

# **APPENDIX 'F'**

## **GEOTECHNICAL REPORT**



PUBLIC WORKS DEPARTMENT • SERVICE DES TRAVAUX PUBLICS

Engineering Division • Division de l'ingénierie

## GEOTECHNICAL INVESTIGATION STREET RECONSTRUCTION

Revised October 28<sup>th</sup>, 2008

### Fieldwork

1. Clear all underground services at each testhole location.
2. Test holes required every **50** m with a minimum of **3** test holes per street.
3. Record location of testhole (offset from curb, distance from cross street and house number).
4. Drill 150 mm-diameter core in pavement.
5. Drill 125 mm-diameter testhole into fill materials and subgrade
6. **If a service trench backfilled with granular materials is encountered, another hole shall be drilled to define the existing sub-surface conditions.**
7. Testhole to be drilled to depth of 2 m  $\pm$  150 mm below surface of the pavement.
8. Recover pavement core sample and representative samples of soil (fill materials, pavement structure materials and subgrade).
9. Measure and record pavement section exposed in the testhole (thickness of concrete or asphalt and different types of pavement structure materials).
10. Pavement structure materials to be identified as crushed limestone or granular fill and the maximum aggregate size of the material (20 mm, 50 mm or 150 mm).
11. Log soil profile for the subgrade.
12. Representative samples of soil must be obtained at the following depths below the bottom of the pavement structure materials - 0.1 m, 0.4 m, 0.7 m, 1.0 m, 1.3 m, 1.6 m, etc. Ensure a sample is obtained from each soil type encountered in the testhole.
13. Make note of any water seepage into the testhole.
14. Backfill testhole with native materials and additional granular fill, if required. Patch pavement surface with hot mix asphalt or high strength durable concrete mix.
15. Return core sample from the pavement and soil samples to the laboratory.

### Lab Work

1. Test all soil samples for moisture content.
2. Photograph core samples recovered from the pavement surface.
3. Conduct tests for plasticity index and hydrometer analysis on selected soil samples **which are between 0.5 m and 1 m below top of pavement (this is the sub-grade on which the pavement and sub-base will be built)**. The selection will be based upon visual classification and moisture content test results, with a minimum of one sample of each soil type per street to be tested.
4. Prepare testhole logs and classify subgrade (based on hydrometer) as follows;
  - < 30% silt - classify as clay
  - 30% - 50% silt - classify as silty clay
  - 50% - 70% silt - classify as clayey silt
  - > 70% silt - classify as silt

Prepared by: The National Testing Laboratories Limited and Eng-Tech Consulting

*Embrace the Spirit • Vivez l'esprit*

**AECOM Canada Ltd.**

**GENERAL STATEMENT**

**NORMAL VARIABILITY OF SUBSURFACE CONDITIONS**

The scope of the investigation presented herein is limited to an investigation of the subsurface conditions as to suitability for the proposed project. This report has been prepared to aid in the evaluation of the site and to assist the engineer in the design of the facilities. Our description of the project represents our understanding of the significant aspects of the project relevant to the design and construction of earth work, foundations and similar. In the event of any changes in the basic design or location of the structures as outlined in this report or plan, we should be given the opportunity to review the changes and to modify or reaffirm in writing the conclusions and recommendations of this report.

The analysis and recommendations presented in this report are based on the data obtained from the borings and test pit excavations made at the locations indicated on the site plans and from other information discussed herein. This report is based on the assumption that the subsurface conditions everywhere are not significantly different from those disclosed by the borings and excavations. However, variations in soil conditions may exist between the excavations and, also, general groundwater levels and conditions may fluctuate from time to time. The nature and extent of the variations may not become evident until construction. If subsurface conditions differ from those encountered in the exploratory borings and excavations, are observed or encountered during construction, or appear to be present beneath or beyond excavations, we should be advised at once so that we can observe and review these conditions and reconsider our recommendations where necessary.

Since it is possible for conditions to vary from those assumed in the analysis and upon which our conclusions and recommendations are based, a contingency fund should be included in the construction budget to allow for the possibility of variations which may result in modification of the design and construction procedures.

In order to observe compliance with the design concepts, specifications or recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated, we recommend that all construction operations dealing with earth work and the foundations be observed by an experienced soils engineer. We can be retained to provide these services for you during construction. In addition, we can be retained to review the plans and specifications that have been prepared to check for substantial conformance with the conclusions and recommendations contained in our report.

