277.9
Moisture %	9.1%	42.6%	36.4%	38.8%	34.7%	41.1%

Test Pit	TH14-04	TH14-04	TH14-05	TH14-05	TH14-05	TH14-05
Depth (m)	2.0 - 2.1	2.9 - 3.0	0.2 - 0.3	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2
Sample #	G31	G32	G33	G34	G35	G36
Tare ID	F148	N109	Z138	P21	E88	Z102
Mass of tare	8	8.3	8.4	8.5	8.5	8.5
Mass wet + tare	524.5	376.3	375	326.1	457.2	361.6
Mass dry + tare	365.9	251.6	280.2	225.7	342.5	266
Mass water	158.6	124.7	94.8	100.4	114.7	95.6
Mass dry soil	357.9	243.3	271.8	217.2	334.0	257.5
Moisture %	44.3%	51.3%	34.9%	46.2%	34.3%	37.1%



Project No. 0035 017 00
Client Morrison Hershfield
Project Local Streets Package 15-R-01, Berry Street

Sample Date 08-Dec-14
Test Date 08-Jan-15
Technician Daniel Wiebe

Test Pit	TH14-05	TH14-05	TH14-05	TH14-05	TH14-06	TH14-06
Depth (m)	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1	2.9 - 3.0	0.2 - 0.3	0.5 - 0.6
Sample #	G37	G38	G39	G40	G41	G42
Tare ID	W09	P03	Z110	D46	Z113	Z77
Mass of tare	8.4	8.5	8.5	8.5	8.4	8.4
Mass wet + tare	394.6	408.6	476.2	507.9	507	371.9
Mass dry + tare	281.8	286.7	330.1	327.6	410.8	273.4
Mass water	112.8	121.9	146.1	180.3	96.2	98.5
Mass dry soil	273.4	278.2	321.6	319.1	402.4	265.0
Moisture %	41.3%	43.8%	45.4%	56.5%	23.9%	37.2%

Test Pit	TH14-06	TH14-06	TH14-06	TH14-06	TH14-06	TH14-06
Depth (m)	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1	2.9 - 3.0
Sample #	G43	G44	G45	G46	G47	G48
Tare ID	C11	W66	F103	E76	N73	F61
Mass of tare	8.2	8.9	8.4	8.1	8.1	8.5
Mass wet + tare	450.7	405.8	368.9	446.7	456.8	457.3
Mass dry + tare	336.5	303.9	274.3	318.2	310.8	298.2
Mass water	114.2	101.9	94.6	128.5	146.0	159.1
Mass dry soil	328.3	295.0	265.9	310.1	302.7	289.7
Moisture %	34.8%	34.5%	35.6%	41.4%	48.2%	54.9%

Test Pit	TH14-07	TH14-07	TH14-07	TH14-07	TH14-07	TH14-07
Depth (m)	0.2 - 0.3	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5	1.7 - 1.8
Sample #	G49	G50	G51	G52	G53	G54
Tare ID	E10	E40	F62	F10	F147	K28
Mass of tare	8.8	8.6	8.8	9.1	8.2	8.3
Mass wet + tare	454.1	403.2	547.1	553.3	761.0	386.0
Mass dry + tare	395.3	317.4	451.4	458.8	627.6	284.6
Mass water	58.8	85.8	95.7	94.5	133.4	101.4
Mass dry soil	386.5	308.8	442.6	449.7	619.4	276.3
Moisture %	15.2%	27.8%	21.6%	21.0%	21.5%	36.7%



www.trekgeotechnical.ca
 1712 St. James Street
 Winnipeg, MB R3H 0L3
 Tel: 204.975.9433 Fax: 204.975.9435

**Moisture Content Report
 ASTM D2216-98**

Project No. 0035 017 00
Client Morrison Hershfield
Project Local Streets Package 15-R-01, Berry Street

Sample Date 08-Dec-14
Test Date 08-Jan-15
Technician Daniel Wiebe

Test Pit	TH14-07	TH14-07	TH14-08	TH14-08	TH14-08	TH14-08
Depth (m)	2.0 - 2.1	2.9 - 3.0	0.2 - 0.3	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2
Sample #	G55	G56	G57	G58	G59	G60
Tare ID	N46	Z130	E52	A4	Z100	Z21
Mass of tare	8.3	8.5	8.4	8.1	8.4	8.5
Mass wet + tare	415.6	453.7	443.4	462.4	566.5	391.1
Mass dry + tare	303.4	303.8	331.9	393.6	443.1	294.2
Mass water	112.2	149.9	111.5	68.8	123.4	96.9
Mass dry soil	295.1	295.3	323.5	385.5	434.7	285.7
Moisture %	38.0%	50.8%	34.5%	17.8%	28.4%	33.9%

