

# **APPENDIX 'A'**

# **GEOTECHNICAL REPORT**



Quality Engineering | Valued Relationships

## **Morrison Hershfield**

### **RFP 547-2023 McGregor-Inkster Geotech. Investigation**

**Prepared for:**

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R3Y 1V2

**Project Number:** 1000-001-33

**Date:** January 22, 2024



Quality Engineering | Valued Relationships

January 22, 2024

Our File No. 1000-001-33

Ron Bruce, P. Eng.  
Morrison Hershfield  
Suite 1, 59 Scurfield Blvd  
Winnipeg, MB.  
R3Y 1V2

**RE: RFP 547-2023 McGregor-Inkster Geotech. Investigation**

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TREK Geotechnical Inc. is pleased to submit our Final Report for the geotechnical investigation for RFP 547-2023 McGregor-Inkster Geotech. Investigation project.

Please contact the undersigned should you have any questions.

Sincerely,

**TREK Geotechnical Inc.**

**Per:**

A handwritten signature in blue ink, appearing to read "N. Ferreira", is written over a light blue circular stamp.

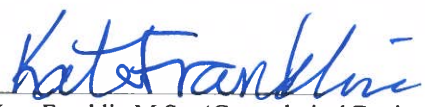
Nelson John Ferreira, Ph.D., P.Eng.  
Senior Geotechnical Engineer

Encl.

## Revision History

Revision No.	Author	Issue Date	Description
0	AD	January 22, 2024	Final Report

## Authorization Signatures

Prepared By:   
Kate Franklin M.Sc. (Geotechnical Engineering)  
Technical Support Specialist



Reviewed By: \_\_\_\_\_  
Nelson John Ferreira, Ph.D., P.Eng.  
Senior Geotechnical Engineer



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~~Appendix D Summary Table, Pavement Core Photos, and Summary of Pavement Compressive  
Strength - Inkster Boulevard~~

## 1.0 Introduction

This report summarizes the results of the road investigation completed for the RFP 547-2023 McGregor-Inkster Geotech. Investigation project. The project included collecting pavement cores and drilling test holes McGregor Street (Church Avenue to McAdam Avenue) and Inkster Boulevard (Main Street to Milner Street). The test hole information collected describes the pavement structure of the existing road as well as the soil stratigraphy beneath the pavement structure. The investigation was carried out following the City of Winnipeg RFP No. 547-2023.

## 2.0 Road Investigation

The investigation included coring of pavement at 61 locations with drilling of test holes at 24 of the cored locations. Morrison Hershfield selected the investigation locations as shown on Figures 01 to 11 (attached) and the table below summarizes the investigation program per street.

**Table 1: Road Investigation Program**

Street	# of Locations	Investigation
<b>McGregor Street – Recon</b> (Church Av to McAdam Av)	10	Pavement Cores and Test Holes
<del><b>Inkster Blvd EB - Recon</b> (Main St to Sinclair St)</del>	<del>10</del>	<del>Pavement Cores and Test Holes</del>
<del><b>Inkster Blvd WB - Recon</b> (McPhillips St to Wiginton St)</del>	<del>4</del>	<del>Pavement Cores and Test Holes</del>
<del><b>Inkster Blvd EB - Rehab</b> (Sheppard St to Milner St)</del>	<del>3</del>	<del>Pavement Cores</del>
<del><b>Inkster Blvd EB – Mill/Fill</b> (Fife St to McPhillips St)</del>	<del>9</del>	<del>Pavement Cores</del>
<del><b>Inkster Blvd WB - Rehab</b> (Lansdowne Av to McPhillips St)</del>	<del>4</del>	<del>Pavement Cores</del>
<del><b>Inkster Blvd WB - Rehab</b> (Airles St to CPR Tracks)</del>	<del>6</del>	<del>Pavement Cores</del>
<del><b>Inkster Blvd WB – Mill/Fill</b> (Arlington St to Parr St)</del>	<del>3</del>	<del>Pavement Cores</del>
<del><b>Inkster Blvd WB - Rehab</b> (Parr St to Andrews St)</del>	<del>8</del>	<del>Pavement Cores</del>
<del><b>Inkster Blvd EB - Rehab</b> (Salter St to Aikins St)</del>	<del>3</del>	<del>Pavement Cores</del>

The road investigation was conducted between December 14<sup>th</sup> and December 21<sup>st</sup>, 2022. The pavement structure (asphalt/concrete) was cored by Tyler Green of TREK Geotechnical Inc. (TREK) using a portable coring press equipped with a hollow 150 mm or 220 mm diameter diamond core drill bits. The test holes were drilled by Kate Franklin to a depth of 2.0 m below road surface by Maple Leaf Drilling Ltd. using a truck mounted drill rig equipped with 125 mm and 200 mm diameter solid stem augers. The sub-surface conditions were observed during drilling and visually classified by Kate Franklin of

TREK. Other pertinent information such as groundwater and drilling conditions were also recorded during the drilling investigation. Disturbed (auger cuttings) samples and bulk 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.

Core and test hole logs noted on the summary tables and test hole locations are based on UTM coordinates obtained using a hand-held GPS, and their location relative to the nearest address or intersection, measured distance from the edge of pavement, or other permanent features.

The laboratory testing program consisted of moisture content determination on all samples, as well as Atterberg limits, and grain size analysis (hydrometer methods) on select samples between 0.6 and 0.9 m below pavement as well as Standard Proctor and CBR testing. Information gathered for each street package is included in separate appendices (Appendices A to D). The information provided in the Appendices includes test hole logs, laboratory testing summary tables and results, photos of the concrete cores, and summary of pavement compressive strength.

Thirteen CBR’s were completed on bulk samples of the soil units present below the pavement. Tests were performed on clay and silt materials encountered within the prescribed sample depth for CBR testing and the results are shown in the table below.

**Table 2: CBR Testing Summary**

Sample Description	Street	Depth (m)	SPMDD (kg/m <sup>3</sup> )	Opt. Moisture (%)	Percent Proctor (%)	Moisture Content (%)	CBR Value at 2.54 mm	CBR Value at 5.08 mm
Silt	McGregor Street (TH23-02)	0.9-2.1	1866	13.9	95.2	13.8	6.8%	5.7%
Silt	McGregor Street (TH23-04)	0.9-1.8	1680	19.4	95.2	19.3	2.1%	2.1%
Clay	McGregor Street (TH23-07)	0.9-1.8	1594	23.2	95.0	23.5	2.3%	1.9%
Clay	McGregor Street (TH23-09)	1.5-2.1	1565	24.1	95.1	24.1	3.4%	2.8%
Clay	McGregor Street (TH23-09, TH23-10)	0.9-1.5	1507	26.1	95.0	26.2	2.0%	1.64%
Clay	Inkster Boulevard (TH23-11)	1.5-2.1	1535	26.1	95.5	26.5	2.6%	1.9%
Clay	Inkster Boulevard (TH23-13)	1.5-2.1	1606	23.0	95.0	23.2	2.8%	2.3%
Clay	Inkster Boulevard (TH23-13, TH23-14, TH23-15)	0.9-1.5 0.9-2.1 1.5-2.1	1507	25.1	95.0	25.4	1.7%	1.4%



Sample Description	Street	Depth (m)	SPMDD (kg/m <sup>3</sup> )	Opt. Moisture (%)	Percent Proctor (%)	Moisture Content (%)	CBR Value at 2.54 mm	CBR Value at 5.08 mm
Clay	Inkster Boulevard (TH23-16, TH23-17)	0.9-2.1 0.9-1.5	1514	24.8	95.2	24.8	1.6%	1.4%
Silt	Inkster Boulevard (TH23-19, TH23-11)	0.9-1.5	1907	12.6	95.3	12.6	7.4%	4.5%
Clay	Inkster Boulevard (TH23-19, TH23-20)	1.5-2.1 0.9-2.1	1522	25.8	95.3	25.7	1.5%	1.3%
Silt	Inkster Boulevard (TH23-21, TH23-22, TH23-24, TH23-25)	0.9-1.5 0.9-1.2	1860	13.8	94.9	14.0	10.5%	9.0%
Clay	Inkster Boulevard (TH23-23, TH23-24)	1.2-2.1	1464	28.2	95.1	28.5	1.8%	1.5%

The test hole logs include a description of the soil units encountered during drilling and other pertinent information such as groundwater conditions and a summary of the laboratory testing results. The soils were classified in general accordance with the Unified Soil Classification System (USCS) and the AASHTO soil classification system (American Association of state highway and transportation officials). The AASHTO system classifies soils based on laboratory testing results from Atterberg Limits and grain size testing methods (hydrometer and mechanical sieve method). Where laboratory testing was not conducted, the AASHTO classification of the soils were interpreted based on a visual assessment as indicated with a (I) on the test hole logs and attached tables. For cohesive soils, the AASHTO system uses a combination of testing results to determine the Group Index of the soils and thus, were only determined where sufficient laboratory test data was available.

### 3.0 Closure

The information provided in this report is in accordance with current engineering principles and practices (Standard of Practice). The findings of this report were based on information provided (field investigation, laboratory testing, geometries). Soil conditions are natural deposits that can be highly variable across a site. If sub-surface conditions are different than the conditions previously encountered on-site or those presented here, we should be notified to adjust our findings if necessary.

All information provided in this report is subject to our standard terms and conditions for engineering services, a copy of which is provided to each of our clients with the original scope of work, or a mutually executed standard engineering services agreement. If these conditions are not attached, and you are not already in possession of such terms and conditions, contact our office and you will be promptly provided with a copy.



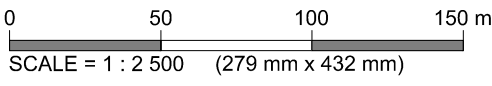
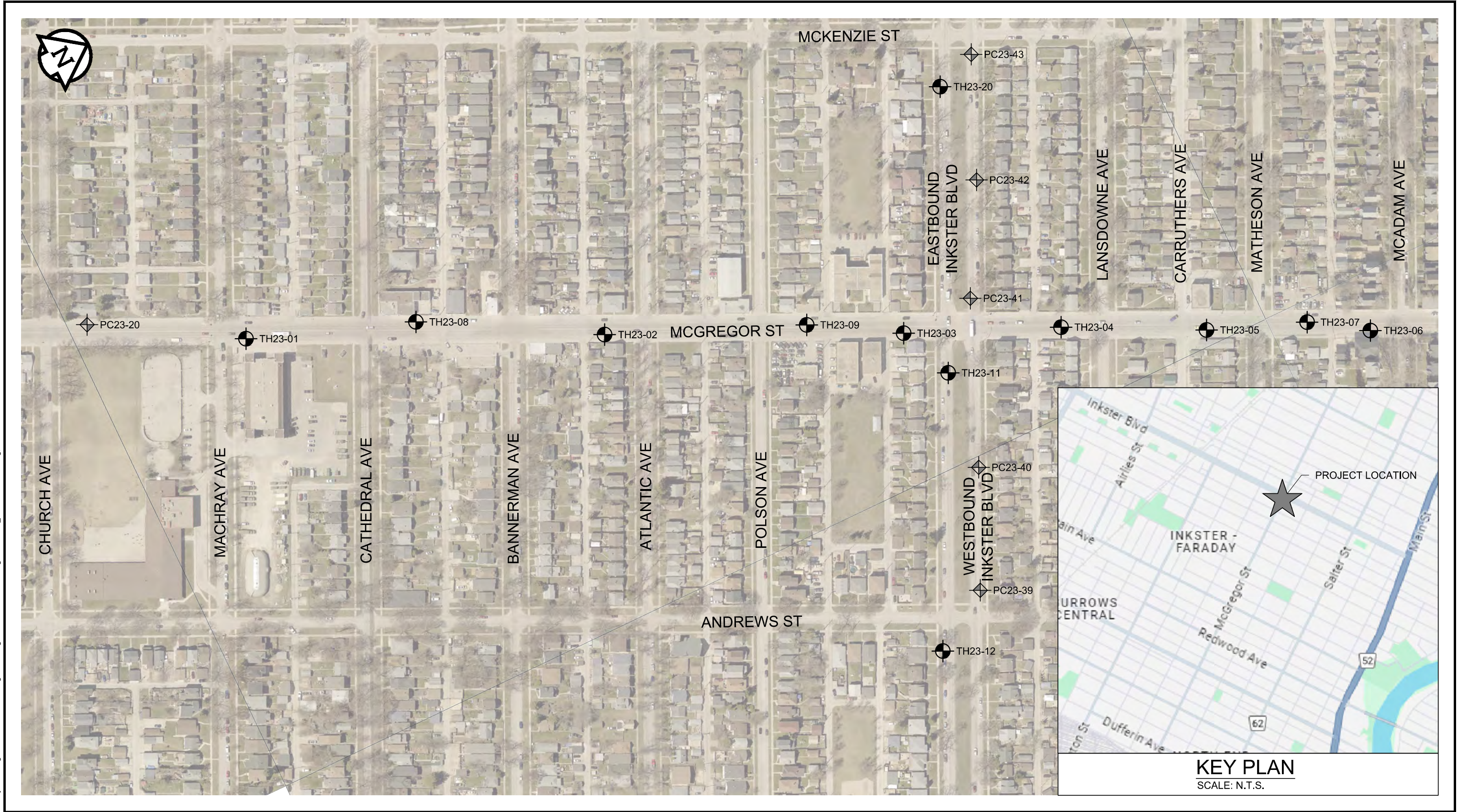
This report has been prepared by TREK Geotechnical Inc. (the Consultant) for the exclusive use of Morrison Hershfield (the Client) and their agents for the work product presented in the report. Any findings or recommendations provided in this report are not to be used or relied upon by any third parties, except as agreed to in writing by the Client and Consultant prior to use.

## Figures

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Z:\Projects\1000 Soils Lab\Lab Projects\1000-001-33 RFP 547-2023 McGregor-Inkster Geotech. Investigation\3 Survey and Dwg\3.4 CAD\3.4.3 Working Folder\Fig 01 2024-01-22 McGregor-Inkster 0\_C-1000-001-33.dwg, 2024-01-23 12:26:26 PM



**LEGEND:**  
 PAVEMENT CORE (TREK, 2023)  
 TEST HOLE (TREK, 2023)

**NOTES:** 1. AERIAL IMAGERY FROM CITY OF WINNIPEG (2021).

**KEY PLAN**  
SCALE: N.T.S.

**Figure 01**  
Test Hole and Pavement Core  
Location Plan



**Appendix A**  
**Test Hole Logs, Summary Table, Lab Testing Results and**  
**Photographs of Pavement Core Samples**  
**McGregor Steet- Church Avenue to McAdam Avenue**

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## GENERAL NOTES

- Classifications are based on the Unified Soil Classification System and include consistency, moisture, and color. Field descriptions have been modified to reflect results of laboratory tests where deemed appropriate.
- Descriptions on these test hole logs apply only at the specific test hole locations and at the time the test holes were drilled. Variability of soil and groundwater conditions may exist between test hole locations.
- When the following classification terms are used in this report or test hole logs, the primary and secondary soil fractions may be visually estimated.

Major Divisions	USCS Classification	Symbols	Typical Names	Laboratory Classification Criteria	Particle Size	Material			
Coarse-Grained soils (More than half the material is larger than No. 200 sieve size)	Gravels (More than half of coarse fraction is larger than 4.75 mm)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	Determine percentages of sand and gravel from grain size curve, depending on percentage of fines (fraction smaller than No. 200 sieve) coarse-grained soils are classified as follows:  Less than 5 percent..... GW, GP, SW, SP More than 12 percent..... GM, GC, SM, SC 6 to 12 percent..... Borderline cases requiring dual symbols*	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	ASTM Sieve sizes #10 to #4 #40 to #10 #200 to #40 < #200			
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines				Not meeting all gradation requirements for GW		
		Gravel with fines (Appreciable amount of fines)	GM		Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols		
			GC		Clayey gravels, gravel-sand-silt mixtures	Atterberg limits above "A" line or P.I. greater than 7			
	Sands (More than half of coarse fraction is smaller than 4.75 mm)	Clean sands (Little or no fines)	SW		Well-graded sands, gravelly sands, little or no fines	$C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3	mm 2.00 to 4.75 0.425 to 2.00 0.075 to 0.425 < 0.075		
			SP		Poorly-graded sands, gravelly sands, little or no fines			Not meeting all gradation requirements for SW	
		Sands with fines (Appreciable amount of fines)	SM		Silty sands, sand-silt mixtures		Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols	
			SC		Clayey sands, sand-clay mixtures		Atterberg limits above "A" line or P.I. greater than 7		
					Material		Sand Coarse Medium Fine Silt or Clay		
					Particle Size				
Fine-Grained soils (More than half the material is smaller than No. 200 sieve size)	Sils and Clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock floor, silty or clayey fine sands or clayey silts with slight plasticity	<b>Plasticity Chart</b> 	ASTM Sieve Sizes > 12 in. 3 in. to 12 in. 3/4 in. to 3 in. #4 to 3/4 in.				
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays						
	Sils and Clays (Liquid limit greater than 50)	OL	Organic silts and organic silty clays of low plasticity		Material	Boulders Cobbles Gravel Coarse Fine			
		MH	Inorganic silts, micaceous or distomaceous fine sandy or silty soils, organic silts						
		CH	Inorganic clays of high plasticity, fat clays						
		OH	Organic clays of medium to high plasticity, organic silts						
	Highly Organic Soils	Pt	Peat and other highly organic soils		Von Post Classification Limit	Strong colour or odour, and often fibrous texture			

\* Borderline classifications used for soils possessing characteristics of two groups are designated by combinations of groups symbols. For example; GW-GC, well-graded gravel-sand mixture with clay binder.