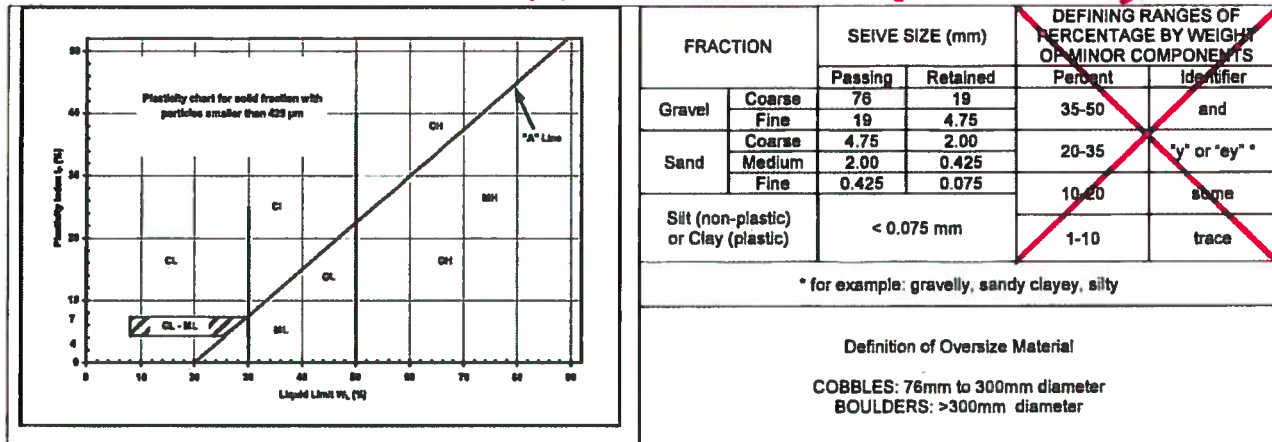
## EXPLANATION OF FIELD & LABORATORY TEST DATA

Description				UMA Log Symbols	USCS Classification	Laboratory Classification Criteria			
						Fines (%)	Grading	Plasticity	Notes
COARSE GRAINED SOILS	GRAVELS (More than 50% of coarse fraction of gravel size)	CLEAN GRAVELS (Little or no fines)	Well graded gravels, sandy gravels, with little or no fines		GW	0-5	$C_u > 4$ $1 < C_c < 3$		Dual symbols if 5-12% fines. Dual symbols if above "A" line and $4 < W_p < 7$  $C_u = \frac{D_{60}}{D_{10}}$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
			Poorly graded gravels, sandy gravels, with little or no fines		GP	0-5	Not satisfying GW requirements		
		DIRTY GRAVELS (With some fines)	Silty gravels, silty sandy gravels		GM	> 12		Atterberg limits below "A" line or $W_p < 4$	
			Clayey gravels, clayey sandy gravels		GC	> 12		Atterberg limits above "A" line or $W_p < 7$	
	SANDS (More than 50% of coarse fraction of sand size)	CLEAN SANDS (Little or no fines)	Well graded sands, gravelly sands, with little or no fines		SW	0-5	$C_u > 6$ $1 < C_c < 3$		
			Poorly graded sands, gravelly sands, with little or no fines		SP	0-5	Not satisfying SW requirements		
		DIRTY SANDS (With some fines)	Silty sands, sand-silt mixtures		SM	> 12		Atterberg limits below "A" line or $W_p < 4$	
			Clayey sands, sand-clay mixtures		SC	> 12		Atterberg limits above "A" line or $W_p < 7$	
	<div>FINE GRAINED SOILS</div>	SILTS (Below 'A' line negligible organic content)	$W_L < 50$	Inorganic silts, silty or clayey fine sands, with slight plasticity		ML			
			$W_L > 50$	Inorganic silts of high plasticity		MH			
CLAYS (Above 'A' line negligible organic content)		$W_L < 30$	Inorganic clays, silty clays, sandy clays of low plasticity, lean clays		CL			Classification is Based upon Plasticity Chart	
		$30 < W_L < 50$	Inorganic clays and silty clays of medium plasticity		CI				
		$W_L > 50$	Inorganic clays of high plasticity, fat clays		CH				
ORGANIC SILTS & CLAYS (Below 'A' line)		$W_L < 50$	Organic silts and organic silty clays of low plasticity		OL				
		$W_L > 50$	Organic clays of high plasticity		OH				
HIGHLY ORGANIC SOILS		Peat and other highly organic soils		Pt	Von Post Classification Limit		Strong colour or odour, and often fibrous texture		
		Asphalt		Till				<div>AECOM</div>	
	Concrete		Bedrock (Undifferentiated)						
	Fill		Bedrock (Limestone)						

When the above classification terms are used in this report or test hole logs, the designated fractions may be visually estimated and not measured.

Not used to classify subgrade. Reference to city of Winnipeg Specs for Geotechnical Investigation street reconstruction (Oct. 2008).

**NOT USED TO CLASSIFY SUBGRADE. REFER TO CITY OF WINNIPEG SPECS FOR GEOTECHNICAL INVESTIGATION STREET RECONSTRUCTION (OCT. 2008)**



### LEGEND OF SYMBOLS

Laboratory and field tests are identified as follows:

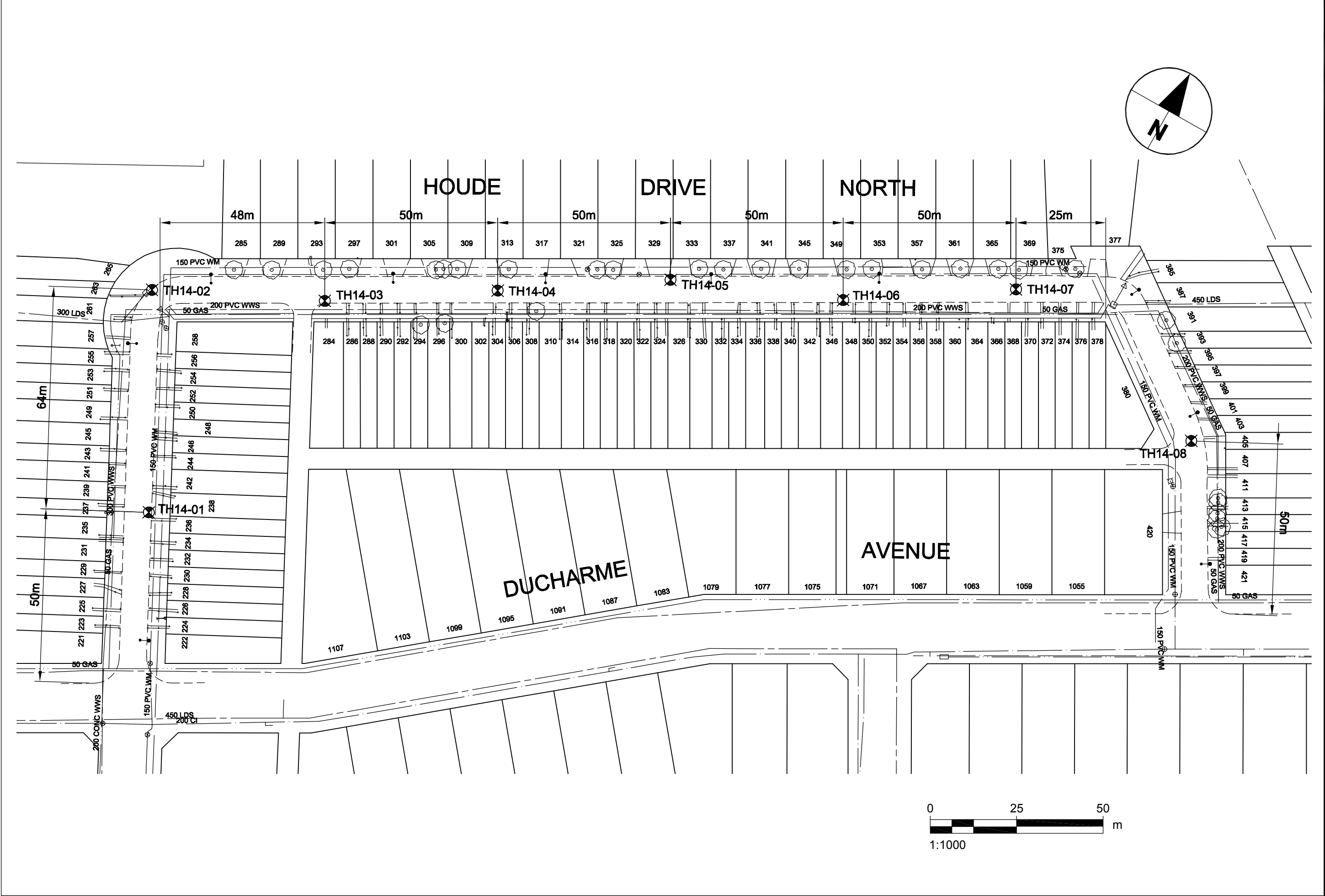
- $q_u$  - undrained shear strength (kPa) derived from unconfined compression testing.
- $T_v$  - undrained shear strength (kPa) measured using a torvane
- $pp$  - undrained shear strength (kPa) measured using a pocket penetrometer.
- $L_v$  - undrained shear strength (kPa) measured using a lab vane.
- $F_v$  - undrained shear strength (kPa) measured using a field vane.
- $\gamma$  - bulk unit weight ( $\text{kN/m}^3$ ).
- SPT - Standard Penetration Test. Recorded as number of blows (N) from a 63.5 kg hammer dropped 0.76 m (free fall) which is required to drive a 51 mm O.D. Raymond type sampler 0.30 m into the soil.
- DPPT - Drive Point Pentrometer Test. Recorded as number of blows from a 63.5 kg hammer dropped 0.76 m (free fall) which is required to drive a 50 mm drive point 0.30 m into the soil.
- $w$  - moisture content ( $W_L$ ,  $W_P$ )

