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March 11, 2015

Mr. Kevin Rae
AECOM Canada Ltd.
99 Commerce Drive
Winnipeg, Manitoba
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Dear Mr. Rae:

Project No: 60334878 (403)

Regarding: Package 15-R-02-2015 - Local Street Renewals, Burnell Street and Downing Street- Subsurface Investigation

This report summarizes the results of the subsurface investigation completed for the proposed 2015 Local Street Renewals of Burnell Street and Downing Street. The objective of the investigation was to provide information related to the existing pavement and soil stratigraphy underneath.

Three test holes (TH15-04 to TH15-06) were drilled along Burnell Street and five test holes (TH15-07 to TH15-11) along Downing Street. The approximate location of the test holes are shown on Figure 01 for Burnell Street and on Figure 02 for Downing Street in Appendix A.

Pavement coring was completed using a hollow 150 mm diameter diamond core drill bit. Core samples were recovered and logged at AECOM's Materials Laboratory. Photos of core samples are included in Appendix A.

The test hole drilling was completed by Paddock Drilling Ltd. using a Brat 22R truck mounted drill rig equipped with 125 mm diameter solid stem augers. The test holes were advanced to a depth of 2.0 m below road surface. During the drilling, AECOM personnel observed subsurface conditions and visually classified the soil. Other pertinent information such as groundwater and drilling conditions were also recorded. Disturbed soil samples from auger cuttings retrieved during the field investigation were transported to AECOM's Materials Laboratory for further testing and classification.

The laboratory soil testing consisted of Moisture Content determination, Atterberg Limits and Grain Size Distribution tests. The test results are recorded on the test hole logs and in the laboratory testing summary Table 01, both included in Appendix A.

Sincerely,
AECOM Canada Ltd.

Aaron Kaluzniak, EIT
Geotechnical Engineering

Reviewed by:

Faris Khalil, P.Eng.
Manager, Geotechnical Engineering

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AECOM: 2012-01-06

Winnipeg

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GEOTECHNICAL INVESTIGATION

STREET RECONSTRUCTION

Revised October 28th, 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 ± 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

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

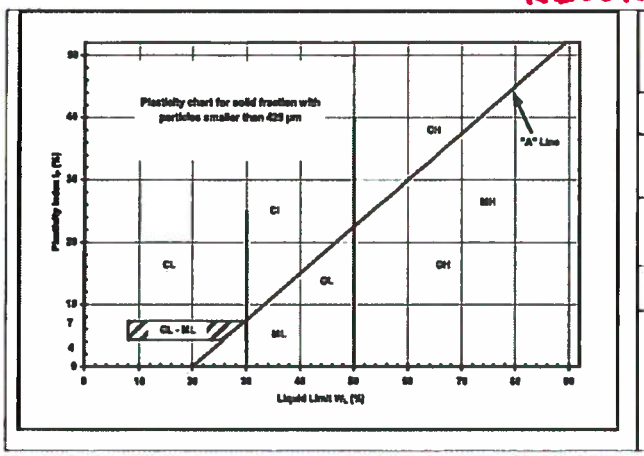
Description				UMA Log Symbols	USCS Classification	Laboratory Classification Criteria			
						Fines (%)	Grading	Plasticity	Notes
COARSE GRAINED SOILS	GRAVELS (More than 50% of coarse fraction of gravel size)	CLEAN GRAVELS (Little or no fines)	Well graded gravels, sandy gravels, with little or no fines		GW	0-5	$C_U > 4$ $1 < C_C < 3$		Dual symbols if 5-12% fines. Dual symbols if above "A" line and $4<W_P<7$ $C_U = \frac{D_{60}}{D_{10}}$ $C_C = \frac{(D_{30})^2}{D_{10} x D_{60}}$
			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 $W_P<7$	
FINE GRAINED SOILS	SILTS (Below 'A' line negligible organic content)	$W_L<50$	Inorganic silts, silty or clayey fine sands, with slight plasticity		ML			Classification is Based upon Plasticity Chart	
		$W_L>50$	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				
		$30<W_L<50$	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 ORGAINIC SOILS			Peat and other highly organic soils		Pt	Von Post Classification Limit		Strong colour or odour, and often fibrous texture	

