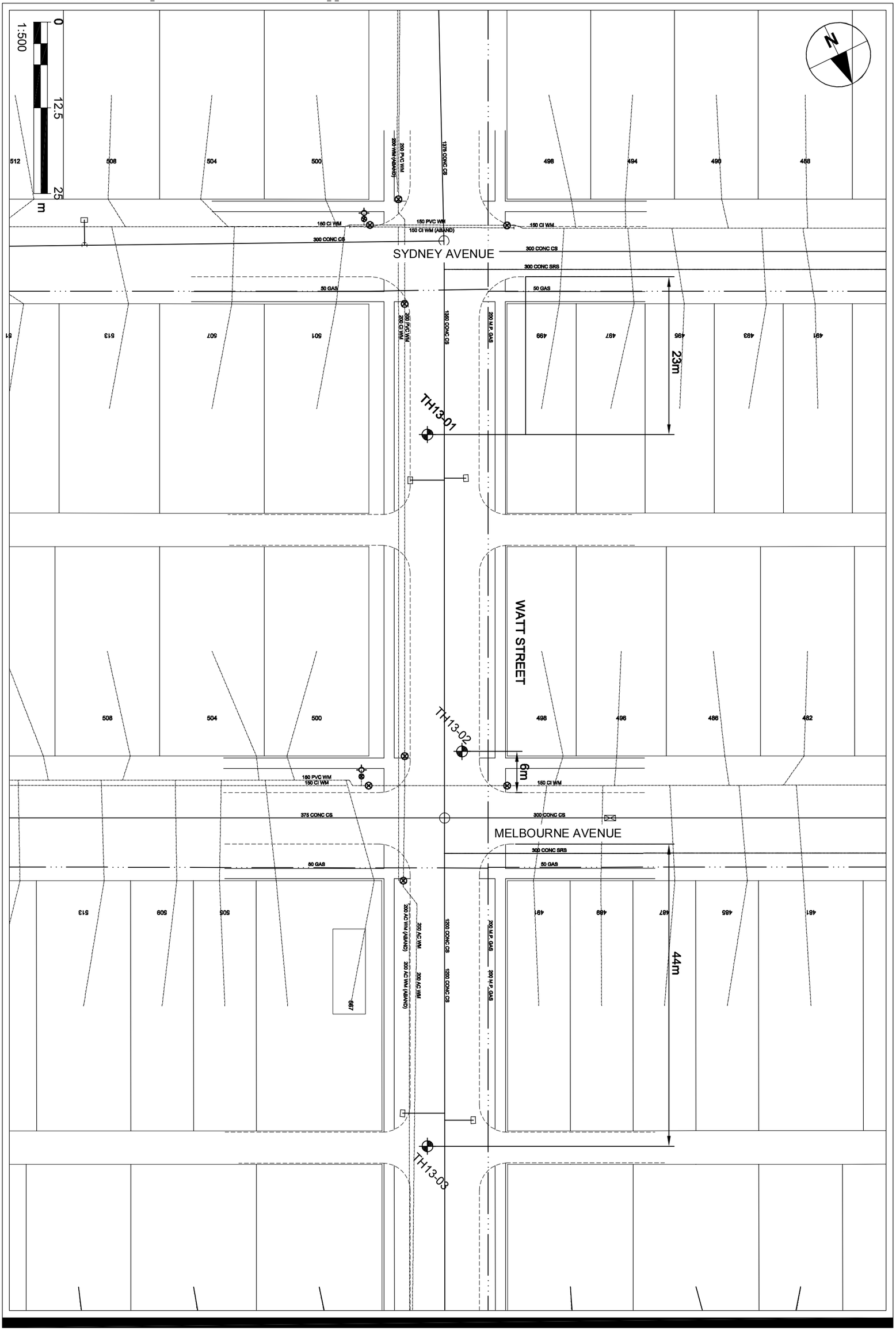
APPENDIX ‘A’

GEOTECHNICAL REPORT

Last saved by: MAHEC (2013-05-27) Last Plotted: 2013-05-27
Filename: P:\60299285\900-CAD-GIS\910 CAD_BIM\03-SKETCHES\B\60299285-FIG-00-0000-B-WATT_1_2013.DWG

