

APPENDIX 'A'

GEOTECHNICAL REPORT



FINAL

Report

Geotechnical Investigation for St. Mary's Road Rehabilitation of 2026 Regional and Local Street Renewal Program

Winnipeg, Manitoba

Submitted to:

Scott Suderman, Project Manager

WSP Canada Inc.
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Submitted by:

WSP Canada Inc.

6 High Level Road Oak Bluff MB
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CA0057241.0340

2025-11-13



Distribution List

Scott Suderman

Record of Issue

Client Contact	Version	Date Issued	Notes/Comments
Scott Suderman	Final	2025-11-13	

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1 INTRODUCTION

As authorized by Scott Suderman, WSP's project manager, on behalf of the City of Winnipeg (Client), Geotechnical Group of WSP Canada Inc. (WSP) conducted a geotechnical investigation for the proposed St. Mary's Road rehabilitation in Winnipeg, Manitoba. The Terms of Reference for the investigation were defined in WSP's proposal 2025CA415045 dated on September 17, 2025. Authorization to proceed was received on September 17, 2025. The purpose of the investigation was to investigate subsurface conditions at the site in accordance with the City of Winnipeg's Site Investigation Requirements for Public Works Street Projects.

2 PROJECT DESCRIPTION

Figure 1 (Appendix A) depicts the site locations. The proposed rehabilitation consists of two sections along St. Mary's Road south of the Perimeter Highway. The north section is about 1400 m long and is located between Seniuk Rd and Viking Rd; the south section is about 1400 m long and is located between Paul Blvd and Chrypko Dr. These sections form part of the City's Primary Line of Defense for flood protection. Based on the City of Winnipeg Transportation Standards Manual, it is understood that the existing St. Mary's Rd within this project is a collector road.

3 GEOTECHNICAL INVESTIGATION

3.1 Coring, Drilling and Sampling

Prior to drilling, WSP notified public utility providers of the intent to drill in order to clear public utilities. A private utility locator was also retained to confirm the utility clearance. All field activities were completed without contacting any underground utilities.

ATS Traffic was retained to provide traffic control for the field investigation in accordance with the City of Winnipeg requirements.

Between 14 and 16 October 2025, WSP supervised the drilling of 12 test holes at select locations along the existing road alignments. Of those, 8 test holes were cored and drilled within the existing roadway to a depth of 3m, and 4 test holes were drilled within the shoulder to 5m for assessment of the temporary dike if installed in the event of flooding as required. The test holes on roadway were staggered across the road centreline to better capture the range of existing pavement structure. The approximate test hole locations are shown on Figure 1 (Appendix A).

At the test hole locations, the pavement (asphalt and concrete) was cored using a Husqvarna coring machine equipped with a 6 inch diameter core barrel and operated by WSP technicians. After coring, the test holes were drilled to depth using a track mounted Acker SS3 drill rig equipped with 125 mm solid stem augers operated by Paddock Drilling Ltd. of Winnipeg, Manitoba. During drilling, WSP field personnel visually classified the soil stratigraphy within the test holes in accordance with ASTM D2487; and recorded observed seepage and sloughing as well as groundwater conditions within the various soil

strata. Soil descriptions are based on the Canadian Foundation Engineering Manual (CFEM, 2023, 5th Edition) generally employed in geotechnical practice. Visual classification and identification of soil involve judgement and WSP does not guarantee descriptions as exact but infers accuracy to the extent that is common in current geotechnical practice.

Cores and soil samples were collected during the filed investigation. Soil sampling consisted of regular grab samples of the auger cuttings at intervals of approximately 0.30 to 0.45 m and bulk samples were obtained from within the subgrade clay below the payment at four locations. All samples were retained in sealed plastic bags and shipped to WSP's Oak Bluff laboratory for review and selected testing.

Upon completion of drilling at each test hole, the depth to accumulated slough and groundwater level was measured prior to backfilling. The test holes were then backfilled to the under side of the pavement with bentonite and auger cuttings, and the pavement surface was repaired with asphalt.

The test hole logs presented in Appendix B include the sampling, field testing, laboratory test results, and subsurface conditions encountered at the test hole locations.

3.2 Laboratory Testing

Following completion of the field investigation, a laboratory testing program was conducted. The laboratory testing program consisted of:

- Compressive strength of concrete cores: 8 samples;
- Moisture content: all soil samples;
- Atterberg limits: 6 soil samples collected near the anticipated subgrade elevation;
- Hydrometer grain size analyses: 6 soil samples collected near the anticipated subgrade elevation;
- Proctor and California bearing ratio (CBR): 4 bulk soil samples collected near the anticipated subgrade elevation.
- Organic content: 4 samples.

Per the test holes completed, the majority of soils encountered within 2.5 m below bottom of the existing pavement consists of organic clay (OH), silt (ML) and fat clay (CH). The organic clay was commonly encountered immediately below the pavement, extended to 1.1 m below the road surface, and was underlain by either the fat clay or silt. It is anticipated that some or all of the organic clay may be removed along with the silt where it is present immediately below the design subgrade level. Therefore, geotechnical tests were conducted for both the organic clay and the fat clay. Atterberg limits were also tested for one silt sample to support the seepage analysis scope of this project.

Test results and other relevant subsurface information are summarized in the test hole logs in Appendix B. The laboratory test reports are provided in Appendix C. The photos of cores are provided in Appendix D.

4 EXISTING PAVEMENT

The pavement structure consisted of asphalt (AC) overlying concrete (PC) and the base / subbase courses. Table 1 provides a summary of the existing pavement structure and the compressive strength of the concrete cores at the eight core locations.

Table 1: Summary of Pavement Thickness

Core ID	Asphalt Thickness (mm)	Concrete Thickness (mm)	Compressive Strength (MPa)	Base/Subbase thickness (mm)
North Section				
TH25-01	76	203	53.6	180
TH25-03	63	190	55.2	210
TH25-04	63	203	56.6	190
TH25-06	50	203	53.9	210
South Section				
TH25-07	50	203	55.4	360
TH25-09	50	203	52.9	210
TH25-10	50	178	54.1	70
TH25-12	38	203	56.8	220

It should be noted that the thicknesses of the aggregate (base / subbase courses) could not be distinguished from each other during the investigation. The roadway shoulders were constructed of aggregate as observed in test holes TH25-02, TH25-05, TH25-08, and TH25-11 with a thickness of 300 mm.

In general, the aggregate consisted of mostly fine to medium gravel, contained little fine sand, was poorly graded, moist to wet, compact (inferred) and tan brown. Moisture contents in the aggregate varied from 5% to 13% (north section) and from 8% to 18% (south section).

5 SUBSURFACE CONDITIONS

5.1 Stratigraphy

Below the existing AC / PC and aggregate base / subbase courses (Section 4), the soil stratigraphy at the test holes generally consisted of high plastic organic clay and high plastic clay extending to the termination depths of 3.1 m to 4.6 m below existing grade. A layer of clay fill was present below the

granular pavement structure at TH25-05, while thin silt layers were Interbedded within the clay at shallow depths at most of the test hole locations.

5.1.1 Clay Fill

A 0.31 m thick layer of clay fill was present below the aggregate base / subbase in a shoulder test hole, TH25-05, in the north section. The clay fill consisted of mostly low plastic fines, contained few fine sand and trace gravel, was moist, very stiff, and dark grey. The moisture content in the clay fill was 13%.

5.1.2 Organic Clay

Organic clay was present in all test holes except two test holes in the north section, TH25-01 and TH25-07. The organic clay was present below the aggregate materials in each case and extended to depths ranging from 0.9 m to 1.1 m below grade. In general, the organic clay consisted of mostly high plastic fines, contained occasional rootlets, was stiff to very stiff, and dark grey. Moisture contents in the organic clay ranged from 16% to 34%.

Laboratory testing of the organic clay consisted of moisture content testing, organic content testing, Atterberg limit testing, hydrometer grain size analysis, and California Bearing Ratio (including Standard Proctor Maximum Dry Density (SPMDD)) tests were done for the organic clay. Detailed laboratory testing results are shown on the test hole logs in Appendix B, with testing reports provided in Appendix C. The Standard Proctor and CBR test results are further summarized in Table 2 and Table 2 below.

Table 2: Organic Content, Atterberg Limit and Hydrometer Testing Results of Organic Clay

Sample	Organic content (%)	Atterberg Limits			Hydrometer Grain Size Analysis			
		Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Gravel	% Sand	%Silt	%Clay
North Section								
TH25-03, 0.9 m	9.1	74	28	49	0	3.1	22.8	74.2
TH25-06, 0.9 m	7.0	-	-	-	-	-	-	-
South Section								
TH25-07, 0.9 m	6.6	-	-	-	-	-	-	-
TH25-10, 0.9 m	4.3	89	29	60	0	1.5	16.4	82.0

Table 3: Standard Proctor and CBR Testing Results of Organic Clay

Sample	Proctor Test		CBR Test @ 95% SPMDD	
	Optimum Moisture Content (%)	Maximum Dry Density (kg/m ³)	@ 2.5mm Penetration (%)	@ 5.1mm Penetration (%)
North Section TP25-06, Bulk 0.5 – 1.2m	21.7	1584	2.8	2.3
Soth Section TH25-10, Bulk 0.3 – 1.5m	25.6	1489	2.9	1.6

Note: Bulk sample includes components from both organic clay and fat clay layers within the identified depth

The test results indicates that organic contents within the organic clay are higher than 6% in 3 out of 4 samples tested, which is higher than typically considered to be acceptable for soils providing subgrade support for heavy duty pavements even though the road has been in place for a long time.

Furthermore, other testing data such as Atterberg limits, gradation, and CBR are considered within typical ranges of the local high plastic clay. Therefore, the removal of this organic clay and replacement with either approved well compacted clay or granular materials in conjunction with the pavement rehabilitation should be carefully considered in terms of long-term performance, cost, and construction time. Where, the organic clay layer is kept in place within the embankment subgrade, maximum CBR=1.5 is recommended for design.

5.1.3 Fat Clay

Fat clay was present in all test holes and extended to the termination depths of 3.1 m to 4.6 m below existing grade. In general, the clay consisted of mostly high plastic fines, was firm to very stiff, and grey becoming brownish grey. Occasional silt and sulphate inclusions were present in the clay at various depths. Moisture contents in the clay ranged from 23% to 54%.

Silt layers were present alternately at variable depths and with variable thicknesses within the clay. In general, the silt consisted of mostly low plastic fines, was soft to stiff, and brown to tan brown.

Moisture contents in the silt ranged from 19% to 34%.

Laboratory testing of the clay and silt layers consisted of moisture content testing, Atterberg limit testing, hydrometer grain size analysis, and California Bearing Ratio (including Standard Proctor Maximum Dry Density (SPMDD)) testing. Detailed laboratory testing results are shown on the test hole logs in Appendix B, with testing reports provided in Appendix C. Atterberg limits, hydrometer grain size analyses and CBR test results are further summarized in Table 4, Table 5, and Table 6 below.

Table 4: Atterberg Limit and Hydrometer Testing Results of Clay

Sample	Atterberg Limits			Hydrometer Grain Size Analysis			
	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Gravel	% Sand	%Silt	%Clay
North Section							
TH25-02, 4.5 m	93	34	59	0	4.9	70.5	24.5
TH25-06, 1.7 m	49	17	32	0	5.6	48.1	46.3
South Section							
TH25-07, 2.4 m	90	31	59	0	0.5	13.7	85.8
TH25-08, 4.5 m	-	-	-	0	0.7	8.9	90.4

Table 5: Atterberg Limit and Hydrometer Testing Results of Silt

Sample	Atterberg Limits			Hydrometer Grain Size Analysis			
	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Gravel	% Sand	%Silt	%Clay
South Section							
TH25-11, 1.2 m	29	17	12	-	-	-	-

Table 6: Standard Proctor and CBR Testing Results of Clay

Sample	Proctor Test		CBR Test @ 95% SPMDD	
	Optimum Moisture Content (%)	Maximum Dry Density (kg/m ³)	@ 2.5mm Penetration (%)	@ 5.1mm Penetration (%)
North Section				
TP25-03, Bulk 1.5 – 3.0m	26.1	1494	2.2	1.7
South Section				
TP25-07, Bulk 2.0 – 3.0m	23.4	1511	1.5	1.4

5.2 Test Hole Termination

All test holes were terminated at a depth of approximately 3.1 m and 4.6 m below existing grade without reaching refusal.

5.3 Groundwater and Sloughing Conditions

Seepage and sloughing conditions were noted during drilling, and the depths to accumulated slough and water levels were measured prior to backfilling. Recorded observations are summarized in Table 7.

Table 7: Sloughing and Groundwater Observations

Test Hole	Drill Depth (m)	During Drilling		Upon Completion	
		Sloughing Zone (m)	Seepage Zone (m)	Depth Open (m)	Depth to Groundwater (m)
North Section					
TH25-01	3.1	N/A	0.3 – 0.5	3.1	N/A
TH25-02	4.6	N/A	N/A	4.6	N/A
TH25-03	3.1	N/A	0.3 – 0.5	3.1	N/A
TH25-04	3.1	N/A	0.3 – 0.5	3.1	2.7
TH25-05	4.6	N/A	N/A	4.6	N/A
TH25-06	3.1	N/A	0.3 – 0.5	3.1	2.8
South Section					
TH25-07	3.1	N/A	0.3 – 0.6	3.1	N/A
TH25-08	4.6	1.5 – 1.7	N/A	3.0	N/A
TH25-09	3.1	N/A	0.3 – 0.5	3.1	2.6
TH25-10	3.1	N/A	0.2 – 0.3	3.1	2.1
TH25-11	4.6	1.1 – 1.5	1.1 – 1.5	0.9	N/A
TH25-12	3.1	N/A	2.9 – 3.1	3.1	2.1

6 CLOSURE

The findings presented in this report were based on the subsurface conditions and limited groundwater data observed during the site investigation described in this report. If conditions other than those reported herein are noted during subsequent phases of the project are not in keeping with the current and/or future design stage, this office should be notified immediately in order that the conditions can be verified and revised as required.

The site investigation conducted and described in this report was for the sole purpose of identifying geotechnical conditions at the project site. Although no environmental issues were identified during the fieldwork, this does not indicate that no such issues exist. If the owner or other parties have any

concern regarding the presence of environmental issues, then an appropriate level environmental assessment should be conducted.

Soil conditions, by their nature, can be highly variable across a site. The placement of fill and prior construction activities on a site can contribute to the variability especially in near surface soil conditions. A contingency should always be included in any construction budget to allow for the possibility of variation in soil conditions, which may result in modification of the design and construction procedures.

This report has been prepared for the exclusive use of the City of Winnipeg, and their agents, for specific application to the project described in this report. The data provided herein should not be used for any other purpose, or by any other parties, without review and written advice from WSP. Any use that a third party makes of this report, or any reliance or decisions made based on this report, are the responsibility of those parties. WSP accepts no responsibility for damages suffered by a third party as a result of decisions made or actions based on this report.

This report has been prepared in accordance with generally accepted geotechnical engineering practices. No other warranty, either expressed or implied, is made.

Respectfully submitted,

WSP Canada Inc.

Signature Page

WSP Canada Inc.