	Asphalt		Till			AECOM
	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. Refrence 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)



FRACTION		SEIVE SIZE (mm)		DEFINING RANGES OF PERCENTAGE BY WEIGHT OF MINOR COMPONENTS	
		Passing	Retained	Percent	Identifier
Gravel	Coarse	76	19	35-50	and
	Fine	19	4.75		
Sand	Coarse	4.75	2.00	20-35	"y" or "ey" *
	Medium	2.00	0.425		
	Fine	0.425	0.075	10-20	some
Silt (non-plastic) or Clay (plastic)		< 0.075 mm		1-10	trace

* for example: gravelly, sandy clayey, silty

Definition of Oversize Material

COBBLES: 76mm to 300mm diameter
BOULDERS: >300mm diameter

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.
- γ - bulk unit weight (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 (Su) of a cohesive soil can be related to its consistency as follows:

Su (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

Appendix A

- Test Hole Location Plans

- Test Hole Logs

- Summary of Laboratory Soil Testing

- Pavement Core Photographs

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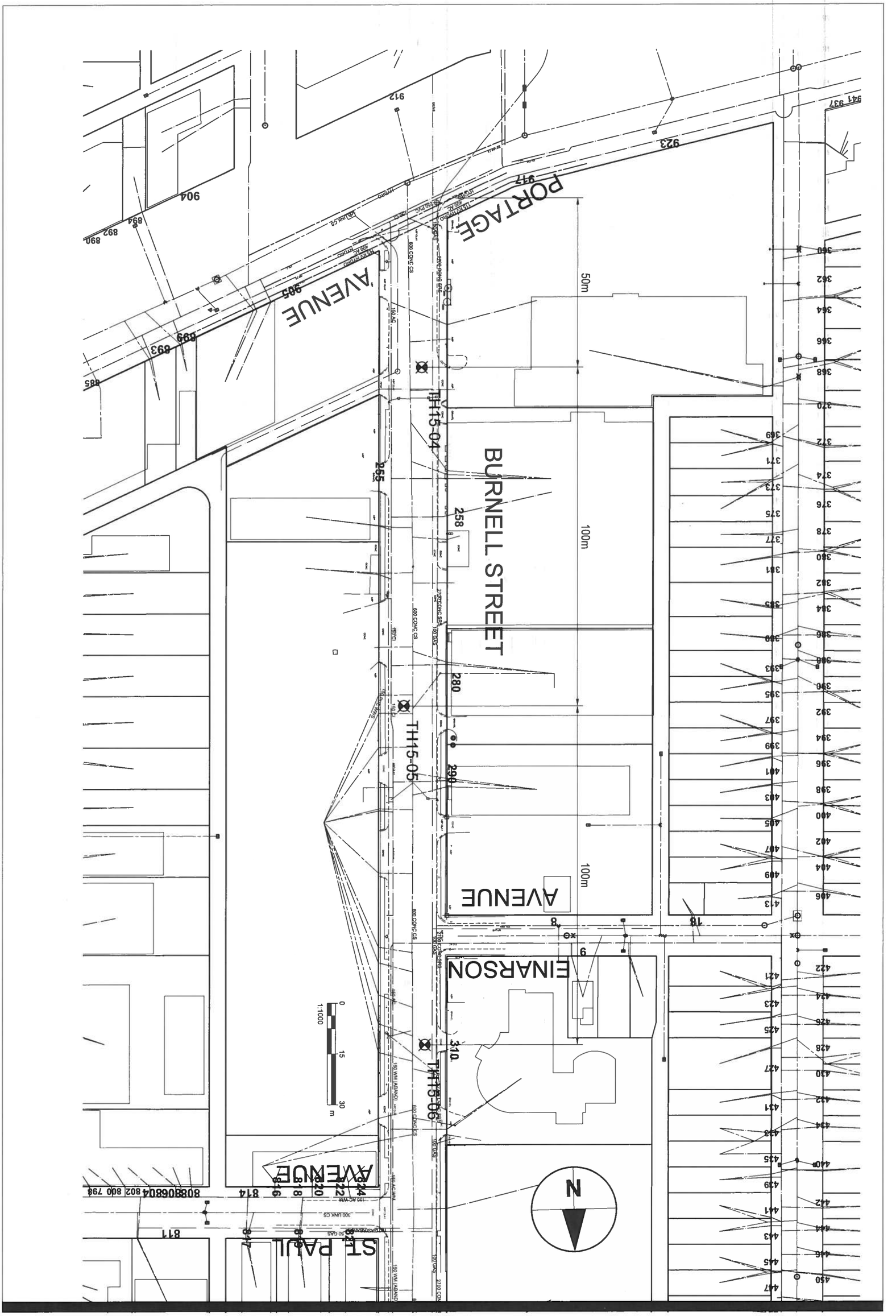
Project Management Initials: Designer: ____ Checked: ____ Approved: ____ ANSI B 279.4mm x 431.8mm