## Other Symbol Types

	Asphalt		Bedrock (undifferentiated)		Cobbles
	Concrete		Limestone Bedrock		Boulders and Cobbles
	Fill		Cemented Shale		Silt Till
			Non-Cemented Shale		Clay Till

## LEGEND OF ABBREVIATIONS AND SYMBOLS

LL - Liquid Limit (%)	VW - Vibrating Wire Piezometer
PL - Plastic Limit (%)	SI - Slope Inclinator
PI - Plasticity Index (%)	▽ Water Level at Time of Drilling
MC - Moisture Content (%)	▼ Water Level at End of Drilling
SPT - Standard Penetration Test	▽ Water Level After Drilling as Indicated on Test Hole Logs
RQD - Rock Quality Designation	
Qu - Unconfined Compression	
Su - Undrained Shear Strength	

## FRACTION OF SECONDARY SOIL CONSTITUENTS ARE BASED ON THE FOLLOWING TERMINOLOGY

TERM	EXAMPLES	PERCENTAGE
and	and CLAY	35 to 50 percent
"y" or "ey"	clayey, silty	20 to 35 percent
some	some silt	10 to 20 percent
trace	trace gravel	1 to 10 percent
with *	with silt, with sand	> 35 percent

\* Used when the material is classified based on behaviour as a cohesive material

## TERMS DESCRIBING CONSISTENCY OR COMPACTION CONDITION

The Standard Penetration Test blow count (N) of a non-cohesive soil can be related to compactness condition as follows:

<u>Descriptive Terms</u>	<u>SPT (N) (Blows/300 mm)</u>
Very loose	< 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very dense	> 50

The Standard Penetration Test blow count (N) of a cohesive soil can be related to its consistency as follows:

<u>Descriptive Terms</u>	<u>SPT (N) (Blows/300 mm)</u>
Very soft	< 2
Soft	2 to 4
Firm	4 to 8
Stiff	8 to 15
Very stiff	15 to 30
Hard	> 30

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

<u>Descriptive Terms</u>	<u>Undrained Shear Strength (kPa)</u>
Very soft	< 12
Soft	12 to 25
Firm	25 to 50
Stiff	50 to 100
Very stiff	100 to 200
Hard	> 200



# Sub-Surface Log

Test Hole TH23-01

1 of 1

Client: Morrison Hershfield Project Number: 1000-001-33  
 Project Name: RFP 547-2023 McGregor-Inkster Geotech. Investigation Location: UTM N-5532258, E-633459  
 Contractor: Maple Leaf Drilling Ground Elevation: Top of Pavement m  
 Method: 200mm Solid Stem Auger, B40 Mobile Truck Mount Date Drilled: December 19, 2023

Sample Type:  Grab (G)  Shelby Tube (T)  Split Spoon (SS) / SPT  Split Barrel (SB) / LPT  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 <sup>3</sup> )						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
		ASPHALT - 145 mm thick														
		CONCRETE - 210 mm thick		PC23-12												
		CLAY - silty, trace to some gravel (<20 mm diam.) to 0.6 m, trace sand to 0.6 m														
-0.5		- dark grey		G01												
		- moist, very stiff														
		- high plasticity														
		- AASHTO: A-7-6 (I)		G02												
		- trace silt inclusions (<20mm diam.), grey below 0.6 m														
-1.0		- very stiff to stiff below 1.0 m		G03												
		- brown below 1.2 m														
-1.5				G04												
-2.0				G05												
-2.5				G06												
-3.0				G07												
				G08												
				G09												

END TEST HOLE AT 3.0 m IN CLAY.

Notes:

- Seepage or sloughing not observed.
- Test Hole open to 3.0 m depth immediately after drilling.
- Test Hole backfilled with cuttings, granular fill and cold patch asphalt.
- Test Hole located in front of #551 McGregor St, Northbound lane, 1.2 m West of the East curb.

Logged By: Kate Franklin Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 2024-01-22, MCGREGOR INKSTER 0. B. KF 1000-001-33.GPJ TREK GDT 1/22/24





# Sub-Surface Log

Test Hole TH23-02

1 of 1

Client: Morrison Hershfield Project Number: 1000-001-33  
 Project Name: RFP 547-2023 McGregor-Inkster Geotech. Investigation Location: UTM N-5532483, E-633563  
 Contractor: Maple Leaf Drilling Ground Elevation: Top of Pavement m  
 Method: 125mm Solid Stem Auger, B40 Mobile Truck Mount Date Drilled: December 19, 2023

Sample Type:  Grab (G)  Shelby Tube (T)  Split Spoon (SS) / SPT  Split Barrel (SB) / LPT  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 <sup>3</sup> )						Undrained Shear Strength (kPa)
					16	17	18	19	20	21	
0.0 - 0.1		ASPHALT - 125 mm thick									
0.1 - 0.3		CONCRETE - 235 mm thick		PC23-13							
0.3 - 0.9		CLAY - silty, trace to some gravel (<20 mm diam.) to 0.6 m - dark grey - moist, stiff - high plasticity - AASHTO: A-7-6 (I)		G10							
0.9 - 1.0				G11							
1.0 - 2.1		SILT - some clay, trace sand - light brown - moist, very soft - low plasticity - AASHTO: A-4 (8)		G12							
2.1 - 2.5				G13							
2.5 - 2.7				G14							
2.7 - 2.9				G15							
2.9 - 3.0		CLAY - silty - brown - moist, very stiff - high plasticity - AASHTO: A-7-6 (I) - stiff below 2.5 m		G16							
				G17							
				G18							

END TEST HOLE AT 3.0 m IN CLAY.

Notes:

- Seepage or sloughing not observed.
- Test Hole open to 3.0 m depth immediately after drilling.
- Test Hole backfilled with cuttings, granular fill and cold patch asphalt.
- Bulk samples were collected between 0.9 m and 2.1 m depth (B20).
- Test Hole located West side of #528 Atlantic Av, Northbound lane, 1.4 m West of the East curb.

Logged By: Kate Franklin Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 2024-01-22, MCGREGOR INKSTER 0. B. KF 1000-001-33.GPJ TREK GDT 1/22/24



# Sub-Surface Log

Test Hole TH23-03

1 of 1

Client: Morrison Hershfield Project Number: 1000-001-33  
 Project Name: RFP 547-2023 McGregor-Inkster Geotech. Investigation Location: UTM N-5532670, E-633651  
 Contractor: Maple Leaf Drilling Ground Elevation: Top of Pavement m  
 Method: 125mm Solid Stem Auger, B40 Mobile Truck Mount Date Drilled: December 19, 2023

Sample Type:  Grab (G)  Shelby Tube (T)  Split Spoon (SS) / SPT  Split Barrel (SB) / LPT  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 <sup>3</sup> )						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		ASPHALT - 120 mm thick														
0.1 - 0.3		CONCRETE - 220 mm thick		PC23-17												
0.3 - 0.6		CLAY - silty, trace sand, trace gravel (<20 mm diam.) to 0.6 m - dark grey - moist, stiff - high plasticity - AASHTO: A-7-6 (I)		G21												
0.6 - 1.0		SILT - some clay - light brown - moist, very soft - low plasticity - AASHTO: A-4 (I)		G22												
1.0 - 1.5				G23												
1.5 - 2.0				G24												
2.0 - 2.5		CLAY - silty, trace silt inclusions (<20 mm diam.) - brown - moist, very stiff - high plasticity - AASHTO: A-7-6 (I)		G25												
2.5 - 3.0		- stiff below 8.5 m		G26												
				G27												
				G28												
				G29												

END TEST HOLE AT 3.0 m IN CLAY.

Notes:

- Seepage or sloughing not observed.
- Test Hole open to 3.0 m depth immediately after drilling.
- Test Hole backfilled with cuttings, granular fill and cold patch asphalt.
- Test Hole located West side of #522 Inkster Blvd, Northbound lane, 4.5 m West of the East curb.

Logged By: Kate Franklin Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 2024-01-22, MCGREGOR INKSTER 0. B. KF 1000-001-33.GPJ TREK GDT 1/22/24



# Sub-Surface Log

Test Hole TH23-04

1 of 1

Client: Morrison Hershfield Project Number: 1000-001-33  
 Project Name: RFP 547-2023 McGregor-Inkster Geotech. Investigation Location: UTM N-5532770, E-633694  
 Contractor: Maple Leaf Drilling Ground Elevation: Top of Pavement m  
 Method: 125mm Solid Stem Auger, B40 Mobile Truck Mount Date Drilled: December 19, 2023

Sample Type:  Grab (G)  Shelby Tube (T)  Split Spoon (SS) / SPT  Split Barrel (SB) / LPT  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 <sup>3</sup> )						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 - 0.1		ASPHALT - 130 mm thick														
0.1 - 0.2		CONCRETE - 220 mm thick		PC23-14												
0.2 - 0.5		SILT - clayey, trace sand - light brown - moist, very soft - low to intermediate plasticity - AASHTO: A-6 (I)		G30												
0.5 - 0.9		CLAY - silty, trace sand, trace gravel (<20 mm diam.) to 0.6 m - brown, moist, very stiff, high plasticity, AASHTO: A-7-6 (I)		G31												
0.9 - 1.8		SILT - clayey, trace sand - light brown - moist, very soft - low to intermediate plasticity - AASHTO: A-6 (12)		G32												
1.8 - 3.0		CLAY - silty, trace silt inclusions (<20 mm diam.) - brown - moist, stiff - high plasticity - AASHTO: A-7-6 (I)		G33												
				G34												
				G35												
				G36												
				G37												
				G38												

END TEST HOLE AT 3.0 m IN CLAY.

Notes:

- Seepage or sloughing not observed.
- Test Hole open to 3.0 m depth immediately after drilling.
- Test Hole backfilled with cuttings, granular fill and cold patch asphalt.
- Bulk samples were collected between 0.9 m and 1.8 m depth (B39).
- Test Hole located West side of #504 Lansdowne Av, Northbound lane, 4.5 m West of the East curb.

Logged By: Kate Franklin Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 2024-01-22, MCGREGOR INKSTER 0. B. KF 1000-001-33.GPJ TREK GDT 1/22/24



# Sub-Surface Log

Test Hole TH23-05

1 of 1

Client: Morrison Hershfield Project Number: 1000-001-33  
 Project Name: RFP 547-2023 McGregor-Inkster Geotech. Investigation Location: UTM N-5532860, E-633739  
 Contractor: Maple Leaf Drilling Ground Elevation: Top of Pavement m  
 Method: 125mm Solid Stem Auger, B40 Mobile Truck Mount Date Drilled: December 19, 2023

Sample Type:  Grab (G)  Shelby Tube (T)  Split Spoon (SS) / SPT  Split Barrel (SB) / LPT  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 <sup>3</sup> )						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
		ASPHALT - 130 mm thick														
		CONCRETE - 135 mm thick		PC23-15												
		CLAY - silty, trace sand, trace gravel (<20 mm diam.) - dark grey - moist, very stiff - high plasticity - AASHTO: A-7-6 (I)		G40												
				G41												
		SILT - some clay - light brown - moist, very soft - low plasticity - AASHTO: A-4 (I)		G42												
				G43												
				G44												
		CLAY - silty - brown, moist, stiff - high plasticity - AASHTO: A-7-6 (I)		G45												
		SILT - clayey - light brown - moist, stiff - intermediate plasticity - AASHTO: A-6 (I)		G46												
		CLAY - silty, trace silt inclusions (<20 mm diam.) - brown - moist, firm to stiff - high plasticity - AASHTO: A-7-6 (I)		G47												
				G48												

END TEST HOLE AT 3.0 m IN CLAY.

Notes:

- Seepage or sloughing not observed.
- Test Hole open to 3.0 m depth immediately after drilling.
- Test Hole backfilled with cuttings, granular fill and cold patch asphalt.
- Test Hole located in front of #671 McGregor St, Northbound lane, 0.7 m West of the East curb.

Logged By: Kate Franklin Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 2024-01-22, MCGREGOR INKSTER 0. B. KF 1000-001-33.GPJ TREK GDT 1/22/24



# Sub-Surface Log

Test Hole TH23-06

1 of 1

Client: Morrison Hershfield Project Number: 1000-001-33  
 Project Name: RFP 547-2023 McGregor-Inkster Geotech. Investigation Location: UTM N-5532962, E-633788  
 Contractor: Maple Leaf Drilling Ground Elevation: Top of Pavement m  
 Method: 125mm Solid Stem Auger, B40 Mobile Truck Mount Date Drilled: December 19, 2023

Sample Type:  Grab (G)  Shelby Tube (T)  Split Spoon (SS) / SPT  Split Barrel (SB) / LPT  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 <sup>3</sup> )						Undrained Shear Strength (kPa)
					16	17	18	19	20	21	
0.0 - 0.1		ASPHALT - 190 mm thick									
0.1 - 0.2		CONCRETE - 160 mm thick		PC23-16							
0.2 - 1.5		CLAY - silty, trace sand, trace gravel (<20 mm diam.) - dark grey - moist, stiff to very stiff - high plasticity - AASHTO: A-7-6 (I)		G49							
				G50							
				G51							
1.5 - 2.3		SILT - some clay - light brown - moist, very soft - low plasticity - AASHTO: A-4 (I)		G52							
				G53							
				G54							
2.3 - 2.7		CLAY - silty - brown - moist, firm - high plasticity - AASHTO: A-7-6 (I)		G55							
2.7 - 3.0		SILT - clayey - light brown, moist, very soft - intermediate plasticity - AASHTO: A-6 (I)		G56							
3.0 - 3.0		CLAY - silty, trace silt inclusions (<20mm diam.) - brown, moist, firm, high plasticity, AASHTO: A-7-6 (I)		G57							

END TEST HOLE AT 3.0 m IN CLAY.

Notes:

- Seepage or sloughing not observed.
- Test Hole open to 3.0 m depth immediately after drilling.
- Test Hole backfilled with cuttings, granular fill and cold patch asphalt.
- Test Hole located in front of #677 McGregor St, Northbound lane, 0.8 m West of the East curb.

Logged By: Kate Franklin Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 2024-01-22, MCGREGOR INKSTER 0. B. KF 1000-001-33.GPJ TREK GDT 1/22/24



# Sub-Surface Log

Test Hole TH23-07

1 of 1

Client: Morrison Hershfield Project Number: 1000-001-33  
 Project Name: RFP 547-2023 McGregor-Inkster Geotech. Investigation Location: UTM N-5532925, E-633764  
 Contractor: Maple Leaf Drilling Ground Elevation: Top of Pavement m  
 Method: 125mm Solid Stem Auger, B40 Mobile Truck Mount Date Drilled: December 19, 2023

Sample Type:  Grab (G)  Shelby Tube (T)  Split Spoon (SS) / SPT  Split Barrel (SB) / LPT  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 <sup>3</sup> )						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		ASPHALT - 100 mm thick														
0.1 - 0.2		CONCRETE - 240 mm thick		PC23-18												
0.2 - 1.5		CLAY - silty, trace sand to 0.6 m, trace gravel (<20 mm diam.) to 0.6 m - dark grey - moist, very stiff - high plasticity - AASHTO: A-7-6 (59)		G58												
				G59												
				G60												
				G61												
1.5 - 2.0		SILT - some clay - light brown, moist, very soft - low plasticity - AASHTO: A-4 (I)		G62												
2.0 - 3.0		CLAY - silty - brown - moist, stiff - high plasticity - AASHTO: A-7-6 (I)		G63												
				G64												
				G65												
				G66												

END TEST HOLE AT 3.0 m IN CLAY.

Notes:

- Seepage or sloughing not observed.
- Test Hole open to 3.0 m depth immediately after drilling.
- Test Hole backfilled with cuttings, granular fill and cold patch asphalt.
- Bulk samples were collected between 0.9 m and 1.8 m depth (B67).
- Test Hole located in front of #678 McGregor St, Southbound lane, 3.0 m East of the West curb.

Logged By: Kate Franklin Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 2024-01-22, MCGREGOR INKSTER 0. B. KF 1000-001-33.GPJ TREK GDT 1/22/24



# Sub-Surface Log

Test Hole TH23-08

1 of 1

**Client:** Morrison Hershfield **Project Number:** 1000-001-33  
**Project Name:** RFP 547-2023 McGregor-Inkster Geotech. Investigation **Location:** UTM N-5532369, E-633499  
**Contractor:** Maple Leaf Drilling **Ground Elevation:** Top of Pavement m  
**Method:** 125mm Solid Stem Auger, B40 Mobile Truck Mount **Date Drilled:** December 19, 2023

**Sample Type:**  Grab (G)  Shelby Tube (T)  Split Spoon (SS) / SPT  Split Barrel (SB) / LPT  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 <sup>3</sup> )						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 - 90 mm thick														
0.05 - 0.15		CONCRETE - 250 mm thick		PC23-19												
0.15 - 3.00		CLAY - silty, trace sand, trace gravel (<20 mm diam.) to 0.6 m - dark grey - moist, stiff to very stiff - high plasticity - AASHTO: A-7-6 (I)  - firm to stiff below 1.5 m		G68												
				G69												
				G70												
				G71												
				G72												
				G73												
				G74												
				G75												
				G76												

END TEST HOLE AT 3.0 m IN CLAY.