Duncan Platts, E.I.T.
Geotechnical Engineer-in-Training



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Linh Trinh, M.Eng., P.Eng.
Senior Geotechnical Engineer



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Senior Principal Geotechnical Engineer

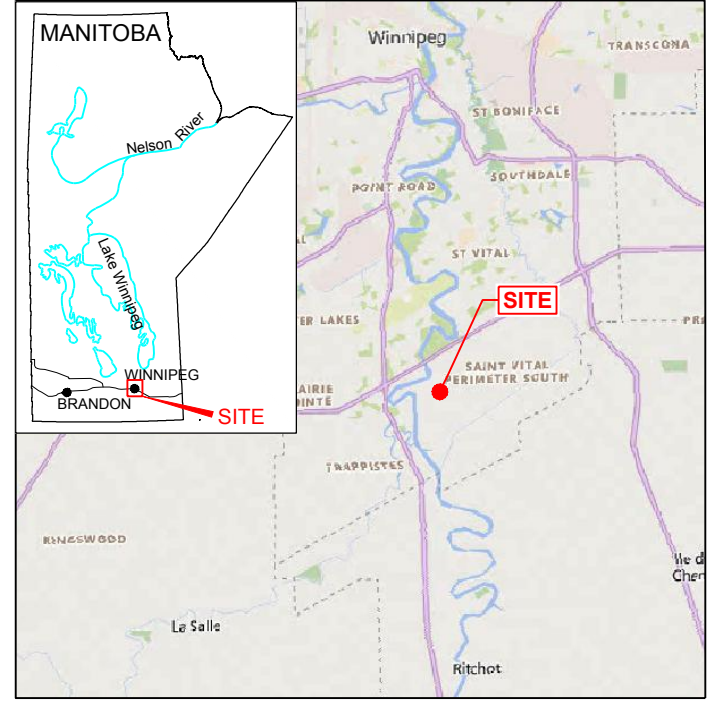
APPENDIX A

Site and Test Hole Locations Plan

Path: \\wsp-pdw\wsp-net\CALC\CALCUL\00\CALUM\City\Winnipeg\St. Mary's Road\99_PROJECTS\CA0057241_0340\02_PRODUCION\00\01\DWG\1 File Name: CA0057241_0340_001.dwg | Last Edited By: gld_garweigh | Date: 2025-10-30 Time: 12:37:58 PM | Printed By: gld_garweigh | Date: 2025-10-30 Time: 12:38:45 PM



KEY PLAN - NOT TO SCALE



LEGEND
 BOREHOLE LOCATION

REFERENCE(S)
 1. BACKGROUND IMAGERY OBTAINED FROM GOOGLE EARTH PRO UNDER LICENCE.
 2. IMAGERY DATE : 2025-05-05 AND IMAGE IS NOT TO SCALE.
 3. KEY PLAN BACKGROUND IMAGE IS FROM OPEN MAP CONTRIBUTORS.
 4. DATUM: NAD83, PROJECTION: UTM ZONE 14




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CLIENT
 CITY OF WINNIPEG

PROJECT
 GEOTECHNICAL INVESTIGATION - 2026 STREET RENEWALS ST. MARY'S ROAD

TITLE
 SITE AND BOREHOLE LOCATION PLAN

	CONSULTANT	YYYY-MM-DD	2025-10-30
	DESIGNED		DP
	PREPARED		GS
	REVIEWED		-
	APPROVED		-

PROJECT NO. CA0057241.0340 PHASE 800.001 REV. A FIGURE 1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM A3/B

APPENDIX B

Test Hole Logs

RECORD OF BOREHOLE: TH25-01

CLIENT: City of Winnipeg
 PROJECT: St. Mary's Road Renewal
 PROJECT NO: CA0057241.0340
 LOCATION: St. Mary's Road

DATE: October 14, 2025
 CONTRACTOR: Paddock Drilling Ltd.

ELEVATION: 232.14 m (Geodetic)
 COORDINATES: N: 5513793.8 m E: 634822.0 m
 COORD SYS: UTM Zone 14N
 HORZ DATUM: NAD83

DEPTH (m)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE			SAMPLES				WATER CONTENT				SHEAR STRENGTH (kPa)		ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS		
			DESCRIPTION	USCS	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	REC %	BLOWS	N-VALUE	Plastic & Liquid Limits (%)		Water Content (%)					Nat Vane	Rem Vane
												NP	NP	○	○					
			ASPHALT; ~76 mm thick.			0.00														
			CONCRETE; ~203 mm thick.			232.06														
			FILL - (GP) Poorly graded gravel with sand, mostly fine GRAVEL, little fine sand; tan brown; non-cohesive, wet, compact.	GP		231.86	1	GS												
			(CH) Fat clay, mostly high plasticity FINES; dark grey; cohesive, w < PL, very stiff.	CH		231.68	2	GS								147.0				
1			- 1.22 m: grey, occasional silt inclusions, w>PL					3	GS								147.0			
								4	GS								110.5			
2			- 1.98 m: low plastic					5	GS								37.0			
								6	GS								86.0			
			- 2.44 m: high plastic, stiff					7	GS											
3							229.10													
			End of hole at 3.05 m. TEST HOLE TERMINATED AT 3.05 m BELOW EXISTING GRADE													86.0				
			-Sloughing was not observed during drilling.																	
			-Seepage observed between 0.3 m and 0.5 m during drilling.																	
			-Test hole remained open to 3.05 m with no water accumulated prior to backfilling.																	
			-Test hole backfilled with auger cuttings, bentonite, and patched with asphalt.																	
4																				

DEPTH SCALE: 1:20
 HAMMER TYPE:



LOGGED: JC
 CHECKED: LT

DATE: Oct 14, 2025
 DATE:

REV:

RECORD OF BOREHOLE: TH25-03

CLIENT: City of Winnipeg
 PROJECT: St. Mary's Road Renewal
 PROJECT NO: CA0057241.0340
 LOCATION: St. Mary's Road

DATE: October 14, 2025
 CONTRACTOR: Paddock Drilling Ltd.

ELEVATION: 232.41 m (Geodetic)
 COORDINATES: N: 5514254.6 m E: 634763.4 m
 COORD SYS: UTM Zone 14N
 HORZ DATUM: NAD83

DEPTH (m)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE			SAMPLES				WATER CONTENT				SHEAR STRENGTH (kPa)		ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
			DESCRIPTION	USCS	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	REC %	BLOWS	N-VALUE	H Plastic & Liquid Limits (%)	O Water Content (%)	NP Nonplastic	Nat Vane			
			ASPHALT; ~63 mm thick.			0.00												
			CONCRETE; ~190 mm thick.			232.35												
						232.16												
			FILL - (GP) Poorly graded gravel with sand, mostly fine GRAVEL, little fine sand; tan brown; non-cohesive, wet, compact.	GP		0.25	1	GS										
			(OH) Organic clay, mostly high plasticity FINES; dark grey; cohesive, w < PL, very stiff, occasional rootlets.	OH		231.95	2	GS										
1							3	GS										
			(CH) Fat clay, mostly high plasticity FINES; grey; cohesive, w > PL, very stiff.	CH		231.34	4	GS										
			- 1.52 m: greyish brown				5	GS										
2			- 1.98 m: silt lens (~10 mm thick)				6	GS										
			- 2.29 m: occasional silt inclusions				7	GS										
3																		
			End of hole at 3.05 m. TEST HOLE TERMINATED AT 3.05 m BELOW EXISTING GRADE															
			-Sloughing was not observed during drilling.															
			-Seepage observed between 0.2 m and 0.5 m during drilling.															
			-Test hole remained open to 3.05 m with no water accumulated prior to backfilling.															
			-Test hole backfilled with auger cuttings, bentonite, and patched with asphalt.															
4																		

0.91 m: Grain Size Analysis - Sample 3 @ 0.91 m
 Gravel = 0%
 Sand = 3.1%
 Silt = 22.8%
 Clay = 74.2%
 Organic Content = 9.1%

1.52 - 3.05 m: California Bearing Ratio on Bulk Sample
 CBR @ 2.5 mm = 2.2%
 CBR @ 5.1 mm = 1.7%
 Maximum Dry Density = 1494 kg/m³
 Optimum Moisture = 26.1%

DEPTH SCALE: 1:20
 HAMMER TYPE:



LOGGED: JC
 CHECKED: LT

DATE: Oct 14, 2025
 DATE:

REV:

RECORD OF BOREHOLE: TH25-04

CLIENT: City of Winnipeg
 PROJECT: St. Mary's Road Renewal
 PROJECT NO: CA0057241.0340
 LOCATION: St. Mary's Road

DATE: October 14, 2025
 CONTRACTOR: Paddock Drilling Ltd.

ELEVATION: 232.57 m (Geodetic)
 COORDINATES: N: 5514517.2 m E: 634748.5 m
 COORD SYS: UTM Zone 14N
 HORZ DATUM: NAD83

DEPTH (m)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE			SAMPLES				WATER CONTENT				SHEAR STRENGTH (kPa)		ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
			DESCRIPTION	USCS	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	REC %	BLOWS	N-VALUE	H Plastic & Liquid Limits (%)	Water Content (%)	NP Nonplastic	Nat Vane			
			ASPHALT; ~63 mm thick.			0.00												
			CONCRETE; ~203 mm thick.			232.51												
						232.30												
			FILL - (GP) Poorly graded gravel with sand, mostly fine GRAVEL, little fine sand; brown; non-cohesive, wet, compact.	GP		232.11	1	GS										
			(OH) Organic clay, mostly high plasticity FINES; dark grey; cohesive, w < PL, stiff, occasional rootlets.	OH		231.50	2	GS										
1			- 0.91 m: w > PL				3	GS										
			(ML) Silt, mostly low plasticity FINES; light brown; cohesive, w > PL, stiff.	ML		230.89	4	GS										
							5	GS										
			(CH) Fat clay, mostly high plasticity FINES; grey; cohesive, w > PL, stiff.	CH		229.52	6	GS										
							7	GS										
			- 2.44 m: silt lens				8	GS										
2																		
3																		
			End of hole at 3.05 m. TEST HOLE TERMINATED AT 3.05 m BELOW EXISTING GRADE															
			-Sloughing was not observed during drilling.															
			-Seepage observed between 0.2 m and 0.5 m during drilling.															
			-Test hole remained open to 3.05 m with water accumulated to 2.7 m prior to backfilling.															
			-Test hole backfilled with auger cuttings, bentonite, and patched with asphalt.															
4																		

DEPTH SCALE: 1:20
 HAMMER TYPE:



LOGGED: JC
 CHECKED: LT

DATE: Oct 14, 2025
 DATE:

REV:

RECORD OF BOREHOLE: TH25-06

CLIENT: City of Winnipeg
 PROJECT: St. Mary's Road Renewal
 PROJECT NO: CA0057241.0340
 LOCATION: St. Mary's Road

DATE: October 14, 2025
 CONTRACTOR: Paddock Drilling Ltd.

ELEVATION: 232.32 m (Geodetic)
 COORDINATES: N: 5514973.8 m E: 634832.4 m
 COORD SYS: UTM Zone 14N
 HORZ DATUM: NAD83

DEPTH (m)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE			SAMPLES				WATER CONTENT				SHEAR STRENGTH (kPa)		ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS
			DESCRIPTION	USCS	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	REC %	BLOWS	N-VALUE	H Plastic & Liquid Limits (%)	Water Content (%)	NP Nonplastic	Nat Vane			
			ASPHALT: ~50 mm thick.			0.00												
			CONCRETE; ~203 mm thick.			232.27 0.05												
			FILL - (GP) Poorly graded gravel with sand, mostly fine to medium GRAVEL, little fine sand; brown; non-cohesive, moist, compact.	GP		232.07 0.25	1	GS										
			(OH) Organic clay, mostly high plasticity FINES; dark grey; cohesive, w < PL, very stiff, occasional rootlets.	OH		231.86 0.46	2	GS										
1			- 0.91 m: w~PL				3	GS										0.46 - 1.22 m: California Bearing Ratio on Bulk Sample CBR @ 2.5 mm = 2.8% CBR @ 5.1 mm = 2.3% Maximum Dry Density = 1584 kg/m3 Optimum Moisture = 21.7%
			(CH) Fat clay, mostly high plasticity FINES; grey; cohesive, w ~ PL, very stiff.	CH		231.25 1.07	4	GS										
			(ML) Silt, mostly low plasticity FINES; grey; cohesive, w > PL, stiff.	ML		231.10 1.22	5	GS										
			(CH) Fat clay, mostly high plasticity FINES; greyish brown; cohesive, w ~ PL, stiff.	CH		230.80 1.52	6	GS										
2			(CL-ML) Silty clay, mostly low plasticity FINES; greyish brown; cohesive, w > PL, stiff.	CL-ML		230.03 2.29	7	GS										
3			End of hole at 3.05 m. TEST HOLE TERMINATED AT 3.05 m BELOW EXISTING GRADE -Sloughing was not observed during drilling. -Seepage observed between 0.2 m and 0.5 m during drilling. -Test hole remained open to 3.05 m with water accumulated to 2.8 m prior to backfilling. -Test hole backfilled with auger cuttings, bentonite, and patched with asphalt.			229.27	8	GS										
4																		

DEPTH SCALE: 1:20
 HAMMER TYPE:



LOGGED: JC
 CHECKED: LT

DATE: Oct 14, 2025
 DATE:

REV:

RECORD OF BOREHOLE: TH25-08

CLIENT: City of Winnipeg
 PROJECT: St. Mary's Road Renewal
 PROJECT NO: CA0057241.0340
 LOCATION: St. Mary's Road

DATE: October 15, 2025
 CONTRACTOR: Paddock Drilling Ltd.

ELEVATION: 232.58 m (Geodetic)
 COORDINATES: N: 5515883.8 m E: 634982.0 m
 COORD SYS: UTM Zone 14N
 HORZ DATUM: NAD83

DEPTH (m)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE				SAMPLES				WATER CONTENT				SHEAR STRENGTH (kPa)				ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS	
			DESCRIPTION	USCS	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	REC %	BLOWS	N-VALUE	H Plastic & Liquid Limits (%)	O Water Content (%)	NP Nonplastic	Nat Vane	Rem Vane	Pocket Pen Su	u				Torvane
			FILL - (SP) Poorly graded sand with gravel, mostly fine SAND, little gravel; brown; non-cohesive, moist, compact.	SP		0.00																
			(OH) Organic clay, mostly high plasticity FINES; dark grey; cohesive, w < PL, very stiff.	OH		232.28	1	GS														
1			(CH) Fat clay, mostly high plasticity FINES; grey; cohesive, w < PL, very stiff, frequent silt lenses.	CH		231.51	2	GS										122.5				
			- 1.37 m: w > PL			231.07	3	GS										122.5				
			(ML) Silt, mostly low plasticity FINES; tan brown; cohesive, w > PL, soft.	ML		231.06	4	GS										110.5				
			(CH) Fat clay, mostly high plasticity FINES; greyish brown; cohesive, w > PL, very stiff.	CH		230.90	5	GS										110.5				
2			- 2.13 m: silt lens (~10 mm thick)			1.52	6	GS										24.5				
						230.90	7	GS										122.5				
						1.68	8	GS										73.5				
3							9	GS										73.5				
							10	GS										86.0				
4			- 3.81 m: occasional sulphate inclusions				11	GS										86.0				
			End of hole at 4.57 m. TEST HOLE TERMINATED AT 4.57 m BELOW EXISTING GRADE			228.01												86.0				
5			-Sloughing observed between 1.5m and 1.7 m and at 2.1 m during drilling. -Seepage was not observed during drilling. -Test hole remained open to 3.0 m with no water accumulated prior to backfilling. -Test hole backfilled with auger cuttings and bentonite.																			
6																						

4.42 m: Grain Size Analysis - Sample 8 @ 4.42 m
 Gravel = 0%
 Sand = 0.7%
 Silt = 8.9%
 Clay = 90.4%

DEPTH SCALE: 1:30
 HAMMER TYPE:



LOGGED: JC
 CHECKED: LT

DATE: Oct 15, 2025
 DATE:

REV:

RECORD OF BOREHOLE: TH25-09

CLIENT: City of Winnipeg
 PROJECT: St. Mary's Road Renewal
 PROJECT NO: CA0057241.0340
 LOCATION: St. Mary's Road

DATE: October 14, 2025
 CONTRACTOR: Paddock Drilling Ltd.