2015 Local Streets Package
Burnell Street
City of Winnipeg

FIGURE 01: TEST HOLES LOCATION PLAN

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Project Management Initials: ____ Designer: ____ Checked: ____ Approved: ____ ANSI B 279.4mm x 431.8mm

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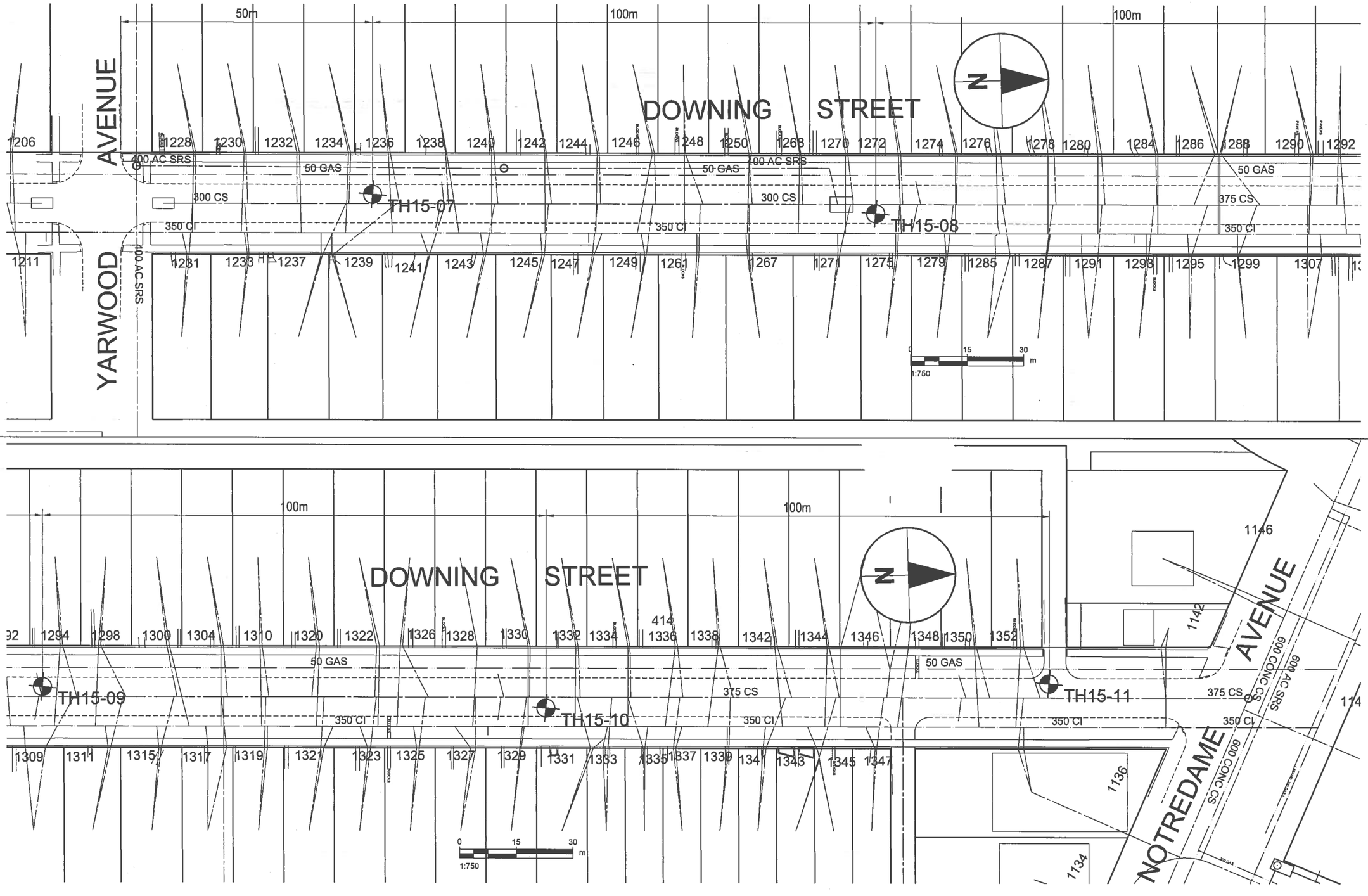