Test Pit	TH14-08	TH14-08	TH14-08	TH14-08		
Depth (m)	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1	2.9 - 3.0		
Sample #	G61	G62	G63	G64		
Tare ID	E72	H21	F58	F49		
Mass of tare	8.3	8.2	8.5	8.4		
Mass wet + tare	615.7	396.9	388.5	427.8		
Mass dry + tare	509.6	296.3	278.5	283.0		
Mass water	106.1	100.6	110.0	144.8		
Mass dry soil	501.3	288.1	270.0	274.6		
Moisture %	21.2%	34.9%	40.7%	52.7%		

Test Pit						
Depth (m)						
Sample #						
Tare ID						
Mass of tare						
Mass wet + tare						
Mass dry + tare						
Mass water						
Mass dry soil						
Moisture %						



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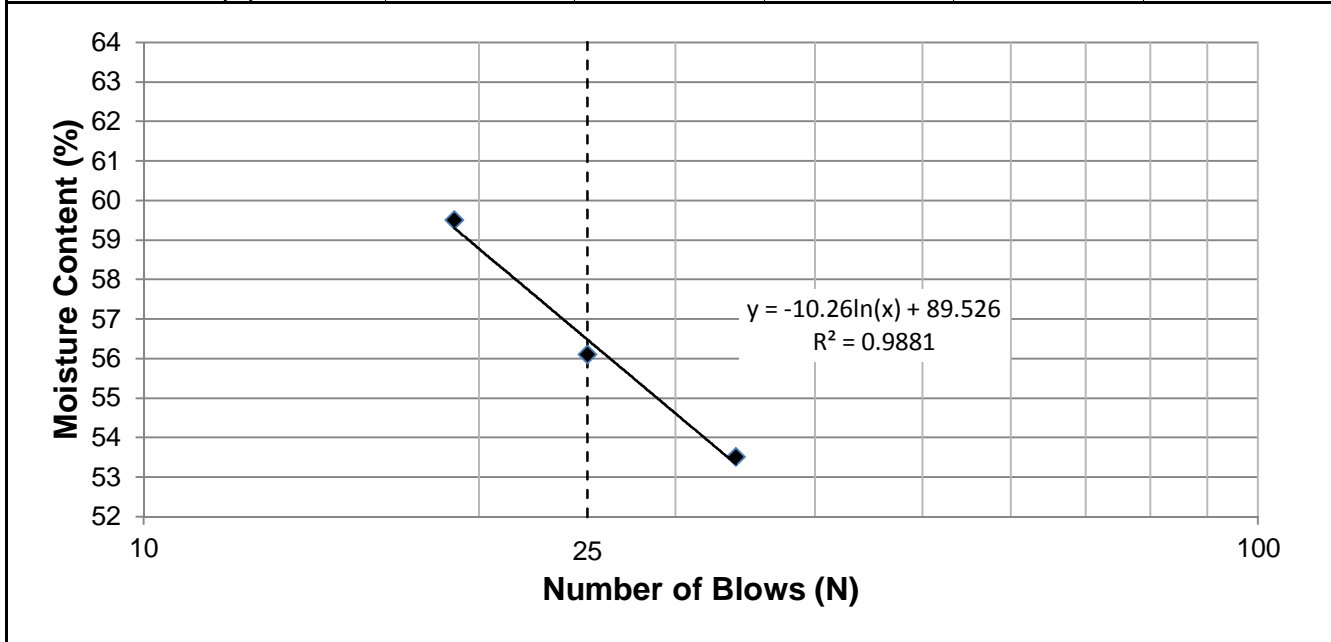
Project No. 0035 017 00
Client Morrison Hershfield
Project Local Streets Package 15-R-01, Berry Street

Test Hole TH14-02
Sample # G10
Depth (m) 0.5 - 0.6
Sample Date 05-Dec-14
Test Date 14-Jan-15
Technician Daniel Wiebe

