

ISO A1 - 594mm x 841mm

### 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 Classifications	Symbols	Typical Names	Laboratory Classification Criteria	Particle Size (ASTM) Sieve Sizes
GW	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	Well-graded gravels, gravel-sand mixtures, little or no fines	$C_u > 6$ greater than 4; $D_{60} > 4 D_{10}$ between 1 and 3	60 to 840
GP	GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines	Poorly-graded gravels, gravel-sand mixtures, little or no fines	Not meeting all gradation requirements for GW	60 to 840
GM	GM	Silty gravels, gravel-sand-silt mixtures	Silty gravels, gravel-sand-silt mixtures	Above "A" line with P.I. between 4 and 7 and 7 are border-line cases requiring use of dual symbols	60 to 840
GC	GC	Clayey gravels, gravel-sand-silt mixtures	Clayey gravels, gravel-sand-silt mixtures	Above "A" line with P.I. greater than 7	60 to 840
SW	SW	Well-graded sands, gravelly sands, little or no fines	Well-graded sands, gravelly sands, little or no fines	$C_u > 6$ greater than 6; $D_{60} > 4 D_{10}$ between 1 and 3	2.0 to 4.75
SP	SP	Poorly-graded sands, gravelly sands, little or no fines	Poorly-graded sands, gravelly sands, little or no fines	Not meeting all gradation requirements for SW	2.0 to 4.75
SM	SM	Silty sands, sand-silt mixtures	Silty sands, sand-silt mixtures	Above "A" line with P.I. between 4 and 7 and 7 are border-line cases requiring use of dual symbols	2.0 to 4.75
SC	SC	Clayey sands, sand-clay mixtures	Clayey sands, sand-clay mixtures	Above "A" line with P.I. greater than 7	2.0 to 4.75
ML	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	Above "A" line with P.I. between 4 and 7 and 7 are border-line cases requiring use of dual symbols	4.75 to 75
CL	CL	Inorganic clays of low to medium plasticity, gravelly clays, silty clays, lean clays	Inorganic clays of low to medium plasticity, gravelly clays, silty clays, lean clays	Above "A" line with P.I. greater than 7	4.75 to 75
OL	OL	Organic silts and organic silty clays of low plasticity	Organic silts and organic silty clays of low plasticity		4.75 to 75
MH	MH	Inorganic silts, micaceous or districaceous fine sandy or silty soils, organic silts	Inorganic silts, micaceous or districaceous fine sandy or silty soils, organic silts		4.75 to 75
CH	CH	Inorganic clays of high plasticity, fat clays	Inorganic clays of high plasticity, fat clays		4.75 to 75
OH	OH	Organic clays of medium to high plasticity, organic silts	Organic clays of medium to high plasticity, organic silts		4.75 to 75
PI	PI	Peat and other highly organic soils	Peat and other highly organic soils		4.75 to 75

**Other Symbol Types**

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

### Sub-Surface Log

Test Hole TH16-01  
1 of 2

**Client:** Morrison Hershfield **Project Number:** 0035 038 00  
**Project Name:** Rue des Trappistes **Location:** UTM N-5513711, E-632442  
**Contractor:** Maple Leaf Drilling Ltd. **Ground Elevation:** 232.20 m  
**Method:** 125mm Solid Stem Auger, DR-150 Track Mount **Date Drilled:** 31 August 2016

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

Elevation (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Number	SPT (N)	Undrained Shear Strength (kPa)
232.1	ASPHALT	ASPHALT (FILL) - clayey, some sand	S01		
231.9	GRAVEL (FILL)	GRAVEL (FILL) - clayey, some sand	S02		
231.4	CLAY (FILL)	CLAY (FILL) - trace sand and gravel	S03		
230.8	CLAY (FILL)	CLAY (FILL) - trace sand and gravel	S04		
229.3	SAND (FILL)	SAND (FILL) - trace gravel	S05		
228.8	CLAY (FILL)	CLAY (FILL) - trace sand and gravel	S06		
228.3	CLAY (FILL)	CLAY (FILL) - trace sand and gravel	S07		
226.5	CLAY (FILL)	CLAY (FILL) - trace sand and gravel	S08		
226.0	CLAY (FILL)	CLAY (FILL) - trace sand and gravel	S09		
225.5	CLAY (FILL)	CLAY (FILL) - trace sand and gravel	S10		

**Logged By:** Adrian Kowalchuk **Reviewed By:** N.J. Ferreira **Project Engineer:** Michael Van Helden

### Sub-Surface Log

Test Hole TH16-02  
1 of 1

**Client:** Morrison Hershfield **Project Number:** 0035 038 00  
**Project Name:** Rue des Trappistes **Location:** UTM N-5513714, E-632445  
**Contractor:** Maple Leaf Drilling Ltd. **Ground Elevation:** 232.20 m  
**Method:** 125mm Solid Stem Auger, DR-150 Track Mount **Date Drilled:** 31 August 2016