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FIGURE 02: TEST HOLES LOCATION PLAN

2015 Local Streets Package
Downing Street
City of Winnipeg

PROJECT: 2015 Local Streets Pkg 15-R-02	CLIENT: City of Winnipeg	TESTHOLE NO: **TH15-04**
LOCATION: Burnell Street; 50 m N of Portage Ave, 3 m E of W Curb, Shoppers Drug Mart		PROJECT NO.: 60334878
CONTRACTOR: Paddock Drilling Ltd.	METHOD: 125 mm SSA	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▯ SHELBY TUBE ☒ SPLIT SPOON ▬ BULK ⊘ NO RECOVERY ◧ CORE

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS / UNDRAINED SHEAR STRENGTH	COMMENTS	DEPTH
0		Asphalt (150 mm)					
		Concrete (190 mm)					
		SAND - gravelly, trace silt, trace clay - brown, moist, frozen		G7		(G7) Gravel: 26.1%, Sand: 59.7%, Silt: 9.9%, Clay: 4.3%	
		CLAY - silty - brown, moist, firm - intermediate to high plasticity - frozen to 1.5 m		G8			
1				G9			1
				G10			
				G11			
				G12			
2		END OF TEST HOLE AT 2.0 m IN CLAY. NOTES: 1. No sloughing. 2. No seepage. 3. Test hole backfilled with auger cuttings and 100 mm asphalt cold patch at surface.					2
3							

PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100 ■ Total Unit Wt ■ (kN/m^3) 16 17 18 19 20 21 Plastic MC Liquid 20 40 60 80 100

UNDRAINED SHEAR STRENGTH: + Torvane + × QU/2 × □ Lab Vane □ △ Pocket Pen. △ ☢ Field Vane ☢ (kPa) 50 100 150 200

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LOGGED BY: Matt Lotecki	COMPLETION DEPTH: 1.98 m
REVIEWED BY: Aaron Kaluzniak	COMPLETION DATE: 2/26/15
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

LOG OF TEST HOLE TEST HOLE LOGS.GPJ UMA WINN.GDT 3/7/15

PROJECT: 2015 Local Streets Pkg 15-R-02	CLIENT: City of Winnipeg	TESTHOLE NO: **TH15-05**
LOCATION: Burnell Street; 150 m N of Portage Ave, 3 m W of E Curb, 277 Burnell Street		PROJECT NO.: 60334878
CONTRACTOR: Paddock Drilling Ltd.	METHOD: 125 mm SSA	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ▨ SPLIT SPOON ▤ BULK ▨ NO RECOVERY ◧ CORE