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



2013 Local Streets Package
Watt Street
City of Winnipeg

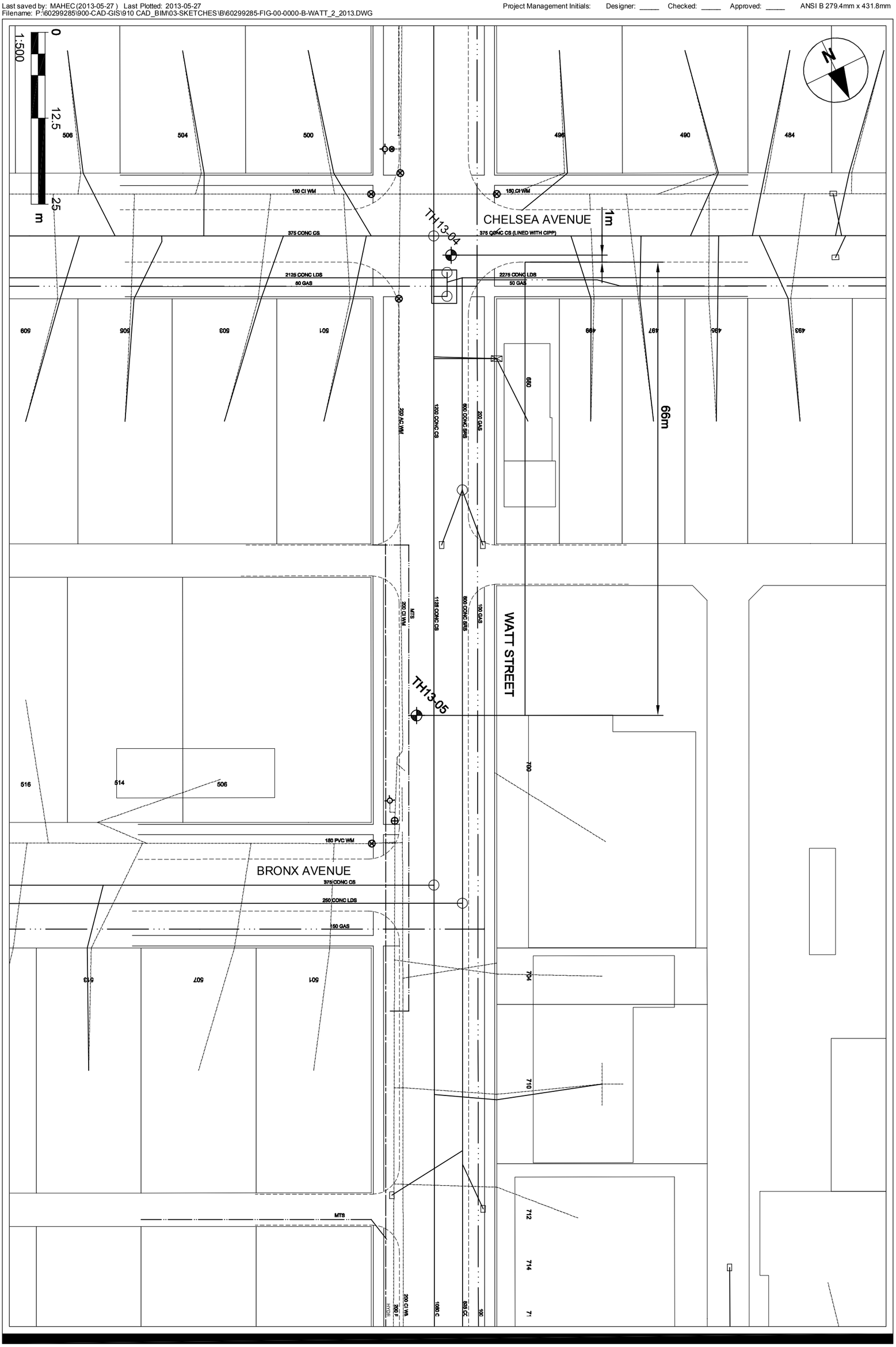
Test Hole Locations

AECOM

Figure: 1

Last saved by: MAHEC (2013-05-27) Last Plotted: 2013-05-27
Filename: P:\60299285\900-CAD-GIS\910 CAD_BIM\03-SKETCHES\B\60299285-FIG-00-0000-B-WATT_2_2013.DWG