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

Elevation (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Number	SPT (N)	Undrained Shear Strength (kPa)
232.1	ASPHALT	ASPHALT (FILL) - some clay, some silt, dark brown, dry, fine to coarse	S11		
231.9	GRAVEL (FILL)	GRAVEL (FILL) - trace silt inclusions (light grey)	S12		
231.4	CLAY (FILL)	CLAY (FILL) - trace silt inclusions (light grey)	S13		
230.8	CLAY (FILL)	CLAY (FILL) - trace silt inclusions (light grey)	S14		
229.3	CLAY (FILL)	CLAY (FILL) - trace silt inclusions (light grey)	S15		
228.8	CLAY (FILL)	CLAY (FILL) - trace silt inclusions (light grey)	S16		
228.3	CLAY (FILL)	CLAY (FILL) - trace silt inclusions (light grey)	S17		
226.5	CLAY (FILL)	CLAY (FILL) - trace silt inclusions (light grey)	S18		
226.0	CLAY (FILL)	CLAY (FILL) - trace silt inclusions (light grey)	S19		
225.5	CLAY (FILL)	CLAY (FILL) - trace silt inclusions (light grey)	S20		

**Logged By:** Adrian Kowalchuk **Reviewed By:** N.J. Ferreira **Project Engineer:** Michael Van Helden

### 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 (%)  
 MC - Moisture Content (%)      Water Level After Drilling as Indicated on Test Hole Logs  
 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 compactness 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

### Sub-Surface Log

Test Hole TH16-01  
2 of 2

**Client:** Morrison Hershfield **Project Number:** 0035 038 00  
**Project Name:** Rue des Trappistes **Location:** UTM N-5513717, E-632450  
**Contractor:** Maple Leaf Drilling Ltd. **Ground Elevation:** 232.20 m  
**Method:** 125mm Solid Stem Auger, DR-150 Track Mount **Date Drilled:** 31 August 2016

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

Elevation (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Number	SPT (N)	Undrained Shear Strength (kPa)
231.9	GRAVEL (FILL)	trace gravel (medium grained, rounded) below 9.3 m depth	T11		
231.4	CLAY (FILL)	firm below 10.6 m depth	T12		
230.8	CLAY (FILL)	trace sand and gravel, mottled dark grey and light grey, wet, very soft below 11.2 m depth	T13		
229.3	CLAY (FILL)	CLAY (FILL) - some sand and gravel	T14		
228.8	SILT (TILL)	SILT (TILL) - some clay, some sand, some gravel	S15		
228.3	SILT (TILL)	SILT (TILL) - some clay, some sand, some gravel	S16		
226.5	SILT (TILL)	SILT (TILL) - some clay, some sand, some gravel	S17		

**Logged By:** Adrian Kowalchuk **Reviewed By:** N.J. Ferreira **Project Engineer:** Michael Van Helden

### Sub-Surface Log

Test Hole TH16-03  
1 of 1

**Client:** Morrison Hershfield **Project Number:** 0035 038 00  
**Project Name:** Rue des Trappistes **Location:** UTM N-5513717, E-632450  
**Contractor:** Maple Leaf Drilling Ltd. **Ground Elevation:** 232.20 m  
**Method:** 125mm Solid Stem Auger, DR-150 Track Mount **Date Drilled:** 31 August 2016

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

Elevation (m)	Soil Symbol	MATERIAL DESCRIPTION	Sample Number	SPT (N)	Undrained Shear Strength (kPa)
232.1	ASPHALT	ASPHALT (FILL) - some clay, some silt, moist	S21		
231.9	GRAVEL (FILL)	GRAVEL (FILL) - brown, firm	S22		
231.4	CLAY (FILL)	CLAY (FILL) - high plasticity	S23		
230.8	GRAVEL (FILL)	GRAVEL (FILL) - sandy	S24		
229.3	CLAY (FILL)	CLAY (FILL) - some sand and gravel	S25		
228.8	CLAY (FILL)	CLAY (FILL) - some sand and gravel	S26		
228.3	CLAY (FILL)	CLAY (FILL) - some sand and gravel	S27		
226.5	CLAY (FILL)	CLAY (FILL) - some sand and gravel	S28		
226.0	CLAY (FILL)	CLAY (FILL) - some sand and gravel	S29		
225.5	CLAY (FILL)	CLAY (FILL) - some sand and gravel	S30		

**Logged By:** Adrian Kowalchuk **Reviewed By:** N.J. Ferreira **Project Engineer:** Michael Van Helden

**BOREHOLE LOG NOTES:**

- REFER TO THE GEOTECHNICAL REPORT PREPARED BY TREK GEOTECHNICAL TITLED "PRELIMINARY DESIGN - RUE DES TRAPPISTES CULVERT REPLACEMENT" (1st REVISION) DATED DECEMBER 6, 2016 FOR BOREHOLE CONTEXT AND INTERPRETATION.
- REFER TO SHEET 03 FOR LOCATIONS OF BOREHOLES IN PLAN VIEW.



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

**LOCATION APPROVED UNDERGROUND STRUCTURES**

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.

DESIGNED BY	DAN	CHECKED BY	BE
DRAWN BY	MS	APPROVED BY	SAL
HOR SCALE	N/A	RELEASED FOR CONSTRUCTION	
VERT SCALE			
DATE	17/09/15	DATE	



BID OPPORTUNITY No. 698-2017

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

**RUE DES TRAPPISTES AT WESTENDORF COULEE CULVERT REPLACEMENT AND ROAD RECONSTRUCTION**

**BOREHOLE LOGS**

CITY DRAWING NUMBER	C372-17-04
SHEET	04 OF 22
DRAWING No.	04
REV	0