Liquid Limit	56
Plastic Limit	26
Plasticity Index	30

Liquid Limit

Trial #	1	2	3	4	5
Number of Blows (N)	19	25	34		
Mass Wet Soil + Tare (g)	23.042	24.643	21.026		
Mass Dry Soil + Tare (g)	19.595	20.835	18.761		
Mass Tare (g)	13.802	14.048	14.528		
Mass Water (g)	3.447	3.808	2.265		
Mass Dry Soil (g)	5.793	6.787	4.233		
Moisture Content (%)	59.503	56.107	53.508		



Plastic Limit

Trial #	1	2	3	4	5
Mass Wet Soil + Tare (g)	20.307	20.701			
Mass Dry Soil + Tare (g)	19.002	19.317			
Mass Tare (g)	14.070	14.069			
Mass Water (g)	1.305	1.384			
Mass Dry Soil (g)	4.932	5.248			
Moisture Content (%)	26.460	26.372			



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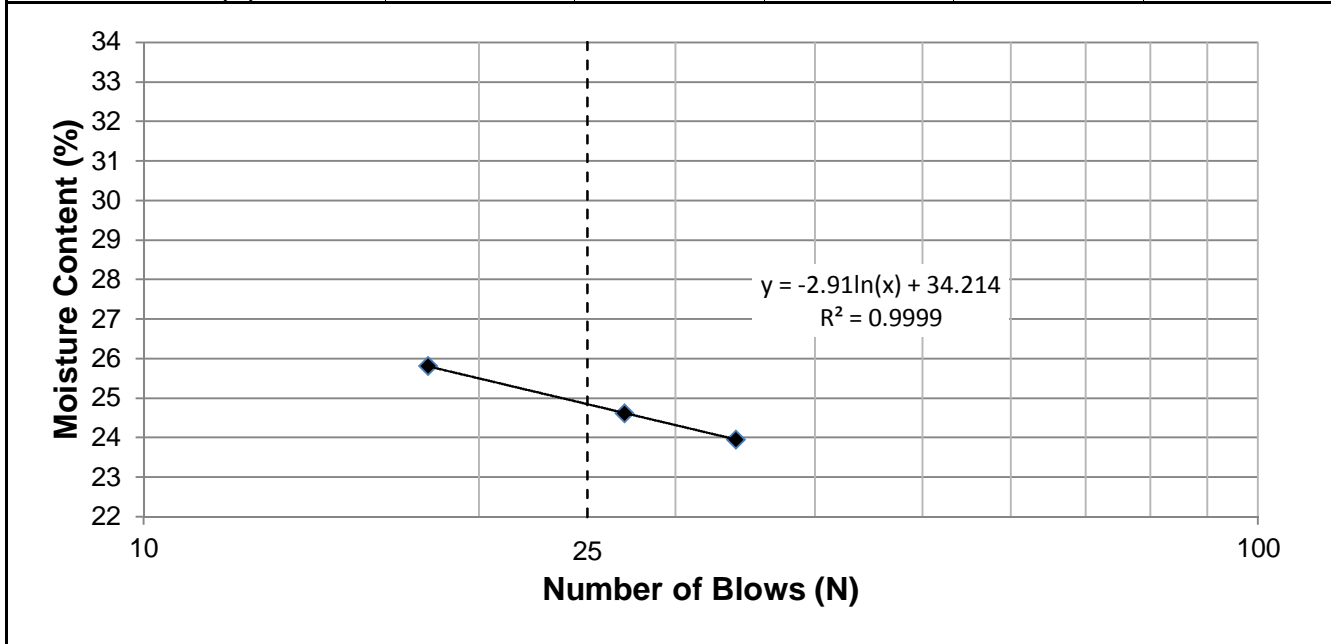
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Client Morrision Hershfield
Project Local Streets Package 15-R-01, Berry Street

Test Hole TH14-03
Sample # G19
Depth (m) 0.8 - 0.9
Sample Date 5-Dec-14
Test Date 14-Jan-15
Technician Daniel Wiebe