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

$S_u$ (kPa)	CONSISTENCY
<12	very soft
12 - 25	soft
25 - 50	medium or firm
50 - 100	stiff
100 - 200	very stiff
200	hard

The resistance (N) of a non-cohesive soil can be related to compactness condition as follows

N - BLOWS/0.30 m	COMPACTNESS
0 - 4	very loose
4 - 10	loose
10 - 30	compact
30 - 50	dense
50	very dense





**Photograph 1. Houde Drive – TH14-01**



**Photograph 2. Houde Drive – TH14-02**





**Photograph 3. Houde Drive – TH14-03**



**Photograph 4. Houde Drive – TH14-04**





**Photograph 5. Houde Drive – TH14-05**



**Photograph 6. Houde Drive – TH14-06**



**Photograph 7. Houde Drive – TH14-07**




**Photograph 8. Houde Drive – TH14-08**

PROJECT: Local street Package 14-R-06				CLIENT: City of Winnipeg				TESTHOLE NO: TH14-01			
LOCATION: Houde Drive North ;7 m East of West Curb								PROJECT NO.: 60312294			
CONTRACTOR: Paddock Drilling Ltd				METHOD: 125 mm SSA with 150 mm Coring				ELEVATION (m):			
SAMPLE TYPE <input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE											

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS		UNDRAINED SHEAR STRENGTH		COMMENTS	DEPTH
					* Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) ■ Total Unit Wt ■ (kN/m³)	+ Torvane + × QU × □ Lab Vane □ △ Pocket Pen. △ ⊗ Field Vane ⊗ (kPa)				
0		ASPHALT (thickness = 52 mm) CLAY - trace sand - dark grey - frozen to 1.7 m , moist when thawed - high plasticity			0 20 40 60 80 100 16 17 18 19 20 21 Plastic MC Liquid					
				G1						
				G2						
1				G3					Clay : 79.9% , Silt : 17.5% , Sand : 2.6% , Gravel : 0.0%	1
				G4						
		- brown below 1.5 m		G5						
		- soft to firm below 1.7 m.		G6						
2				G7						2
		END OF TEST HOLE AT 2.44 m IN CLAY. NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.28 m, solid stem augers to 2.4 m.								
3										

LOG OF TEST HOLE STREET PACKAGE 14-R-06 BERRYDALE AND HOUE.GPJ UMA WINN.GDT 2/2/14




LOGGED BY: Saba Ibrahim	COMPLETION DEPTH: 2.44 m
REVIEWED BY: Faris Khalil	COMPLETION DATE: 2/5/14
PROJECT ENGINEER:	

Page 1 of 1

PROJECT: Local street Package 14-R-06				CLIENT: City of Winnipeg				TESTHOLE NO: TH14-02					
LOCATION: Houde Drive North ;1 m East of West Curb								PROJECT NO.: 60312294					
CONTRACTOR: Paddock Drilling Ltd				METHOD: 125 mm SSA with 150 mm Coring				ELEVATION (m):					
SAMPLE TYPE		<input checked="" type="checkbox"/> GRAB		<input type="checkbox"/> SHELBY TUBE		<input checked="" type="checkbox"/> SPLIT SPOON		<input type="checkbox"/> BULK		<input checked="" type="checkbox"/> NO RECOVERY		<input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS		UNDRAINED SHEAR STRENGTH		COMMENTS	DEPTH
					* Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100	Total Unit Wt (kN/m³) 16 17 18 19 20 21 Plastic MC Liquid	+ Torvane + × QU × □ Lab Vane □ △ Pocket Pen. △ ⊗ Field Vane ⊗ (kPa) 50 100 150 200			
0		ASPHALT (thickness = 95 mm)								
		CLAY - trace sand - grayish brown, - frozen to 1.5 m, moist when thawed - high plasticity								
				G8						
				G9						
1				G10						1
		- some sand and some gravel at 1.4 m		G11						
		- brown, soft to firm, below 1.5 m		G12						
2				G13						2
				G14						
3		END OF TEST HOLE AT 2.44 m IN CLAY. NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.330 m, solid stem augers to 2.4								

LOG OF TEST HOLE STREET PACKAGE 14-R-06 BERRYDALE AND HOUE.GPJ UMA WINN.GDT 2/2/14




LOGGED BY: Saba Ibrahim	COMPLETION DEPTH: 2.44 m
REVIEWED BY: Faris Khalil	COMPLETION DATE: 2/5/14
PROJECT ENGINEER:	Page 1 of 1

PROJECT: Local street Package 14-R-06				CLIENT: City of Winnipeg				TESTHOLE NO: TH14-03					
LOCATION: Houde Drive North ;7 m South of North Curb								PROJECT NO.: 60312294					
CONTRACTOR: Paddock Drilling Ltd				METHOD: 125 mm SSA with 150 mm Coring				ELEVATION (m):					
SAMPLE TYPE		<input checked="" type="checkbox"/> GRAB		<input type="checkbox"/> SHELBY TUBE		<input checked="" type="checkbox"/> SPLIT SPOON		<input type="checkbox"/> BULK		<input checked="" type="checkbox"/> NO RECOVERY		<input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS * Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) ■ Total Unit Wt ■ (kN/m³) Plastic MC Liquid 20 40 60 80 100	UNDRAINED SHEAR STRENGTH + Torvane + × QU × □ Lab Vane □ △ Pocket Pen. △ ⊗ Field Vane ⊗ (kPa) 50 100 150 200	COMMENTS	DEPTH
0		ASPHALT (thickness = 70 mm)						
		CLAY - trace sand - dark grey to grey - frozen to 1.5 m, moist when thawed - high plasticity						
				G15				
				G16			Clay : 81.5%, Silt : 15.1% , Sand : 3.5% , Gravel : 0.0%	
1				G17				1
				G18				
		- brown, soft below 1.5 m		G19				
2				G20				2
				G21				
3		END OF TEST HOLE AT 2.44 m IN CLAY. NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.330 m, solid stem augers to 2.4 m.						

