

**TREK GEOTECHNICAL**

### EXPLANATION OF FIELD AND LABORATORY TESTING

**GENERAL NOTES**

- Classifications are based on the United 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 Symbols	Typical Names	Laboratory Classification Criteria
GW	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_u > 6$ greater than 6; $C_c$ between 1 and 3
GP	GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines	Not meeting all gradation requirements for GW
GM	GM	Silty gravels, gravel-sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4
GC	GC	Clayey gravels, gravel-sand-silt mixtures	Atterberg limits above "A" line or P.I. greater than 7
SW	SW	Well-graded sands, gravelly sands, little or no fines	$C_u > 6$ greater than 6; $C_c$ between 1 and 3
SP	SP	Poorly-graded sands, gravelly sands, little or no fines	Not meeting all gradation requirements for SW
SM	SM	Silty sands, sand-silt mixtures	Atterberg limits below "A" line or P.I. less than 4
SC	SC	Clayey sands, sand-clay mixtures	Atterberg limits above "A" line or P.I. greater than 7
ML	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	Atterberg limits below "U" line or P.I. less than 4
CL	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	Atterberg limits above "U" line or P.I. greater than 7
OL	OL	Organic silts and organic silty clays of low plasticity	
MH	MH	Inorganic silts, micaceous or discontinuous fine sandy or silty soils, organic silts	
CH	CH	Inorganic clays of high plasticity, fat clays	
OH	OH	Organic clays of medium to high plasticity, organic silts	
PT	PT	Peat and other highly organic soils	

**Plasticity Chart**

**Other Symbol Types**

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

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### Sub-Surface Log

Test Hole TH15-01 1 of 2

Client: Morrison Hershfield Project Number: 0035 020 00  
 Project Name: Saskatchewan over Omand's Creek Location: UTM N-5529845.75, E-629659.55  
 Contractor: Maple Leaf Drilling Ground Elevation: 233.66 m Existing Ground  
 Method: 125 mm Solid Stem Auger, B37X Track Mount Date Drilled: 7 April 2015

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

Particle Size Legend: Fines Clay Silt Gravel Cobbles Boulders

Elevation (m)	Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	SPT (N)	1-150µm (%)	15-60µm (%)	60-200µm (%)	Undrained Shear Strength (kPa)	Test Type
233.66	0.0		ORGANIC CLAY (FILL) - silty, trace sand, trace gravel <15 mm - black - moist to dry, stiff, frozen from 1.2 m to 1.5 m - intermediate to high plasticity	G1							
231.8	1.8		CLAY - silty, brown - moist, stiff, intermediate plasticity	G2							
231.8	1.8		SILT - trace clay - light brown - moist, firm to soft - low plasticity	G3							
230.8	2.8		CLAY - silty - mottled brown / grey - moist, very stiff - intermediate plasticity - trace oxidation, trace silt inclusions <5 mm below 3.7 m - firm to stiff below 4.3 m	G4							
	5.0		grey below 5.2 m	T5							
	6.1		soft below 6.1 m	G5							
	8.2		trace silt inclusions below 8.2 m	T7							
				G8							
				G9							

Logged By: Syl Precourt Reviewed By: Michael Van Heiden Project Engineer: Michael Van Heiden

**TREK GEOTECHNICAL**

### Sub-Surface Log

Test Hole TH15-02 1 of 2

Client: Morrison Hershfield Project Number: 0035 020 00  
 Project Name: Saskatchewan over Omand's Creek Location: UTM N-5529842.53, E-629636.11  
 Contractor: Maple Leaf Drilling Ground Elevation: 233.68 m Existing Ground  
 Method: 125 mm Solid Stem Auger, B37X Track Mount Date Drilled: 7 April 2015

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

Particle Size Legend: Fines Clay Silt Gravel Cobbles Boulders

Elevation (m)	Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	SPT (N)	1-150µm (%)	15-60µm (%)	60-200µm (%)	Undrained Shear Strength (kPa)	Test Type
233.68	0.0		ORGANIC CLAY (FILL) - silty, trace sand, trace gravel <15 mm - black - moist to dry, stiff, frozen to 0.6 m - intermediate plasticity	G16							
231.8	1.8		GRAVEL / CLAY (FILL) - < 20 mm, silty, trace sand - brown - moist, stiff - intermediate plasticity	G17							
231.8	1.8		SILT - trace clay, light brown - moist, firm to soft, low plasticity	G18							
230.8	2.8		CLAY - silty, trace sand - moist, stiff - intermediate plasticity - mottled brown / grey, firm below 3.5 m	G19							
	5.5		grey, soft below 5.5 m	T20							
				T21							
				G22							
				T23							

Logged By: Syl Precourt Reviewed By: Michael Van Heiden Project Engineer: Michael Van Heiden

**TREK GEOTECHNICAL**

### EXPLANATION OF FIELD AND LABORATORY TESTING

**LEGEND OF ABBREVIATIONS AND SYMBOLS**

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

**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

**TERMS DESCRIBING CONSISTENCY OR COMPACTION CONDITION**

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

Descriptive Terms	SPT (N) (Blows/300 mm)
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:

Descriptive Terms	SPT (N) (Blows/300 mm)
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:

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

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### Sub-Surface Log

Test Hole TH15-01 2 of 2

Client: Morrison Hershfield Project Number: 0035 020 00  
 Project Name: Saskatchewan over Omand's Creek Location: UTM N-5529845.75, E-629659.55  
 Contractor: Maple Leaf Drilling Ground Elevation: 233.66 m Existing Ground  
 Method: 125 mm Solid Stem Auger, B37X Track Mount Date Drilled: 7 April 2015