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS / UNDRAINED SHEAR STRENGTH	COMMENTS	DEPTH
0		Asphalt (150 mm)			PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ (kN/m^3) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100. UNDRAINED SHEAR STRENGTH: + Torvane + × QU/2 × □ Lab Vane □ △ Pocket Pen. △ ⛢ Field Vane ⛢ (kPa) 50 100 150 200		
		Concrete (250 mm)					
		CLAY - some silt, trace silt inclusions - brown, moist, firm - intermediate to high plasticity - frozen to 1.5 m		G1			
				G2			
1		CLAYEY SILT - some sand - brown, moist, firm - low plasticity		G3		(G3) Gravel: 0.0%, Sand: 18.6%, Silt: 66.0%, Clay: 15.4%	1
				G4			
		CLAY - some silt, trace silt inclusions - brown, moist, firm - intermediate to high plasticity		G5			
2		END OF TEST HOLE AT 2.0 m IN CLAY. NOTES: 1. No sloughing. 2. No seepage. 3. Test hole backfilled with auger cuttings and 100 mm asphalt cold patch at surface.		G6			2
3							

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REVIEWED BY: Aaron Kaluzniak	COMPLETION DATE: 2/26/15
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

LOG OF TEST HOLE TEST HOLE LOGS.GPJ UMA WINN.GDT 3/7/15

PROJECT: 2015 Local Streets Pkg 15-R-02	CLIENT: City of Winnipeg	TESTHOLE NO: **TH15-06**
LOCATION: Burnell Street; 250 m N of Portage Ave, 3 m E of W Curb, 310 Burnell Street		PROJECT NO.: 60334878
CONTRACTOR: Paddock Drilling Ltd.	METHOD: 125 mm SSA	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▯ SHELBY TUBE ☒ SPLIT SPOON ▬ BULK ⊘ NO RECOVERY ◧ CORE

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS / UNDRAINED SHEAR STRENGTH	COMMENTS	DEPTH
0		Asphalt (200 mm)					
		Concrete (125 mm)					
		CLAY - some silt - brown, moist, firm - intermediate plasticity - frozen to 1.6 m		G13			
				G14			
1				G15			1
				G16			
				G17			
2		END OF TEST HOLE AT 2.0 m IN CLAY. NOTES: 1. No sloughing. 2. No seepage. 3. Test hole backfilled with auger cuttings and 100 mm asphalt cold patch at surface.		G18		(G18) Gravel: 0.0%, Sand: 5.0%, Silt: 25.8%, Clay: 69.2%	2
3							

PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ (kN/m^3) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100

UNDRAINED SHEAR STRENGTH: + Torvane + × QU/2 × ☐ Lab Vane ☐ △ Pocket Pen. △ ☘ Field Vane ☘ (kPa) 50 100 150 200

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REVIEWED BY: Aaron Kaluzniak	COMPLETION DATE: 2/26/15
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

LOG OF TEST HOLE TEST HOLE LOGS.GPJ UMA WINN.GDT 3/7/15

PROJECT: 2015 Local Streets Pkg 15-R-02	CLIENT: City of Winnipeg	TESTHOLE NO: **TH15-07**
LOCATION: Downing Street; 50 m N of Yarwood Ave, 2 m E of W Curb, 1236 Downing Street		PROJECT NO.: 60334878
CONTRACTOR: Paddock Drilling Ltd.	METHOD: 125 mm SSA	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ▩ SPLIT SPOON ▤ BULK ▨ NO RECOVERY ◧ CORE

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS / UNDRAINED SHEAR STRENGTH	COMMENTS	DEPTH
0		Asphalt (30 mm) Concrete (200 mm)					
		CLAYEY SILT - brown, moist, soft to firm - low to intermediate plasticity - frozen to 1.5 m		G43			
				G44			
				G45			
1							1
				G46			
				G47			
		CLAY - trace silt, trace sand - brown, moist, firm - high plasticity		G48		(G48) Gravel: 0.0%, Sand: 5.5%, Silt: 7.4%, Clay: 86.8%	
2		END OF TEST HOLE AT 2.0 m IN CLAY. NOTES: 1. No sloughing. 2. No seepage. 3. Test hole backfilled with auger cuttings and 100 mm asphalt cold patch at surface.					2
3							

PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ (kN/m^3) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100

UNDRAINED SHEAR STRENGTH: + Torvane + × QU/2 × □ Lab Vane □ △ Pocket Pen. △ ◆ Field Vane ◆ (kPa) 50 100 150 200