LOG OF TEST HOLE STREET PACKAGE 14-R-06 BERRYDALE AND HOUE.GPJ UMA WINN.GDT 2/2/14



LOGGED BY: Saba Ibrahim	COMPLETION DEPTH: 2.44 m
REVIEWED BY: Faris Khalil	COMPLETION DATE: 2/5/14
PROJECT ENGINEER:	

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PROJECT: Local street Package 14-R-06			CLIENT: City of Winnipeg			TESTHOLE NO: TH14-04		
LOCATION: Houde Drive North ;4 m South of North Curb						PROJECT NO.: 60312294		
CONTRACTOR: Paddock Drilling Ltd			METHOD: 125 mm SSA with 150 mm Coring			ELEVATION (m):		
SAMPLE TYPE <input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE								
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS * Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) ■ Total Unit Wt (kN/m³) Plastic MC Liquid 20 40 60 80 100	UNDRAINED SHEAR STRENGTH + Torvane + × QU × □ Lab Vane □ △ Pocket Pen. △ ⊗ Field Vane ⊗ (kPa) 50 100 150 200	COMMENTS	DEPTH
0		ASPHALT (thickness = 70 mm)						
		CLAY - trace sand - black to dark grey - frozen to 1.8 m, moist when thawed - high plasticity						
				G22				
				G23				
1				G24				1
				G25				
		- dark brown below 1.5 m		G26				
		- silty, light brown, soft below 1.8 m		G27				
2				G28				2
		END OF TEST HOLE AT 2.44 m IN CLAY. NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.305 m, solid stem augers to 2.4 m.						
3								

PROJECT: Local street Package 14-R-06				CLIENT: City of Winnipeg				TESTHOLE NO: TH14-05					
LOCATION: Houde Drive North ;1 m South of North Curb								PROJECT NO.: 60312294					
CONTRACTOR: Paddock Drilling Ltd				METHOD: 125 mm SSA with 150 mm Coring				ELEVATION (m):					
SAMPLE TYPE		<input checked="" type="checkbox"/> GRAB		<input type="checkbox"/> SHELBY TUBE		<input checked="" type="checkbox"/> SPLIT SPOON		<input type="checkbox"/> BULK		<input type="checkbox"/> NO RECOVERY		<input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS	UNDRAINED SHEAR STRENGTH	COMMENTS	DEPTH
0		ASPHALT (thickness = 52 mm)			<div style="font-size: 0.8em;">           * Becker *            ◇ Dynamic Cone ◇            ◆ SPT (Standard Pen Test) ◆            (Blows/300mm)            0 20 40 60 80 100            ■ Total Unit Wt ■            (kN/m³)            16 17 18 19 20 21            Plastic MC Liquid            20 40 60 80 100         </div>	<div style="font-size: 0.8em;">           + Torvane +            × QU ×            □ Lab Vane □            △ Pocket Pen. △            ⊗ Field Vane ⊗            (kPa)            50 100 150 200         </div>		
		CLAY (FILL) - trace sand, trace gravel - black - frozen, moist when thawed - high plasticity		G29	●			
		CLAY - trace sand - grey, - frozen to 1.5 m, moist when thawed - high plasticity		G30	●		Clay : 70.5%, Silt : 24% , Sand : 5.5% , Gravel : 0.0%	
1				G31	●			
				G32	●			
		- brown, soft to firm below 1.5 m		G33	●			
2				G34	●			
		- silty, light brown, soft below 2.1 m		G35	●			
3		END OF TEST HOLE AT 2.44 m IN CLAY. NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.380 m, solid stem augers to 2.4 m.						

	LOGGED BY: Saba Ibrahim	COMPLETION DEPTH: 2.44 m
	REVIEWED BY: Faris Khalil	COMPLETION DATE: 2/5/14
	PROJECT ENGINEER:	Page 1 of 1


LOG OF TEST HOLE STREET PACKAGE 14-R-06 BERRYDALE AND HOUE.GPJ UMA WINN.GDT 2/2/14



PROJECT: Local street Package 14-R-06				CLIENT: City of Winnipeg				TESTHOLE NO: TH14-06					
LOCATION: Houde Drive North ;7 m South of North Curb								PROJECT NO.: 60312294					
CONTRACTOR: Paddock Drilling Ltd				METHOD: 125 mm SSA with 150 mm Coring				ELEVATION (m):					
SAMPLE TYPE		<input checked="" type="checkbox"/> GRAB		<input type="checkbox"/> SHELBY TUBE		<input checked="" type="checkbox"/> SPLIT SPOON		<input type="checkbox"/> BULK		<input checked="" type="checkbox"/> NO RECOVERY		<input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS		UNDRAINED SHEAR STRENGTH		COMMENTS	DEPTH
					* Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100	Total Unit Wt (kN/m³) 16 17 18 19 20 21 Plastic MC Liquid	+ Torvane + × QU × □ Lab Vane □ △ Pocket Pen. △ ⊗ Field Vane ⊗ (kPa) 50 100 150 200			
0		ASPHALT (thickness = 70 mm)								
		CLAY (FILL) - trace sand - black - frozen, moist when thawed - high plasticity		G36						
		CLAY - trace oxidation - grey, - frozen to 1.5 m, moist when thawed - high plasticity		G37						
1				G38						1
				G39						
		- brown, soft to firm below 1.5 m		G40						
2				G41						2
				G42						
3		END OF TEST HOLE AT 2.44 m IN CLAY. NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.380 m, solid stem augers to 2.4								

LOG OF TEST HOLE STREET PACKAGE 14-R-06 BERRYDALE AND HOUE.GPJ UMA WINN.GDT 2/2/14




LOGGED BY: Saba Ibrahim	COMPLETION DEPTH: 2.44 m
REVIEWED BY: Faris Khalil	COMPLETION DATE: 2/5/14
PROJECT ENGINEER:	

Page 1 of 1

PROJECT: Local street Package 14-R-06				CLIENT: City of Winnipeg				TESTHOLE NO: TH14-07					
LOCATION: Houde Drive North ;4 m South of North Curb								PROJECT NO.: 60312294					
CONTRACTOR: Paddock Drilling Ltd				METHOD: 125 mm SSA with 150 mm Coring				ELEVATION (m):					
SAMPLE TYPE		<input checked="" type="checkbox"/> GRAB		<input type="checkbox"/> SHELBY TUBE		<input checked="" type="checkbox"/> SPLIT SPOON		<input type="checkbox"/> BULK		<input checked="" type="checkbox"/> NO RECOVERY		<input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS * Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) ■ Total Unit Wt ■ (kN/m³) Plastic MC Liquid 20 40 60 80 100	UNDRAINED SHEAR STRENGTH + Torvane + × QU × □ Lab Vane □ △ Pocket Pen. △ ⊗ Field Vane ⊗ (kPa) 50 100 150 200	COMMENTS	DEPTH
0		ASPHALT (thickness = 52 mm)						
		SILT - some sand - brown to light brown, - frozen to 1.5 m, moist when thawed - low plasticity						
				G43				
				G44				Clay : 29.3%, Silt : 45.2% , Sand : 25.4% , Gravel : 0.0%
1				G45				
		SAND - - light brown, - frozen to 1.5 m, moist when thawed  - loose below 1.5 m.						
				G46				
				G47				
2		CLAY - - brown, firm - moist - high plasticity						
				G48				
				G49				
3		END OF TEST HOLE AT 2.44 m IN CLAY. NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.380 m, solid stem augers to 2.4						