Notes:

- Seepage or sloughing not observed.
- Test Hole open to 3.0 m depth immediately after drilling.
- Test Hole backfilled with cuttings, granular fill and cold patch asphalt.
- Test Hole located East side of #559 Cathedral Av, Southbound lane, 1.0 m East of the West curb.

**Logged By:** Kate Franklin **Reviewed By:** N.J Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG LOGS 2024-01-22, MCGREGOR INKSTER 0. B. KF 1000-001-33.GPJ TREK GDT 1/22/24





# Sub-Surface Log

Test Hole TH23-09

1 of 1

Client: Morrison Hershfield Project Number: 1000-001-33  
 Project Name: RFP 547-2023 McGregor-Inkster Geotech. Investigation Location: UTM N-5532612, E-633617  
 Contractor: Maple Leaf Drilling Ground Elevation: Top of Pavement m  
 Method: 200mm Solid Stem Auger, B40 Mobile Truck Mount Date Drilled: December 20, 2023

Sample Type:  Grab (G)  Shelby Tube (T)  Split Spoon (SS) / SPT  Split Barrel (SB) / LPT  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 <sup>3</sup> )						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
		ASPHALT - 120 mm thick														
		CONCRETE - 125 mm thick		PC23-2												
		CLAY - silty, trace gravel (<20 mm diam.) to 0.9 m														
-0.5		- dark grey		G77												
		- moist, stiff to very stiff		G78												
		- high plasticity		G79												
-1.0		- AASHTO: A-7-6 (61)														
		- brown below 0.9 m		G80												
-1.5		- silt pockets (<40mm diam.) between 1.5 and 1.8 m		G81												
				G82												
-2.0				G83												
				G84												
-2.5				G85												
		- stiff below 2.6 m														
-3.0																

END TEST HOLE AT 3.0 m IN CLAY.

Notes:

- Seepage or sloughing not observed.
- Test Hole open to 3.0 m depth immediately after drilling.
- Test Hole backfilled with cuttings, granular fill and cold patch asphalt.
- Bulk samples were collected between 0.9 m and 1.5 m depth (B86A), and 1.5 and 2.1 m depth (B86B).
- Test Hole located East side of #537 Polson Av, Southbound lane, 3.2 m East of the West curb.

Logged By: Kate Franklin Reviewed By: N.J Ferreira Project Engineer: Nelson Ferreira

SUB-SURFACE LOG LOGS 2024-01-22, MCGREGOR INKSTER 0. B. KF 1000-001-33.GPJ TREK.GDT 1/22/24





# Sub-Surface Log

Test Hole TH23-10

1 of 1

**Client:** Morrison Hershfield **Project Number:** 1000-001-33  
**Project Name:** RFP 547-2023 McGregor-Inkster Geotech. Investigation **Location:** UTM N-5532163, E-633403  
**Contractor:** Maple Leaf Drilling **Ground Elevation:** Top of Pavement m  
**Method:** 200mm Solid Stem Auger, B40 Mobile Truck Mount **Date Drilled:** December 20, 2023

**Sample Type:**  Grab (G)  Shelby Tube (T)  Split Spoon (SS) / SPT  Split Barrel (SB) / LPT  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 <sup>3</sup> )						Undrained Shear Strength (kPa)					
					16	17	18	19	20	21						
					Particle Size (%)											
					0	20	40	60	80	100						
					PL   MC   LL 0 20 40 60 80 100						Test Type △ Torvane △ ⊕ Pocket Pen. ⊕ ⊠ Qu ⊠ ○ Field Vane ○					
					0	20	40	60	80	100	0	50	100	150	200	250
0.0 - 0.1		ASPHALT - 130 mm thick														
0.1 - 0.2		CONCRETE - 180 mm thick		PC23-20												
0.2 - 0.8		CLAY - silty, trace gravel (<20 mm diam.) to 0.8 m - dark grey - moist, stiff to very stiff - high plasticity - AASHTO: A-7-6 (74)		G87												
0.8 - 1.0		- brown below 0.8 m		G88												
1.0 - 1.5				G89												
1.5 - 2.0		SILT - clayey - light brown - moist, - very soft - low to intermediate plasticity - AASHTO: A-6 (I)		G90												
2.0 - 2.5				G91												
2.5 - 3.0				G92												
3.0 - 3.1				G93												
3.1 - 3.2				G94												
3.2 - 3.3		CLAY - silty - brown, moist, stiff - high plasticity - AASHTO: A-7-6 (I)		G95												

END TEST HOLE AT 3.0 m IN CLAY.

Notes:

- Seepage or sloughing not observed.
- Test Hole open to 3.0 m depth immediately after drilling.
- Test Hole backfilled with cuttings, granular fill and cold patch asphalt.
- Bulk samples were collected between 0.9 m and 1.5 m (B96A), and 1.5 and 2.1 m depth (B96B).
- Test Hole located East side of #579 Church Av, Southbound lane, 1.2 m East of the West curb.

**Logged By:** Kate Franklin **Reviewed By:** N.J Ferreira **Project Engineer:** Nelson Ferreira

SUB-SURFACE LOG LOGS 2024-01-22, MCGREGOR INKSTER 0. B. KF 1000-001-33.GPJ TREK.GDT 1/22/24





RFP 547-2023 McGregor - Inkster Geotech. Investigation  
Sub-Surface Investigation

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)		Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Plastic	Liquid	Plasticity Index
TH23-04	UTM : 5532770 N, 633694 E Located West side of #504 Lansdowne Av, Northbound lane, 4.5 m West of the East curb	Asphalt	130	Concrete	220	Silt, AASHTO: A-6 (I)	0.5	0.6	16							
						Clay, AASHTO: A-7-6 (I)	0.8	0.9	30							
						Silt, AASHTO: A-6 (I2)	1.1	1.2	22	23	72	5	0	16	30	14
						Silt, AASHTO: A-6 (I2)	1.4	1.5	22							
						Clay, AASHTO: A-7-6 (I)	1.7	1.8	54							
TH23-05	UTM : 5532860 N, 633739 E Located in front of #671 McGregor St, Northbound lane, 0.7 m West of the East curb	Asphalt	130	Concrete	135	Silt, AASHTO: A-4 (I)	1.1	1.2	22							
						Silt, AASHTO: A-4 (I)	1.4	1.5	23							
						Silt, AASHTO: A-4 (I)	1.7	1.8	21							
						Clay, AASHTO: A-7-6 (I)	2.0	2.1	39							
						Silt, AASHTO: A-4 (I)	2.3	2.4	27							
TH23-06	UTM : 5532962 N, 633788 E Located in front of #677 McGregor St, Northbound lane, 0.8 m West of the East curb	Asphalt	190	Concrete	160	Clay, AASHTO: A-7-6 (I)	2.6	2.7	42							
						Clay, AASHTO: A-7-6 (I)	2.9	3.0	50							
						Clay, AASHTO: A-7-6 (I)	0.5	0.6	38							
						Clay, AASHTO: A-7-6 (I)	0.8	0.9	36							
						Clay, AASHTO: A-7-6 (I)	1.1	1.2	27							





RFP 547-2023 McGregor - Inkster Geotech. Investigation  
Sub-Surface Investigation

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)		Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Plastic	Liquid	Plasticity Index
TH23-10	UTM : 5532163 N, 633403 E Located East side of #579 Church Av. Southbound lane, 1.2 m East of the West curb	Asphalt	130	Concrete	180	Clay, AASHTO: A-7-6 (74)	0.5	0.6	32							
						Clay, AASHTO: A-7-6 (74)	0.8	0.9	32							
						Clay, AASHTO: A-7-6 (74)	1.1	1.2	33	75	25	0	0	24	88	64
						Clay, AASHTO: A-7-6 (74)	1.4	1.5	32							
						Clay, AASHTO: A-7-6 (74)	1.7	1.8	33							
						Silt, AASHTO: A-6 (I)	2.0	2.1	28							
						Silt, AASHTO: A-6 (I)	2.3	2.4	24							
						Silt, AASHTO: A-6 (I)	2.6	2.7	23							
						Clay, AASHTO: A-7-6 (I)	2.9	3.0	35							



**Project No.** 1000-001-33  
**Client** Morrison Hershfield  
**Project** RFP 547-2023 McGregor-Inkster Geotech. Investigation

**Sample Date** 19-Dec-23  
**Test Date** 08-Jan-24  
**Technician** KF

Test Hole	TH23-01	TH23-01	TH23-01	TH23-01	TH23-01	TH23-01
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 #	G01	G02	G03	G04	G05	G06
Tare ID	M70	M21	E33	AB54	P27	C18
Mass of tare	6.9	6.8	6.8	6.8	8.5	8.7
Mass wet + tare	190.8	217.8	416.4	203.1	215.4	230.7
Mass dry + tare	148.8	173.2	315.3	153.6	154.3	164.6
Mass water	42.0	44.6	101.1	49.5	61.1	66.1
Mass dry soil	141.9	166.4	308.5	146.8	145.8	155.9
Moisture %	29.6%	26.8%	32.8%	33.7%	41.9%	42.4%

Test Hole	TH23-01	TH23-01	TH23-01	TH23-02	TH23-02	TH23-02
Depth (m)	2.3 - 2.4	2.6 - 2.7	2.9 - 3.0	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2
Sample #	G07	G08	G09	G10	G11	G12
Tare ID	W36	H72	E136	Z43	C14	E17
Mass of tare	8.7	6.8	8.5	8.5	8.5	6.8
Mass wet + tare	230.4	312.7	223.0	204.8	200.5	470.9
Mass dry + tare	163.2	217.8	155.1	149.5	148.0	382.7
Mass water	67.2	94.9	67.9	55.3	52.5	88.2
Mass dry soil	154.5	211.0	146.6	141.0	139.5	375.9
Moisture %	43.5%	45.0%	46.3%	39.2%	37.6%	23.5%

Test Hole	TH23-02	TH23-02	TH23-02	TH23-02	TH23-02	TH23-02
Depth (m)	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1	2.3 - 2.4	2.6 - 2.7	2.9 - 3.0
Sample #	G13	G14	G15	G16	G17	G18
Tare ID	W09	A21	E59	D27	W97	W05
Mass of tare	8.4	8.8	8.5	8.6	8.5	8.5
Mass wet + tare	238.8	224.1	232.9	204.2	219.3	212.3
Mass dry + tare	196.9	183.7	188.6	155.5	151.8	145.3
Mass water	41.9	40.4	44.3	48.7	67.5	67.0
Mass dry soil	188.5	174.9	180.1	146.9	143.3	136.8
Moisture %	22.2%	23.1%	24.6%	33.2%	47.1%	49.0%



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## Moisture Content Report ASTM D2216-98

**Project No.** 1000-001-33  
**Client** Morrison Hershfield  
**Project** RFP 547-2023 McGregor-Inkster Geotech. Investigation

**Sample Date** 19-Dec-23  
**Test Date** 08-Jan-24  
**Technician** KF

Test Hole	TH23-03	TH23-03	TH23-03	TH23-03	TH23-03	TH23-03
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 #	G21	G22	G23	G24	G25	G26
Tare ID	AB40	Z73	M62	K35	Z80	P28
Mass of tare	6.8	8.7	6.9	8.4	8.5	8.6
Mass wet + tare	229.4	223.4	416.2	226.2	274.2	236.9
Mass dry + tare	172.7	175.8	341.1	187.9	223.0	179.1
Mass water	56.7	47.6	75.1	38.3	51.2	57.8
Mass dry soil	165.9	167.1	334.2	179.5	214.5	170.5
Moisture %	34.2%	28.5%	22.5%	21.3%	23.9%	33.9%

Test Hole	TH23-03	TH23-03	TH23-03	TH23-04	TH23-04	TH23-04
Depth (m)	2.3 - 2.4	2.6 - 2.7	2.9 - 3.0	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2
Sample #	G27	G28	G29	G30	G31	G32
Tare ID	W24	M26	F26	D45	J82	E48
Mass of tare	8.5	6.8	8.5	8.8	7.1	7.1
Mass wet + tare	216.5	248.4	214.8	217.6	237.7	443.1
Mass dry + tare	158.0	170.7	144.7	188.2	184.4	364.2
Mass water	58.5	77.7	70.1	29.4	53.3	78.9
Mass dry soil	149.5	163.9	136.2	179.4	177.3	357.1
Moisture %	39.1%	47.4%	51.5%	16.4%	30.1%	22.1%

Test Hole	TH23-04	TH23-04	TH23-04	TH23-04	TH23-04	TH23-04
Depth (m)	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1	2.3 - 2.4	2.6 - 2.7	2.9 - 3.0
Sample #	G33	G34	G35	G36	G37	G38
Tare ID	P22	D500	AB60	E	E49	N57
Mass of tare	8.8	6.8	6.8	6.7	6.9	8.7
Mass wet + tare	227.4	213.8	200.8	202.0	227.9	259.8
Mass dry + tare	187.6	141.2	133.2	135.6	159.2	184.7
Mass water	39.8	72.6	67.6	66.4	68.7	75.1
Mass dry soil	178.8	134.4	126.4	128.9	152.3	176.0
Moisture %	22.3%	54.0%	53.5%	51.5%	45.1%	42.7%



**Project No.** 1000-001-33  
**Client** Morrison Hershfield  
**Project** RFP 547-2023 McGregor-Inkster Geotech. Investigation  
  
**Sample Date** 19-Dec-23  
**Test Date** 08-Jan-24  
**Technician** KF

Test Hole	TH23-05	TH23-05	TH23-05	TH23-05	TH23-05	TH23-05
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 #	G40	G41	G42	G43	G44	G45
Tare ID	D29	Z23	M80	E25	E39	E04
Mass of tare	8.8	8.4	6.9	6.9	6.8	6.8
Mass wet + tare	212.7	210.0	171.3	191.1	205.3	212.0
Mass dry + tare	162.6	168.5	141.9	157.2	170.3	154.6
Mass water	50.1	41.5	29.4	33.9	35.0	57.4
Mass dry soil	153.8	160.1	135.0	150.3	163.5	147.8
Moisture %	32.6%	25.9%	21.8%	22.6%	21.4%	38.8%

Test Hole	TH23-05	TH23-05	TH23-05	TH23-06	TH23-06	TH23-06
Depth (m)	2.3 - 2.4	2.6 - 2.7	2.9 - 3.0	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2
Sample #	G46	G47	G48	G49	G50	G51
Tare ID	H22	I72	M96	AC37	N39	A106
Mass of tare	6.7	6.9	6.8	6.8	8.4	8.2
Mass wet + tare	237.5	215.8	158.5	231.7	222.8	219.0
Mass dry + tare	189.0	153.6	107.6	170.1	166.5	174.1
Mass water	48.5	62.2	50.9	61.6	56.3	44.9
Mass dry soil	182.3	146.7	100.8	163.3	158.1	165.9
Moisture %	26.6%	42.4%	50.5%	37.7%	35.6%	27.1%

Test Hole	TH23-06	TH23-06	TH23-06	TH23-06	TH23-06	TH23-06
Depth (m)	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1	2.3 - 2.4	2.6 - 2.7	2.9 - 3.0
Sample #	G52	G53	G54	G55	G56	G57
Tare ID	C2	P24	C26	AB43	H25	W34
Mass of tare	8.5	8.6	8.5	6.7	8.4	8.6
Mass wet + tare	212.3	224.9	240.5	225.7	227.4	205.8
Mass dry + tare	169.8	177.2	197.3	164.0	168.6	147.8
Mass water	42.5	47.7	43.2	61.7	58.8	58.0
Mass dry soil	161.3	168.6	188.8	157.3	160.2	139.2
Moisture %	26.3%	28.3%	22.9%	39.2%	36.7%	41.7%





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## Moisture Content Report ASTM D2216-98

**Project No.** 1000-001-33  
**Client** Morrison Hershfield  
**Project** RFP 547-2023 McGregor-Inkster Geotech. Investigation

**Sample Date** 19-Dec-23  
**Test Date** 08-Jan-24  
**Technician** KF

Test Hole	TH23-07	TH23-07	TH23-07	TH23-07	TH23-07	TH23-07
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 #	G58	G59	G60	G61	G62	G63
Tare ID	E33	AB05	E89	K11	W55	W19
Mass of tare	8.7	7.1	6.9	8.7	8.7	8.7
Mass wet + tare	222.8	214.9	442.7	212.6	232.3	230.7
Mass dry + tare	172.7	169.9	343.2	168.8	191.5	167.8
Mass water	50.1	45.0	99.5	43.8	40.8	62.9
Mass dry soil	164.0	162.8	336.3	160.1	182.8	159.1
Moisture %	30.5%	27.6%	29.6%	27.4%	22.3%	39.5%

Test Hole	TH23-07	TH23-07	TH23-07	TH23-08	TH23-08	TH23-08
Depth (m)	2.3 - 2.4	2.6 - 2.7	2.9 - 3.0	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2
Sample #	G64	G65	G66	G68	G69	G70
Tare ID	Z64	AH18	F34	AB46	E108	H49
Mass of tare	8.5	8.6	8.6	6.7	8.6	8.5
Mass wet + tare	227.5	225.2	233.6	213.0	234.9	223.5
Mass dry + tare	172.2	160.6	187.2	162.7	182.8	164.0
Mass water	55.3	64.6	46.4	50.3	52.1	59.5
Mass dry soil	163.7	152.0	178.6	156.0	174.2	155.5
Moisture %	33.8%	42.5%	26.0%	32.2%	29.9%	38.3%