ELEVATION: 232.48 m (Geodetic)
 COORDINATES: N: 5516091.2 m E: 635058.9 m
 COORD SYS: UTM Zone 14N
 HORZ DATUM: NAD83

DEPTH (m)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE			SAMPLES				WATER CONTENT				SHEAR STRENGTH (kPa)		ADDITIONAL LAB TESTING	GROUNDWATER OBSERVATIONS	ADDITIONAL OBSERVATIONS		
			DESCRIPTION	USCS	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	REC %	BLOWS	N-VALUE	Plastic & Liquid Limits (%)		Water Content (%)					Nat Vane	Rem Vane
												H	NP	O	NP					
			ASPHALT; ~50 mm thick.			0.00														
			CONCRETE; ~203 mm thick.			232.43														
						232.23														
			FILL - (GP) Poorly graded gravel with sand, mostly fine GRAVEL, little fine sand; brown; non-cohesive, wet, compact.	GP		232.02	1	GS												
			(OH) Organic clay, mostly high plasticity FINES; dark grey; cohesive, w < PL, very stiff.	OH		232.02	2	GS												
1						231.41	3	GS												
			(CH) Fat clay, mostly high plasticity FINES; grey; cohesive, w < PL, very stiff.	CH		231.41	4	GS												
						230.96	5	GS												
			(ML) Silt, mostly low plasticity FINES; brown; cohesive, w > PL, firm.	ML		230.96	6	GS												
2						230.35	7	GS												
			(CH) Fat clay, mostly high plasticity FINES; greyish brown; cohesive, w > PL, very stiff.	CH		230.35	7	GS												
						229.43	8	GS												
3						229.43	8	GS												
			End of hole at 3.05 m. TEST HOLE TERMINATED AT 3.05 m BELOW EXISTING GRADE -Sloughing was not observed during drilling. -Seepage observed between 0.2 m and 0.5 m during drilling. -Test hole remained open to 3.05 m with water accumulated to 2.6 m prior to backfilling. -Test hole backfilled with auger cuttings, bentonite, and patched with asphalt.																	
4																				

DEPTH SCALE: 1:20
 HAMMER TYPE:



LOGGED: JC
 CHECKED: LT

DATE: Oct 14, 2025
 DATE:

REV:

APPENDIX C

Laboratory Test Reports

CONCRETE CORE REPORT




Client: WSP Project No: CA0057241.0340
 Project: 2026 Street Renewals St Marys Road
 Contractor: N/A Lab No: CA0057241.0340-01
 Date Cored: 2025-10-14 Date Received: 2025-10-14
 Cored By: Michael L Received By: Michael L

Sample No.	Location	Mass In Air (g)	Mass In Water (g)	Mass SSD(g)	Density (kg/m ³)	Length (mm)		Average Diameter (mm)	Area (mm ²)	Length Diameter	Corr. Factor	Load (kN)	Comp. Strength (MPa)	Date Tested	Age at time of Testing (Days)
						Cored	Tested								
1	TH 25-01, Southbound Lane, 1.5m West of Centerline at 3399 St Marys	-	-	-	-	200	188	150	17663	1.3	0.93	1018.8	53.6	14-Oct-25	N/A
2	TH 25-03, Northbound Lane, 2.25m East of Centerline at 3283 St Marys	-	-	-	-	200	190	150	17663	1.3	0.93	1048.9	55.2	14-Oct-25	N/A
3	TH 25-04, Southbound Lane, 2m West of Centerline at 3210 St Marys	-	-	-	-	200	193	150	17663	1.3	0.93	1074.5	56.6	14-Oct-25	N/A
4	TH 25-06, Northbound Lane, 2m East of Centerline at 3071 St Marys	-	-	-	-	200	189	150	17663	1.3	0.93	1024.5	53.9	14-Oct-25	N/A
5	TH 25-07, Southbound Lane, 1.5m West of Centerline at 2910 St Marys	-	-	-	-	200	197	150	17663	1.3	0.94	1040.3	55.4	14-Oct-25	N/A
6	TH 25-09, Northbound Lane, 2m East of Centerline at 2877 St Marys	-	-	-	-	200	184	150	17663	1.2	0.92	1015.4	52.9	14-Oct-25	N/A
7	TH 25-10, Southbound Lane, 2.5m West of Centerline at 2712 St Marys	-	-	-	-	200	180	150	17663	1.2	0.92	1038.6	54.1	14-Oct-25	N/A
8	TH 25-12, Northbound Lane, 2m East of Centerline at 2641 St Marys	-	-	-	-	200	195	150	17663	1.3	0.94	1066.7	56.8	14-Oct-25	N/A

Remarks:

Reviewed by:


 Alexis Roncal, C.E.T.
 Lab Supervisor/Experienced Laboratory Technician
 WSP Canada Inc.

Reporting of these results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request.



MOISTURE CONTENT OF SOIL AND ROCK (ASTM D2216)

Client: City Of Winnipeg
Project: St Mary's Rd Rehab
Date Sampled: 2025-10-14/16
Sampled By: John Catigay

Project No.: CA0057241.0340
Report Date: Nov 03, 2025
Date Tested: Oct 20, 2025
Tested By: Ranjit Dhami

Test Hole No.	Sample No.	Depth (ft)	Moisture Content (%)
TH25-01	S1	1.5	10.0
TH25-01	S2	2.0	25.6
TH25-01	S3	4.0	32.2
TH25-01	S4	5.0	32.1
TH25-01	S5	6.0	23.3
TH25-01	S6	8.0	41.8
TH25-01	S7	10.0	39.9
TH25-02	S1	1.0	5.4
TH25-02	S2	1.5	19.6
TH25-02	S3	3.0	34.4
TH25-02	S4	3.5	29.0
TH25-02	S5	5.0	38.5
TH25-02	S6	8.0	46.5
TH25-02	S7	10.0	49.3
TH25-02	S8	15.0	51.9
TH25-03	S1	1.5	12.7
TH25-03	S2	2.0	22.4
TH25-03	S3	3.0	32.2
TH25-03	S4	4.0	34.8
TH25-03	S5	5.0	37.3
TH25-03	S6	8.0	46.7
TH25-03	S7	10.0	49.1
TH25-04	S1	1.5	11.9
TH25-04	S2	2.0	22.6
TH25-04	S3	3.0	35.0
TH25-04	S4	4.0	24.8
TH25-04	S5	5.0	31.6
TH25-04	S6	6.0	43.8
TH25-04	S7	8.0	49.9
TH25-04	S8	10.0	52.0
TH25-05	S1	1.0	5.8
TH25-05	S2	2.0	13.1
TH25-05	S3	2.5	18.8
TH25-05	S4	5.5	29.0
TH25-05	S5	5.0	38.4
TH25-05	S6	8.0	53.7



MOISTURE CONTENT OF SOIL AND ROCK (ASTM D2216)

Client: City Of Winnipeg
Project: St Mary's Rd Rehab
Date Sampled: 2025-10-14/16
Sampled By: John Catigay

Project No.: CA0057241.0340
Report Date: Nov 03, 2025
Date Tested: Oct 20, 2025
Tested By: Ranjit Dhami

Test Hole No.	Sample No.	Depth (ft)	Moisture Content (%)
TH25-05	S7	10.0	49.5
TH25-05	S8	15.0	53.4
TH25-06	S1	1.5	9.4
TH25-06	S2	2.0	19.0
TH25-06	S3	3.0	30.2
TH25-06	S4	4.0	30.2
TH25-06	S5	4.5	33.8
TH25-06	S6	5.5	28.0
TH25-06	S7	8.0	24.0
TH25-06	S8	10.0	23.2
TH25-07	S1	2.0	11.7
TH25-07	S2	2.5	23.3
TH25-07	S3	3.0	32.6
TH25-07	S4	4.0	19.3
TH25-07	S5	5.0	23.3
TH25-07	S6	6.5	31.3
TH25-07	S7	8.0	35.2
TH25-07	S8	10.0	48.2
TH25-08	S1	1.0	7.6
TH25-08	S2	2.0	26.7
TH25-08	S3	3.0	28.5
TH25-08	S4	4.0	29.4
TH25-08	S5	5.0	38.8
TH25-08	S6	5.5	23.6
TH25-08	S7	6.0	31.7
TH25-08	S8	8.0	43.8
TH25-08	S9	10.0	45.4
TH25-08	S10	12.5	49.5
TH25-08	S11	15.0	49.7
TH25-09	S1	1.5	15.4
TH25-09	S2	2.5	28.7
TH25-09	S3	3.0	22.8
TH25-09	S4	4.0	32.4
TH25-09	S5	5.0	31.0
TH25-09	S6	5.5	27.2
TH25-09	S7	7.5	41.2



MOISTURE CONTENT OF SOIL AND ROCK (ASTM D2216)

Client: City Of Winnipeg
Project: St Mary's Rd Rehab
Date Sampled: 2025-10-14/16
Sampled By: John Catigay

Project No.: CA0057241.0340
Report Date: Nov 03, 2025
Date Tested: Oct 20, 2025
Tested By: Ranjit Dhami

Test Hole No.	Sample No.	Depth (ft)	Moisture Content (%)
TH25-09	S8	10.5	46.5
TH25-10	S1	1.0	18.2
TH25-10	S2	1.5	27.8
TH25-10	S3	3.0	34.0
TH25-10	S4	4.0	31.5
TH25-10	S5	5.0	31.2
TH25-10	S6	7.5	24.3
TH25-10	S7	10.0	23.6
TH25-11	S1	1.0	14.6
TH25-11	S2	2.0	20.2
TH25-11	S3	3.0	30.7
TH25-11	S4	4.0	22.8
TH25-11	S5	5.0	23.2
TH25-11	S6	5.5	35.7
TH25-11	S7	8.0	46.0
TH25-11	S8	10.0	49.1
TH25-11	S9	12.5	51.0
TH25-11	S10	15.0	55.9
TH25-12	S1	1.5	8.0
TH25-12	S2	2.0	16.1
TH25-12	S3	3.0	24.8
TH25-12	S4	4.0	25.0
TH25-12	S5	5.0	25.3
TH25-12	S6	7.0	34.7
TH25-12	S7	8.0	50.3
TH25-12	S8	10.0	48.3

Reviewed by:

Md Nazri Mohidin, E.I.T
Experienced Laboratory Technician

Notice: The test data given herein pertain to the sample provided. Reporting of these data constitutes a testing service. Engineering review and interpretation may be provided upon written request.

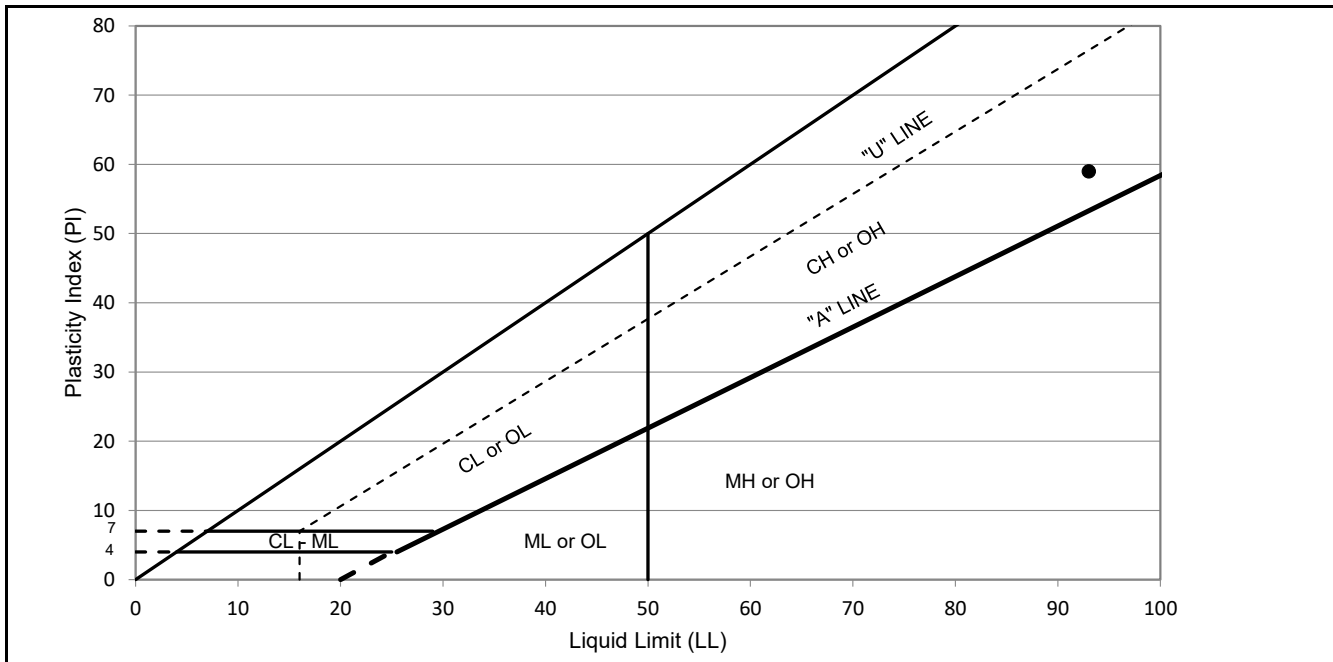


ATTERBERG LIMITS (ASTM D4318)

Client:	City Of Winnipeg	Project No.:	CA0057241.0340
Project:	St Mary's Rd Rehab	Report Date:	Oct 30, 2025
Date Sampled:	2025-10-14/16	Date Tested:	Oct 27, 2025
Sampled By:	John Catigay	Date Received:	Oct 17, 2025
Testhole No.:	TH25-02	Sample No.:	S08
Drying Method:	Oven	Method:	Multi-Point
		Depth (ft):	15.0

Liquid Limit Test (Manual, Plastic Grooving tool)			
Trial	A	B	C
No. of Blows	34	27	19
Moisture Content (%)	89.7	92.1	95.1

Plastic Limit Test (Hand rolled)		
Trial	A	B
Moisture Content (%)	33.7	34.0



USCS Symbol	CH
LL, Liquid Limit (%)	93
PL, Plastic Limit (%)	34
PI, Plasticity Index	59

Soil Description: High Plastic

Reviewed by: 

Md Nazri Mohidin, E.I.T
Experienced Laboratory Technician

Comment: As received moisture content is 51.9 %.