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



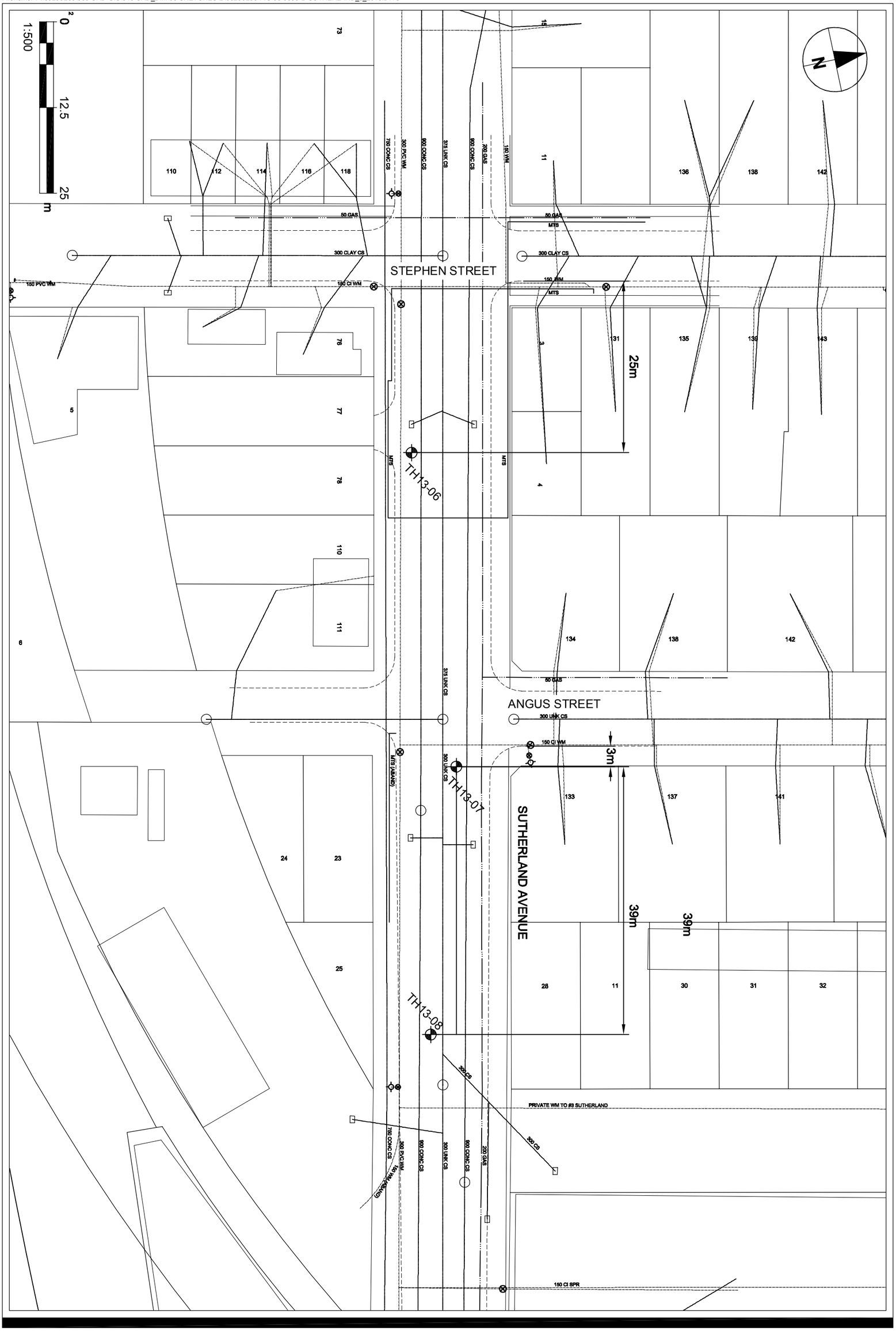
2013 Local Streets Package
Watt Street
City of Winnipeg

Test Hole Locations

AECOM

Figure: 2

Last saved by: MAHEC (2013-05-27) Last Plotted: 2013-05-27
Filename: P:\60299285\900-CAD-GIS\910 CAD_BIM\03-SKETCHES\B\60299285-FIG-00-0000-B-SUTHERLAND_3_2013.DWG
Project Management Initials: Designer: ____ Checked: ____ Approved: ____ ANSI B 279.4mm x 431.8mm