LOGGED BY: Saba Ibrahim  
 REVIEWED BY: Faris Khalil  
 PROJECT ENGINEER:

COMPLETION DEPTH: 2.44 m  
 COMPLETION DATE: 2/5/14  
 Page 1 of 1

LOG OF TEST HOLE STREET PACKAGE 14-R-06 BERRYDALE AND HOUE.GPJ UMA WINN.GDT 2/2/14

PROJECT: Local street Package 14-R-06				CLIENT: City of Winnipeg				TESTHOLE NO: TH14-08					
LOCATION: Houde Drive North ;4 m West of East Curb								PROJECT NO.: 60312294					
CONTRACTOR: Paddock Drilling Ltd				METHOD: 125 mm SSA with 150 mm Coring				ELEVATION (m):					
SAMPLE TYPE		<input checked="" type="checkbox"/> GRAB		<input type="checkbox"/> SHELBY TUBE		<input checked="" type="checkbox"/> SPLIT SPOON		<input type="checkbox"/> BULK		<input checked="" type="checkbox"/> NO RECOVERY		<input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS		UNDRAINED SHEAR STRENGTH		COMMENTS	DEPTH
					* Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) ■ Total Unit Wt ■ (kN/m³)	+ Torvane + × QU × □ Lab Vane □ △ Pocket Pen. △ ⊗ Field Vane ⊗ (kPa)				
0		ASPHALT (thickness = 52 mm)								
		CLAY (FILL) - trace sand - black to dark brown - frozen to 1.5 m, moist when thawed - high plasticity								
		CLAY - - grey, - frozen to 1.5 m, moist when thawed - high plasticity								
1				G50					Clay : 78.2%, Silt : 18.5% , Sand : 3.3% , Gravel : 0.0%	1
				G51						
				G52						
				G53						
		- soft to firm below 1.5 m.		G54						
		- silty, brown to dark brown below 1.75 m		G55						
2		- grayish brown below 1.9 m		G56						2
		- gypsum lenses below 2.1 m								
		END OF TEST HOLE AT 2.44 m IN CLAY. NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.380 m, solid stem augers to 2.4.								
3										



LOGGED BY: Saba Ibrahim  
 REVIEWED BY: Faris Khalil  
 PROJECT ENGINEER:

COMPLETION DEPTH: 2.44 m  
 COMPLETION DATE: 2/7/14  
 Page 1 of 1

LOG OF TEST HOLE STREET PACKAGE 14-R-06 BERRYDALE AND HOUE.GPJ UMA WINN.GDT 2/2/14

City of Winnipeg

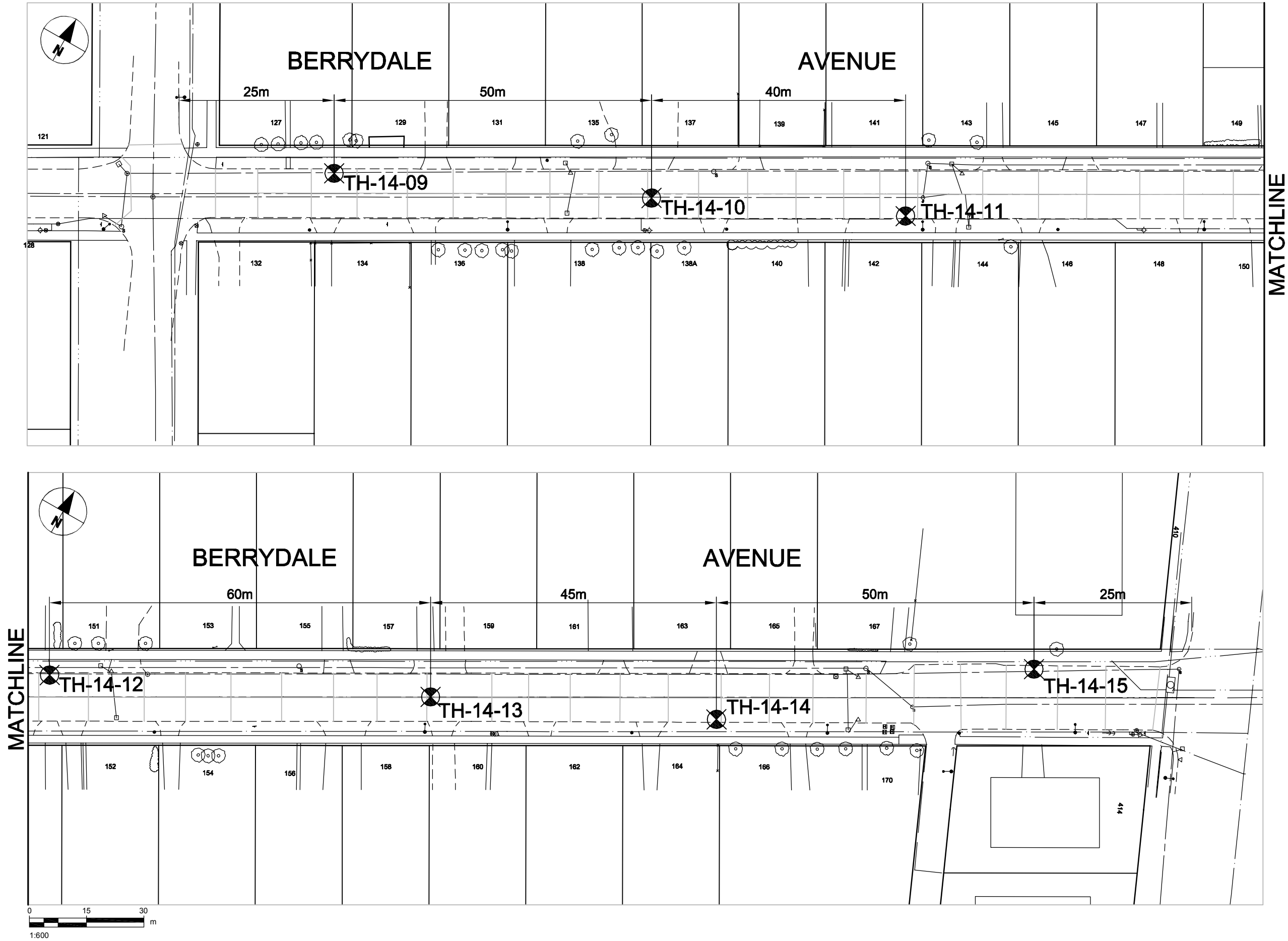
Houde Drive - Package 14-R-06

Geotechnical Investigation

Table 01- Summary of Laboratory Soil Testing

Test Hole No.	Testhole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits		
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH14-01	Houde Drive North ;7 m East of West Curb	Asphalt	52	None	n/a	Clay	0.46	38.0							
						Clay	0.76	38.8							
						Clay	1.06	38.6	0.0	2.6	17.5	79.9	84.8	29.3	55.6
		Concrete	n/a			Clay	1.37	37.8							
						Clay	1.67	35.6							
						Clay	1.98	39.8							
						Clay	2.28	40.3							
TH14-02	Asphalt	95	None	n/a	Clay	0.46	36.5								
					Clay	0.76	36.3								
	Concrete	n/a			Clay	1.06	37.6								
					Clay	1.37	21.6								
					Clay	1.67	41.0								
					Clay	1.98	40.8								
					Clay	2.28	44.8								
TH14-03	Asphalt	70	None	n/a	Clay	0.46	37.3								
					Clay	0.76	36.6	0.0	3.5	15.1	81.5	83.7	27.7	56.0	
	Concrete	n/a			Clay	1.06	37.8								
					Clay	1.37	37.9								
					Clay	1.67	37.4								
					Clay	1.98	37.9								
					Clay	2.28	38.7								
TH14-04	Asphalt	70	None	n/a	Clay	0.46	29.4								
					Clay	0.76	31.9								
	Concrete	n/a			Clay	1.06	34.2								
					Clay	1.37	35.9								
					Clay	1.67	35.3								
					Silty Clay	1.98	37.2								
					Silty Clay	2.28	39.1								
TH14-05	Asphalt	52	None	n/a	Clay Fill	0.46	34.4								
					Clay	0.76	32.1	0.0	5.5	24	70.5	77.9	26.8	51.1	
	Concrete	n/a			Clay	1.06	32.0								
					Clay	1.37	32.0								
					Clay	1.67	30.7								
					Clay	1.98	35.6								
					Silty Clay	2.28	35.4								

Test Hole No.	Testhole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits			
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index	
TH14-06	Houde Drive North ;7 m South of North Curb	Asphalt	70	None	n/a	Clay Fill	0.46	32.9								
						Clay	0.76	36.7								
						Clay	1.06	32.1								
		Concrete	n/a			Clay	1.37	35.6								
						Clay	1.67	36.7								
						Clay	1.98	39.4								
						Clay	2.28	41.1								
TH14-07	Houde Drive North ;4 m South of North Curb	Asphalt	52	None	n/a	Silt	0.46	29.3								
						Silt	0.76	24.8	0.0	25.4	45.2	29.3	30	12.9	17.1	
		Concrete	n/a			Silt	1.06	19.1								
						Sand	1.37	21.7								
						Sand	1.67	34.2								
						Clay	1.98	41.2								
						Clay	2.28	46.6								
TH14-08	Houde Drive North ;4 m West of East Curb	Asphalt	52	None	n/a	Clay Fill	0.46	32.5	0.0	3.3	18.5	78.2	82.5	29.2	53.3	
						Clay	0.76	33.2								
		Concrete	n/a			Clay	1.06	32.1								
						Clay	1.37	32.7								
						Clay	1.67	38.6								
						Silty Clay	1.98	38.7								
						Silty Clay	2.28	39.5								





**Photograph 1. Berrydale Avenue – TH14-09**



**Photograph 2. Berrydale Avenue – TH14-10**





**Photograph 3. Berrydale Avenue – TH14-11**



**Photograph 4. Berrydale Avenue – TH14-12**



**Photograph 5. Berrydale Avenue – TH14-13**



**Photograph 6. Berrydale Avenue – TH14-14**




**Photograph 7. Berrydale Avenue – TH14-15**

PROJECT: Local street Package 14-R-06				CLIENT: City of Winnipeg				TESTHOLE NO: TH14-09					
LOCATION: Berrydale Avenue ;1 m South of North Curb								PROJECT NO.: 60312294					
CONTRACTOR: Paddock Drilling Ltd				METHOD: 125 mm SSA with 150 mm Coring				ELEVATION (m):					
SAMPLE TYPE		<input checked="" type="checkbox"/> GRAB		<input type="checkbox"/> SHELBY TUBE		<input checked="" type="checkbox"/> SPLIT SPOON		<input type="checkbox"/> BULK		<input checked="" type="checkbox"/> NO RECOVERY		<input type="checkbox"/> CORE	


DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS		UNDRAINED SHEAR STRENGTH		COMMENTS	DEPTH
					* Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100	Total Unit Wt (kN/m³) 16 17 18 19 20 21 Plastic MC Liquid	+ Torvane + × QU × □ Lab Vane □ △ Pocket Pen. △ ⊗ Field Vane ⊗ (kPa) 50 100 150 200			
0		CONCRETE (thickness = 153 mm)								
		CLAY (FILL) - trace sand - black, - frozen to 1.5 m, moist when thawed - high plasticity		G57						
				G58						
1		CLAY -trace oxidation - grey, - frozen to 1.5, moist when thawed - high plasticity		G59						
				G60						
		- soft to firm below 1.5 m.		G61						
				G62						
2		- brown to light brown below 1.8 m		G63						
		END OF TEST HOLE AT 2.44 m IN CLAY. NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.305 m, solid stem augers to 2.4								

LOG OF TEST HOLE STREET PACKAGE 14-R-06 BERRYDALE AND HOUE.GPJ UMA WINN.GDT 2/2/14



LOGGED BY: Saba Ibrahim  
 REVIEWED BY: Faris Khalil  
 PROJECT ENGINEER:


COMPLETION DEPTH: 2.44 m  
 COMPLETION DATE: 2/7/14  
 Page 1 of 1

PROJECT: Local street Package 14-R-06				CLIENT: City of Winnipeg				TESTHOLE NO: TH14-10			
LOCATION: Berrydale Avenue ;5 m South of North Curb								PROJECT NO.: 60312294			
CONTRACTOR: Paddock Drilling Ltd				METHOD: 125 mm SSA with 150 mm Coring				ELEVATION (m):			
SAMPLE TYPE <input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE											
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS * Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) ■ Total Unit Wt ■ (kN/m <sup>2</sup> ) Plastic MC Liquid 20 40 60 80 100	UNDRAINED SHEAR STRENGTH + Torvane + × QU × □ Lab Vane □ △ Pocket Pen. △ ● Field Vane ● (kPa) 50 100 150 200	COMMENTS	DEPTH			
0		CONCRETE (thickness = 128 mm)									
		CLAY (FILL) - silty, trace sand - black to dark brown - frozen to 1.5 m, moist when thawed - high plasticity									
				G64							
				G65			Clay : 62%, Silt : 30%, Sand : 7.6%, Gravel : 0.3%				
1				G66				1			
		- some gravel, some sand below 1.2 m		G67							
		CLAY - silty, - dark brown to brown, - soft, moist - high plasticity		G68							
2		SILT - - light brown - soft, moist to wet - low plasticity		G69				2			
				G70							
3		END OF TEST HOLE AT 2.44 m IN SILT. NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.305 m, solid stem augers to 2.4									
					LOGGED BY: Saba Ibrahim		COMPLETION DEPTH: 2.44 m				
					REVIEWED BY: Faris Khalil		COMPLETION DATE: 2/7/14				
					PROJECT ENGINEER:		Page 1 of 1				