The test data given herein pertain to the sample provided. Reporting of these data constitutes a testing service. Engineering review and interpretation may be provided upon written request.

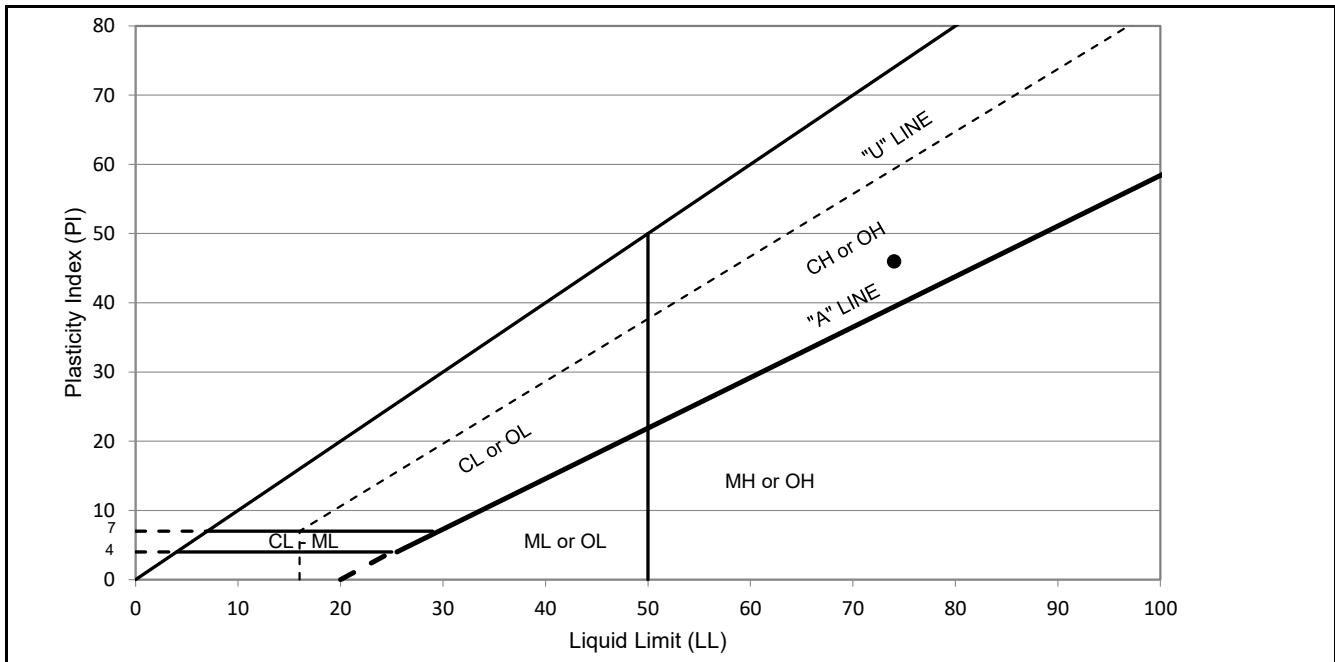


ATTERBERG LIMITS (ASTM D4318)

Client:	City Of Winnipeg	Project No.:	CA0057241.0340
Project:	St Mary's Rd Rehab	Report Date:	Oct 30, 2025
Date Sampled:	2025-10-14/16	Date Tested:	Nov 12, 2025
Sampled By:	John Catigay	Date Received:	Oct 17, 2025
Testhole No.:	TH25-03	Sample No.:	S03
Drying Method:	Oven	Method:	Multi-Point
		Depth (ft):	3.0

Liquid Limit Test (Manual, Plastic Grooving tool)			
Trial	A	B	C
No. of Blows	29	24	18
Moisture Content (%)	72.9	74.3	75.8

Plastic Limit Test (Hand rolled)		
Trial	A	B
Moisture Content (%)	28.2	28.0



USCS Symbol	CH
LL, Liquid Limit (%)	74
PL, Plastic Limit (%)	28
PI, Plasticity Index	46

Soil Description: High Plastic

Reviewed by: 

Md Nazri Mohidin, E.I.T
Experienced Laboratory Technician

Comment: As received moisture content is 31.4 %.

The test data given herein pertain to the sample provided. Reporting of these data constitutes a testing service. Engineering review and interpretation may be provided upon written request.

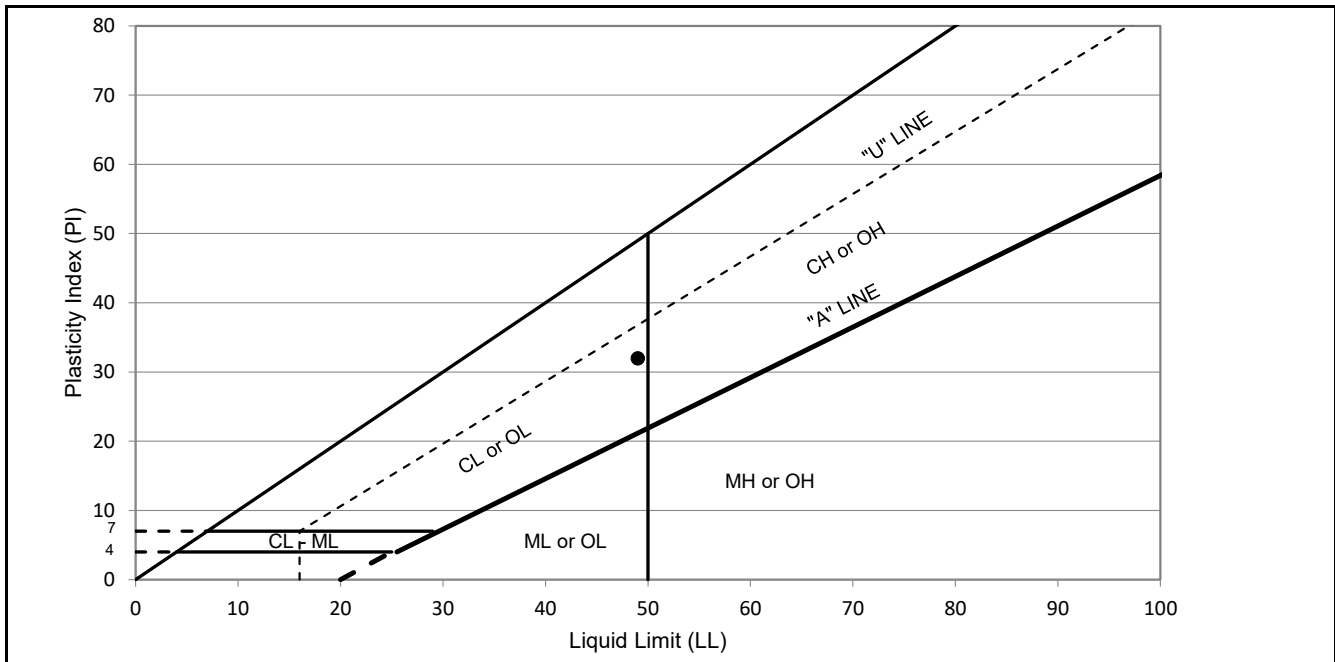


ATTERBERG LIMITS (ASTM D4318)

Client:	City Of Winnipeg	Project No.:	CA0057241.0340
Project:	St Mary's Rd Rehab	Report Date:	Oct 30, 2025
Date Sampled:	2025-10-14/16	Date Tested:	Oct 27, 2025
Sampled By:	John Catigay	Date Received:	Oct 17, 2025
Testhole No.:	TH25-06	Sample No.:	S06
Drying Method:	Oven	Depth (ft):	5.5
		Method:	Multi-Point

Liquid Limit Test (Manual, Plastic Grooving tool)			
Trial	A	B	C
No. of Blows	33	22	17
Moisture Content (%)	47.2	49.9	51.2

Plastic Limit Test (Hand rolled)		
Trial	A	B
Moisture Content (%)	17.0	17.1



USCS Symbol	CL
LL, Liquid Limit (%)	49
PL, Plastic Limit (%)	17
PI, Plasticity Index	32

Soil Description: Low Plastic

Reviewed by:

Md Nazri Mohidin, E.I.T
Experienced Laboratory Technician

Comment: As received moisture content is 28.0 %.

The test data given herein pertain to the sample provided. Reporting of these data constitutes a testing service. Engineering review and interpretation may be provided upon written request.

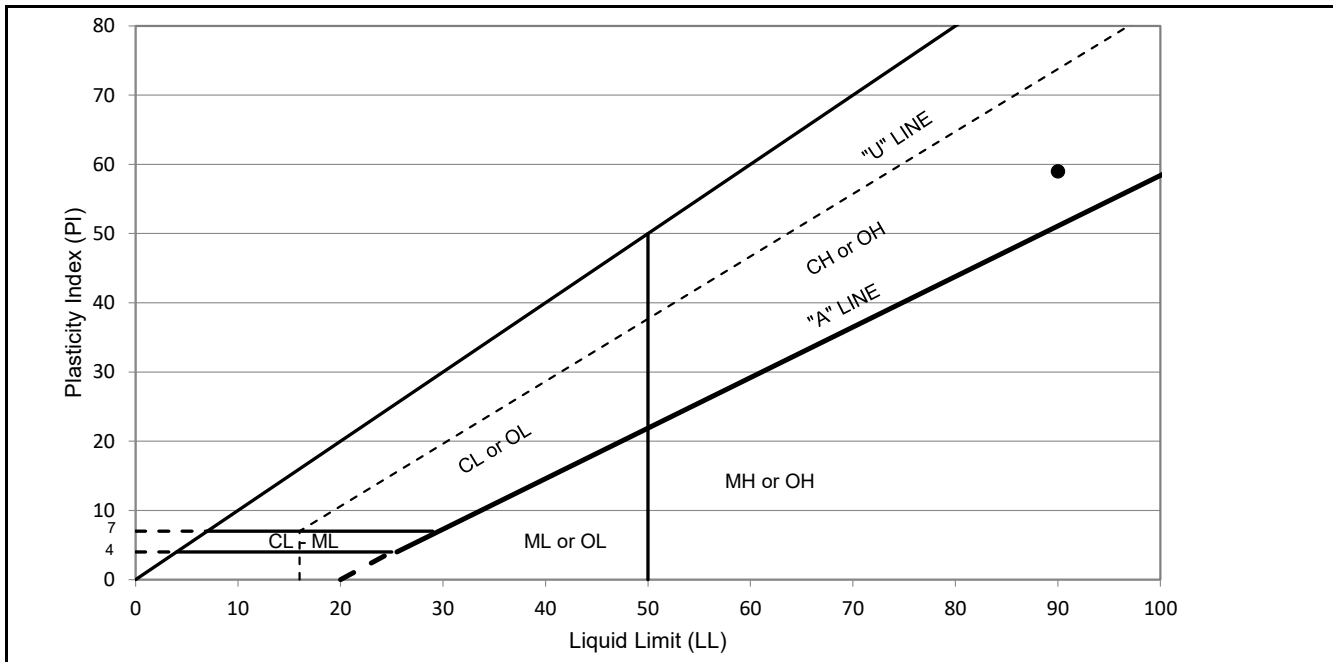


ATTERBERG LIMITS (ASTM D4318)

Client:	City Of Winnipeg	Project No.:	CA0057241.0340
Project:	St Mary's Rd Rehab	Report Date:	Oct 30, 2025
Date Sampled:	2025-10-14/16	Date Tested:	Oct 27, 2025
Sampled By:	John Catigay	Date Received:	Oct 17, 2025
Testhole No.:	TH25-07	Sample No.:	S07
Drying Method:	Oven	Method:	Multi-Point
		Depth (ft):	8.0

Liquid Limit Test (Manual, Plastic Grooving tool)			
Trial	A	B	C
No. of Blows	34	25	18
Moisture Content (%)	86.7	89.9	92.5

Plastic Limit Test (Hand rolled)		
Trial	A	B
Moisture Content (%)	30.8	30.6



USCS Symbol	CH
LL, Liquid Limit (%)	90
PL, Plastic Limit (%)	31
PI, Plasticity Index	59

Soil Description: High Plastic

Reviewed by: 

Md Nazri Mohidin, E.I.T
Experienced Laboratory Technician

Comment: As received moisture content is 35.2 %.

The test data given herein pertain to the sample provided. Reporting of these data constitutes a testing service. Engineering review and interpretation may be provided upon written request.

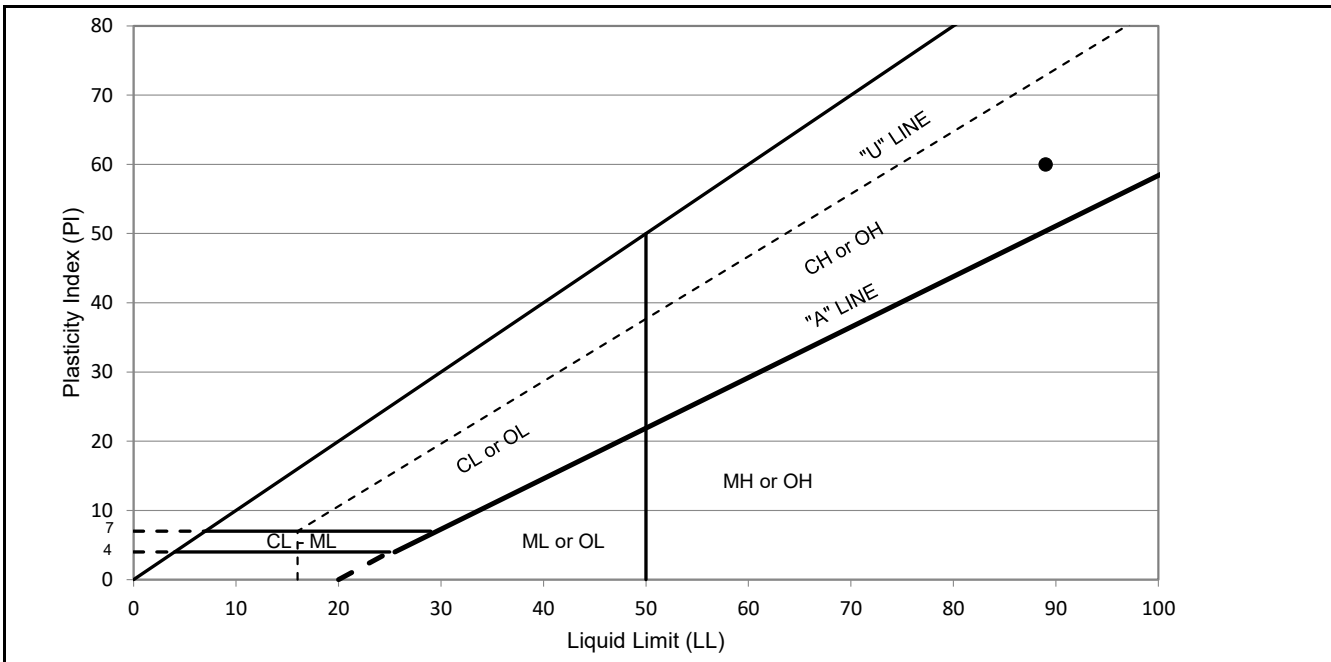


ATTERBERG LIMITS
(ASTM D4318)

Client:	City Of Winnipeg	Project No.:	CA0057241.0340
Project:	St Mary's Rd Rehab	Report Date:	Oct 30, 2025
Date Sampled:	2025-10-14/16	Date Tested:	Nov 12, 2025
Sampled By:	John Catigay	Date Received:	Oct 17, 2025
Testhole No.:	TH25-10	Sample No.:	S03
Drying Method:	Oven	Method:	Multi-Point
		Depth (ft):	3.0

Liquid Limit Test (Manual, Plastic Grooving tool)			
Trial	A	B	C
No. of Blows	34	26	19
Moisture Content (%)	85.9	88.7	91.1

Plastic Limit Test (Hand rolled)		
Trial	A	B
Moisture Content (%)	28.9	29.0



USCS Symbol	CH
LL, Liquid Limit (%)	89
PL, Plastic Limit (%)	29
PI, Plasticity Index	60

Soil Description: High Plastic

Reviewed by: *Md Nazri Mohidin*

Md Nazri Mohidin, E.I.T
Experienced Laboratory Technician

Comment: As received moisture content is 35.2 %.