Liquid Limit	25
Plastic Limit	17
Plasticity Index	8

Liquid Limit

Trial #	1	2	3	4	5
Number of Blows (N)	18	34	27		
Mass Wet Soil + Tare (g)	25.275	24.803	27.186		
Mass Dry Soil + Tare (g)	22.972	22.727	24.586		
Mass Tare (g)	14.048	14.062	14.024		
Mass Water (g)	2.303	2.076	2.600		
Mass Dry Soil (g)	8.924	8.665	10.562		
Moisture Content (%)	25.807	23.958	24.617		



Plastic Limit

Trial #	1	2	3	4	5
Mass Wet Soil + Tare (g)	22.250	21.253			
Mass Dry Soil + Tare (g)	21.062	20.264			
Mass Tare (g)	14.088	14.090			
Mass Water (g)	1.188	0.989			
Mass Dry Soil (g)	6.974	6.174			
Moisture Content (%)	17.035	16.019			



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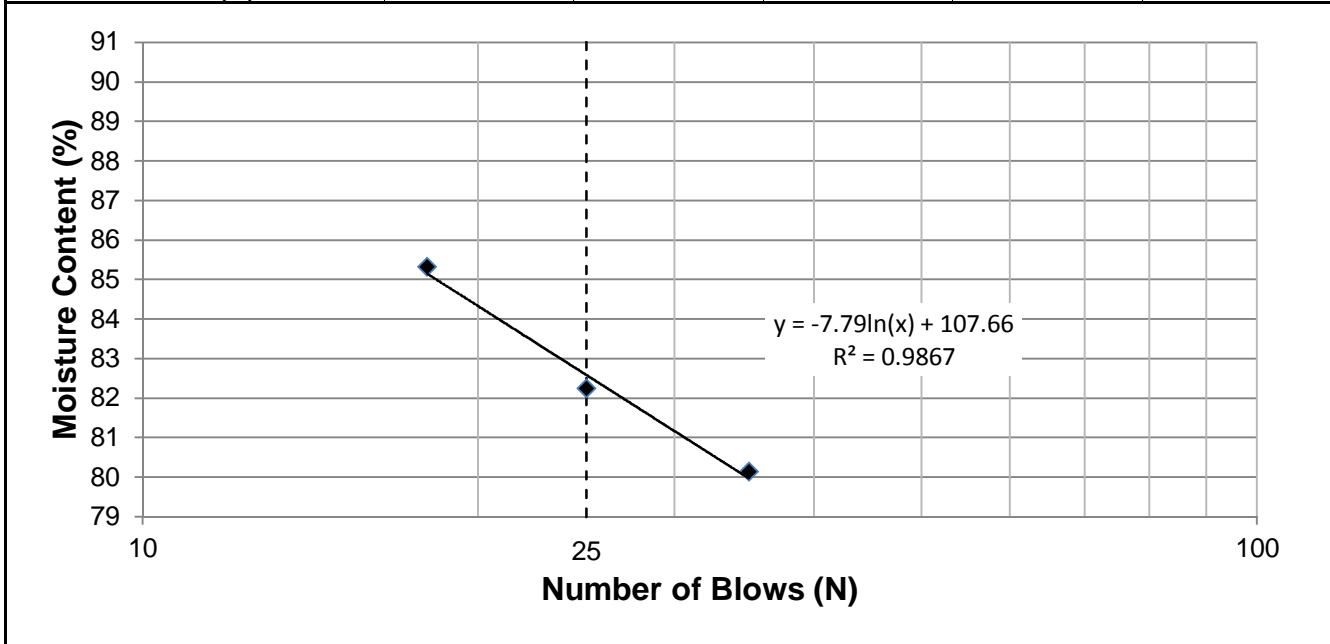
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Test Hole TH14-06
Sample # G43
Depth (m) 0.8 - 0.9
Sample Date 5-Dec-14
Test Date 14-Jan-15
Technician Daniel Wiebe

Liquid Limit	83
Plastic Limit	27
Plasticity Index	55

Liquid Limit

Trial #	1	2	3	4	5
Number of Blows (N)	25	35	18		
Mass Wet Soil + Tare (g)	23.128	21.645	23.679		
Mass Dry Soil + Tare (g)	19.011	18.284	19.232		
Mass Tare (g)	14.005	14.090	14.020		
Mass Water (g)	4.117	3.361	4.447		
Mass Dry Soil (g)	5.006	4.194	5.212		
Moisture Content (%)	82.241	80.138	85.322		