Test Hole	TH23-08	TH23-08	TH23-08	TH23-08	TH23-08	TH23-08
Depth (m)	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1	2.3 - 2.4	2.6 - 2.7	2.9 - 3.0
Sample #	G71	G72	G73	G74	G75	G76
Tare ID	AC09	F154	D12	AA13	F76	K10
Mass of tare	6.8	8.4	8.5	6.7	8.8	8.5
Mass wet + tare	203.3	221.2	230.8	238.6	237.2	265.9
Mass dry + tare	148.4	147.8	153.8	165.2	165.4	186.6
Mass water	54.9	73.4	77.0	73.4	71.8	79.3
Mass dry soil	141.6	139.4	145.3	158.5	156.6	178.1
Moisture %	38.8%	52.7%	53.0%	46.3%	45.8%	44.5%



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## Moisture Content Report ASTM D2216-98

**Project No.** 1000-001-33  
**Client** Morrison Hershfield  
**Project** RFP 547-2023 McGregor-Inkster Geotech. Investigation

**Sample Date** 19-Dec-23  
**Test Date** 08-Jan-24  
**Technician** KF

Test Hole	TH23-09	TH23-09	TH23-09	TH23-09	TH23-09	TH23-09
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 #	G77	G78	G79	G80	G81	G82
Tare ID	N59	W81	AC33	D44	F22	E140
Mass of tare	8.5	8.7	6.8	8.4	8.5	8.5
Mass wet + tare	231.5	250.3	440.6	244.3	229.2	238.9
Mass dry + tare	173.8	187.7	330.5	186.1	170.8	183.8
Mass water	57.7	62.6	110.1	58.2	58.4	55.1
Mass dry soil	165.3	179.0	323.7	177.7	162.3	175.3
Moisture %	34.9%	35.0%	34.0%	32.8%	36.0%	31.4%

Test Hole	TH23-09	TH23-09	TH23-09	TH23-10	TH23-10	TH23-10
Depth (m)	2.3 - 2.4	2.6 - 2.7	2.9 - 3.0	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2
Sample #	G83	G84	G85	G87	G88	G89
Tare ID	Z25	Z107	H21	Z82	Z47	M09
Mass of tare	8.3	8.8	8.5	8.4	8.6	6.9
Mass wet + tare	246.8	223.7	239.4	267.0	215.8	443.9
Mass dry + tare	175.6	159.3	161.2	204.7	165.2	336.0
Mass water	71.2	64.4	78.2	62.3	50.6	107.9
Mass dry soil	167.3	150.5	152.7	196.3	156.6	329.1
Moisture %	42.6%	42.8%	51.2%	31.7%	32.3%	32.8%

Test Hole	TH23-10	TH23-10	TH23-10	TH23-10	TH23-10	TH23-10
Depth (m)	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1	2.3 - 2.4	2.6 - 2.7	2.9 - 3.0
Sample #	G90	G91	G92	G93	G94	G95
Tare ID	M75	M74	E18	E66	W63	K19
Mass of tare	6.8	6.7	6.8	6.8	8.5	6.8
Mass wet + tare	230.3	225.7	248.2	315.0	271.7	253.3
Mass dry + tare	176.6	171.4	195.8	255.6	223.0	189.4
Mass water	53.7	54.3	52.4	59.4	48.7	63.9
Mass dry soil	169.8	164.7	189.0	248.8	214.5	182.6
Moisture %	31.6%	33.0%	27.7%	23.9%	22.7%	35.0%



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**Atterberg Limits**  
**ASTM D4318-10e1**

**Project No.** 1000-001-33  
**Client** Morrison Hershfield  
**Project** RFP 547-2023 McGregor-Inkster Geotech. Investigation

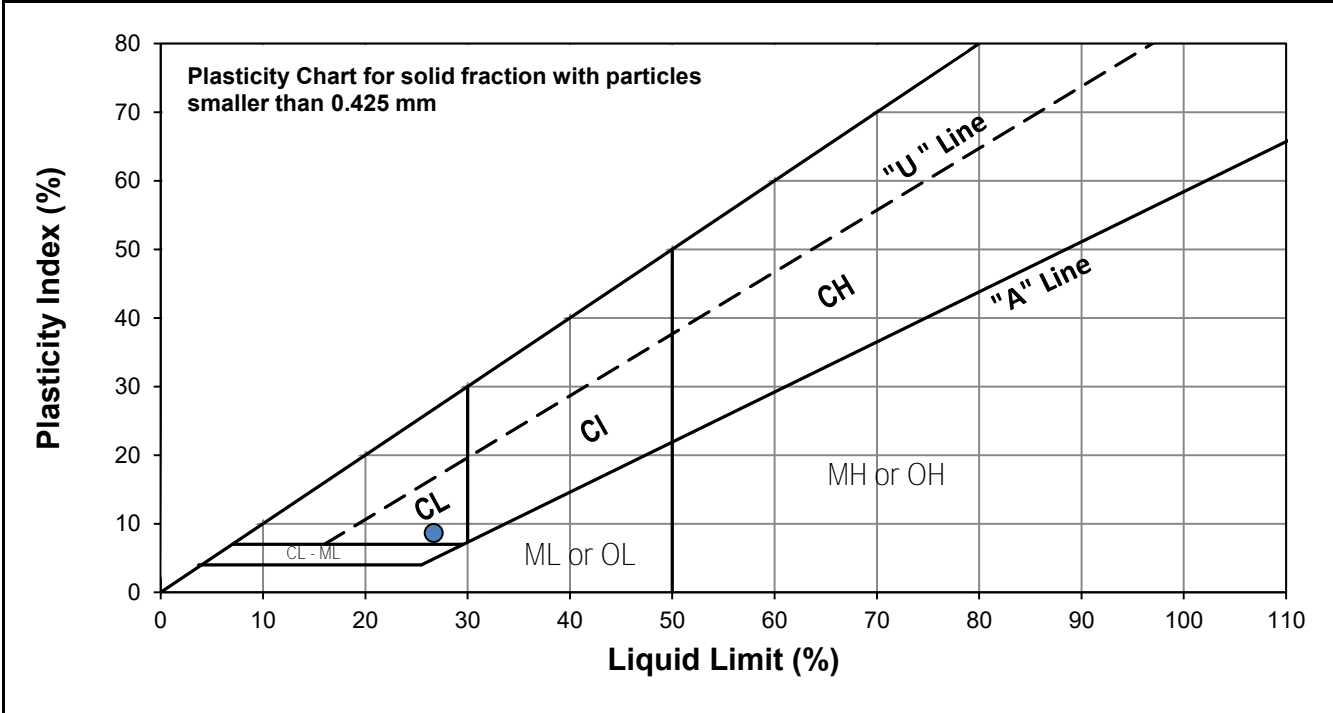


**Test Hole** TH23-02  
**Sample #** G12  
**Depth (m)** 1.1 - 1.2  
**Sample Date** 19-Dec-23  
**Test Date** 12-Jan-24  
**Technician** KM

<b>Liquid Limit</b>	27
<b>Plastic Limit</b>	18
<b>Plasticity Index</b>	9

**Liquid Limit**

Trial #	1	2	3
<b>Number of Blows (N)</b>	16	20	34
<b>Mass Tare (g)</b>	13.957	13.995	14.053
<b>Mass Wet Soil + Tare (g)</b>	26.237	26.162	25.704
<b>Mass Dry Soil + Tare (g)</b>	23.550	23.541	23.319
<b>Mass Water (g)</b>	2.687	2.621	2.385
<b>Mass Dry Soil (g)</b>	9.593	9.546	9.266
<b>Moisture Content (%)</b>	28.010	27.457	25.739



**Plastic Limit**

Trial #	1	2	3	4	5
<b>Mass Tare (g)</b>	13.975	14.096			
<b>Mass Wet Soil + Tare (g)</b>	21.260	21.730			
<b>Mass Dry Soil + Tare (g)</b>	20.146	20.558			
<b>Mass Water (g)</b>	1.114	1.172			
<b>Mass Dry Soil (g)</b>	6.171	6.462			
<b>Moisture Content (%)</b>	18.052	18.137			

Note: Additional information recorded/measured for this test is available upon request.



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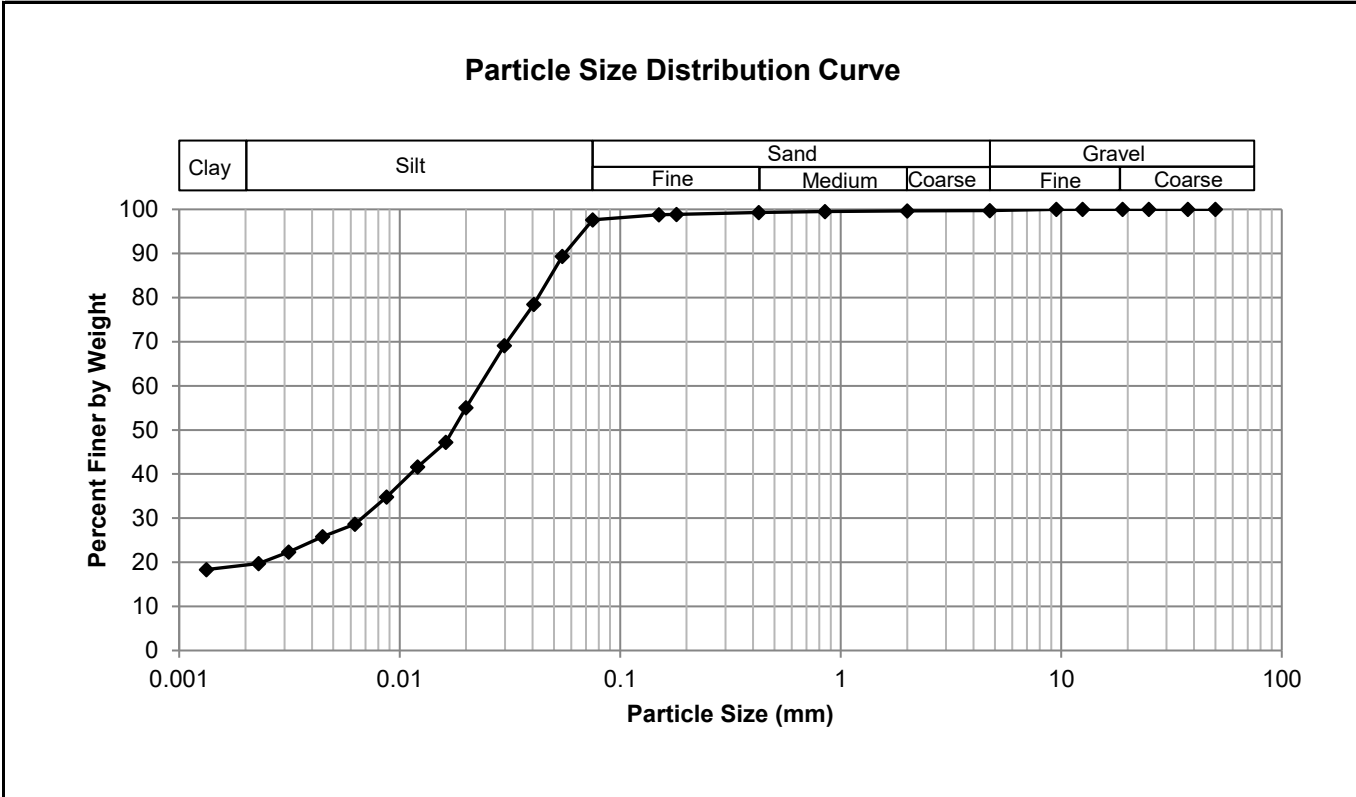
**Grain Size Analysis (Hydrometer Method)**  
**AASHTO T 88**

**Project No.** 1000-001-33  
**Client** Morrison Hershfield  
**Project** RFP 547-2023 McGregor-Inkster Geotech. Investigation



**Test Hole** TH23-02  
**Sample #** G12  
**Depth (m)** 1.1 - 1.2  
**Sample Date** 19-Dec-23  
**Test Date** 11-Jan-24  
**Technician** CK/KF

<b>Gravel</b>	0.3%
<b>Sand</b>	2.1%
<b>Silt</b>	78.3%
<b>Clay</b>	19.4%



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	99.71	0.0750	97.64
37.5	100.00	2.00	99.65	0.0545	89.35
25.0	100.00	0.850	99.49	0.0406	78.44
19.0	100.00	0.425	99.28	0.0298	69.10
12.5	100.00	0.180	98.87	0.0199	55.03
9.50	100.00	0.150	98.76	0.0162	47.24
4.75	99.71	0.075	97.64	0.0121	41.63
				0.0087	34.78
				0.0063	28.64
				0.0045	25.83
				0.0031	22.32
				0.0023	19.73
				0.0013	18.35



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**Atterberg Limits**  
**ASTM D4318-10e1**

**Project No.** 1000-001-33  
**Client** Morrison Hershfield  
**Project** RFP 547-2023 McGregor-Inkster Geotech. Investigation

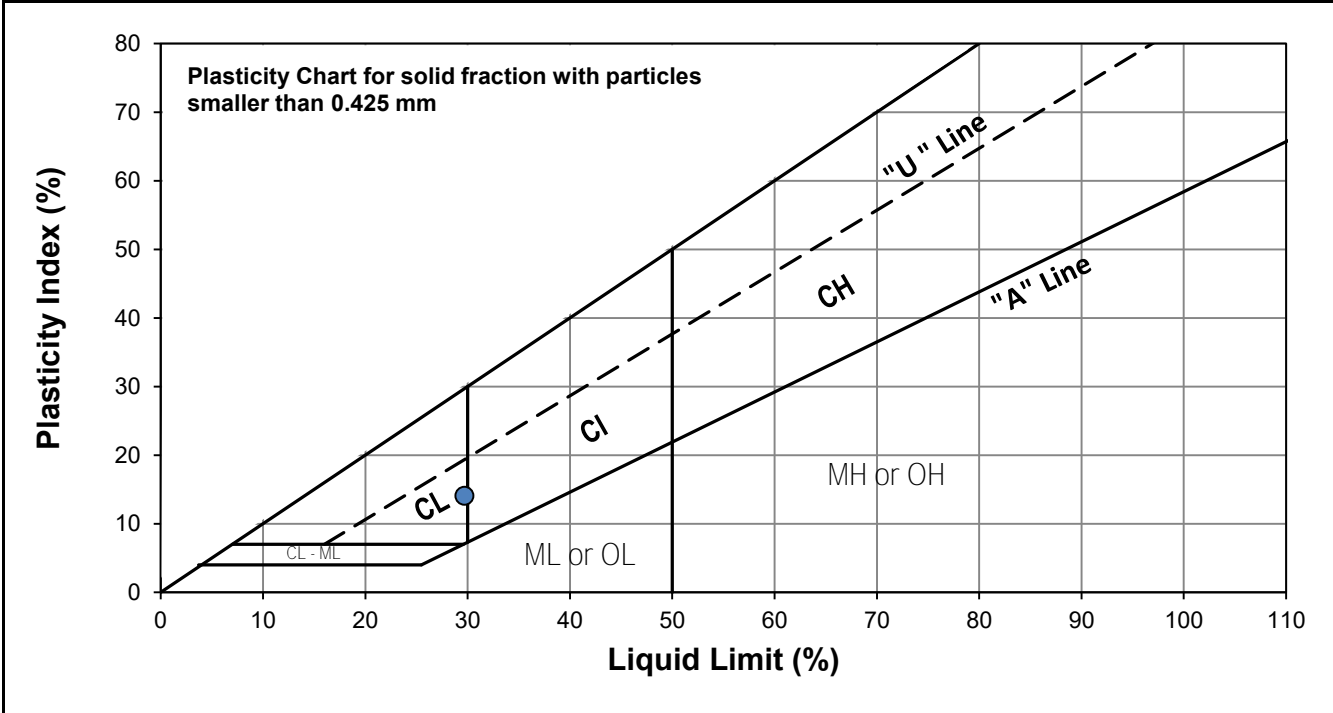
**Test Hole** TH23-04  
**Sample #** G32  
**Depth (m)** 1.1 - 1.2  
**Sample Date** 19-Dec-23  
**Test Date** 12-Jan-24  
**Technician** KF



<b>Liquid Limit</b>	30
<b>Plastic Limit</b>	16
<b>Plasticity Index</b>	14

**Liquid Limit**

Trial #	1	2	3
<b>Number of Blows (N)</b>	18	26	35
<b>Mass Tare (g)</b>	14.260	14.338	14.085
<b>Mass Wet Soil + Tare (g)</b>	23.255	23.776	24.616
<b>Mass Dry Soil + Tare (g)</b>	21.160	21.617	22.253
<b>Mass Water (g)</b>	2.095	2.159	2.363
<b>Mass Dry Soil (g)</b>	6.900	7.279	8.168
<b>Moisture Content (%)</b>	30.362	29.661	28.930



**Plastic Limit**

Trial #	1	2	3	4	5
<b>Mass Tare (g)</b>	14.048	13.946			
<b>Mass Wet Soil + Tare (g)</b>	23.486	24.281			
<b>Mass Dry Soil + Tare (g)</b>	22.212	22.885			
<b>Mass Water (g)</b>	1.274	1.396			
<b>Mass Dry Soil (g)</b>	8.164	8.939			
<b>Moisture Content (%)</b>	15.605	15.617			

Note: Additional information recorded/measured for this test is available upon request.