PROJECT: Local street Package 14-R-06				CLIENT: City of Winnipeg				TESTHOLE NO: TH14-11					
LOCATION: Berrydale Avenue ;7.5 m South of North Curb								PROJECT NO.: 60312294					
CONTRACTOR: Paddock Drilling Ltd				METHOD: 125 mm SSA with 150 mm Coring				ELEVATION (m):					
SAMPLE TYPE		<input checked="" type="checkbox"/> GRAB		<input type="checkbox"/> SHELBY TUBE		<input checked="" type="checkbox"/> SPLIT SPOON		<input type="checkbox"/> BULK		<input type="checkbox"/> NO RECOVERY		<input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS		UNDRAINED SHEAR STRENGTH		COMMENTS	DEPTH
					* Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) ■ Total Unit Wt ■ (kN/m <sup>3</sup> ) Plastic MC Liquid	+ Torvane + × QU × □ Lab Vane □ △ Pocket Pen. △ ⊗ Field Vane ⊗ (kPa)				
0		CONCRETE (thickness = 140 mm)								
		CLAY (FILL)- trace sand, trace oxidation - brown - frozen to 1.5 m, moist when thawed - high plasticity		G71						
		CLAY -silty, trace sand, trace oxidation - grey to light brown, - frozen to 1.5 m, moist when thawed - high plasticity - some sand below 0.7 m		G72						
1		- trace gypsum below 1.0 m		G73						
		- brown, firm below 1.5 m		G74						
				G75						
2				G76						
		SILT - clayey, trace oxidation - light brown - soft, moist - low plasticity		G77						
3		END OF TEST HOLE AT 2.44 m IN SILT. NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.305 m, solid stem augers to 2.4								

LOG OF TEST HOLE STREET PACKAGE 14-R-06 BERRYDALE AND HOUE.GPJ UMA WINN.GDT 2/21/14




LOGGED BY: Saba Ibrahim	COMPLETION DEPTH: 2.44 m
REVIEWED BY: Faris Khalil	COMPLETION DATE: 2/7/14
PROJECT ENGINEER:	

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PROJECT: Local street Package 14-R-06				CLIENT: City of Winnipeg				TESTHOLE NO: TH14-12					
LOCATION: Berrydale Avenue ;0.5 m South of North Curb								PROJECT NO.: 60312294					
CONTRACTOR: Paddock Drilling Ltd				METHOD: 125 mm SSA with 150 mm Coring				ELEVATION (m):					
SAMPLE TYPE		<input checked="" type="checkbox"/> GRAB		<input type="checkbox"/> SHELBY TUBE		<input checked="" type="checkbox"/> SPLIT SPOON		<input type="checkbox"/> BULK		<input checked="" type="checkbox"/> NO RECOVERY		<input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS		UNDRAINED SHEAR STRENGTH		COMMENTS	DEPTH
					* Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100	Total Unit Wt (kN/m³) 16 17 18 19 20 21 Plastic MC Liquid	+ Torvane + × QU × □ Lab Vane □ △ Pocket Pen. △ ⊗ Field Vane ⊗ (kPa) 50 100 150 200			
0		CONCRETE (thickness = 128 mm)								
		SAND (FILL) - some gravel, - brown, - frozen to 1.5 m, moist when thawed								
		CLAY - trace oxidation, - grey, - frozen to 1.5 m ,moist when thawed - high plasticity - some sand from 0.6 to 0.9 m		G78						
				G79					Clay : 77.1%, Silt : 22% , Sand : 0.9% , Gravel : 0.0%	
1				G80						1
				G81						
		- trace gravel at 1.5 m - brown, firm below 1.5 m		G82						
2				G83						2
				G84						
3		END OF TEST HOLE AT 2.44 m IN CLAY. NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.380 m, solid stem augers to 2.4.								

LOG OF TEST HOLE STREET PACKAGE 14-R-06 BERRYDALE AND HOUE.GPJ UMA WINN.GDT 2/21/14




LOGGED BY: Saba Ibrahim	COMPLETION DEPTH: 2.44 m
REVIEWED BY: Faris Khalil	COMPLETION DATE: 2/7/14
PROJECT ENGINEER:	Page 1 of 1



PROJECT: Local street Package 14-R-06				CLIENT: City of Winnipeg				TESTHOLE NO: TH14-13					
LOCATION: Berrydale Avenue ;4 m South of North Curb								PROJECT NO.: 60312294					
CONTRACTOR: Paddock Drilling Ltd				METHOD: 125 mm SSA with 150 mm Coring				ELEVATION (m):					
SAMPLE TYPE		<input checked="" type="checkbox"/> GRAB		<input type="checkbox"/> SHELBY TUBE		<input checked="" type="checkbox"/> SPLIT SPOON		<input type="checkbox"/> BULK		<input checked="" type="checkbox"/> NO RECOVERY		<input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS		UNDRAINED SHEAR STRENGTH		COMMENTS	DEPTH
					* Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) ■ Total Unit Wt ■ (kN/m³) Plastic MC Liquid	+ Torvane + × QU × □ Lab Vane □ △ Pocket Pen. △ ⊗ Field Vane ⊗ (kPa)				
0		CONCRETE (thickness = 152 mm)								
		CLAY (FILL) - some sand, trace gravel - black to dark brown - frozen to 1.5 m, moist when thawed - high plasticity								
		- some gravel below 0.6 m		G85						
				G86						
1				G87						1
				G88						
		CLAY - trace sand, trace oxidation - brown, - soft to firm, moist, - high plasticity		G89						
2				G90						2
		- some gravel, angular <10 mm in dia. at 2.1 m		G91						
		END OF TEST HOLE AT 2.44 m IN CLAY. NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.380 m, solid stem augers to 2.4.								
3										



LOGGED BY: Saba Ibrahim  
 REVIEWED BY: Faris Khalil  
 PROJECT ENGINEER:

COMPLETION DEPTH: 2.44 m  
 COMPLETION DATE: 2/7/14  
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LOG OF TEST HOLE STREET PACKAGE 14-R-06 BERRYDALE AND HOUE.GPJ UMA WINN.GDT 2/21/14