Plastic Limit

Trial #	1	2	3	4	5
Mass Wet Soil + Tare (g)	20.928	20.337			
Mass Dry Soil + Tare (g)	19.488	19.021			
Mass Tare (g)	14.263	14.149			
Mass Water (g)	1.440	1.316			
Mass Dry Soil (g)	5.225	4.872			
Moisture Content (%)	27.560	27.011			

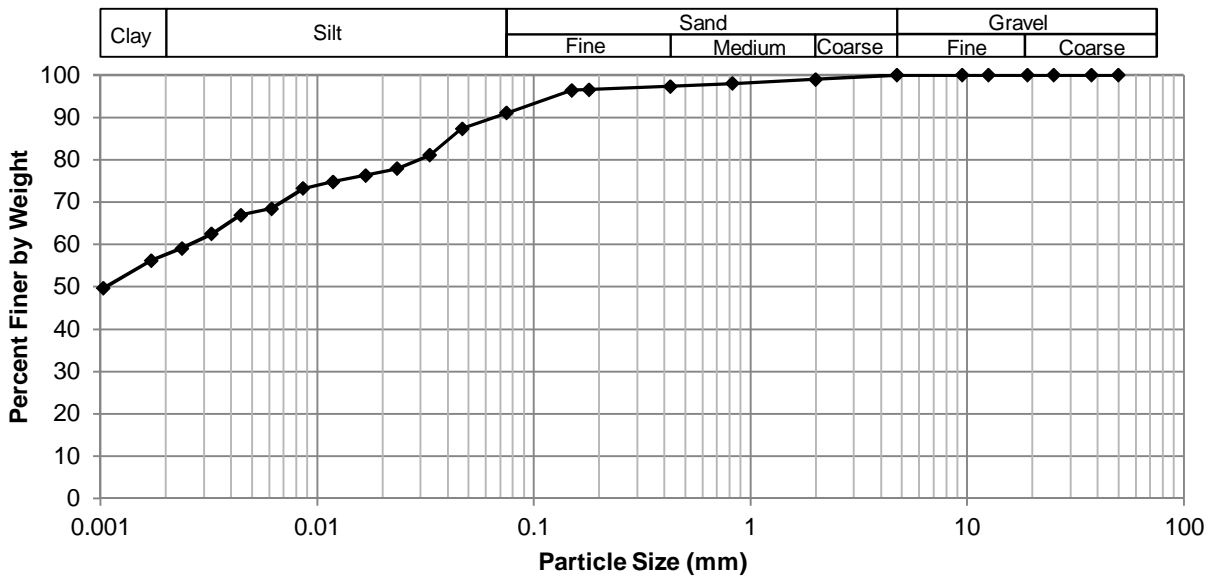


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Test Hole TH14-02
Sample # G10
Depth (m) 0.5 - 0.6
Sample Date 8-Dec-14
Test Date 14-Jan-15
Technician Junhui Wu/Daniel Wiebe

Gravel	0.0%
Sand	9.0%
Silt	33.6%
Clay	57.5%

Particle Size Distribution Curve



Gravel		Sand		Silt and Clay	
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	100.00	0.0750	91.02
37.5	100.00	2.00	98.98	0.0468	87.35
25.0	100.00	0.825	98.02	0.0331	81.06
19.0	100.00	0.425	97.30	0.0234	77.92
12.5	100.00	0.180	96.59	0.0167	76.35
9.50	100.00	0.150	96.45	0.0118	74.78
4.75	100.00	0.075	91.02	0.0086	73.21
				0.0062	68.49
				0.0044	66.92
				0.0033	62.51
				0.0024	59.06
				0.0017	56.23
				0.0010	49.63