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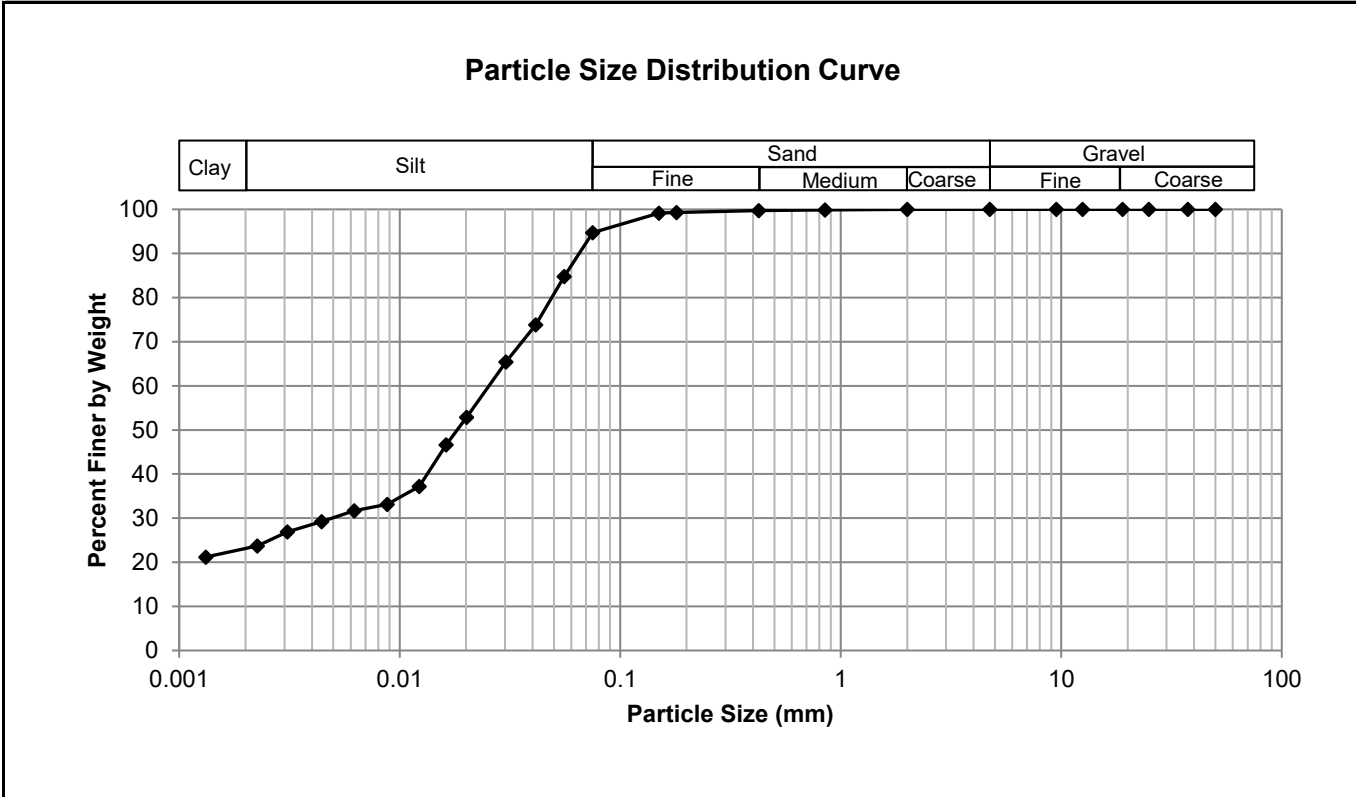
**Grain Size Analysis (Hydrometer Method)**  
**AASHTO T 88**

**Project No.** 1000-001-33  
**Client** Morrison Hershfield  
**Project** RFP 547-2023 McGregor-Inkster Geotech. Investigation



**Test Hole** TH23-04  
**Sample #** G32  
**Depth (m)** 1.1 - 1.2  
**Sample Date** 19-Dec-23  
**Test Date** 11-Jan-24  
**Technician** KF

<b>Gravel</b>	0.0%
<b>Sand</b>	5.3%
<b>Silt</b>	71.7%
<b>Clay</b>	23.0%



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	94.73
37.5	100.00	2.00	100.00	0.0558	84.80
25.0	100.00	0.850	99.86	0.0414	73.85
19.0	100.00	0.425	99.71	0.0303	65.41
12.5	100.00	0.180	99.27	0.0201	52.90
9.50	100.00	0.150	99.13	0.0162	46.65
4.75	100.00	0.075	94.73	0.0122	37.20
				0.0088	33.13
				0.0062	31.72
				0.0044	29.22
				0.0031	26.88
				0.0023	23.68
				0.0013	21.19



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**Atterberg Limits**  
**ASTM D4318-10e1**

**Project No.** 1000-001-33  
**Client** Morrison Hershfield  
**Project** RFP 547-2023 McGregor-Inkster Geotech. Investigation

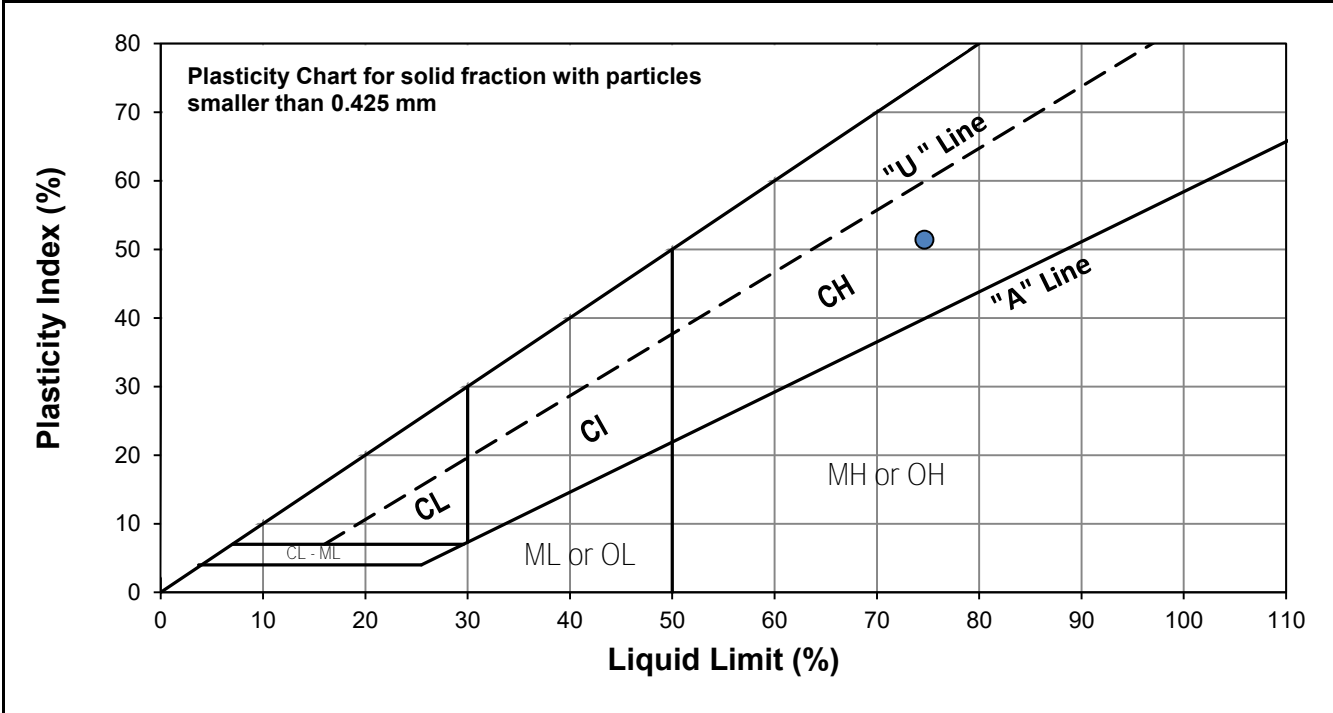


**Test Hole** TH23-07  
**Sample #** G60  
**Depth (m)** 1.1 - 1.2  
**Sample Date** 19-Dec-23  
**Test Date** 12-Jan-24  
**Technician** JC

<b>Liquid Limit</b>	75
<b>Plastic Limit</b>	23
<b>Plasticity Index</b>	51

**Liquid Limit**

Trial #	1	2	3
<b>Number of Blows (N)</b>	18	24	33
<b>Mass Tare (g)</b>	14.032	14.165	14.084
<b>Mass Wet Soil + Tare (g)</b>	32.179	32.427	31.468
<b>Mass Dry Soil + Tare (g)</b>	24.304	24.621	24.122
<b>Mass Water (g)</b>	7.875	7.806	7.346
<b>Mass Dry Soil (g)</b>	10.272	10.456	10.038
<b>Moisture Content (%)</b>	76.665	74.656	73.182



**Plastic Limit**

Trial #	1	2	3	4	5
<b>Mass Tare (g)</b>	14.108	14.121			
<b>Mass Wet Soil + Tare (g)</b>	21.149	21.781			
<b>Mass Dry Soil + Tare (g)</b>	19.810	20.347			
<b>Mass Water (g)</b>	1.339	1.434			
<b>Mass Dry Soil (g)</b>	5.702	6.226			
<b>Moisture Content (%)</b>	23.483	23.032			

Note: Additional information recorded/measured for this test is available upon request.



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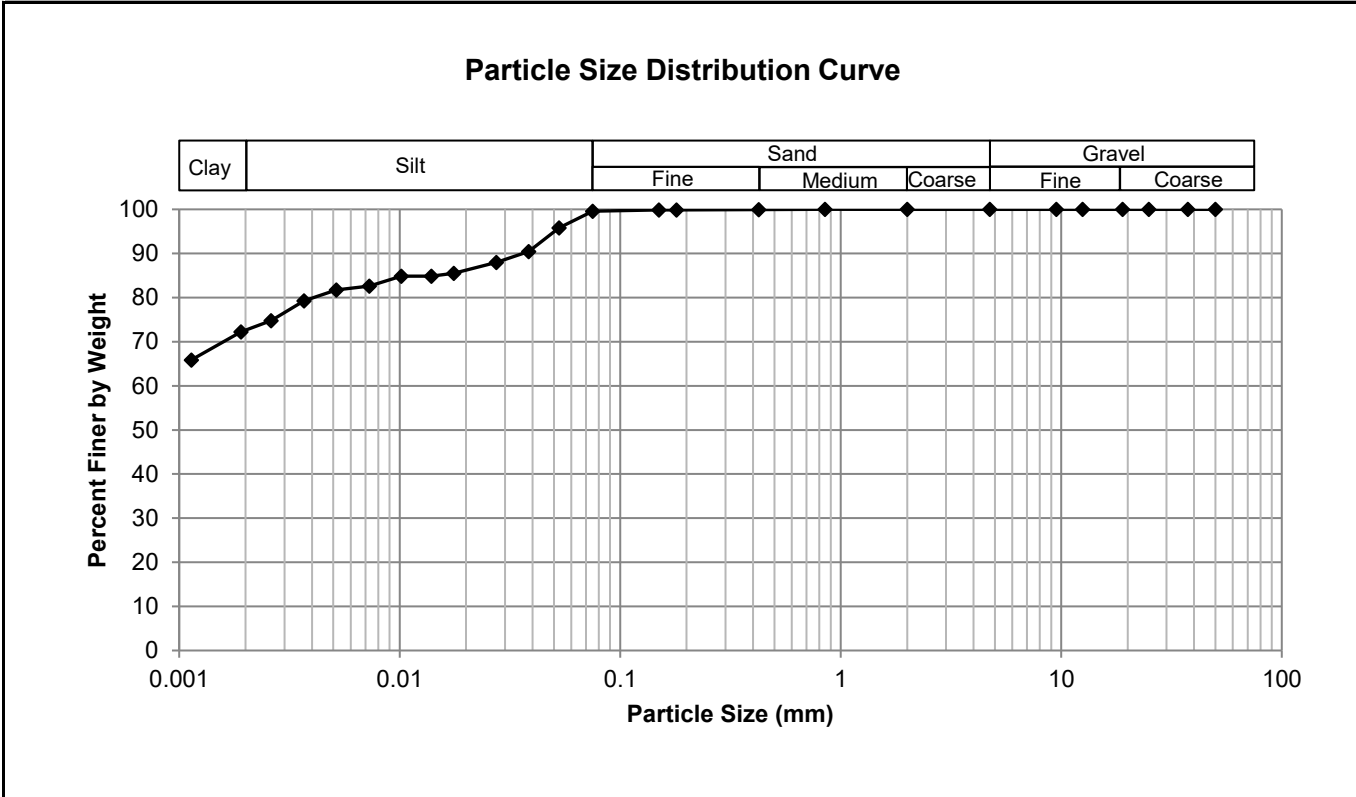
**Grain Size Analysis (Hydrometer Method)**  
**AASHTO T 88**

**Project No.** 1000-001-33  
**Client** Morrison Hershfield  
**Project** RFP 547-2023 McGregor-Inkster Geotech. Investigation



**Test Hole** TH23-07  
**Sample #** G60  
**Depth (m)** 1.1 - 1.2  
**Sample Date** 19-Dec-23  
**Test Date** 11-Jan-24  
**Technician** KF

<b>Gravel</b>	0.0%
<b>Sand</b>	0.4%
<b>Silt</b>	27.0%
<b>Clay</b>	72.6%



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	100.00	0.0750	99.58
37.5	100.00	2.00	100.00	0.0529	95.78
25.0	100.00	0.850	99.98	0.0384	90.47
19.0	100.00	0.425	99.96	0.0275	88.00
12.5	100.00	0.180	99.89	0.0176	85.50
9.50	100.00	0.150	99.86	0.0139	84.84
4.75	100.00	0.075	99.58	0.0102	84.84
				0.0073	82.62
				0.0052	81.71
				0.0037	79.25
				0.0026	74.80
				0.0019	72.26
				0.0011	65.88





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**Atterberg Limits**  
**ASTM D4318-10e1**

**Project No.** 1000-001-33  
**Client** Morrison Hershfield  
**Project** RFP 547-2023 McGregor-Inkster Geotech. Investigation

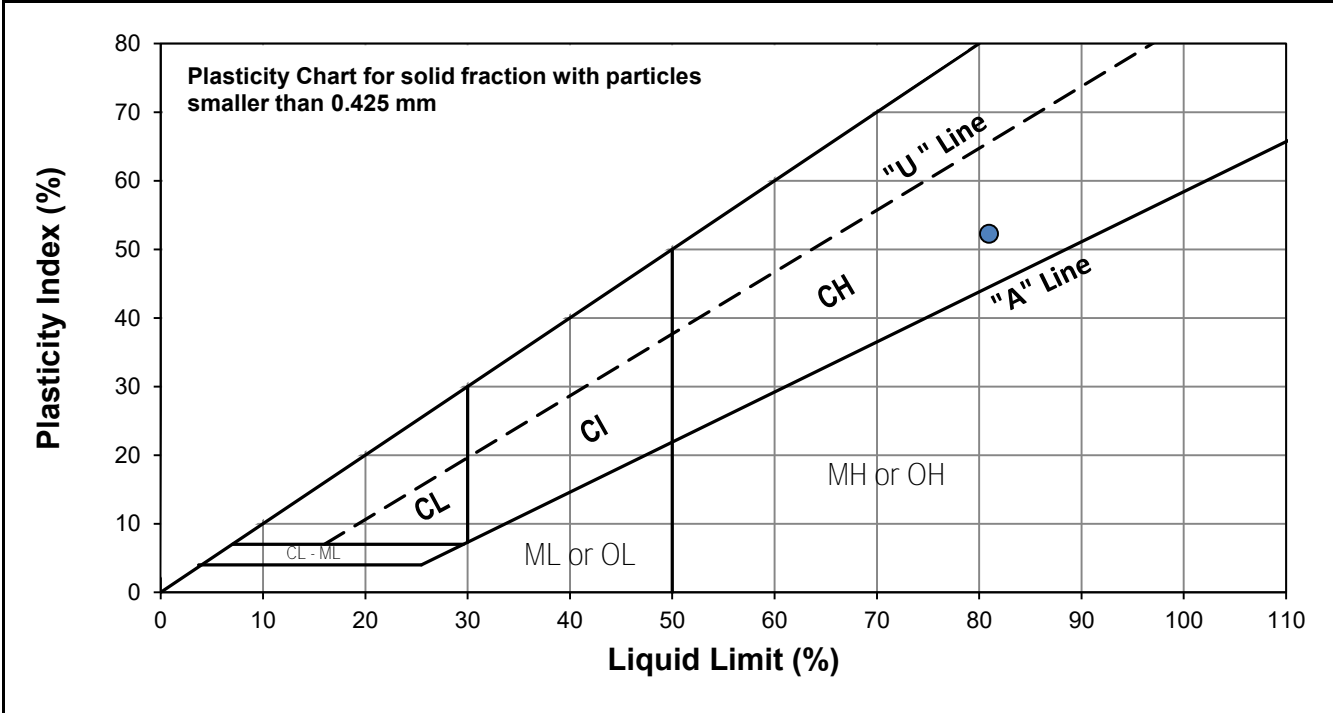
**Test Hole** TH23-09  
**Sample #** G79  
**Depth (m)** 1.1 - 1.2  
**Sample Date** 19-Dec-23  
**Test Date** 13-Jan-24  
**Technician** AB



<b>Liquid Limit</b>	81
<b>Plastic Limit</b>	29
<b>Plasticity Index</b>	52

**Liquid Limit**

Trial #	1	2	3
<b>Number of Blows (N)</b>	21	27	34
<b>Mass Tare (g)</b>	13.848	14.227	14.202
<b>Mass Wet Soil + Tare (g)</b>	28.133	26.499	29.818
<b>Mass Dry Soil + Tare (g)</b>	21.645	21.032	23.054
<b>Mass Water (g)</b>	6.488	5.467	6.764
<b>Mass Dry Soil (g)</b>	7.797	6.805	8.852
<b>Moisture Content (%)</b>	83.211	80.338	76.412



**Plastic Limit**

Trial #	1	2	3	4	5
<b>Mass Tare (g)</b>	14.230	13.985			
<b>Mass Wet Soil + Tare (g)</b>	24.413	22.655			
<b>Mass Dry Soil + Tare (g)</b>	22.154	20.710			
<b>Mass Water (g)</b>	2.259	1.945			
<b>Mass Dry Soil (g)</b>	7.924	6.725			
<b>Moisture Content (%)</b>	28.508	28.922			

Note: Additional information recorded/measured for this test is available upon request.