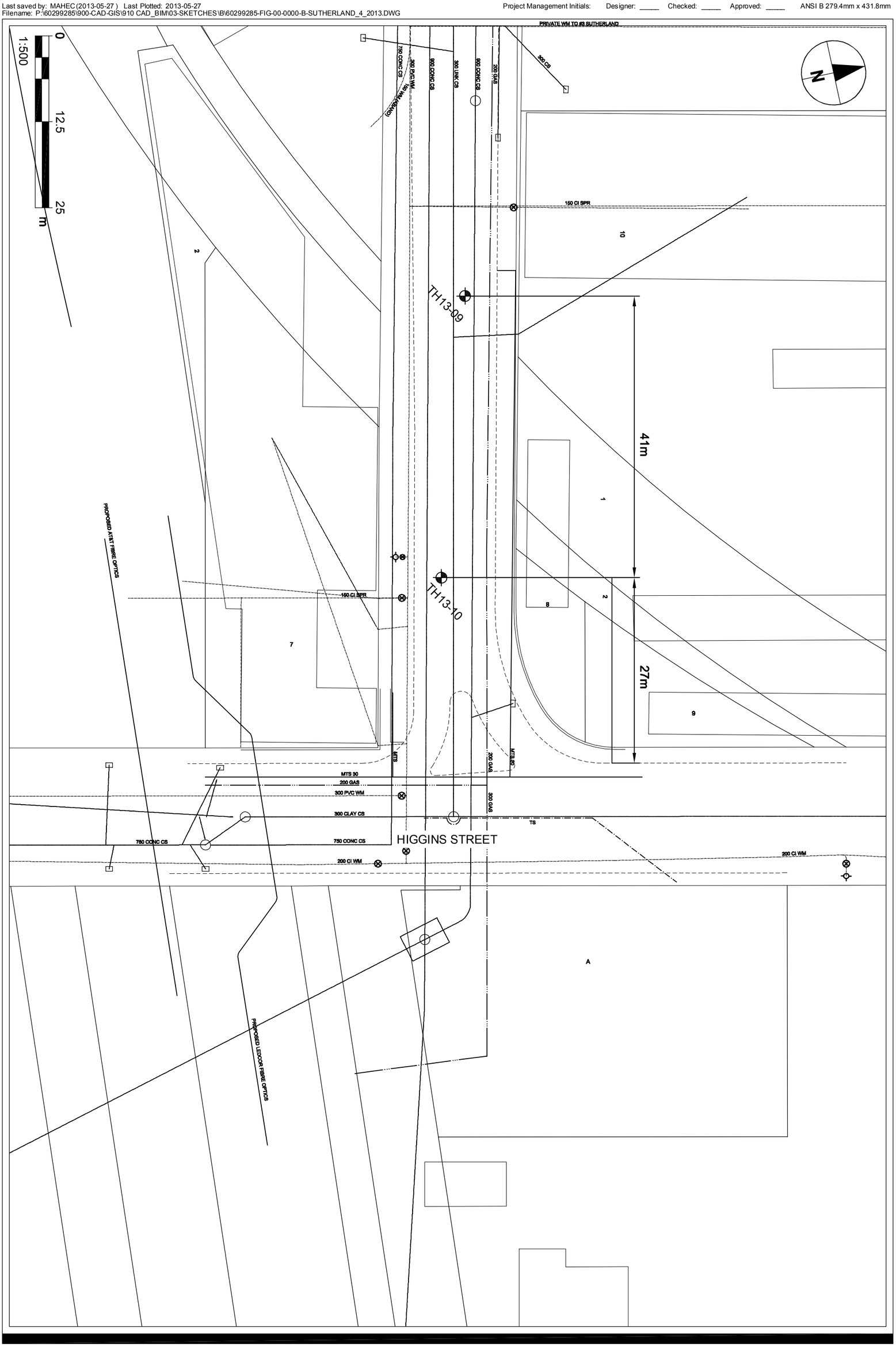
2013 Local Streets Package
Sutherland Avenue
City of Winnipeg

Test Hole Locations

AECOM

Figure: 3

Last saved by: MAHEC (2013-05-27) Last Plotted: 2013-05-27
Filename: P:\60299285\900-CAD-GIS\910 CAD_BIM\03-SKETCHES\B\60299285-FIG-00-0000-B-SUTHERLAND_4_2013.DWG
Project Management Initials: Designer: _____ Checked: _____ Approved: _____ ANSI B 279.4mm x 431.8mm



2013 Local Streets Package
Sutherland Avenue
City of Winnipeg

Test Hole Locations

AECOM

Figure: 4

Last saved by: MAHEC (2013-05-28) Last Plotted: 2013-05-28
Filename: P:\60299285\900-CAD-GIS\910 CAD_BIM\03-SKETCHES\B\60299285-FIG-00-0000-B-DIPLOMAT_5_2013.DWG