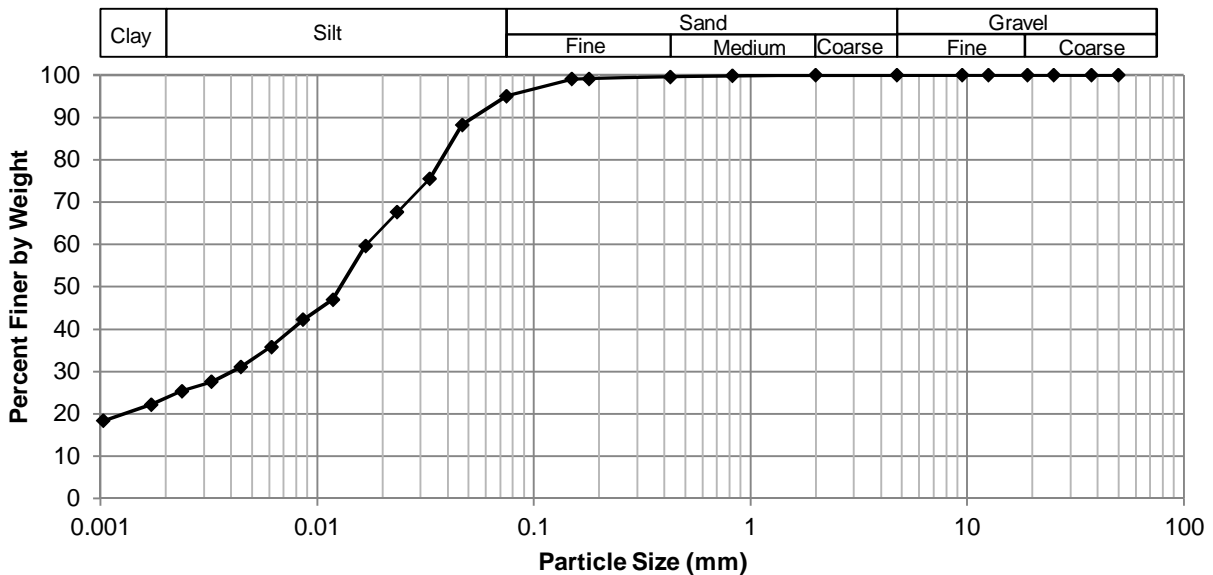


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Client Morrison Hershfield
Project Local Streets Packages 15-R-01, Berry Street

Test Hole TH14-03
Sample # G19
Depth (m) 0.8 - 0.9
Sample Date 8-Dec-14
Test Date 14-Jan-15
Technician Junhui Wu/Daniel Wiebe

Gravel	0.0%
Sand	4.9%
Silt	71.5%
Clay	23.6%

Particle Size Distribution Curve



Gravel		Sand		Silt and Clay	
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	100.00	0.0750	95.08
37.5	100.00	2.00	100.00	0.0468	88.26
25.0	100.00	0.825	99.79	0.0331	75.55
19.0	100.00	0.425	99.56	0.0234	67.61
12.5	100.00	0.180	99.11	0.0167	59.67
9.50	100.00	0.150	99.06	0.0118	46.97
4.75	100.00	0.075	95.08	0.0086	42.21
				0.0062	35.86
				0.0044	31.09
				0.0033	27.59
				0.0024	25.37
				0.0017	22.20
				0.0010	18.39