The test data given herein pertain to the sample provided. Reporting of these data constitutes a testing service. Engineering review and interpretation may be provided upon written request.

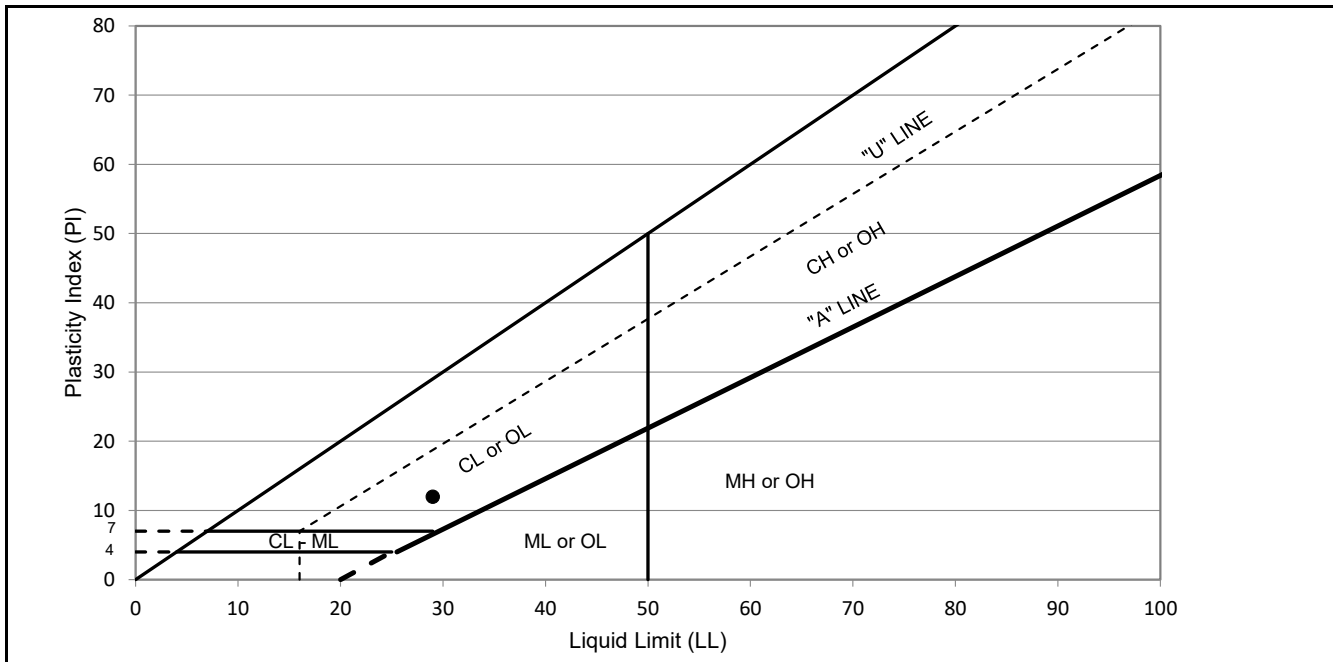


ATTERBERG LIMITS (ASTM D4318)

Client:	City Of Winnipeg	Project No.:	CA0057241.0340
Project:	St Mary's Rd Rehab	Report Date:	Oct 30, 2025
Date Sampled:	2025-10-14/16	Date Tested:	Oct 27, 2025
Sampled By:	John Catigay	Date Received:	Oct 17, 2025
Testhole No.:	TH25-11	Sample No.:	S04
Drying Method:	Oven	Method:	Multi-Point
		Depth (ft):	4.0

Liquid Limit Test (Manual, Plastic Grooving tool)			
Trial	A	B	C
No. of Blows	32	23	18
Moisture Content (%)	28.6	29.7	30.3

Plastic Limit Test (Hand rolled)		
Trial	A	B
Moisture Content (%)	16.7	16.9



USCS Symbol	CL
LL, Liquid Limit (%)	29
PL, Plastic Limit (%)	17
PI, Plasticity Index	12

Soil Description: Low Plastic

Reviewed by:

Md Nazri Mohidin, E.I.T
Experienced Laboratory Technician

Comment: As received moisture content is 22.8%.

The test data given herein pertain to the sample provided. Reporting of these data constitutes a testing service. Engineering review and interpretation may be provided upon written request.



PARTICLE-SIZE DISTRIBUTION OF SOILS USING SIEVE AND HYDROMETER ANALYSIS (ASTM D6913 and D7928)

Client: City Of Winnipeg

Project No.: CA0057241.0340

Project: St Mary's Rd Rehab

Testhole No.: TH25-02

Sampled by: John Catigay

Sample Source: TH25-02

Sample No.: S08

Date Sampled: October 14/16, 2025

Date Received: October 17, 2025

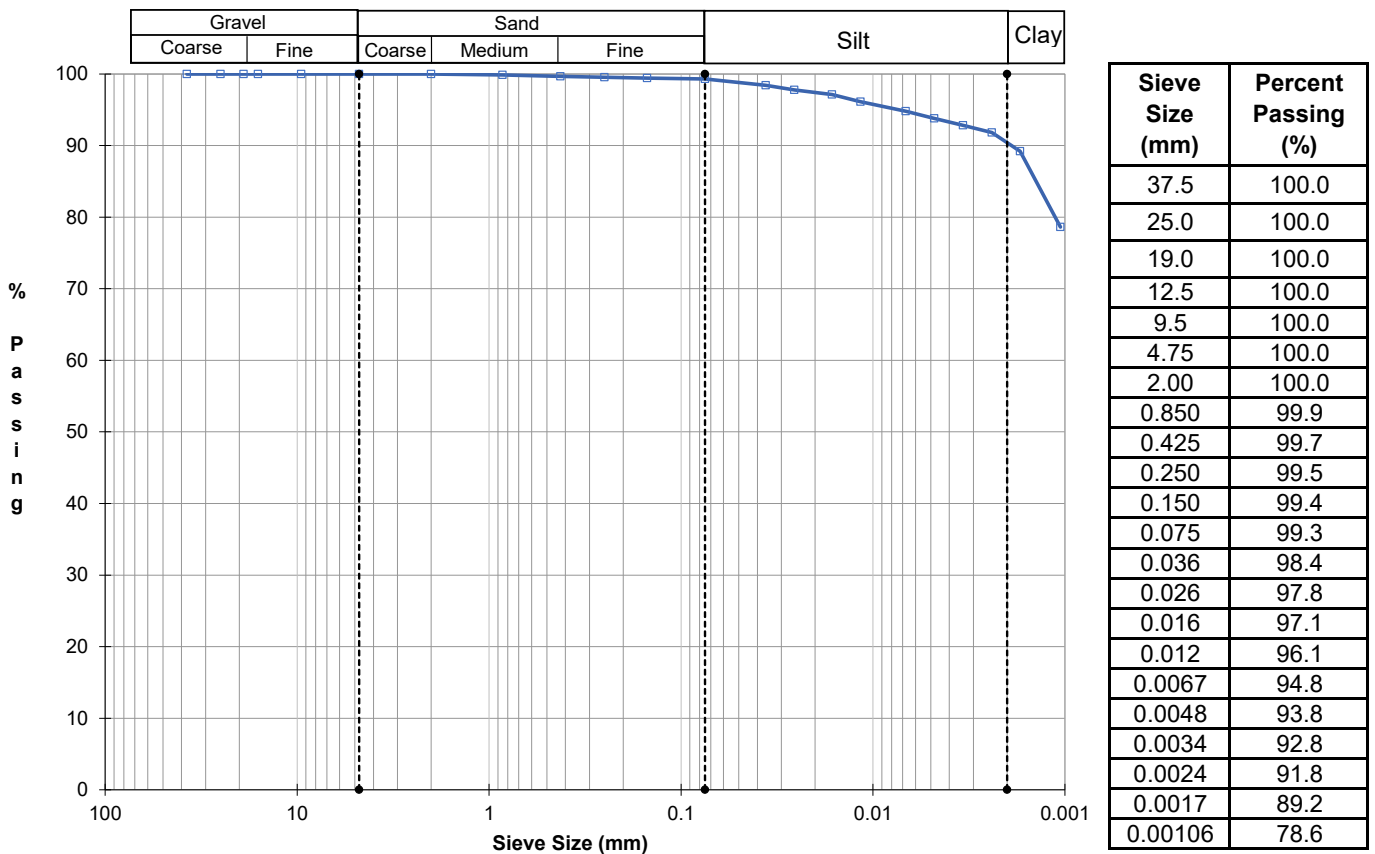
Depth (m): 15.0

Tested By: NM/RD

Dispersion Method: Stirring

Dispersion Period (min): 1

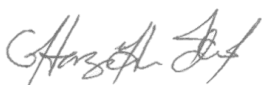
S.G. (assumed): 2.7



Percent of: Gravel = 0.0% Sand = 0.7% Silt = 8.9% Clay = 90.4%

Sample Discription:
Clay, few silt, trace sand

Remarks:
Separation made on No 10 sieve (2.0 mm).


 Reviewed by:
 Md Nazri Mohidin, E.I.T
 Experienced Laboratory Technician

The test data given herein pertain to the sample provided. Reporting of these data constitutes a testing service. Engineering review and interpretation may be provided upon written request.



PARTICLE-SIZE DISTRIBUTION OF SOILS USING SIEVE AND HYDROMETER ANALYSIS (ASTM D6913 and D7928)

Client: City Of Winnipeg

Project No.: CA0057241.0340

Project: St Mary's Rd Rehab

Testhole No.: TH25-03

Sampled by: John Catigay

Sample Source: TH25-03

Sample No.: S03

Date Sampled: October 14/16, 2025

Date Received: October 17, 2025

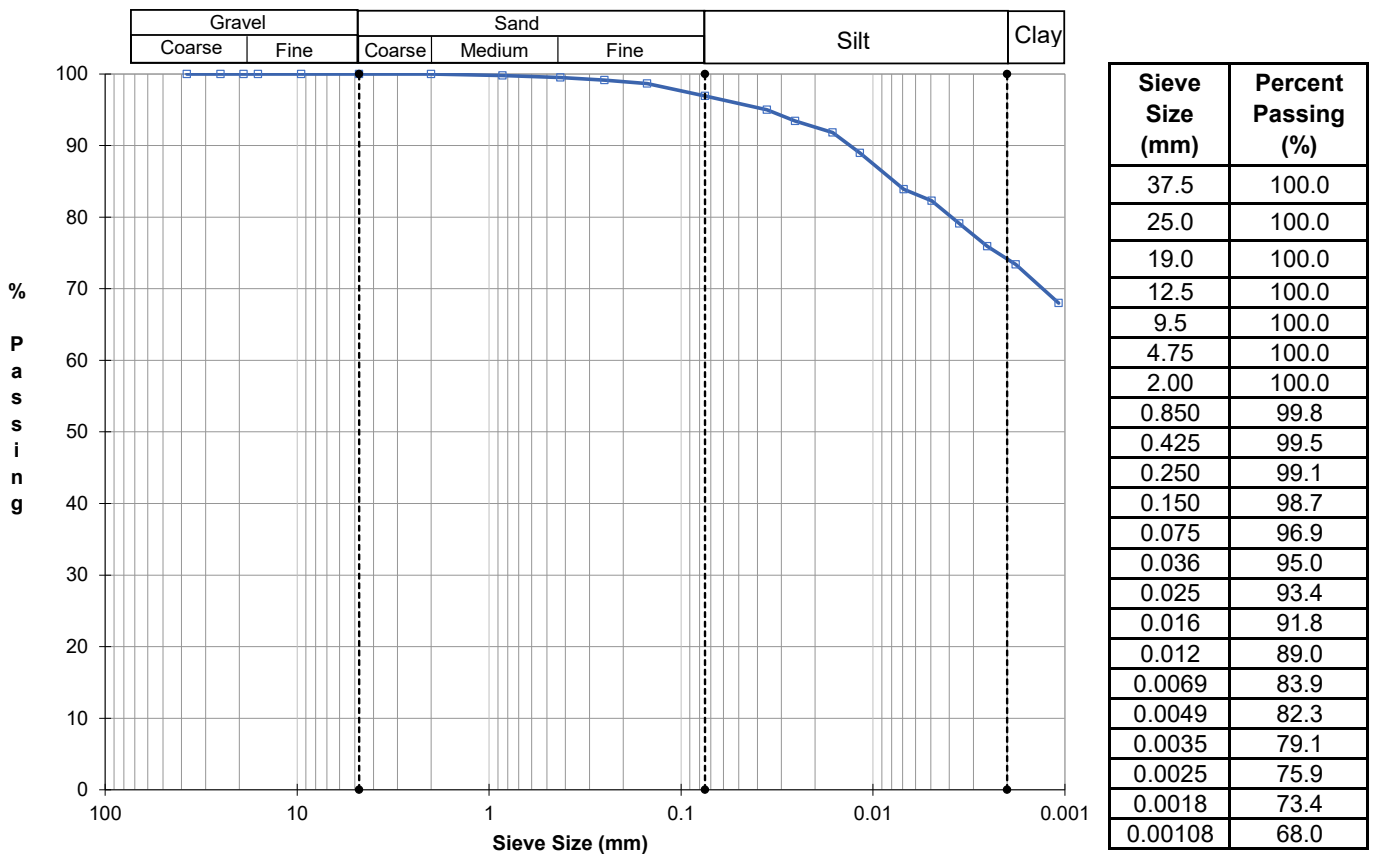
Depth (m): 3.0

Tested By: NM

Dispersion Method: Stirring

Dispersion Period (min): 1


S.G. (assumed): 2.7



Percent of: Gravel = 0.0% Sand = 3.1% Silt = 22.8% Clay = 74.2%

Sample Description:
Clay, little silt, trace sand

Remarks:
Separation made on No 10 sieve (2.0 mm).


 Reviewed by:
 Md Nazri Mohidin, E.I.T
 Experienced Laboratory Technician

The test data given herein pertain to the sample provided. Reporting of these data constitutes a testing service. Engineering review and interpretation may be provided upon written request.