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

2013 Local Streets Package
Diplomat Drive
City of Winnipeg

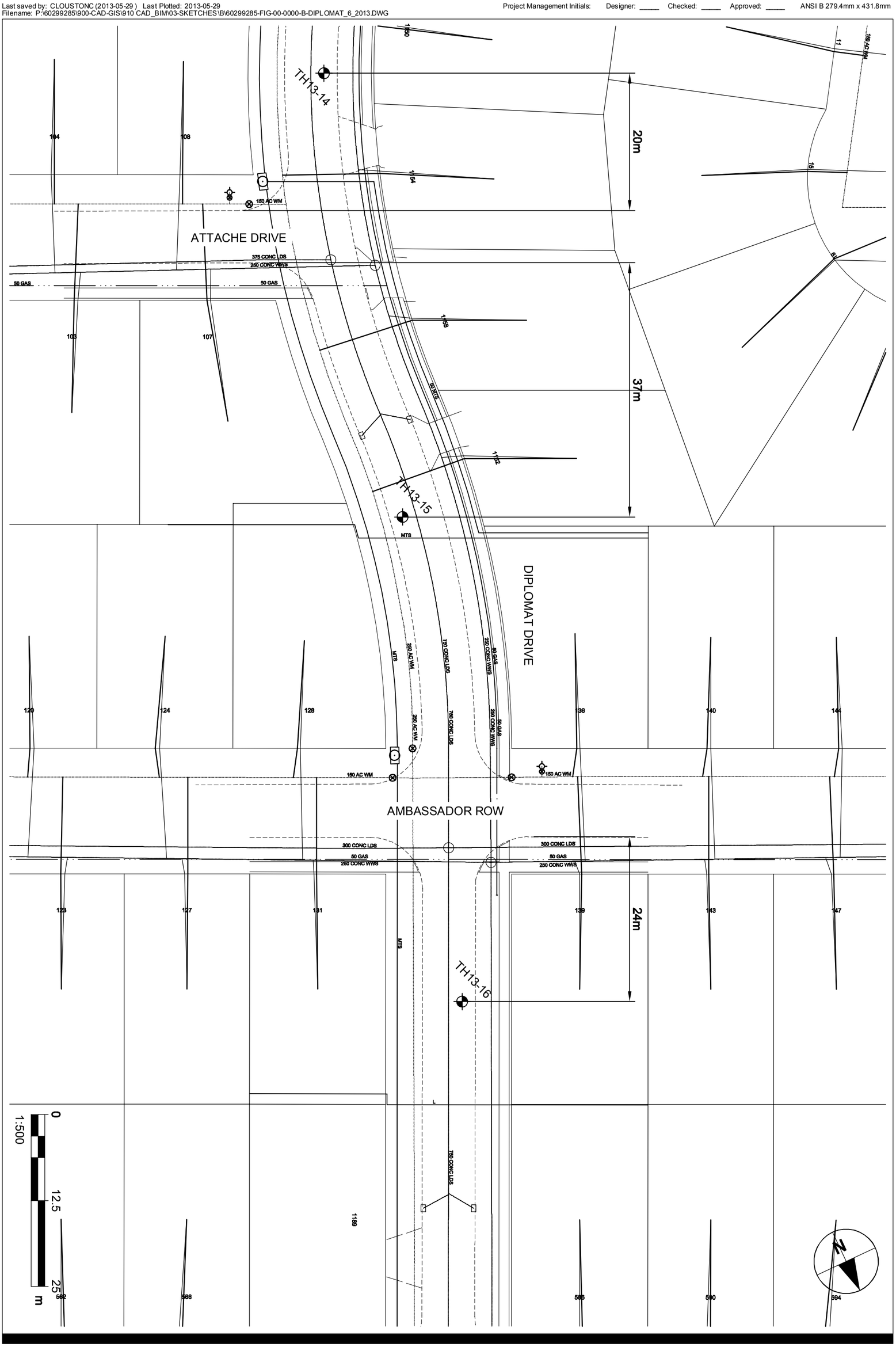
Test Hole Locations

AECOM

Figure: 5

Last saved by: CLOUSTONC (2013-05-29) Last Plotted: 2013-05-29
Filename: P:\60299285\900-CAD-GIS\910 CAD_BIM\03-SKETCHES\B\60299285-FIG-00-0000-B-DIPLOMAT_6_2013.DWG