PROJECT: Local street Package 14-R-06				CLIENT: City of Winnipeg				TESTHOLE NO: TH14-14					
LOCATION: Berrydale Avenue ;7 m South of North Curb								PROJECT NO.: 60312294					
CONTRACTOR: Paddock Drilling Ltd				METHOD: 125 mm SSA with 150 mm Coring				ELEVATION (m):					
SAMPLE TYPE		<input checked="" type="checkbox"/> GRAB		<input type="checkbox"/> SHELBY TUBE		<input checked="" type="checkbox"/> SPLIT SPOON		<input type="checkbox"/> BULK		<input checked="" type="checkbox"/> NO RECOVERY		<input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS		UNDRAINED SHEAR STRENGTH		COMMENTS	DEPTH
					* Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100 ■ Total Unit Wt ■ (kN/m³) 16 17 18 19 20 21 Plastic MC Liquid 20 40 60 80 100	+ Torvane + × QU × □ Lab Vane □ △ Pocket Pen. △ ⊗ Field Vane ⊗ (kPa) 50 100 150 200				
0		CONCRETE (thickness = 128 mm)								
		CLAY (FILL) - some sand - black , - frozen to 1.5 m, moist when thawed - high plasticity		G92						
		SILT - some sand - light brown - frozen to 1.5 m, moist when thawed - low plasticity		G93						
1		- dark brown to brown below 1.2 m		G94						
		CLAY - - brown, - soft to firm, moist, - high plasticity		G95						
		- soft ,intermediate plasticity below 1.8 m		G96						
2				G97						
				G98						
3		END OF TEST HOLE AT 2.44 m IN CLAY. NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.380 m, solid stem augers to 2.4.								

Clay : 20.1%, Silt :  
 64.1% , Sand : 15.1% ,  
 Gravel : 0.7%


LOGGED BY: Saba Ibrahim  
 REVIEWED BY: Faris Khalil  
 PROJECT ENGINEER:

COMPLETION DEPTH: 2.44 m  
 COMPLETION DATE: 2/7/14  
 Page 1 of 1

PROJECT: Local street Package 14-R-06				CLIENT: City of Winnipeg				TESTHOLE NO: TH14-15					
LOCATION: Berrydale Avenue ;1 m South of North Curb								PROJECT NO.: 60312294					
CONTRACTOR: Paddock Drilling Ltd				METHOD: 125 mm SSA with 150 mm Coring				ELEVATION (m):					
SAMPLE TYPE		<input checked="" type="checkbox"/> GRAB		<input type="checkbox"/> SHELBY TUBE		<input checked="" type="checkbox"/> SPLIT SPOON		<input type="checkbox"/> BULK		<input checked="" type="checkbox"/> NO RECOVERY		<input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS * Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) ■ Total Unit Wt ■ (kN/m³) Plastic MC Liquid 20 40 60 80 100	UNDRAINED SHEAR STRENGTH + Torvane + × QU × □ Lab Vane □ △ Pocket Pen. △ ⊗ Field Vane ⊗ (kPa) 50 100 150 200	COMMENTS	DEPTH
0		CONCRETE (thickness = 128 mm)						
		CLAY - - grey, - frozen to 1.5 m, moist when thawed, - high plasticity						
				G99				
				G100			Clay : 72.1%, Silt : 26.9% , Sand : 0.9% , Gravel : 0.0%	
1				G101				1
		- some gravel below 1.35		G102				
		- trace oxidation, brown, firm, below 1.5 m		G103				
2		SILT - clayey, trace oxidation - light brown, - soft, moist to wet - low plasticity		G104				2
				G105				
		END OF TEST HOLE AT 2.44 m IN SILT. NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.380 m, solid stem augers to 2.4.						
3								

LOG OF TEST HOLE STREET PACKAGE 14-R-06 BERRYDALE AND HOUE.GPJ UMA WINN.GDT 2/21/14



LOGGED BY: Saba Ibrahim	COMPLETION DEPTH: 2.44 m
REVIEWED BY: Faris Khalil	COMPLETION DATE: 2/7/14
PROJECT ENGINEER:	

Page 1 of 1

City of Winnipeg

Berrydale Avenue - Package 14-R-06

Geotechnical Investigation

Table 02- Summary of Laboratory Soil Testing

Test Hole No.	Testhole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits		
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH14-09	Berrydale Avenue ;1 m South of North Curb	Asphalt	n/a	None	n/a	Clay Fill	0.46	28.4							
						Clay Fill	0.76	37.3							
						Clay	1.06	35.1							
		Concrete	153			Clay	1.37	32.4							
						Clay	1.67	36.7							
						Clay	1.98	32.9							
						Clay	2.28	30.1							
TH14-10	Asphalt	n/a	None	n/a	Silty Clay Fill	0.46	28.1								
					Silty Clay Fill	0.76	28.4	0.3	7.6	30	62	67.4	24.9	42.5	
	Concrete	128			Silty Clay Fill	1.06	30.0								
					Silty Clay Fill	1.37	27.6								
					Silty Clay	1.67	32.0								
					Silt	1.98	29.4								
					Silt	2.28	21.9								
TH14-11	Asphalt	n/a	None	n/a	Clay Fill	0.46	36.3								
					Silty Clay	0.76	34.2								
	Concrete	140			Silty Clay	1.06	30.0								
					Silty Clay	1.37	32.4								
					Silty Clay	1.67	41.2								
					Silty Clay	1.98	50.4								
					Clayey Silt	2.28	45.7								
TH14-12	Asphalt	n/a	None	n/a	Sand Fill	0.46	22.9								
					Clay	0.76	29.0	0.0	0.9	22	77.1	63.2	24.6	38.6	
	Concrete	128			Clay	1.06	34.9								
					Clay	1.37	41.0								
					Clay	1.67	43.2								
					Clay	1.98	47.9								
					Clay	2.28	51.2								
TH14-13	Asphalt	n/a	None	n/a	Clay fill	0.46	30.2								
					Clay fill	0.76	25.8								
	Concrete	152			Clay fill	1.06	33.4								
					Clay fill	1.37	25.3								
					Clay	1.67	44.0								
					Clay	1.98	41.8								
					Clay	2.28	36.8								

Test Hole No.	Testhole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits			
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index	
TH14-14	Berrydale Avenue ;7 m South of North Curb	Asphalt	n/a	None	n/a	Clay Fill	0.46	36.2								
						Silt	0.76	23.9	0.7	15.1	64.1	20.1	29.8	14.8	15.0	
						Silt	1.06	22.9								
		concrete	128			Silt	1.37	27.3								
						Clay	1.67	56.6								
						Clay	1.98	44.7								
						Clay	2.28	48.6								
TH14-15	Berrydale Avenue ;1 m South of North Curb	Asphalt	n/a	None	n/a	Clay	0.46	31.3								
						Clay	0.76	29.8	0.0	0.9	26.9	72.1	69.8	24.6	45.3	
		Concrete	128			Clay	1.06	30.1								
						Clay	1.37	32.5								
						Clay	1.67	29.1								
						Clayey Silt	1.98	25.5								
						Clayey Silt	2.28	24.9								