PARTICLE-SIZE DISTRIBUTION OF SOILS USING SIEVE AND HYDROMETER ANALYSIS (ASTM D6913 and D7928)

Client: City Of Winnipeg

Project No.: CA0057241.0340

Project: St Mary's Rd Rehab

Testhole No.: TH25-06

Sampled by: John Catigay

Sample Source: TH25-02

Sample No.: S06

Date Sampled: October 14/16, 2025

Date Received: October 17, 2025

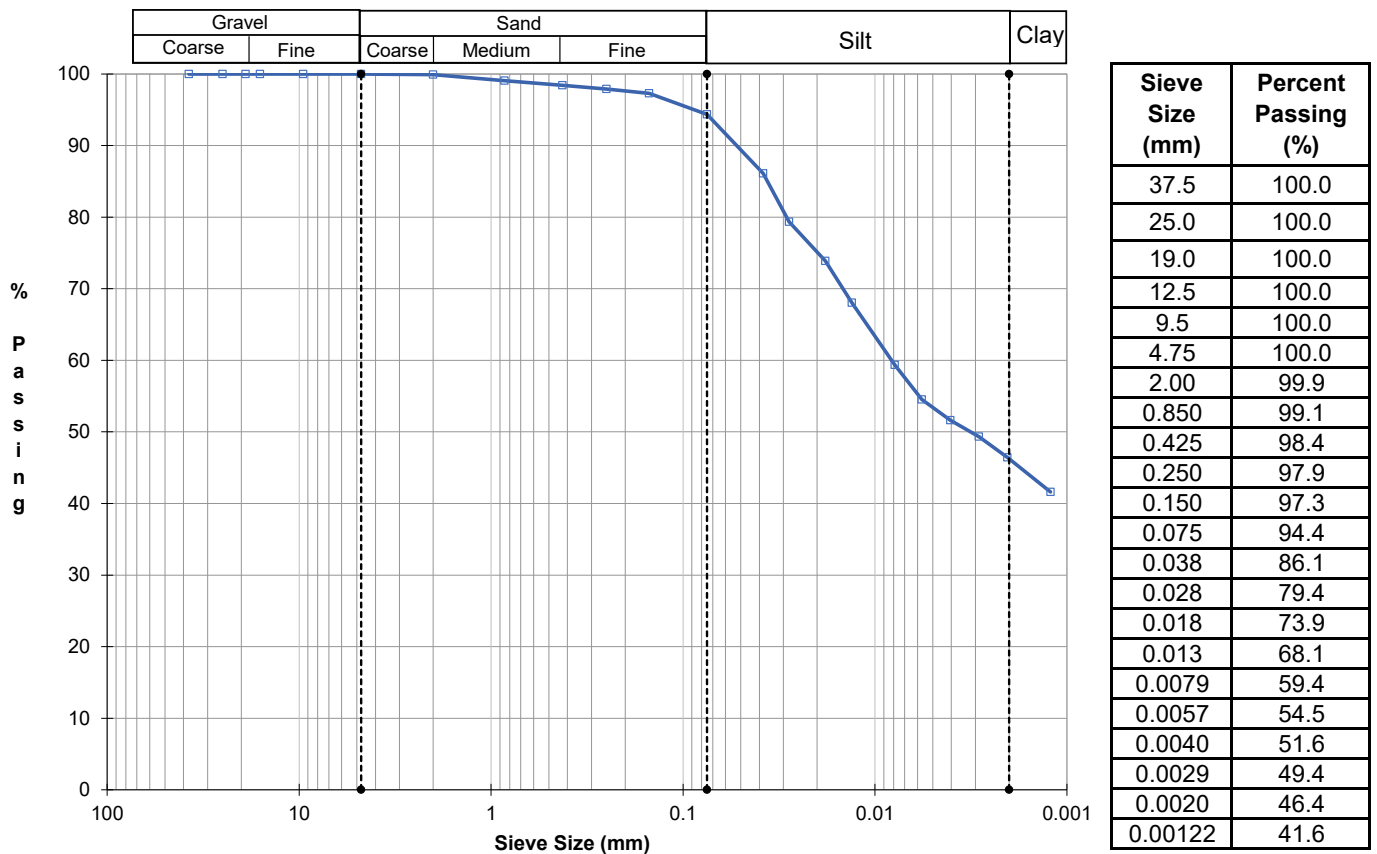
Depth (m): 5.5

Tested By: NM/RD

Dispersion Method: Stirring

Dispersion Period (min): 1


S.G. (assumed): 2.7



Percent of: Gravel = 0.0% Sand = 5.6% Silt = 48.1% Clay = 46.3%

Sample Description:
Some silt, some clay, few sand

Remarks:
Separation made on No 10 sieve (2.0 mm).


 Reviewed by:
 Md Nazri Mohidin, E.I.T
 Experienced Laboratory Technician

The test data given herein pertain to the sample provided. Reporting of these data constitutes a testing service. Engineering review and interpretation may be provided upon written request.



PARTICLE-SIZE DISTRIBUTION OF SOILS USING SIEVE AND HYDROMETER ANALYSIS (ASTM D6913 and D7928)

Client: City Of Winnipeg

Project No.: CA0057241.0340

Project: St Mary's Rd Rehab

Testhole No.: TH25-07

Sampled by: John Catigay

Sample Source: TH25-02

Sample No.: S07

Date Sampled: October 14/16, 2025

Date Received: October 17, 2025

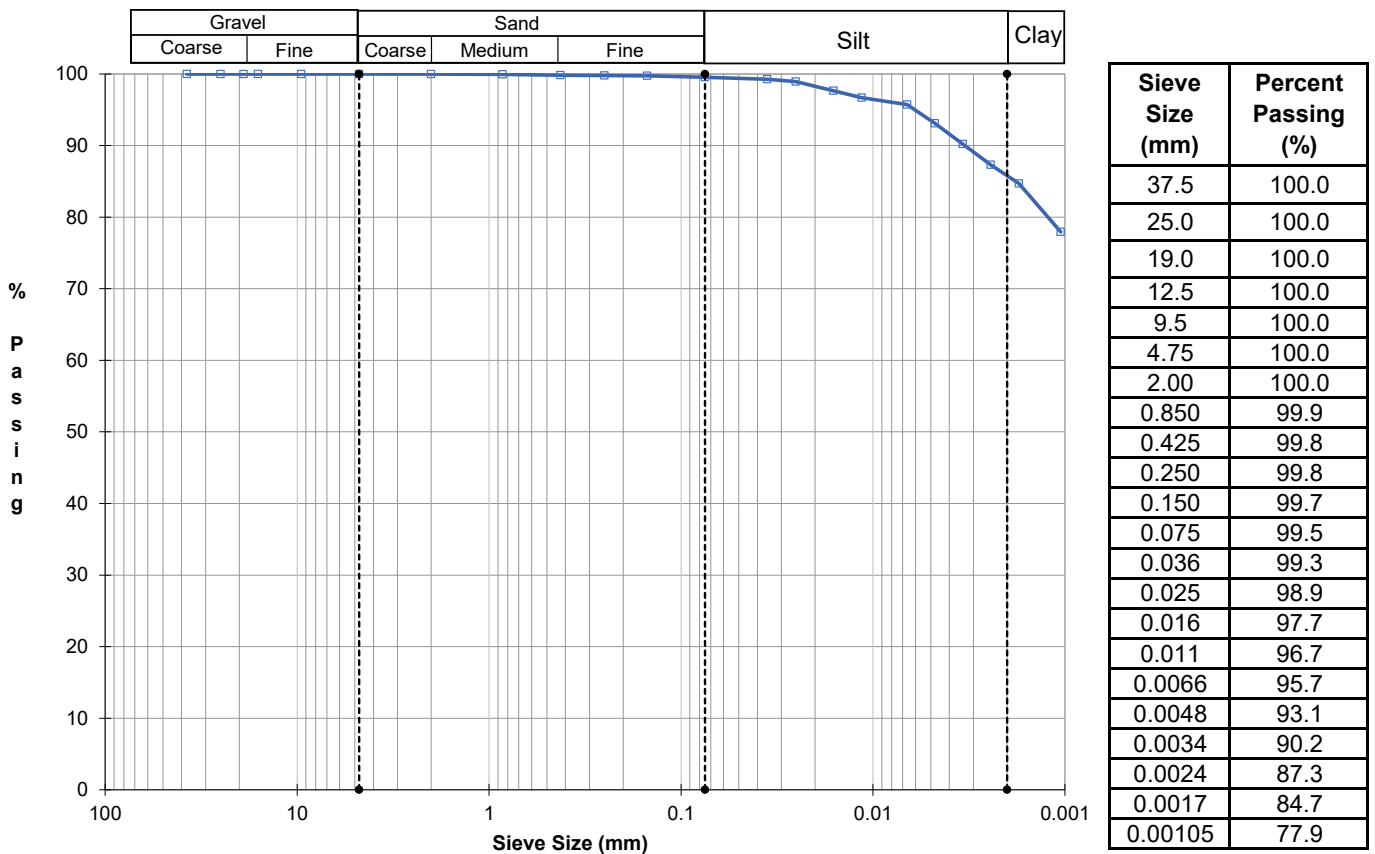
Depth (m): 8.0

Tested By: NM/RD

Dispersion Method: Stirring

Dispersion Period (min): 1

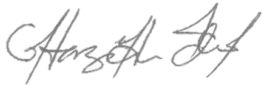
S.G. (assumed): 2.7



Percent of: Gravel = 0.0% Sand = 0.5% Silt = 13.7% Clay = 85.8%

Sample Description:
Clay, little silt, trace sand

Remarks:
Separation made on No 10 sieve (2.0 mm).


 Reviewed by:
 Md Nazri Mohidin, E.I.T
 Experienced Laboratory Technician

The test data given herein pertain to the sample provided. Reporting of these data constitutes a testing service. Engineering review and interpretation may be provided upon written request.



PARTICLE-SIZE DISTRIBUTION OF SOILS USING SIEVE AND HYDROMETER ANALYSIS (ASTM D6913 and D7928)

Client: City Of Winnipeg

Project No.: CA0057241.0340

Project: St Mary's Rd Rehab

Testhole No.: TH25-10

Sampled by: John Catigay

Sample Source: TH25-10

Sample No.: S03

Date Sampled: October 14/16, 2025

Date Received: October 17, 2025

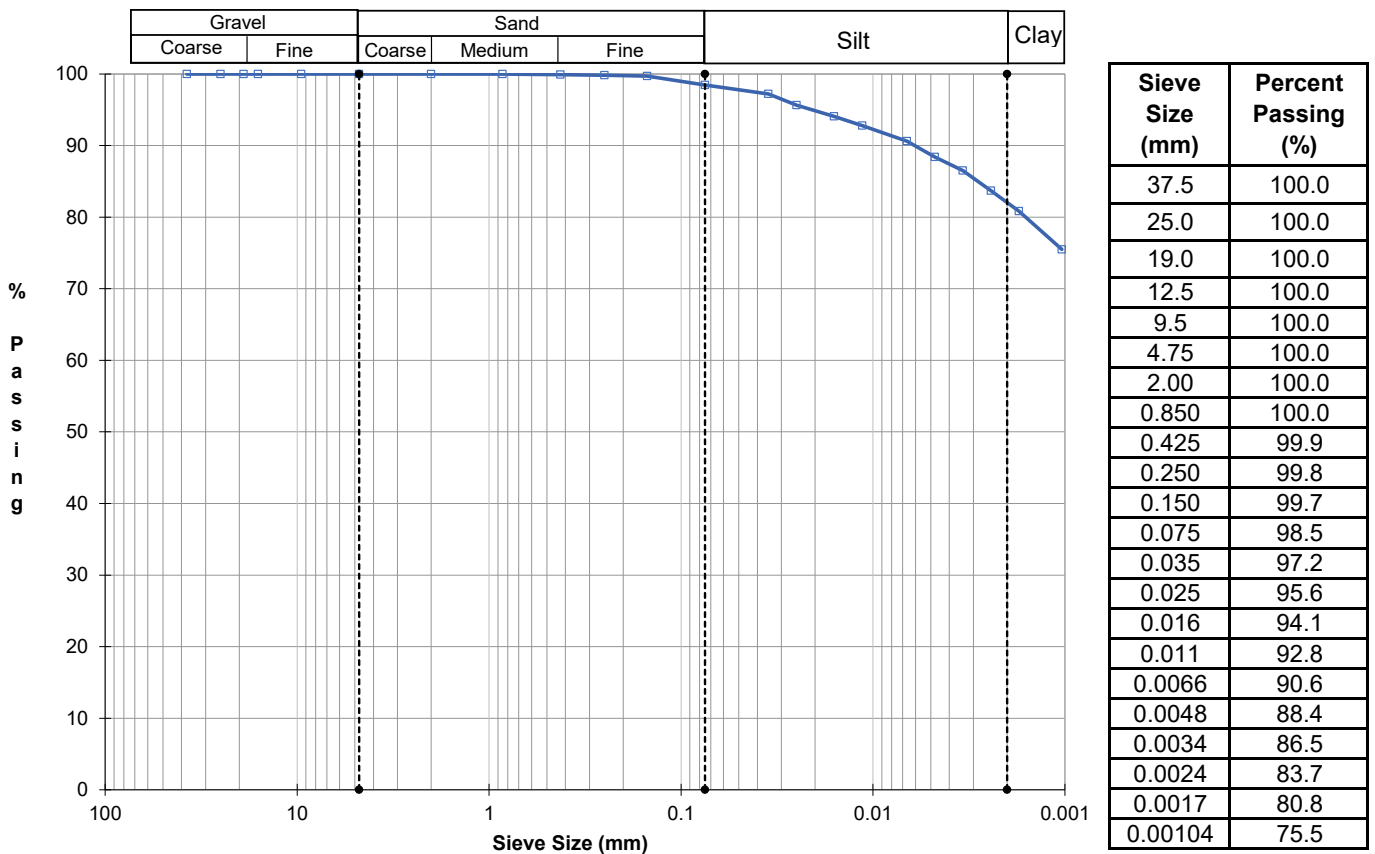
Depth (m): 3.0

Tested By: NM

Dispersion Method: Stirring

Dispersion Period (min): 1

S.G. (assumed): 2.7



Percent of: Gravel = 0.0% Sand = 1.5% Silt = 16.4% Clay = 82.0%

Sample Description:

Clay, little silt, trace sand

Remarks:

Separation made on No 10 sieve (2.0 mm).

Reviewed by:

Md Nazri Mohidin, E.I.T
Experienced Laboratory Technician

The test data given herein pertain to the sample provided. Reporting of these data constitutes a testing service. Engineering review and interpretation may be provided upon written request.