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



2013 Local Streets Package
Diplomat Drive
City of Winnipeg

Test Hole Locations

AECOM

Figure: 6

Photograph 1. Watt Street – TH13-01

Photograph 2. Watt Street – TH13-02

Photograph 3. Watt Street – TH13-03

Photograph 4. Watt Street – TH13-04

Photograph 5. Watt Street – TH13-05

Photograph 6. Sutherland Avenue – TH13-06

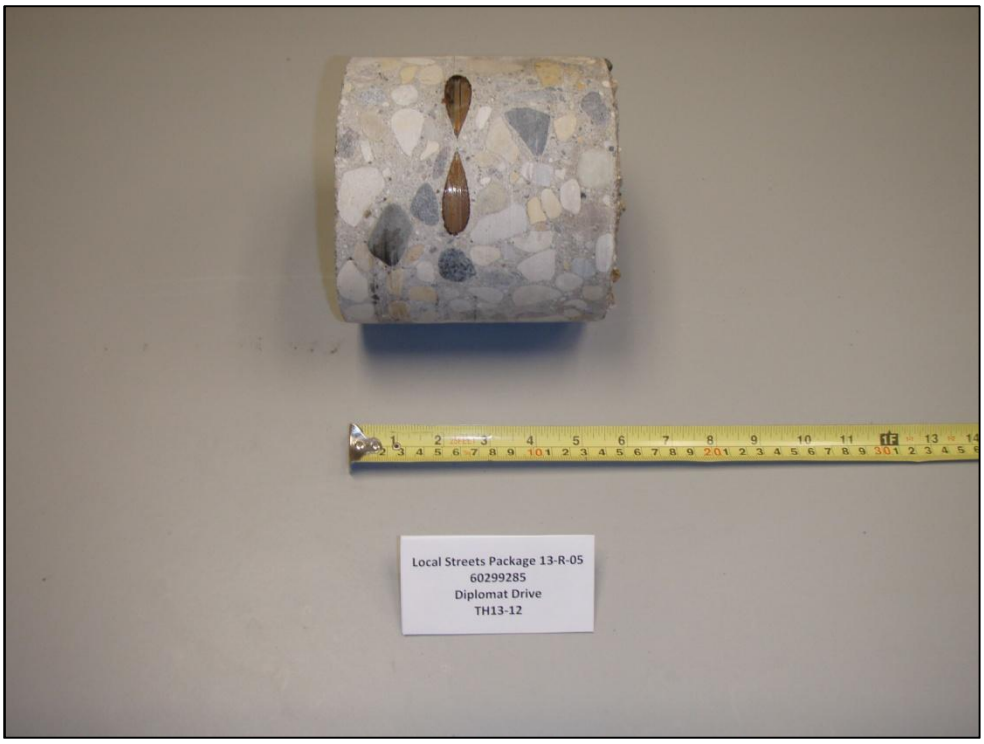
Photograph 7. Sutherland Avenue – TH13-07