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

Particle Size Legend: Fines Clay Silt Gravel Cobbles Boulders

Elevation (m)	Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	SPT (N)	1-150µm (%)	15-60µm (%)	60-200µm (%)	Undrained Shear Strength (kPa)	Test Type
217.2	16.5		SILT TILL - trace gravel <20 mm - light grey - moist to wet, soft - non plastic	G10							
				G11							
				G12							
				G13							
				G14							

END OF TEST HOLE AT 16.5 m IN SILT TILL

Notes:

- Power auger refusal encountered at 16.5 m.
- No seepage or sloughing observed.
- Water at 6.7 m.
- Test hole was backfilled with auger cuttings 0.5 m bentonite at bottom of test hole and 0.5 m bentonite at top.
- Test hole was open to 11.6 m.

Logged By: Syl Precourt Reviewed By: Michael Van Heiden Project Engineer: Michael Van Heiden

**TREK GEOTECHNICAL**

### Sub-Surface Log

Test Hole TH15-02 2 of 2

Client: Morrison Hershfield Project Number: 0035 020 00  
 Project Name: Saskatchewan over Omand's Creek Location: UTM N-5529842.53, E-629636.11  
 Contractor: Maple Leaf Drilling Ground Elevation: 233.68 m Existing Ground  
 Method: 125 mm Solid Stem Auger, B37X Track Mount Date Drilled: 7 April 2015

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

Particle Size Legend: Fines Clay Silt Gravel Cobbles Boulders

Elevation (m)	Depth (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Type	Sample Number	SPT (N)	1-150µm (%)	15-60µm (%)	60-200µm (%)	Undrained Shear Strength (kPa)	Test Type
216.7	17.0		SILT TILL - trace gravel <20 mm - light grey - moist to wet, soft - non plastic - increase to some gravel <20 mm below 14.0 m	G24							
				G25							
				G26							
				G27							
				G28							

END OF TEST HOLE AT 16.7 m IN SILT TILL ON SUSPECTED BOULDER

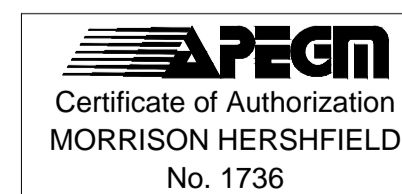
Notes:

- Power auger refusal encountered at 16.7 m.
- No seepage or sloughing observed.
- Water at 3.0 m.
- Test hole was backfilled with auger cuttings 0.5 m bentonite at bottom of test hole and 0.5 m bentonite at top.
- Test hole was open to 10.7 m.

Logged By: Syl Precourt Reviewed By: Michael Van Heiden Project Engineer: Michael Van Heiden

**BOREHOLE LOG NOTES:**

- REFER TO THE GEOTECHNICAL REPORT PREPARED BY TREK GEOTECHNICAL TITLED "SASKATCHEWAN AVENUE BRIDGE OVER OMAND'S CREEK CULVERT REPLACEMENT GEOTECHNICAL INVESTIGATION" DATED SEPTEMBER 23, 2015 FOR BOREHOLE CONTEXT AND INTERPRETATION.
- REFER TO SHEET 03 FOR LOCATIONS OF BOREHOLES TH15-01 & TH15-02 IN PLAN VIEW. ADDITIONAL HISTORIC BOREHOLE LOGS PROXIMATE TO THE BRIDGE SITE ARE DOCUMENTED IN THE GEOTECHNICAL REPORT.



**METRIC**  
WHOLE NUMBERS INDICATE MILLIMETRES  
DECIMALIZED NUMBERS INDICATE METRES

LOCATION APPROVED UNDERGROUND STRUCTURES

SUPR. / UG STRUCTURES DATE COMMITTEE

NOTE: LOCATION OF UNDERGROUND STRUCTURES AS SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE BUT NO GUARANTEE IS GIVEN THAT ALL EXISTING UTILITIES ARE SHOWN OR THAT THE GIVEN LOCATIONS ARE EXACT. CONFIRMATION OF EXISTENCE AND EXACT LOCATION OF ALL SERVICES MUST BE OBTAINED FROM THE INDIVIDUAL UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION.

BM ELEV			
0	ISSUED FOR TENDER	15/10/22	DAN
No.	REVISIONS	YYMMDD	BY

**MORRISON HERSHFIELD**

DESIGNED BY	DAN	CHECKED BY	SAL
DRAWN BY	DML	APPROVED BY	BE
HOR. SCALE	AS SHOWN	ACCEPTED BY	DATE
VERT. SCALE	AS SHOWN	ORIGINAL DRAWING	15/10/22
DATE	15/04/24	SIGNED BY:	D.N. BURMEY, P.ENG.
			BRIDGE PROJECTS ENGINEER

PROFESSIONAL'S SEAL

PROVINCE OF MANITOBA

D.A. NEILSON ORIGINAL SIGNED 15/10/22 37248 REGISTERED PROFESSIONAL ENGINEER

CONSULTANT DRAWING No. W150005-DWG-BRIDGE.dwg

**THE CITY OF WINNIPEG**  
PUBLIC WORKS DEPARTMENT  
ENGINEERING DIVISION

**SASKATCHEWAN AVENUE AT OMAND'S CREEK BRIDGE REPLACEMENT**

CITY DRAWING NUMBER B144-16-05  
SHEET 05 OF 18  
DRAWING No. REV 05 0

**BOREHOLE LOGS**