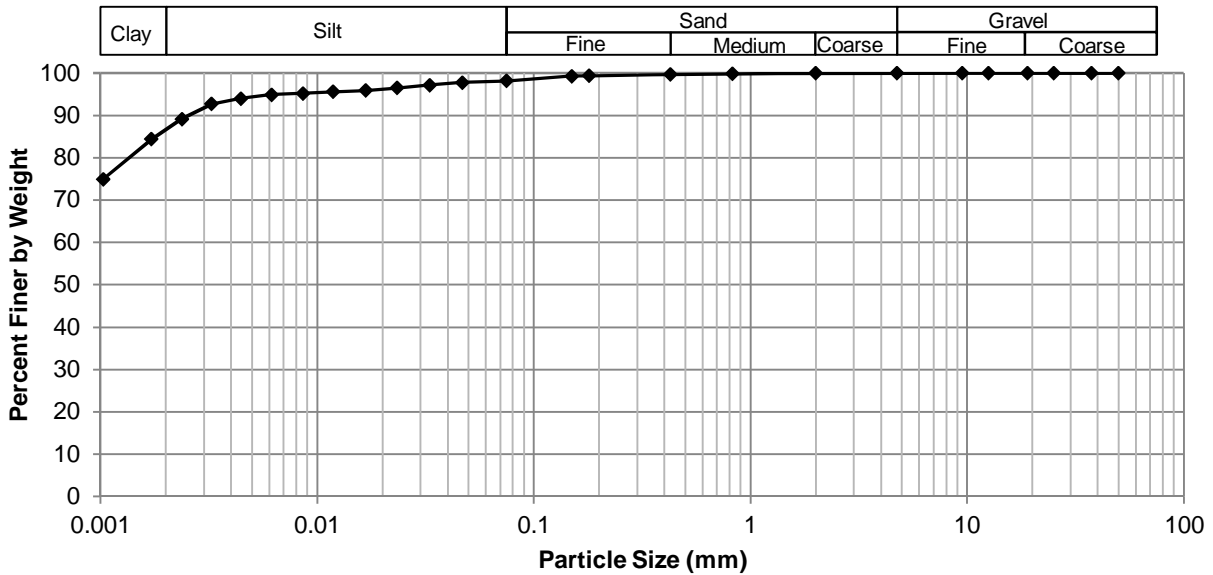


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Client Morrison Hershfield
Project Local Streets Packages 15-R-01, Berry Street

Test Hole TH14-06
Sample # G43
Depth (m) 0.8 - 0.9
Sample Date 8-Dec-14
Test Date 14-Jan-15
Technician Junhui Wu/Daniel Wiebe

Gravel	0.0%
Sand	1.8%
Silt	11.7%
Clay	86.5%

Particle Size Distribution Curve



Gravel		Sand		Silt and Clay	
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	100.00	0.0750	98.17
37.5	100.00	2.00	100.00	0.0468	97.78
25.0	100.00	0.825	99.80	0.0331	97.15
19.0	100.00	0.425	99.66	0.0234	96.51
12.5	100.00	0.180	99.35	0.0167	95.88
9.50	100.00	0.150	99.27	0.0118	95.56
4.75	100.00	0.075	98.17	0.0086	95.24
				0.0062	94.92
				0.0044	93.97
				0.0033	92.69
				0.0024	89.20
				0.0017	84.44
				0.0010	74.91



Photo 1: Concrete Core Sample From Test Hole TH14-01



Photo 2: Concrete Core Sample From Test Hole TH14-01B

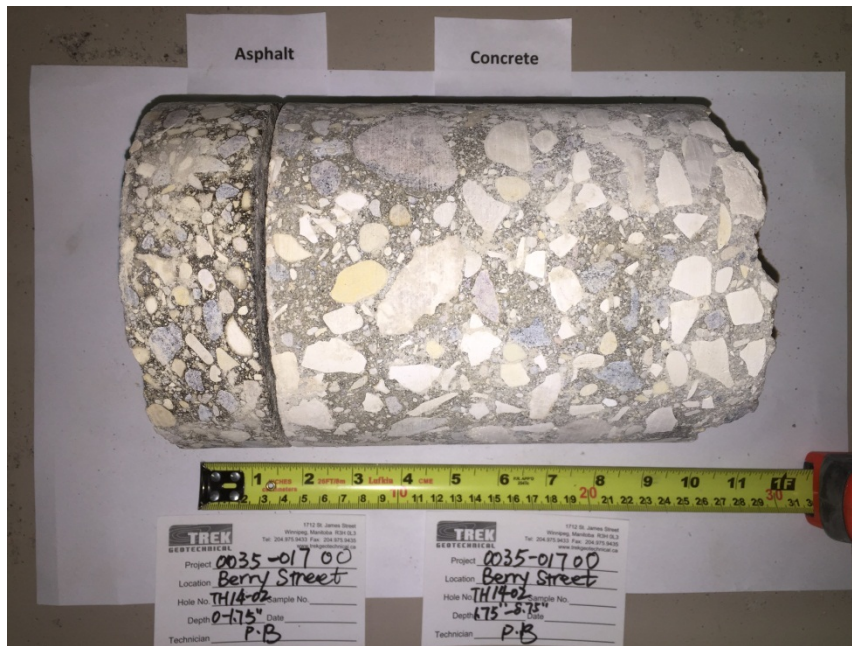


Photo 3: Concrete Core Sample From Test Hole TH14-02



Photo 4: Concrete Core Sample From Test Hole TH14-03



Photo 5: Concrete Core Sample From Test Hole TH14-04



Photo 6: Concrete Core Sample From Test Hole TH14-05



Photo 7: Concrete Core Sample From Test Hole TH14-06



Photo 8: Concrete Core Sample From Test Hole TH14-07



Photo 9: Concrete Core Sample From Test Hole TH14-08