Photograph 8. Sutherland Avenue – TH13-08

Photograph 9. Sutherland Avenue – TH13-09

Photograph 10. Sutherland Avenue – TH13-10

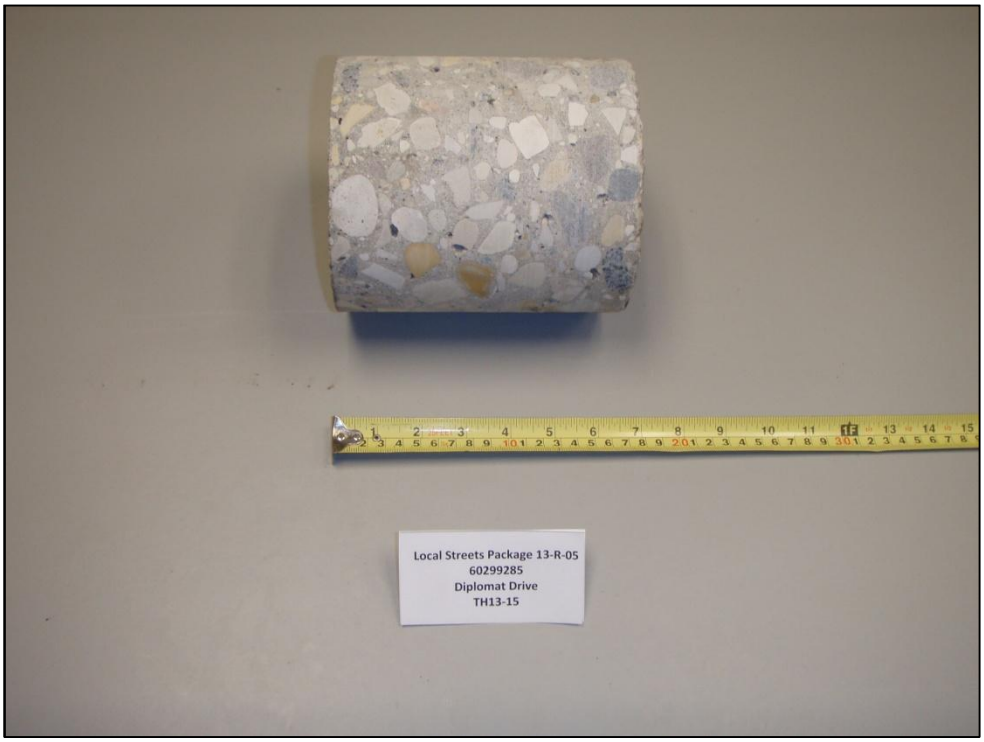
Photograph 11. Diplomat Drive – TH13-11



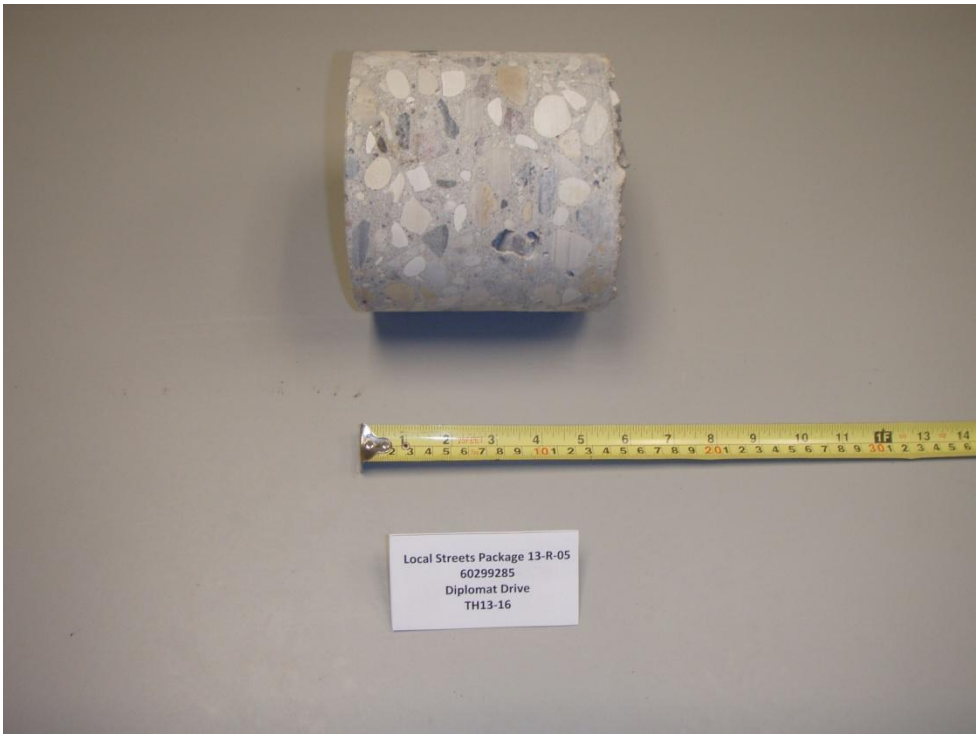
Photograph 12. Diplomat Drive – TH13-12

Photograph 13. Diplomat Drive – TH13-13

Photograph 14. Diplomat Drive – TH13-14



Photograph 15. Diplomat Drive – TH13-15



Photograph 16. Diplomat Drive – TH13-16

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

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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.

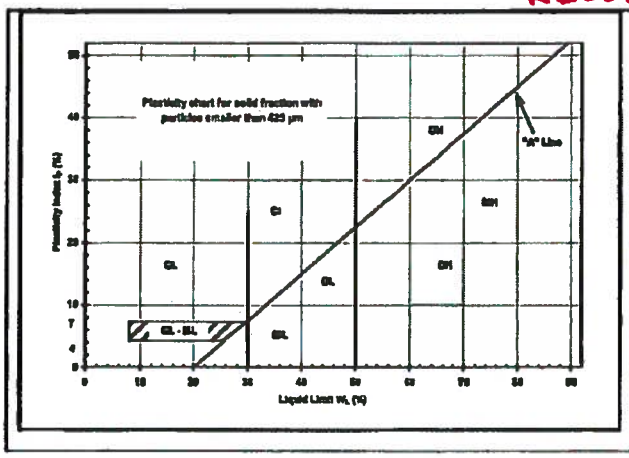
EXPLANATION OF FIELD & LABORATORY TEST DATA

Description				AECOM 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		
	Concrete		Bedrock (Undifferentiated)		AECOM
	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. 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

PROJECT: Local Streets Package 13-R-05	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-06
LOCATION: Sutherland Street; Eastbound Centre Lane, 25 m East of Stephens Street, 5.0 m North of Curb		PROJECT NO.: 60299285
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

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 × ☐ Lab Vane ☐ △ Pocket Pen. △ ✣ Field Vane ✣ (kPa) 50 100 150 200

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH
0		ASPHALT (thickness = 162.5 mm)				
		CONCRETE (thickness = 387.5 mm)				
		CLEAN CRUSHED LIMESTONE (<50 mm diameter)				
		CLAY - trace to some silt, trace sand - brown, moist, firm - intermediate to high plasticity		G1		
1				G2		1
				G3		
				G4		
2				G5		2
				G6		
				G7		
		- dark grey inclusions below 2.9 m				
3				G8		3
		END OF TEST HOLE AT 3.0 m in CLAY NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.550 m, solid stem augers to 3.0 m.				
4						

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 3.00 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/16/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