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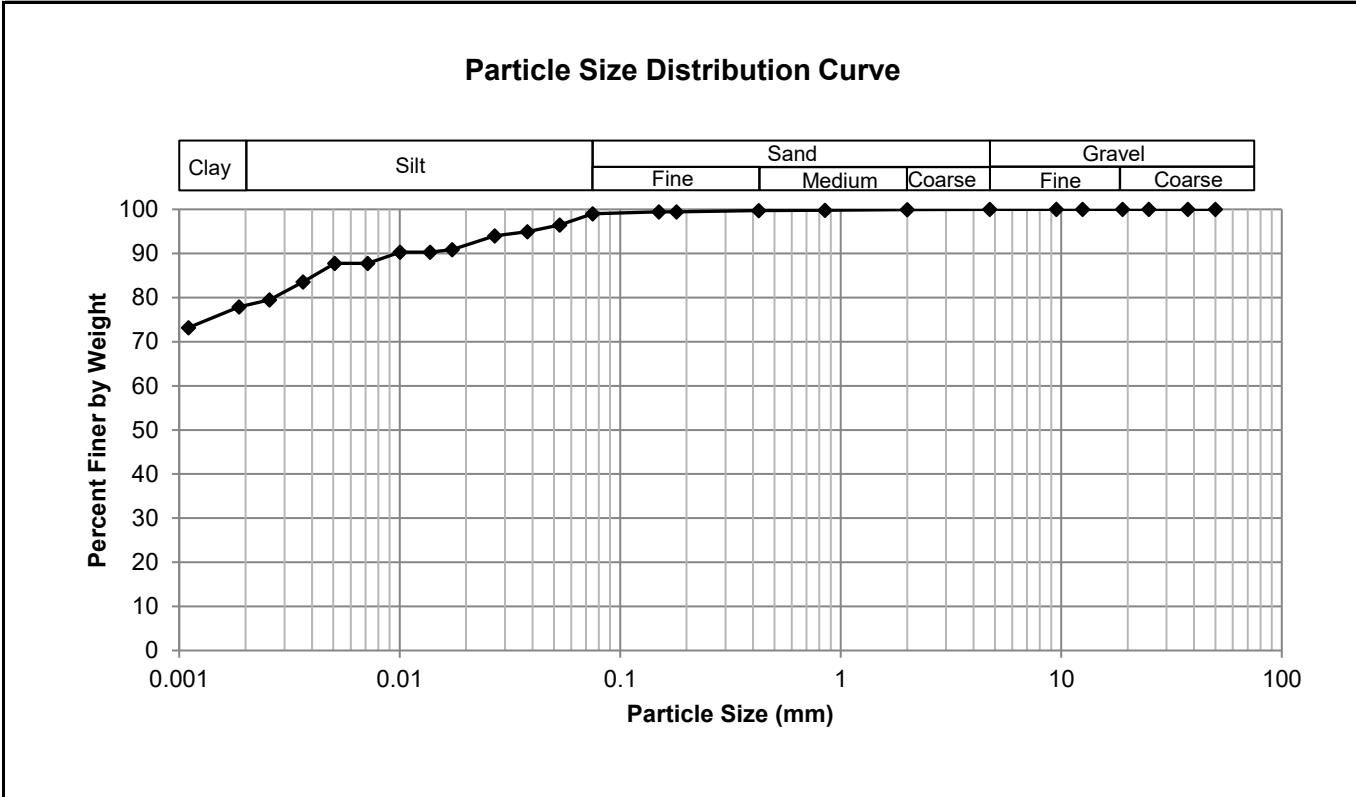
**Grain Size Analysis (Hydrometer Method)**  
**AASHTO T 88**

**Project No.** 1000-001-33  
**Client** Morrison Hershfield  
**Project** RFP 547-2023 McGregor-Inkster Geotech. Investigation



**Test Hole** TH23-09  
**Sample #** G79  
**Depth (m)** 0.3 - 0.4  
**Sample Date** 19-Dec-23  
**Test Date** 15-Jan-24  
**Technician** AD/KF

<b>Gravel</b>	0.0%
<b>Sand</b>	1.0%
<b>Silt</b>	20.8%
<b>Clay</b>	78.1%



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	98.99
37.5	100.00	2.00	99.94	0.0533	96.49
25.0	100.00	0.850	99.82	0.0380	94.93
19.0	100.00	0.425	99.69	0.0270	93.99
12.5	100.00	0.180	99.47	0.0173	90.86
9.50	100.00	0.150	99.41	0.0137	90.28
4.75	100.00	0.075	98.99	0.0100	90.28
				0.0072	87.79
				0.0051	87.79
				0.0036	83.55
				0.0026	79.49
				0.0019	77.93
				0.0011	73.19



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**Atterberg Limits**  
**ASTM D4318-10e1**

**Project No.** 1000-001-33  
**Client** Morrison Hershfield  
**Project** RFP 547-2023 McGregor-Inkster Geotech. Investigation

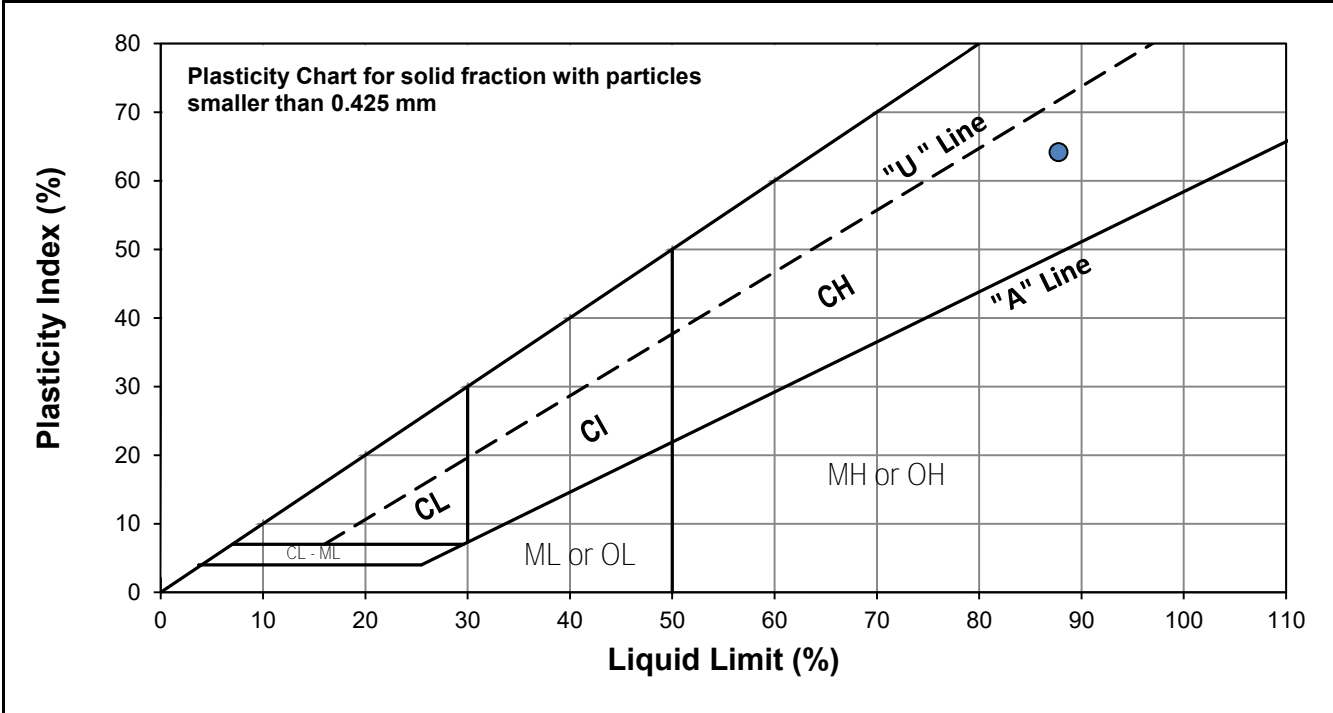
**Test Hole** TH23-10  
**Sample #** G89  
**Depth (m)** 1.1 - 1.2  
**Sample Date** 19-Dec-23  
**Test Date** 12-Jan-24  
**Technician** JC



<b>Liquid Limit</b>	88
<b>Plastic Limit</b>	24
<b>Plasticity Index</b>	64

**Liquid Limit**

Trial #	1	2	3
<b>Number of Blows (N)</b>	18	25	28
<b>Mass Tare (g)</b>	14.198	13.958	13.918
<b>Mass Wet Soil + Tare (g)</b>	29.992	27.762	27.093
<b>Mass Dry Soil + Tare (g)</b>	22.519	21.313	20.959
<b>Mass Water (g)</b>	7.473	6.449	6.134
<b>Mass Dry Soil (g)</b>	8.321	7.355	7.041
<b>Moisture Content (%)</b>	89.809	87.682	87.118



**Plastic Limit**

Trial #	1	2	3	4	5
<b>Mass Tare (g)</b>	14.283	14.187			
<b>Mass Wet Soil + Tare (g)</b>	21.317	21.008			
<b>Mass Dry Soil + Tare (g)</b>	19.981	19.696			
<b>Mass Water (g)</b>	1.336	1.312			
<b>Mass Dry Soil (g)</b>	5.698	5.509			
<b>Moisture Content (%)</b>	23.447	23.816			

Note: Additional information recorded/measured for this test is available upon request.



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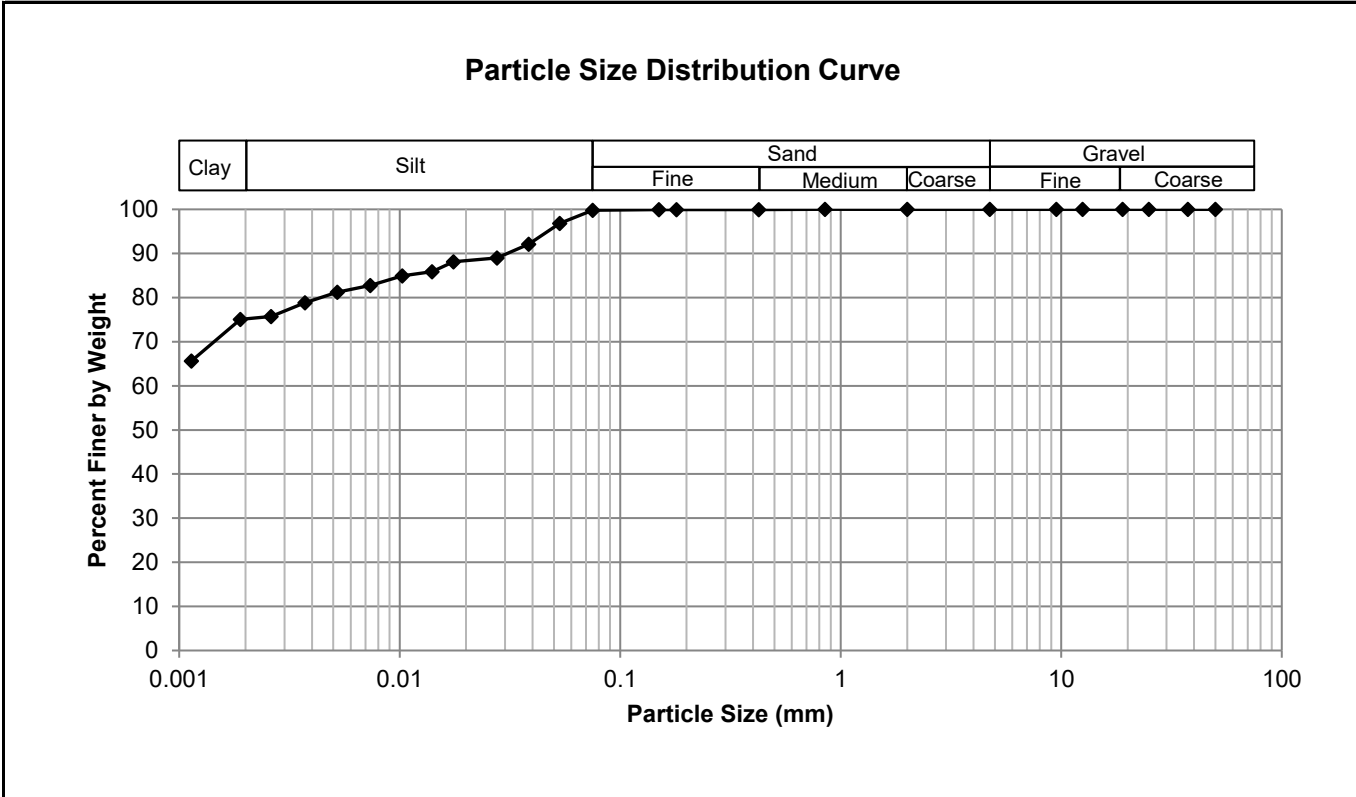
**Grain Size Analysis (Hydrometer Method)**  
**AASHTO T 88**

**Project No.** 1000-001-33  
**Client** Morrison Hershfield  
**Project** RFP 547-2023 McGregor-Inkster Geotech. Investigation



**Test Hole** TH23-10  
**Sample #** G89  
**Depth (m)** 0.3 - 0.4  
**Sample Date** 19-Dec-23  
**Test Date** 15-Jan-24  
**Technician** AD/KF

<b>Gravel</b>	0.0%
<b>Sand</b>	0.2%
<b>Silt</b>	24.6%
<b>Clay</b>	75.2%



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	99.78
37.5	100.00	2.00	100.00	0.0531	96.80
25.0	100.00	0.850	99.99	0.0385	92.11
19.0	100.00	0.425	99.97	0.0276	88.98
12.5	100.00	0.180	99.94	0.0175	88.09
9.50	100.00	0.150	99.93	0.0140	85.85
4.75	100.00	0.075	99.78	0.0103	84.92
				0.0073	82.73
				0.0052	81.22
				0.0037	78.82
				0.0026	75.69
				0.0019	75.06
				0.0011	65.63



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## Standard Proctor Compaction Test ASTM D698-12 (2021)

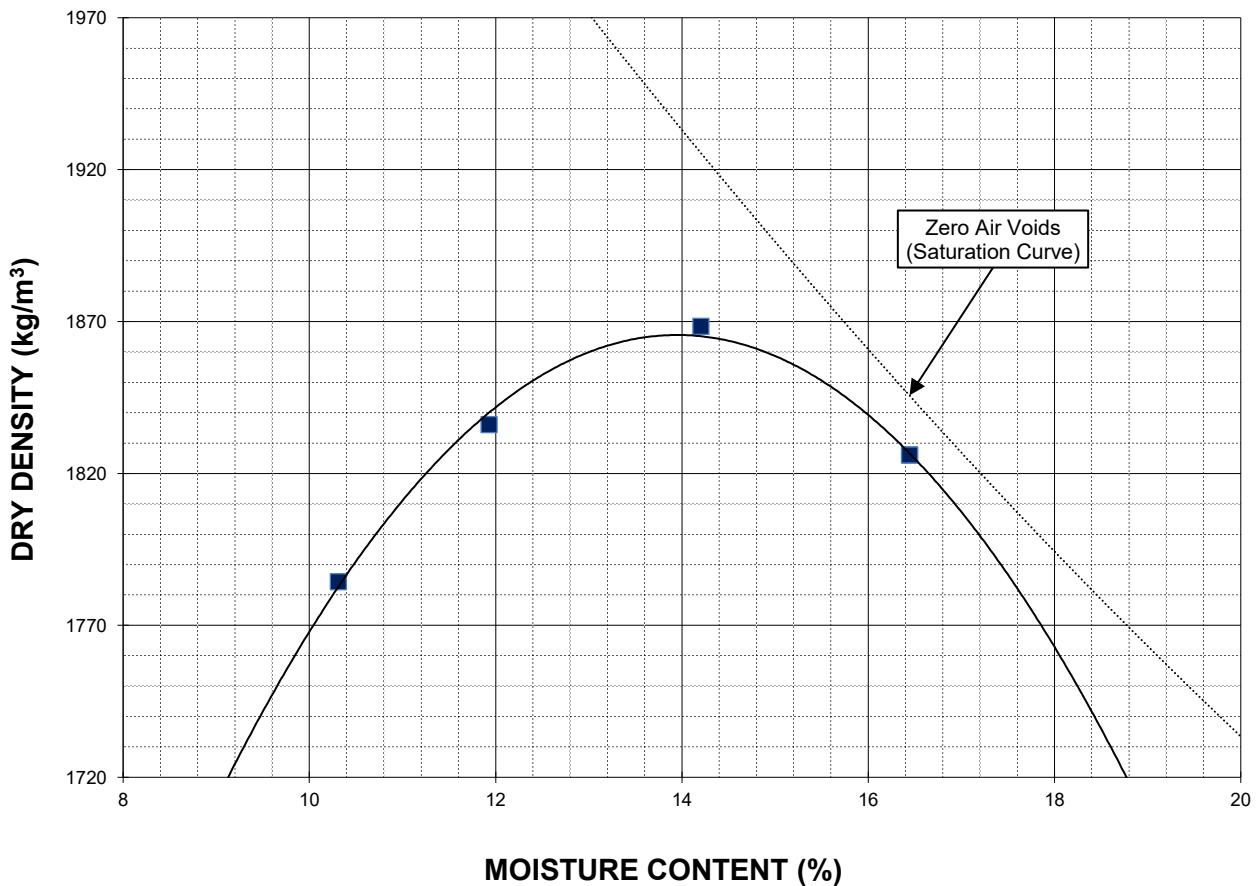


**Project No.** 1000-001-33  
**Client** Morrison Hershfield  
**Project** RFP 547-2023 McGregor-Inkster Geotech. Investigation

**Sample #** L24-001  
**Source** TH23-02 (0.9 m -1.8 m)  
**Material** Silt  
**Sample Date** 19-Dec-23  
**Test Date** 09-Jan-24  
**Technician** AD

<b>Maximum Dry Density (kg/m<sup>3</sup>)</b>	1866
<b>Optimum Moisture (%)</b>	13.9

Trial Number	1	2	3	4	
<b>Wet Density (kg/m<sup>3</sup>)</b>	1968	2055	2134	2126	
<b>Dry Density (kg/m<sup>3</sup>)</b>	1784	1836	1868	1826	
<b>Moisture Content (%)</b>	10.3	11.9	14.2	16.4	



Note: Additional information recorded/measured for this test is available upon request.