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REVIEWED BY: Aaron Kaluzniak	COMPLETION DATE: 2/26/15
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

LOG OF TEST HOLE TEST HOLE LOGS.GPJ UMA WINN.GDT 3/7/15

PROJECT: 2015 Local Streets Pkg 15-R-02	CLIENT: City of Winnipeg	TESTHOLE NO: **TH15-08**
LOCATION: Downing Street; 150 m N of Yarwood Ave, 1 m W of E Curb, 1275 Downing Street		PROJECT NO.: 60334878
CONTRACTOR: Paddock Drilling Ltd.	METHOD: 125 mm SSA	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ▨ SPLIT SPOON ▤ BULK ▨ NO RECOVERY ◧ CORE

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS / UNDRAINED SHEAR STRENGTH	COMMENTS	DEPTH
0		Asphalt (50 mm)					
		Concrete (200 mm)					
		CLAYEY SILT - brown, moist, soft to firm - low to intermediate plasticity - frozen	■	G37			
			■	G38			
1			■	G39			1
			■	G40			
			■	G41			
		SILTY CLAY - brown, moist, firm - intermediate plasticity	■	G42			
2		END OF TEST HOLE AT 2.0 m IN SILTY CLAY. NOTES: 1. No sloughing. 2. No seepage. 3. Test hole backfilled with auger cuttings and 100 mm asphalt cold patch at surface.					2
3							

PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100 ■ Total Unit Wt ■ (kN/m^3) 16 17 18 19 20 21 Plastic MC Liquid 20 40 60 80 100

UNDRAINED SHEAR STRENGTH: + Torvane + × QU/2 × □ Lab Vane □ △ Pocket Pen. △ ☘ Field Vane ☘ (kPa) 50 100 150 200

AECOM

LOGGED BY: Matt Lotecki	COMPLETION DEPTH: 1.98 m
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LOG OF TEST HOLE TEST HOLE LOGS.GPJ UMA WINN.GDT 3/7/15

PROJECT: 2015 Local Streets Pkg 15-R-02	CLIENT: City of Winnipeg	TESTHOLE NO: **TH15-09**
LOCATION: Downing Street; 250 m N of Yarwood Ave, 2 m E of W Curb, 1294 Downing Street		PROJECT NO.: 60334878
CONTRACTOR: Paddock Drilling Ltd.	METHOD: 125 mm SSA	ELEVATION (m):

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS / UNDRAINED SHEAR STRENGTH	COMMENTS	DEPTH
0		Asphalt (25 mm) Concrete (200 mm)					
		CLAY - some silt, some sand - brown, moist, soft - high plasticity - frozen to 1.5 m		G31		(G31) Gravel: 0.3%, Sand: 18.7%, Silt: 19.0%, Clay: 62.1%	
				G32			
				G33			
1				G34			1
				G35			
				G36			
2		END OF TEST HOLE AT 2.0 m IN CLAY. NOTES: 1. No sloughing. 2. No seepage. 3. Test hole backfilled with auger cuttings and 100 mm asphalt cold patch at surface.					2
3							

PENETRATION TESTS: ✳ Becker ✳ | ◇ Dynamic Cone ◇ | ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100 | ■ Total Unit Wt ■ (kN/m^3) 16 17 18 19 20 21 | Plastic MC Liquid 20 40 60 80 100

UNDRAINED SHEAR STRENGTH: + Torvane + | × QU/2 × | □ Lab Vane □ | △ Pocket Pen. △ | ✤ Field Vane ✤ (kPa) 50 100 150 200

AECOM

LOGGED BY: Matt Lotecki	COMPLETION DEPTH: 1.98 m
REVIEWED BY: Aaron Kaluzniak	COMPLETION DATE: 2/26/15
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

LOG OF TEST HOLE TEST HOLE LOGS.GPJ UMA WINN.GDT 3/7/15

PROJECT: 2015 Local Streets Pkg 15-R-02	CLIENT: City of Winnipeg	TESTHOLE NO: **TH15-10**
LOCATION: Downing Street; 350 m N of Yarwood Ave, 1 m W of E Curb, 1331 Downing Street		PROJECT NO.: 60334878
CONTRACTOR: Paddock Drilling Ltd.	METHOD: 125 mm SSA	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ▨ SPLIT SPOON ▤ BULK ▨ NO RECOVERY ◧ CORE