PARTICLE-SIZE DISTRIBUTION OF SOILS USING SIEVE AND HYDROMETER ANALYSIS (ASTM D6913 and D7928)

Client: City Of Winnipeg

Project No.: CA0057241.0340

Project: St Mary's Rd Rehab

Testhole No.: TH25-11

Sampled by: John Catigay

Sample Source: TH25-02

Sample No.: S04

Date Sampled: October 14/16, 2025

Date Received: October 17, 2025

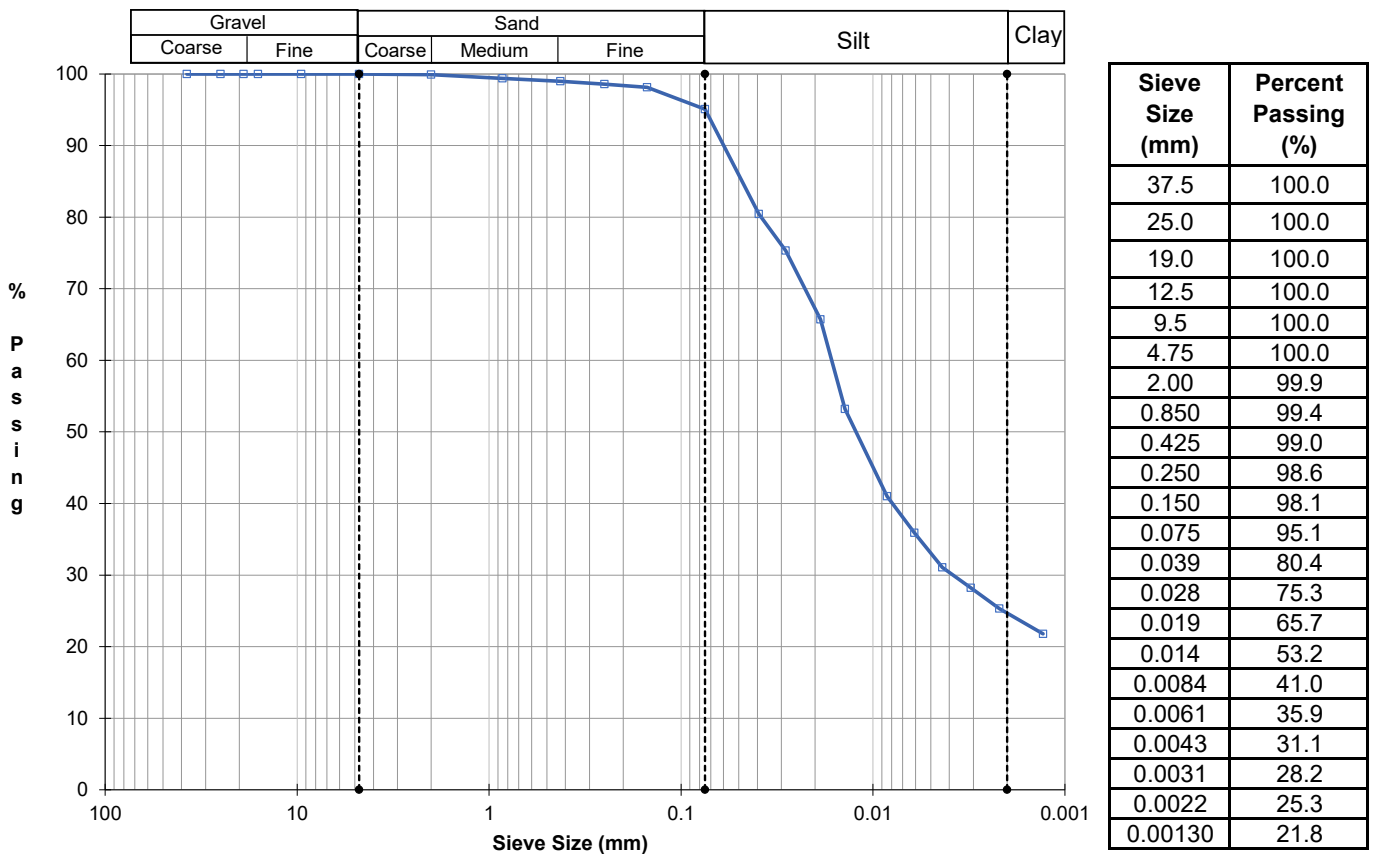
Depth (m): 4.0

Tested By: NM/RD

Dispersion Method: Stirring

Dispersion Period (min): 1

S.G. (assumed): 2.7



Percent of: Gravel = 0.0% Sand = 4.9% Silt = 70.5% Clay = 24.5%

Sample Description:

Mostly silt, some clay, trace sand

Remarks:

Separation made on No 10 sieve (2.0 mm).

Reviewed by:

Md Nazri Mohidin, E.I.T
Experienced Laboratory Technician

The test data given herein pertain to the sample provided. Reporting of these data constitutes a testing service. Engineering review and interpretation may be provided upon written request.

Moisture / Density Relationship



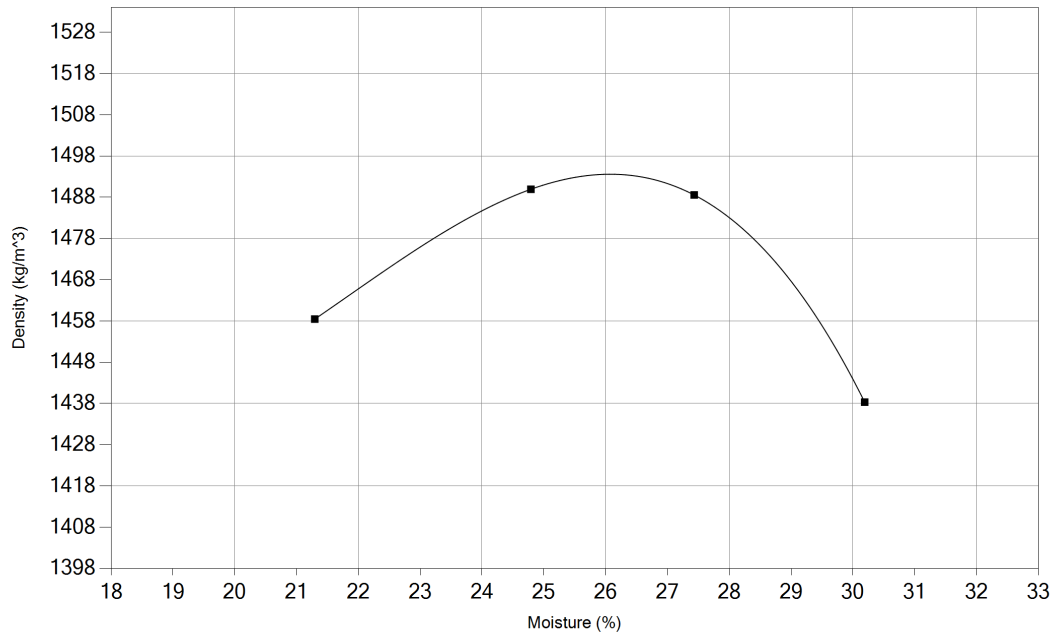
Report Date: November 03, 2025

Client

Name: WSP Canada Inc.
Address: 1600 Buffalo Place Winnipeg, MB R3T 6B8
Attention: Linh Trinh
PO Number:
Sample Date: 10/16/2025 by John Catigay
Source: TH25-03
Depth: 5-10 feet

Project

Name: (CA0057241.0340) St. Marys Rd Rehabilitation from PTH 101 to Chrytko Rd
Address: Winnipeg, MB
Phase: N/A **Task:** N/A
Manager: Randell Johnson
Lab/Ref. #: CA0057241.0340-Proc01
Description: Clay 01



Moisture Density Relationship: (ASTM D698-12) Method: A

Preparation Method: Dry Rammer Type: Mechanical

Maximum Density (kg/m³): 1494

Optimum Moisture (%): 26.1

Received Moisture Content (%): 24.9%

Remarks:

Distribution: Linh Trinh

Reviewed By: Md Nazri Mohidin

Reporting of these results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request.

WSP Canada Inc. - 6 High Level Road - Oak Bluff (Wpg), Mb



CCIL Certified Aggregate Type C, Type D & Concrete Aggregate
Type R in accordance with CSA A283-19



**CALIFORNIA BEARING RATIO (CBR)
ASTM D1883**

Client: City Of Winnipeg
Project: St. Mary's Rd Rehab
Job No.: CA0057241.0340
Report Date: Nov 02, 2025
Sample Description: Clay
Sample Location: TH25-03, Depth: 5-10 feet

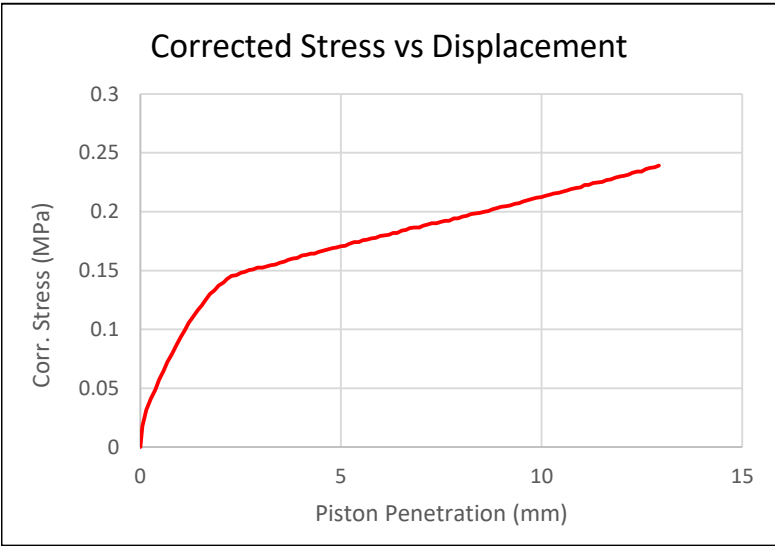
Sampled By: John Catigay
Tested By: Nazri Mohidin
Date Sampled: 14/16 oct 2025
Test Date: Oct 27, 2025
Sample No.: Clay 01

Standard Proctor Results (ASTM D698)	
Max. Dry Density (kg/m ³)	1494
Optimum Moisture Content (%)	26.1
% Retained about 4.75 mm	0.0

CBR Preparation	
Initial Dry Density (kg/m ³)	1413
Initial Moisture Content (%)	26.3
Initial Percent of Proctor (%)	94.6


Immersion Data	
Mass of Surcharge (kg)	4.54
Immersion Time (h)	96.0
Swell	3.1%
Moisture Content of top 25.4 mm	34.7%

Soaked CBR Test Results	
CBR at 2.5 mm (0.1")	2.2%
CBR at 5.1 mm (0.2")	1.7%
Correction (mm)	0



Stress Data	
Penetration (mm)	Corrected Stress (Mpa)
0.635	0.07
1.270	0.11
1.905	0.14
2.540	0.15
3.175	0.15
3.810	0.16
4.445	0.17
5.080	0.17
6.350	0.18
7.620	0.19
8.890	0.20
10.160	0.21
11.430	0.22
12.700	0.24

Comments:

Reviewed by: 
Md Nazri Mohidin, E.I.T
Experienced Laboratory Technician

The test data given herein pertain to the sample provided. Reporting of these data constitutes a testing service. Engineering review and interpretation may be provided upon written request.

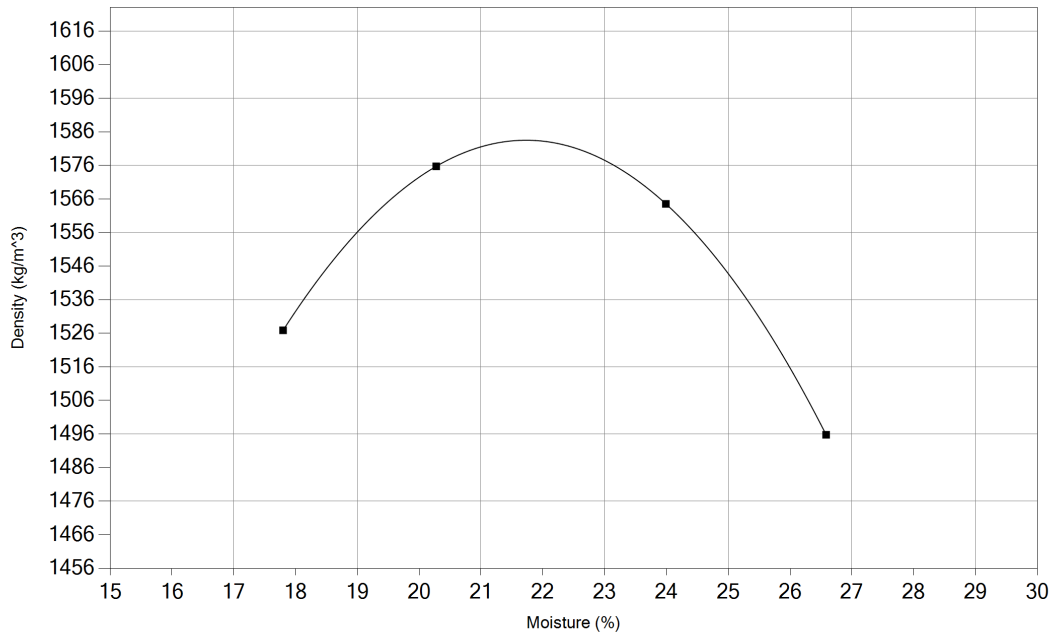
Moisture / Density Relationship



Report Date: November 03, 2025

Client
Name: WSP Canada Inc.
Address: 1600 Buffalo Place Winnipeg, MB R3T 6B8
Attention: Linh Trinh
PO Number:
Sample Date: 10/16/2025 by John Catigay
Source: TH25-06
Depth: 1.5-4 feet

Project
Name: (CA0057241.0340) St. Marys Rd Rehabilitation from PTH 101 to Chrytko Rd
Address: Winnipeg, MB
Phase: N/A **Task:** N/A
Manager: Randell Johnson
Lab/Ref. #: CA0057241.0340-Proc02
Description: Clay 02



Moisture Density Relationship: (ASTM D698-12) Method: A

Preparation Method: Dry **Rammer Type:** Mechanical

Maximum Density (kg/m³): 1584

Optimum Moisture (%): 21.7

Received Moisture Content (%): 23.5%

Remarks:

Distribution:

Reviewed By: Md Nazri Mohidin

Reporting of these results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request.