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**California Bearing Ratio Test Data Sheet**  
**ASTM D1883-16**

<b>Project No.</b>	1000-001-33	<b>Source</b>	TH23-02 (0.9 m -1.8 m)
<b>Client</b>	Morrison Hershfield	<b>Material</b>	Silt
<b>Project</b>	RFP 547-2023 McGregor- Inkster Geotech. Investigation	<b>Sample Date</b>	2023-12-19
<b>Sample #</b>	L24-001	<b>Test Date</b>	2024-01-11
		<b>Technician</b>	AD

**Proctor Results (ASTM D698)**

Maximum Dry Density	1866 kg/m <sup>3</sup>
Optimum Moisture Content	13.9 %
Material Retained on 19 mm Sieve	0.0 %

**CBR Sample Compaction**

Dry Density	1776 kg/m <sup>3</sup>
Initial Moisture Content	13.8 %
Relative Density	95.2 % SPMDD

**Soaking Results**

Surcharge	4.54 kg
Swell	0.6 %
Moisture Content in top 25 mm	21.4 %
Immersion Period	95 h

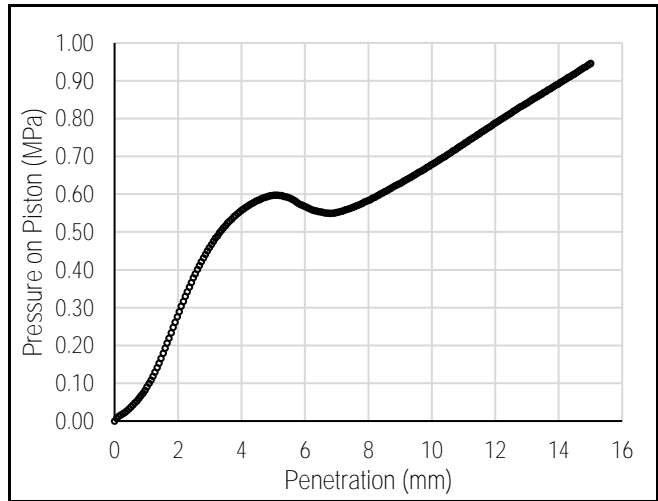
**CBR Results**

CBR at 2.54 mm	6.8 %
CBR at 5.08 mm	5.7 %
Zero Correction	0.5 mm

**Test Data**

Penetration (mm)	Measured Pressure (MPa)	Corrected Pressure (MPa)
0.64	0.05	0.11
1.27	0.13	0.23
1.91	0.26	0.37
2.54	0.39	0.47
3.18	0.48	0.53
3.81	0.54	0.57
4.45	0.58	0.60
5.08	0.60	0.59
7.62	0.57	0.59
10.16	0.69	0.71
12.70	0.83	0.85

**Load/Penetration Curve**



**Comments:**



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**Standard Proctor Compaction Test**  
**ASTM D698-12e2**

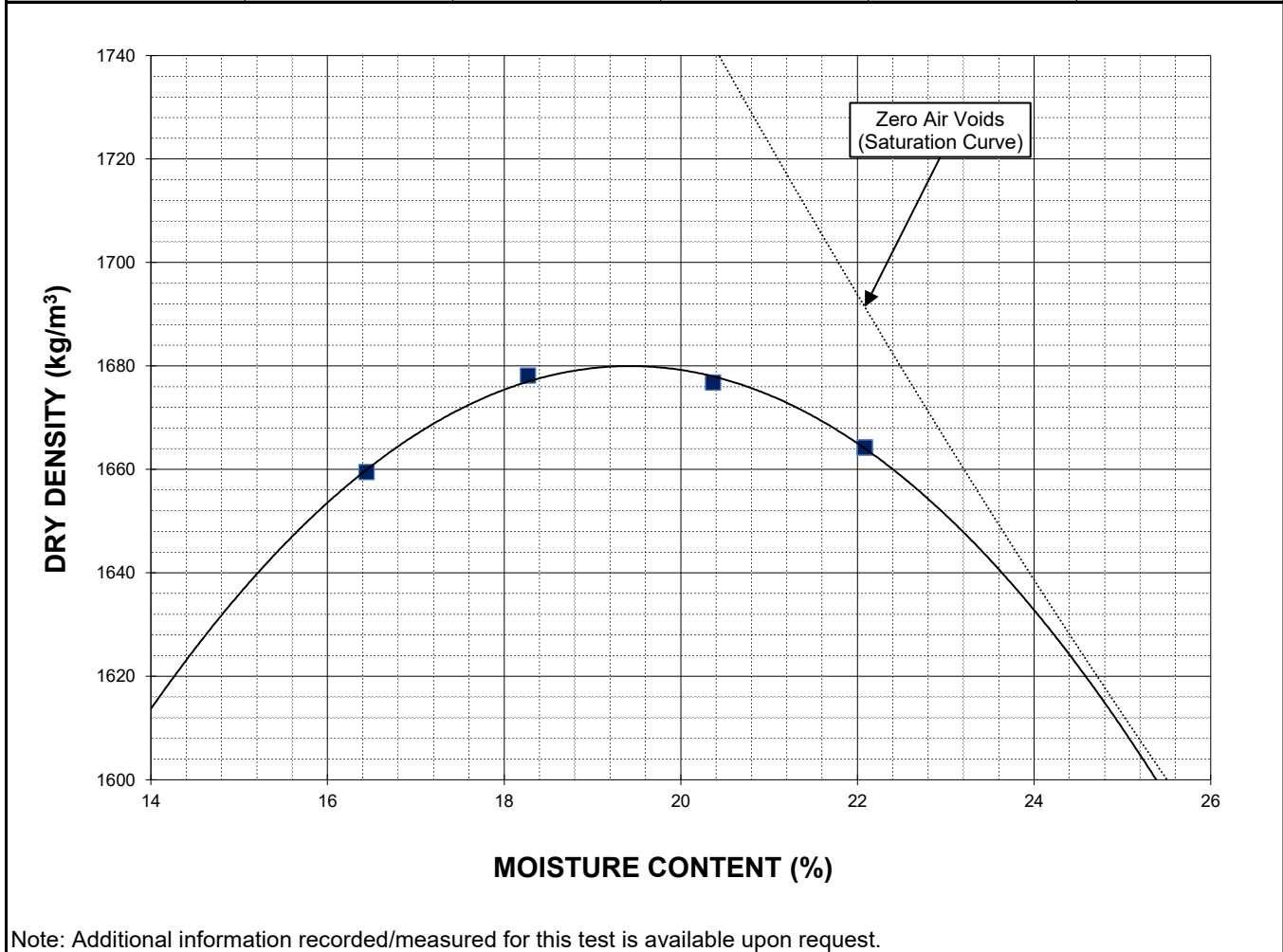
**Project No.** 1000-001-33  
**Client** Morison Hershfield  
**Project** RFP 547-2023 McGregor-Inkster Geotech. Investigation

**Sample #** L24-001  
**Source** TH23-04 (0.9 m - 1.8 m)  
**Material** Silt  
**Sample Date** 19-Dec-23  
**Test Date** 04-Jan-23  
**Technician** AD



<b>Maximum Dry Density (kg/m<sup>3</sup>)</b>	1680
<b>Optimum Moisture (%)</b>	19.4

Trial Number	1	2	3	4
<b>Wet Density (kg/m<sup>3</sup>)</b>	1932	1985	2018	2032
<b>Dry Density (kg/m<sup>3</sup>)</b>	1660	1678	1677	1664
<b>Moisture Content (%)</b>	16.4	18.3	20.4	22.1



Note: Additional information recorded/measured for this test is available upon request.



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**California Bearing Ratio Test Data Sheet**  
**ASTM D1883-16**

<b>Project No.</b>	1000-001-33	<b>Source</b>	TH23-04 (0.9 m - 1.8 m)
<b>Client</b>	Morrison Hershfield	<b>Material</b>	Silt
<b>Project</b>	RFP 547-2023 McGregor- Inkster Geotech. Investigation	<b>Sample Date</b>	2023-12-20
<b>Sample #</b>	L24-001	<b>Test Date</b>	2024-01-09
		<b>Technician</b>	AD

**Proctor Results (ASTM D698)**

Maximum Dry Density	1680 kg/m <sup>3</sup>
Optimum Moisture Content	19.4 %
Material Retained on 19 mm Sieve	0.0 %

**CBR Sample Compaction**

Dry Density	1599 kg/m <sup>3</sup>
Initial Moisture Content	19.3 %
Relative Density	95.2 % SPMDD

**Soaking Results**

Surcharge	4.54 kg
Swell	1.5 %
Moisture Content in top 25 mm	31.7 %
Immersion Period	94 h

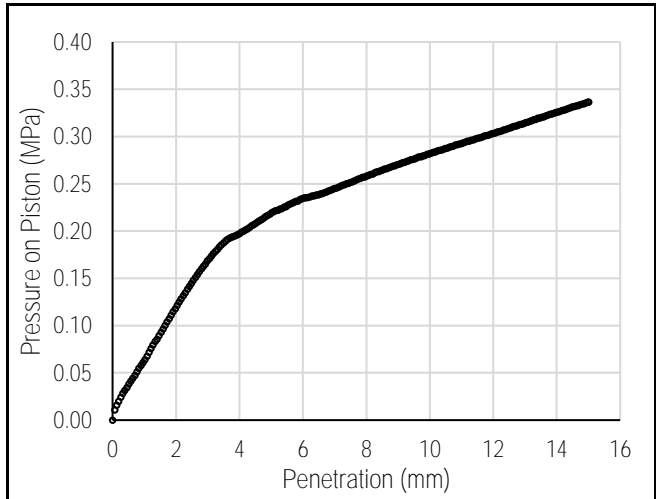
**CBR Results**

CBR at 2.54 mm	2.1 %
CBR at 5.08 mm	2.1 %
Zero Correction	0 mm

**Test Data**

Penetration (mm)	Measured Pressure (MPa)	Corrected Pressure (MPa)
0.64	0.04	0.04
1.27	0.08	0.08
1.91	0.11	0.11
2.54	0.15	0.15
3.18	0.18	0.18
3.81	0.19	0.19
4.45	0.21	0.21
5.08	0.22	0.22
7.62	0.25	0.25
10.16	0.28	0.28
12.70	0.31	0.31

**Load/Penetration Curve**



**Comments:**





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## Standard Proctor Compaction Test ASTM D698-12 (2021)

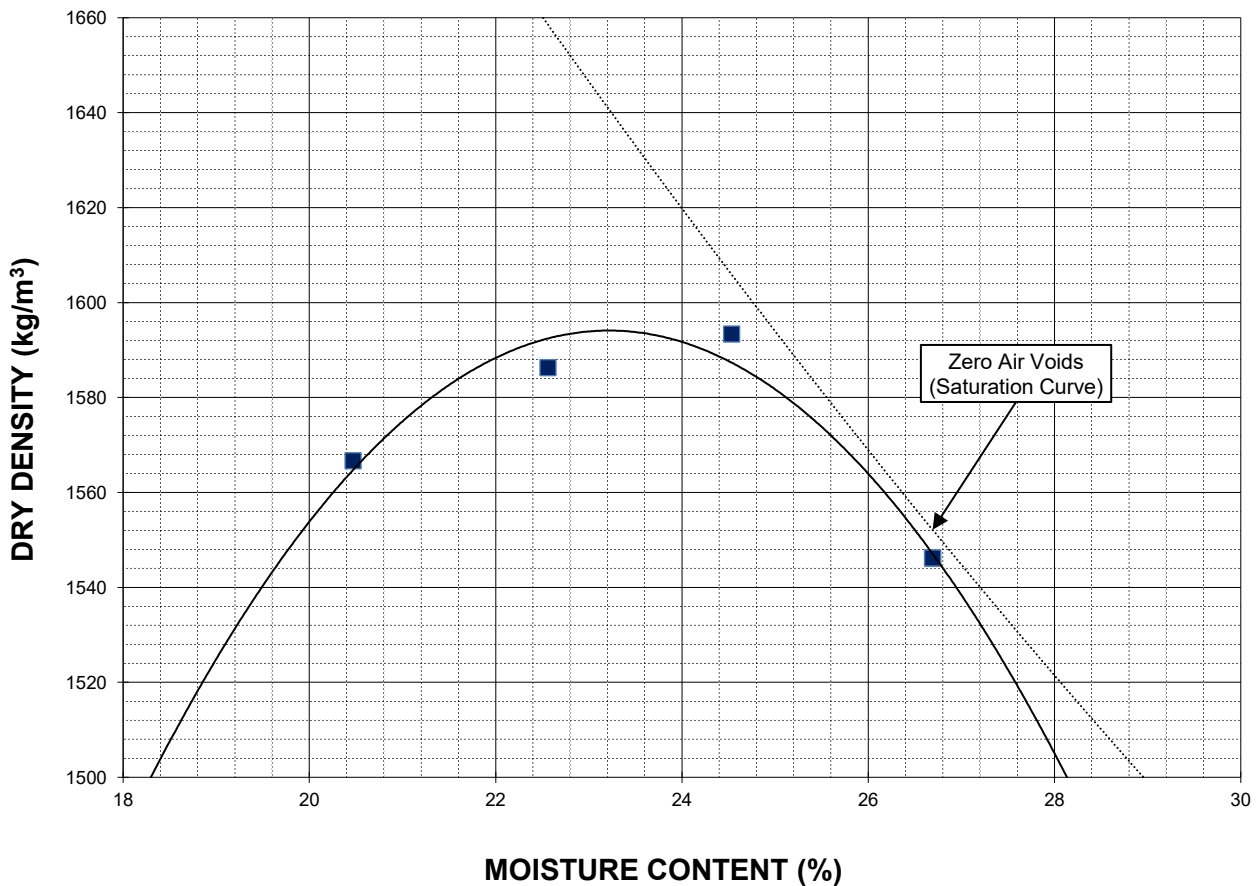


**Project No.** 1000-001-33  
**Client** Morrison Hershfield  
**Project** RFP 547-2023 McGregor-Inkster Geotech. Investigation

**Sample #** L24-001  
**Source** TH23-07 (0.9 m - 1.8 m)  
**Material** Clay  
**Sample Date** 19-Dec-23  
**Test Date** 04-Jan-24  
**Technician** AD

<b>Maximum Dry Density (kg/m<sup>3</sup>)</b>	1594
<b>Optimum Moisture (%)</b>	23.2

Trial Number	1	2	3	4	
<b>Wet Density (kg/m<sup>3</sup>)</b>	1887	1944	1984	1959	
<b>Dry Density (kg/m<sup>3</sup>)</b>	1567	1586	1593	1546	
<b>Moisture Content (%)</b>	20.5	22.6	24.5	26.7	



Note: Additional information recorded/measured for this test is available upon request.