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS / UNDRAINED SHEAR STRENGTH	COMMENTS	DEPTH
0		Asphalt (25 mm) Concrete (200 mm)					
		SAND - gravelly, trace silt, trace clay - brown, moist, frozen					
		CLAYEY SILT - brown, moist, soft to firm - low to intermediate plasticity - frozen to 1.5 m	■	G25			
			■	G26			
1			■	G27			1
			■	G28			
			■	G29			
		SILTY CLAY - brown, moist, firm - intermediate plasticity	■	G30			
2		END OF TEST HOLE AT 2.0 m IN CLAY. NOTES: 1. No sloughing. 2. No seepage. 3. Test hole backfilled with auger cuttings and 100 mm asphalt cold patch at surface.					2
3							

PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100 ■ Total Unit Wt ■ (kN/m^3) 16 17 18 19 20 21 Plastic MC Liquid 20 40 60 80 100

UNDRAINED SHEAR STRENGTH: + Torvane + × QU/2 × □ Lab Vane □ △ Pocket Pen. △ ☢ Field Vane ☢ (kPa) 50 100 150 200

AECOM

LOGGED BY: Matt Lotecki	COMPLETION DEPTH: 1.98 m
REVIEWED BY: Aaron Kaluzniak	COMPLETION DATE: 2/26/15
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

LOG OF TEST HOLE TEST HOLE LOGS.GPJ UMA WINN.GDT 3/7/15

PROJECT: 2015 Local Streets Pkg 15-R-02	CLIENT: City of Winnipeg	TESTHOLE NO: **TH15-11**
LOCATION: Downing Street; 450 m N of Yarwood Ave, 1 m E of W Curb, 1352 Downing Street		PROJECT NO.: 60334878
CONTRACTOR: Paddock Drilling Ltd.	METHOD: 125 mm SSA	ELEVATION (m):

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ▨ SPLIT SPOON ▤ BULK ▨ NO RECOVERY ◧ CORE

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS / UNDRAINED SHEAR STRENGTH	COMMENTS	DEPTH
0		Concrete (150 mm)					
		SAND - gravelly, trace silt, trace clay - brown, moist, frozen					
		SILTY CLAY - trace sand - brown, moist, soft - low to intermediate plasticity - frozen to 1.5 m	■	G19			
			■	G20			
1			■	G21			1
		CLAYEY SILT - sandy - brown, moist, soft - low plasticity	■	G22		(G22) Gravel: 0.0%, Sand: 23.0%, Silt: 62.7%, Clay: 14.2%	
			■	G23			
2		END OF TEST HOLE AT 2.0 m IN CLAYEY SILT. NOTES: 1. No sloughing. 2. No seepage. 3. Test hole backfilled with auger cuttings and 100 mm asphalt cold patch at surface.	■	G24			2
3							

PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ (kN/m^3) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100

UNDRAINED SHEAR STRENGTH: + Torvane + × QU/2 × □ Lab Vane □ △ Pocket Pen. △ ☢ Field Vane ☢ (kPa) 50 100 150 200

LOGGED BY: Matt Lotecki	COMPLETION DEPTH: 1.98 m
REVIEWED BY: Aaron Kaluzniak	COMPLETION DATE: 2/26/15
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