WSP Canada Inc. - 6 High Level Road - Oak Bluff (Wpg), Mb



CCIL Certified Aggregate Type C, Type D & Concrete Aggregate
Type R in accordance with CSA A283-19



CALIFORNIA BEARING RATIO (CBR) ASTM D1883

Client: City Of Winnipeg
Project: St. Mary's Rd Rehab
Job No.: CA0057241.0340
Report Date: Nov 02, 2025
Sample Description: Clay
Sample Location: TH25-06, Depth: 1.5-4 feet

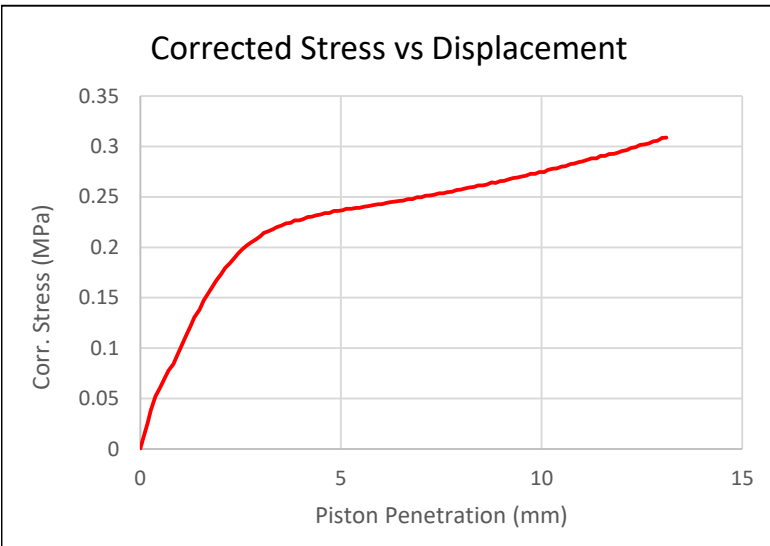
Sampled By: John Catigay
Tested By: Nazri Mohidin
Date Sampled: 14/16 oct 2025
Test Date: Oct 27, 2025
Sample No.: Clay 02

Standard Proctor Results (ASTM D698)	
Max. Dry Density (kg/m ³)	1584
Optimum Moisture Content (%)	21.7
% Retained about 4.75 mm	0.0

CBR Preparation	
Initial Dry Density (kg/m ³)	1499
Initial Moisture Content (%)	22.2
Initial Percent of Proctor (%)	94.6

Immersion Data	
Mass of Surcharge (kg)	4.54
Immersion Time (h)	96.0
Swell	2.9%
Moisture Content of top 25.4 mm	28.5%

Soaked CBR Test Results	
CBR at 2.5 mm (0.1")	2.8%
CBR at 5.1 mm (0.2")	2.3%
Correction (mm)	0



Stress Data	
Penetration (mm)	Corrected Stress (Mpa)
0.635	0.07
1.270	0.13
1.905	0.17
2.540	0.20
3.175	0.22
3.810	0.23
4.445	0.23
5.080	0.24
6.350	0.25
7.620	0.25
8.890	0.26
10.160	0.28
11.430	0.29
12.700	0.30

Comments:

Reviewed by: 

Md Nazri Mohidin, E.I.T
 Experienced Laboratory Technician

The test data given herein pertain to the sample provided. Reporting of these data constitutes a testing service. Engineering review and interpretation may be provided upon written request.

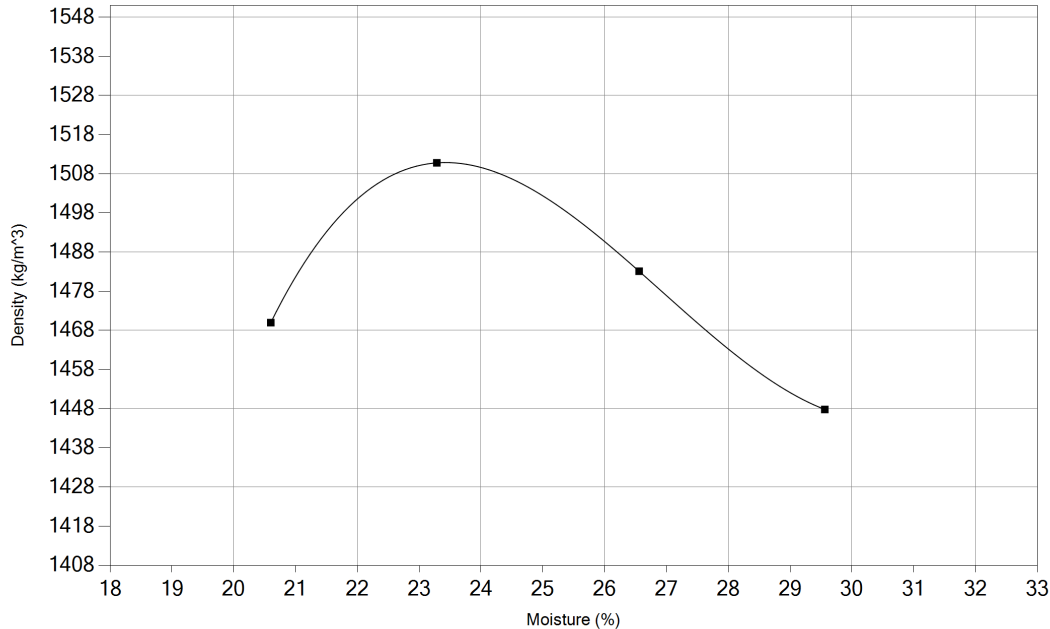
Moisture / Density Relationship



Report Date: November 03, 2025

Client
Name: WSP Canada Inc.
Address: 1600 Buffalo Place Winnipeg, MB R3T 6B8
Attention: Linh Trinh
PO Number:
Sample Date: 10/16/2025 by John Catigay
Source: TH25-07
Depth: 6.3-10 feet

Project
Name: (CA0057241.0340) St. Marys Rd Rehabilitation from PTH 101 to Chrytko Rd
Address: Winnipeg, MB
Phase: N/A **Task:** N/A
Manager: Randell Johnson
Lab/Ref. #: CA0057241.0340-Proc03
Description: Clay 03



Moisture Density Relationship: (ASTM D698-12) Method: A

Preparation Method: Dry **Rammer Type:** Mechanical

Maximum Density (kg/m³): 1511

Optimum Moisture (%): 23.4

Received Moisture Content (%): 35.7%

Remarks:

Distribution: Linh Trinh

Reviewed By: Md Nazri Mohidin

Reporting of these results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request.

WSP Canada Inc. - 6 High Level Road - Oak Bluff (Wpg), Mb



CCIL Certified Aggregate Type C, Type D & Concrete Aggregate Type R in accordance with CSA A283-19



CALIFORNIA BEARING RATIO (CBR) ASTM D1883

Client: City Of Winnipeg
Project: St. Mary's Rd Rehab
Job No.: CA0057241.0340
Report Date: Nov 02, 2025
Sample Description: Clay
Sample Location: TH25-07, Depth: 6.3-10 feet

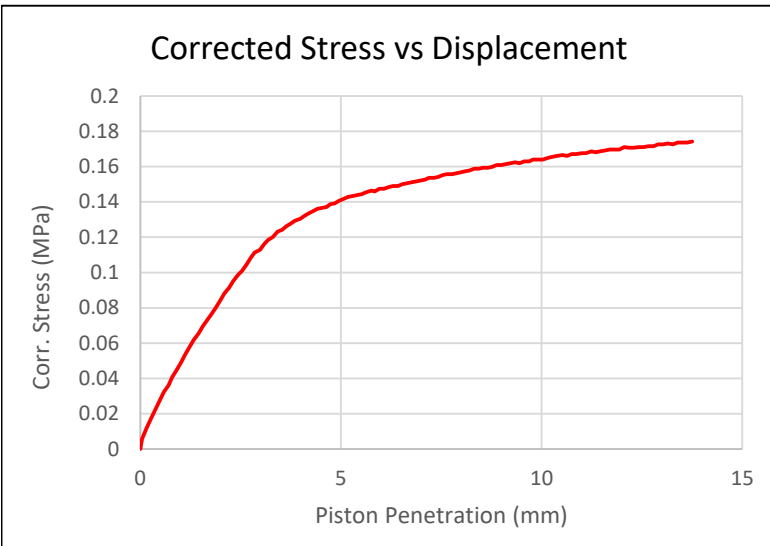
Sampled By: John Catigay
Tested By: Nazri Mohidin
Date Sampled: 14/16 oct 2025
Test Date: Oct 27, 2025
Sample No.: Clay 03

Standard Proctor Results (ASTM D698)	
Max. Dry Density (kg/m ³)	1511
Optimum Moisture Content (%)	23.4
% Retained about 4.75 mm	0.0

CBR Preparation	
Initial Dry Density (kg/m ³)	1433
Initial Moisture Content (%)	23.9
Initial Percent of Proctor (%)	94.8


Immersion Data	
Mass of Surcharge (kg)	4.54
Immersion Time (h)	96.0
Swell	6.8%
Moisture Content of top 25.4 mm	38.3%

Soaked CBR Test Results	
CBR at 2.5 mm (0.1")	1.5%
CBR at 5.1 mm (0.2")	1.4%
Correction (mm)	0



Stress Data	
Penetration (mm)	Corrected Stress (Mpa)
0.635	0.03
1.270	0.06
1.905	0.08
2.540	0.10
3.175	0.12
3.810	0.13
4.445	0.14
5.080	0.14
6.350	0.15
7.620	0.16
8.890	0.16
10.160	0.16
11.430	0.17
12.700	0.17

Comments:

Reviewed by: 
 Md Nazri Mohidin, E.I.T
 Experienced Laboratory Technician

The test data given herein pertain to the sample provided. Reporting of these data constitutes a testing service. Engineering review and interpretation may be provided upon written request.

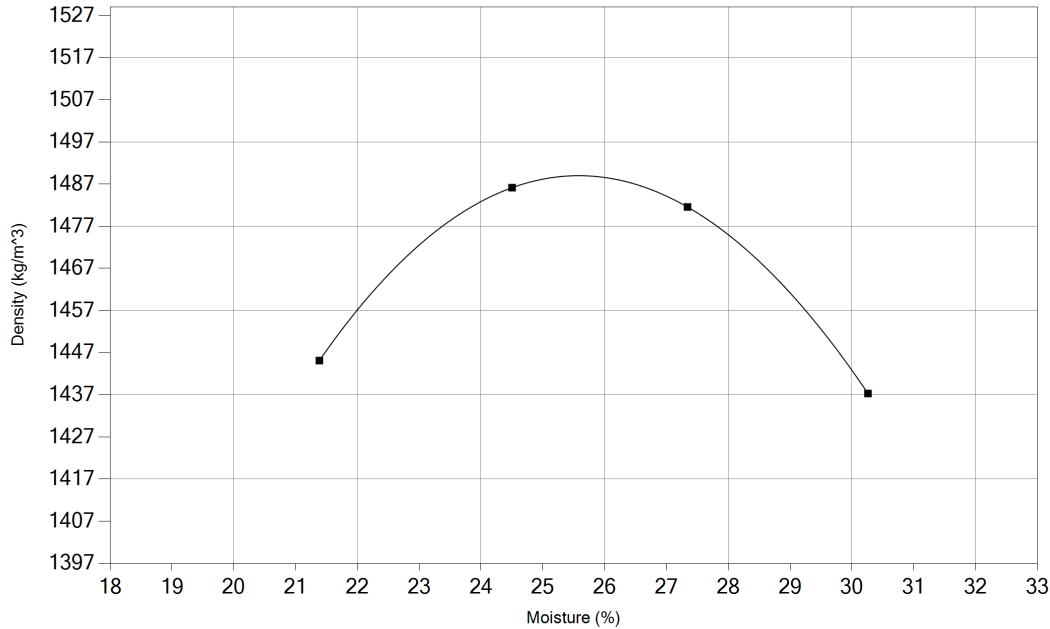
Moisture / Density Relationship



Report Date: November 03, 2025

Client
Name: WSP Canada Inc.
Address: 1600 Buffalo Place Winnipeg, MB R3T 6B8
Attention: Linh Trinh
PO Number:
Sample Date: 10/16/2025 by John Catigay
Source: TH25-10
Depth: 1-5 feet

Project
Name: (CA0057241.0340) St. Marys Rd Rehabilitation from PTH 101 to Chrytko Rd
Address: Winnipeg, MB
Phase: N/A **Task:** N/A
Manager: Randell Johnson
Lab/Ref. #: CA0057241.0340-Proc04
Description: Clay 04



Moisture Density Relationship: (ASTM D698-12) Method: A

Preparation Method: Dry **Rammer Type:** Mechanical

Maximum Density (kg/m³): 1489

Optimum Moisture (%): 25.6

Received Moisture Content (%): 26.6%

Remarks:

Distribution: Linh Trinh

Reviewed By: Md Nazri Mohidin

Reporting of these results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request.

WSP Canada Inc. - 6 High Level Road - Oak Bluff (Wpg), Mb



CCIL Certified Aggregate Type C, Type D & Concrete Aggregate
Type R in accordance with CSA A283-19



**CALIFORNIA BEARING RATIO (CBR)
ASTM D1883**

Client: City Of Winnipeg
Project: St. Mary's Rd Rehab
Job No.: CA0057241.0340
Report Date: Nov 02, 2025
Sample Description: Clay
Sample Location: TH25-10, Depth: 1-5 feet

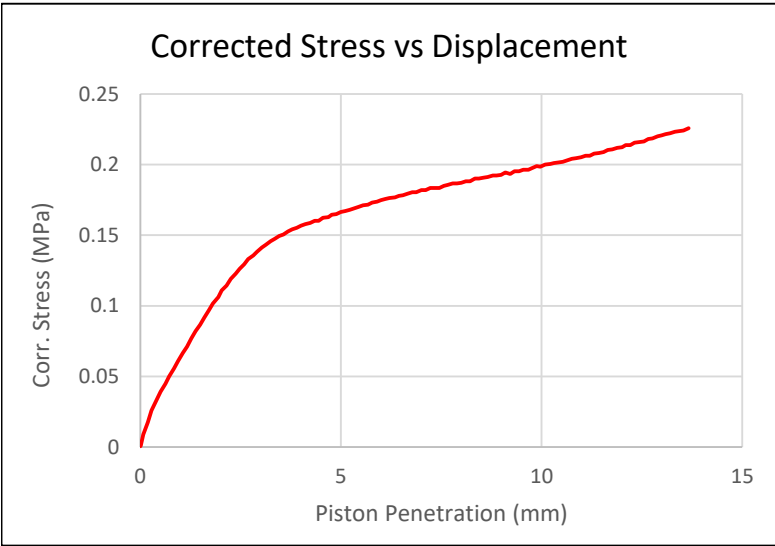
Sampled By: John Catigay
Tested By: Nazri Mohidin
Date Sampled: 14/16 oct 2025
Test Date: Oct 27, 2025
Sample No.: Clay 04

Standard Proctor Results (ASTM D698)	
Max. Dry Density (kg/m ³)	1489
Optimum Moisture Content (%)	25.6
% Retained about 4.75 mm	0.0

CBR Preparation	
Initial Dry Density (kg/m ³)	1413
Initial Moisture Content (%)	26.1
Initial Percent of Proctor (%)	94.9


Immersion Data	
Mass of Surcharge (kg)	4.54
Immersion Time (h)	96.0
Swell	3.9%
Moisture Content of top 25.4 mm	35.7%

Soaked CBR Test Results	
CBR at 2.5 mm (0.1")	1.9%
CBR at 5.1 mm (0.2")	1.6%
Correction (mm)	0



Stress Data	
Penetration (mm)	Corrected Stress (Mpa)
0.635	0.05
1.270	0.07
1.905	0.10
2.540	0.13
3.175	0.14
3.810	0.15
4.445	0.16
5.080	0.17
6.350	0.18
7.620	0.19
8.890	0.19
10.160	0.20
11.430	0.21
12.700	0.22





Comments:





Reviewed by: 
Md Nazri Mohidin, E.I.T
Experienced Laboratory Technician

The test data given herein pertain to the sample provided. Reporting of these data constitutes a testing service. Engineering review and interpretation may be provided upon written request.

APPENDIX D

Coring Logs

Core ID	Core photos	Remark
North Section		
TH25-01		SB lane, 1.5m west of centreline
TH25-03		NB lane, 2.25m east of centreline
TH25-04		SB lane, 2.0m west of centreline
TH25-06		NB lane, 2.0m east of centreline

Core ID	Core photos	Remark
South Section		
TH25-07		SB lane, 1.5m west of centreline
TH25-09		NB lane, 2.0m east of centreline
TH25-10		SB lane, 2.5m west of centreline
TH25-12		NB lane, 2.0m east of centreline

Note: Co-ordinates of core holes are provided in Appendix B



wsp.com