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**California Bearing Ratio Test Data Sheet**  
**ASTM D1883-16**

<b>Project No.</b>	1000-001-33	<b>Source</b>	TH23-07 (0.9 m - 1.8 m)
<b>Client</b>	Morrison Hershfield	<b>Material</b>	Clay
<b>Project</b>	RFP 547-2023 McGregor- Inkster Geotech. Investigation	<b>Sample Date</b>	2023-12-19
<b>Sample #</b>	L24-001	<b>Test Date</b>	2024-01-09
		<b>Technician</b>	AD

**Proctor Results (ASTM D698)**

Maximum Dry Density	1594 kg/m <sup>3</sup>
Optimum Moisture Content	23.2 %
Material Retained on 19 mm Sieve	0.0 %

**CBR Sample Compaction**

Dry Density	1514 kg/m <sup>3</sup>
Initial Moisture Content	23.5 %
Relative Density	95.0 % SPMDD

**Soaking Results**

Surcharge	4.54 kg
Swell	1.6 %
Moisture Content in top 25 mm	36.9 %
Immersion Period	96 h

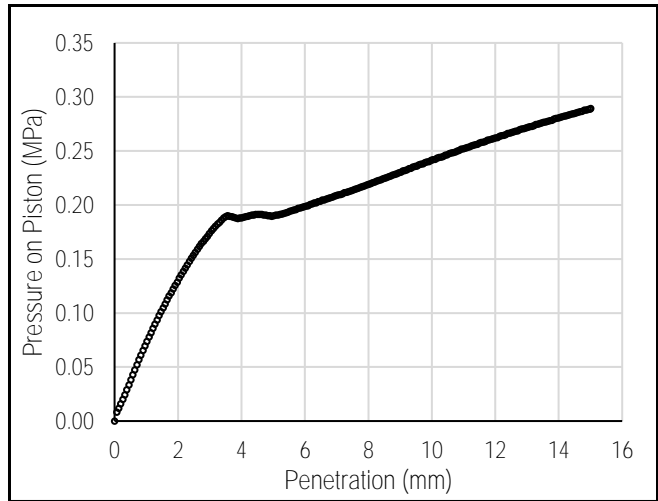
**CBR Results**

CBR at 2.54 mm	2.3 %
CBR at 5.08 mm	1.9 %
Zero Correction	0 mm

**Test Data**

Penetration (mm)	Measured Pressure (MPa)	Corrected Pressure (MPa)
0.64	0.05	0.05
1.27	0.09	0.09
1.91	0.13	0.13
2.54	0.16	0.16
3.18	0.18	0.18
3.81	0.19	0.19
4.45	0.19	0.19
5.08	0.19	0.19
7.62	0.22	0.22
10.16	0.24	0.24
12.70	0.27	0.27

**Load/Penetration Curve**



**Comments:**



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# Standard Proctor Compaction Test

## ASTM D698-12 (2021)

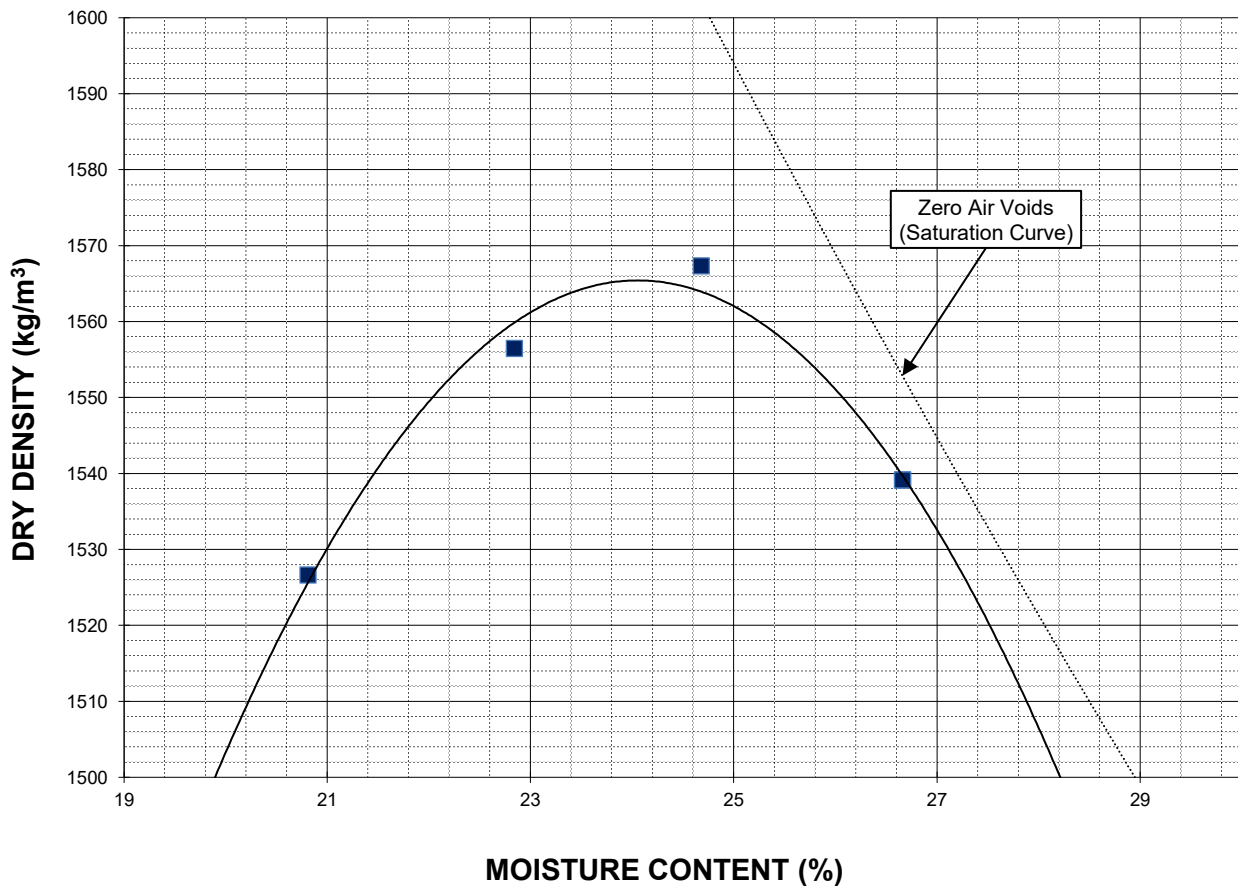


**Project No.** 1000-001-33  
**Client** Morrison Hershfield  
**Project** RFP 547-2023 McGregor-Inkster Geotech. Investigation

**Sample #** L24-001  
**Source** TH23-09 (1.5 m - 2.1 m)  
**Material** Clay  
**Sample Date** 20-Dec-23  
**Test Date** 04-Jan-24  
**Technician** AD

<b>Maximum Dry Density (kg/m<sup>3</sup>)</b>	1565
<b>Optimum Moisture (%)</b>	24.1

Trial Number	1	2	3	4	
Wet Density (kg/m <sup>3</sup> )	1844	1912	1954	1950	
Dry Density (kg/m <sup>3</sup> )	1527	1556	1567	1539	
Moisture Content (%)	20.8	22.8	24.7	26.7	



Note: Additional information recorded/measured for this test is available upon request.



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**California Bearing Ratio Test Data Sheet**  
**ASTM D1883-16**

<b>Project No.</b>	1000-001-33	<b>Source</b>	TH23-09 (1.5 m - 2.1 m)
<b>Client</b>	Morrison Hershfield	<b>Material</b>	Clay
<b>Project</b>	RFP 547-2023 McGregor- Inkster Geotech. Investigation	<b>Sample Date</b>	2023-12-20
<b>Sample #</b>	L24-001	<b>Test Date</b>	2024-01-09
		<b>Technician</b>	AD

**Proctor Results (ASTM D698)**

Maximum Dry Density	1565 kg/m3
Optimum Moisture Content	24.1 %
Material Retained on 19 mm Sieve	0.0 %

**CBR Sample Compaction**

Dry Density	1488 kg/m3
Initial Moisture Content	24.1 %
Relative Density	95.1 % SPMDD

**Soaking Results**

Surcharge	4.54 kg
Swell	1.4 %
Moisture Content in top 25 mm	34.5 %
Immersion Period	95 h

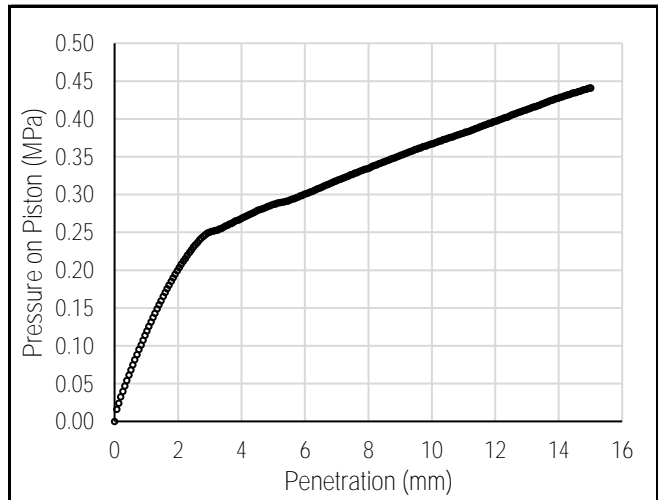
**CBR Results**

CBR at 2.54 mm	3.4 %
CBR at 5.08 mm	2.8 %
Zero Correction	0 mm

**Test Data**

Penetration (mm)	Measured Pressure (MPa)	Corrected Pressure (MPa)
0.64	0.08	0.08
1.27	0.14	0.14
1.91	0.20	0.20
2.54	0.23	0.23
3.18	0.25	0.25
3.81	0.27	0.27
4.45	0.28	0.28
5.08	0.29	0.29
7.62	0.33	0.33
10.16	0.37	0.37
12.70	0.41	0.41

**Load/Penetration Curve**



**Comments:**



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## Standard Proctor Compaction Test ASTM D698-12 (2021)

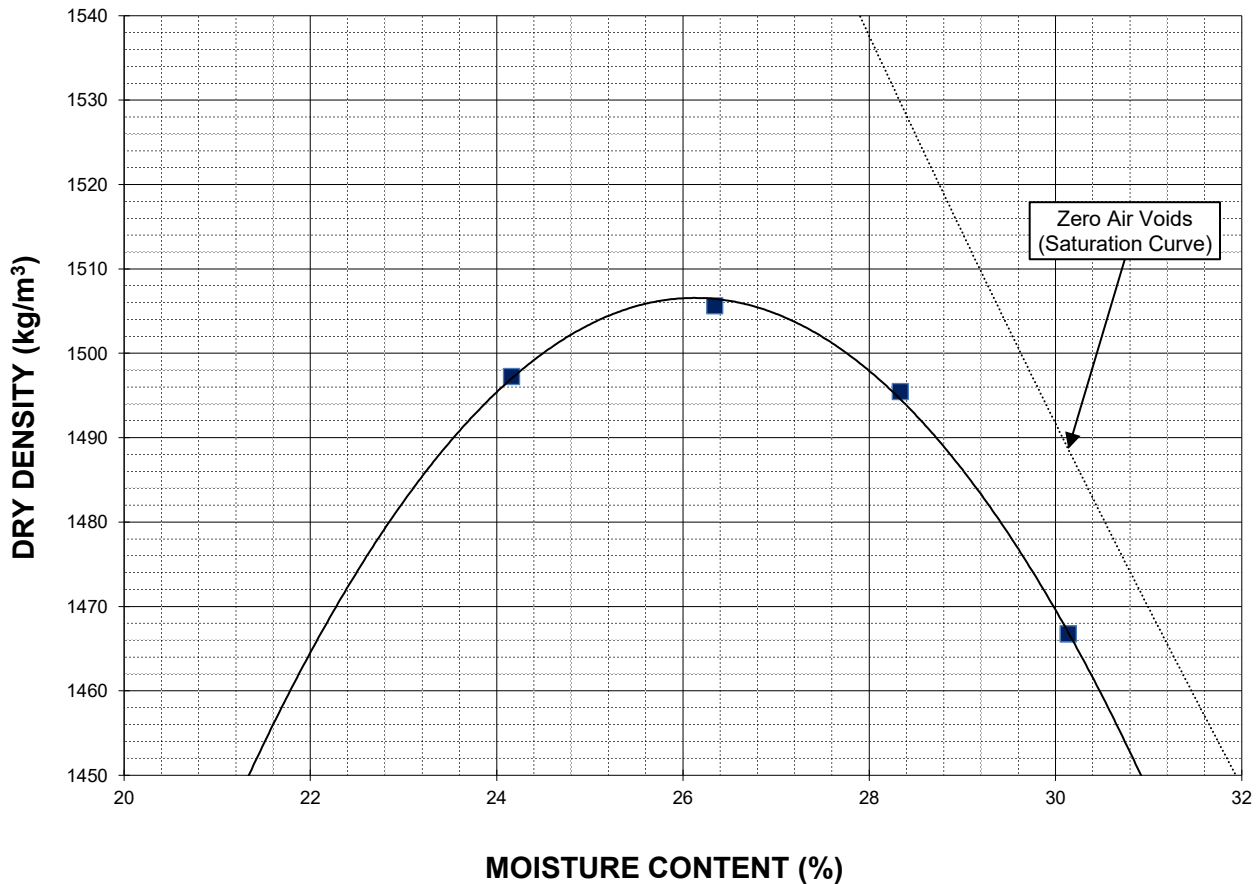
**Project No.** 1000-001-33  
**Client** Morrison Hershfield  
**Project** RFP 547-2023 McGregor-Inkster Geotech. Investigation



**Sample #** L24-001  
**Source** TH23-09 (0.9 m - 1.5 m), TH23-10 (0.9 m - 1.5 m)  
**Material** Clay  
**Sample Date** 21-Dec-23  
**Test Date** 11-Jan-24  
**Technician** AD

<b>Maximum Dry Density (kg/m<sup>3</sup>)</b>	1507
<b>Optimum Moisture (%)</b>	26.1

Trial Number	1	2	3	4	
<b>Wet Density (kg/m<sup>3</sup>)</b>	1859	1902	1919	1909	
<b>Dry Density (kg/m<sup>3</sup>)</b>	1497	1506	1495	1467	
<b>Moisture Content (%)</b>	24.2	26.3	28.3	30.1	



Note: Additional information recorded/measured for this test is available upon request.



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**California Bearing Ratio Test Data Sheet**  
**ASTM D1883-16**

<b>Project No.</b>	1000-001-33	<b>Source</b>	TH23-09 (0.9 m - 1.5 m), TH23-10 (0.9 m - 1.5 m)
<b>Client</b>	Morrison Hershfield	<b>Material</b>	Clay
<b>Project</b>	RFP 547-2023 McGregor-Inkster Geotech. Investigation	<b>Sample Date</b>	2023-12-20
<b>Sample #</b>	L24-001	<b>Test Date</b>	2024-01-13
		<b>Technician</b>	AD

**Proctor Results (ASTM D698)**

Maximum Dry Density	1507 kg/m <sup>3</sup>
Optimum Moisture Content	26.1 %
Material Retained on 19 mm Sieve	0.0 %

**CBR Sample Compaction**

Dry Density	1431 kg/m <sup>3</sup>
Initial Moisture Content	26.2 %
Relative Density	95.0 % SPMDD

**Soaking Results**

Surcharge	4.54 kg
Swell	2.6 %
Moisture Content in top 25 mm	44.3 %
Immersion Period	96 h

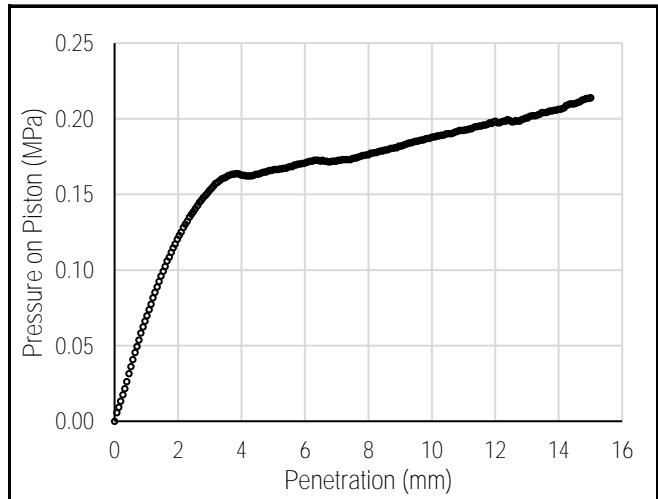
**CBR Results**

CBR at 2.54 mm	2.0 %
CBR at 5.08 mm	1.6 %
Zero Correction	0 mm

**Test Data**

Penetration (mm)	Measured Pressure (MPa)	Corrected Pressure (MPa)
0.64	0.05	0.05
1.27	0.09	0.09
1.91	0.12	0.12
2.54	0.14	0.14
3.18	0.16	0.16
3.81	0.16	0.16
4.45	0.16	0.16
5.08	0.17	0.17
7.62	0.17	0.17
10.16	0.19	0.19
12.70	0.20	0.20

**Load/Penetration Curve**



**Comments:**



Photo 1: Pavement Core Sample at Test Hole TH23-01



Photo 2: Pavement Core Sample at Test Hole TH23-02





Photo 3: Pavement Core Sample at Test Hole TH23-03



Photo 4: Pavement Core Sample at Test Hole TH23-04





Photo 5: Pavement Core Sample at Test Hole TH23-05



Photo 6: Pavement Core Sample at Test Hole TH23-06



Photo 7: Pavement Core Sample at Test Hole TH23-07



Photo 8: Pavement Core Sample at Test Hole TH23-08





Photo 9: Pavement Core Sample at Test Hole TH23-09



Photo 10: Pavement Core Sample P at Test Hole TH23-10