AECOM

LOG OF TEST HOLE TEST HOLE LOGS.GPJ UMA WINN.GDT 3/7/15

City of Winnipeg

Burnell and Downing Package

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
TH15-04	Burnell Street; 50 m N of Portage Ave, 3 m E of W Curb, Shoppers Drug Mart	Asphalt	150	SAND – gravelly	190	CLAY	0.7	30.7							
						CLAY	1.0	27.8							
						CLAY	1.3	30.7							
		Concrete	190			CLAY	1.6	36.7							
						CLAY	1.9	36.4							
TH15-05	Burnell Street; 150 m N of Portage Ave, 3 m W of E Curb, 277 Burnell Street	Asphalt	150	None	n/a	CLAY	0.5	40.1							
						CLAY	0.8	29.6							
		Concrete	250			CLAYEY SILT	1.1	22.9	0.0	18.6	66.0	15.4	24.9	12.8	12.1
						CLAYEY SILT	1.4	24.5							
						CLAY	1.7	31.0							
						CLAY	1.9	40.2							
TH15-06	Burnell Street; 250 m N of Portage Ave, 3 m E of W Curb, 310 Burnell Street	Asphalt	200	None	n/a	CLAY	0.4	52.7							
						CLAY	0.7	35.4							
		Concrete	125			CLAY	1.0	36.7							
						CLAY	1.3	24.6							
						CLAY	1.6	21.9							
						CLAY	1.9	31.0	0.0	5.0	25.8	69.2	65.2	21.5	43.7
TH15-07	Downing Street; 50 m N of Yarwood Ave, 2 m E of W Curb, 1236 Downing Street	Asphalt	30	None	n/a	CLAYEY SILT	0.3	61.3							
						CLAYEY SILT	0.6	27.8							
		Concrete	200			CLAYEY SILT	0.9	27.8							
						CLAYEY SILT	1.2	20.9							
						CLAYEY SILT	1.5	18.3							
						CLAY	1.8	34.3	0.0	5.5	7.4	86.8	79.5	26.1	53.4
TH15-08	Downing Street; 150 m N of Yarwood Ave, 1 m W of E Curb, 1275 Downing Street	Asphalt	50	None	n/a	CLAYEY SILT	0.3	30.9							
						CLAYEY SILT	0.6	35.4							
		Concrete	200			CLAYEY SILT	0.9	25.7							
						CLAYEY SILT	1.2	23.6							
						CLAYEY SILT	1.6	31.8							
						SILTY CLAY	1.9	34.6							

* Note – Subgrade Description based on City of Winnipeg Specificiations for Geotechnical Investigation Street Reconstruction (October 2008)

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
TH15-09	Downing Street; 250 m N of Yarwood Ave, 2 m E of W Curb, 1294 Downing Street	Asphalt	25	None	n/a	CLAY	0.3	36.3	0.3	18.7	19.0	62.1	67.3	19.8	47.5
						CLAY	0.6	31.9							
						CLAY	0.9	35.3							
		Concrete	200			CLAY	1.2	22.3							
						CLAY	1.5	21.4							
						CLAY	1.8	32.8							
TH15-10	Downing Street; 350 m N of Yarwood Ave, 1 m W of E Curb, 1331 Downing Street	Asphalt	25	Sand - gravelly	75	CLAYEY SILT	0.4	45.8							
						CLAYEY SILT	0.7	23.4							
		Concrete	200			CLAYEY SILT	1.0	27.7							
						CLAYEY SILT	1.3	21.2							
						CLAYEY SILT	1.6	23.4							
						SILTY CLAY	1.9	32.6							
TH15-11	Downing Street; 450 m N of Yarwood Ave, 1 m E of W Curb, 1352 Downing Street	Asphalt	0	Sand – gravelly	150	SILTY CLAY	0.4	34.8							
						SILTY CLAY	0.7	29.7							
		Concrete	150			SILTY CLAY	1.0	39.5							
						CLAYEY SILT	1.3	22.6	0.0	23.0	62.7	14.2	22.1	16.5	5.6
						CLAYEY SILT	1.6	24.3							
						CLAYEY SILT	1.9	24.2							

* Note – Subgrade Description based on City of Winnipeg Specificiations for Geotechnical Investigation Street Reconstruction (October 2008)

Photograph 1. Burnell Street – TH15-04

Photograph 2. Burnell Street – TH15-05

Photograph 3. Burnell Street – TH15-06

Photograph 4. Downing Street – TH15-07

Photograph 5. Downing Street – TH15-08

Photograph 6. Downing Street – TH15-09

Photograph 7. Downing Street – TH15-10

Photograph 8. Downing Street – TH15-11