LOG OF TEST HOLE SUTHERLAND & DIPLOMAT.GPJ UMA WINN.GDT 6/11/13

PROJECT: Local Streets Package 13-R-05	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-07
LOCATION: Sutherland Street; Westbound Centre Lane, 3.0 m East of Angus Street, 5.5 m South of Curb		PROJECT NO.: 60299285
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

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 × □ Lab Vane □ △ Pocket Pen. △ ✣ Field Vane ✣ (kPa) 50 100 150 200

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH
0		ASPHALT (thickness = 100 mm)				
		CONCRETE (thickness = 450 mm)				
		CLEAN CRUSHED LIMESTONE (<50 mm diameter)				
		CLAY - silty, trace sand - brown, moist, firm - intermediate plasticity		G33		
1				G34		1
				G35		
				G36		
2				G37		2
				G38		
		SILT - clayey, trace sand - brown, moist, soft - intermediate plasticity		G39		
3				G40		3
		END OF TEST HOLE AT 3.0 m in SILT NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.550 m, solid stem augers to 3.0 m.				
4						

LOG OF TEST HOLE SUTHERLAND & DIPLOMAT.GPJ UMA WINN.GDT 6/11/13

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 3.00 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/16/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

PROJECT: Local Streets Package 13-R-05	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-08
LOCATION: Sutherland Street; Eastbound Centre Lane, 42 m East of Angus Street, 5.0 m North of Curb		PROJECT NO.: 60299285
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

PENETRATION TESTS: ✳ 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

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

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH
0		ASPHALT (thickness = 162.5 mm)				
		CONCRETE (thickness = 387.5 mm)				
		CLEAN CRUSHED LIMESTONE (<50 mm diameter)				
		SILTY CLAY - some sand, trace gravel - brown, moist, firm - high plasticity				
1				G9		1
				G10	Gradation: Gravel = 0.3%, Sand = 11.7%, Silt = 45.5%, Clay = 42.5%	
				G11		
				G12		
2						2
				G13		
				G14		
				G15		
		- dark grey below 2.9 m				
3				G16		3
		END OF TEST HOLE AT 3.0 m in CLAY NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.550 m, solid stem augers to 3.0 m.				
4						

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 3.00 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/16/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

LOG OF TEST HOLE SUTHERLAND & DIPLOMAT.GPJ UMA WINN.GDT 6/11/13

PROJECT: Local Streets Package 13-R-05	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-09
LOCATION: Sutherland Street; Westbound Centre Lane, 68 m West of Higgins Avenue, 5.0 m South of Curb		PROJECT NO.: 60299285
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS: 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	UNDRAINED SHEAR STRENGTH: Torvane; QU; Lab Vane; Pocket Pen.; Field Vane (kPa) 50 100 150 200	COMMENTS	DEPTH
0		ASPHALT (thickness = 75 mm)						
		CONCRETE (thickness = 450 mm)						
		CLEAN CRUSHED LIMESTONE (<50 mm diameter)						
		CLAY - silty, trace sand - brown, moist, firm - intermediate plasticity		G25				
1				G26				1
				G27				
				G28				
2				G29				2
				G30				
		SILT - clayey, trace sand - brown, moist, soft to firm - intermediate plasticity		G31				
3				G32				3
		END OF TEST HOLE AT 3.0 m in SILT NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.525 m, solid stem augers to 3.0 m.						
4								

LOG OF TEST HOLE SUTHERLAND & DIPLOMAT.GPJ UMA WINN.GDT 6/11/13

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 3.00 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/16/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

PROJECT: Local Streets Package 13-R-05	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-10
LOCATION: Sutherland Street; Eastbound Lane, 27 m West of Higgins Avenue, 3.5 m North of Curb		PROJECT NO.: 60299285
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

PENETRATION TESTS: 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

UNDRAINED SHEAR STRENGTH: Torvane; QU; Lab Vane; Pocket Pen.; Field Vane (kPa) 50 100 150 200

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH
0		ASPHALT (thickness = 150 mm)				
		CONCRETE (thickness = 437.5 mm)				
		CLEAN CRUSHED LIMESTONE (<50 mm diameter)				
		SILTY CLAY - some sand, trace gravel - brown, moist, soft - high plasticity		G17	Gradation: Gravel = 1.1%, Sand = 15.8%, Silt = 48.8%, Clay = 34.3%	
1		- firm at 1.2 m		G18		1
		SAND - trace silt, trace clay - brown, fine grained, moist		G19		
		SAND - silty, clayey - brown, soft, moist - low plasticity		G20		
2				G21		2
				G22		
		CLAYEY SILT - trace sand - grey, moist, firm to soft - low plasticity		G23		
3				G24		3
		END OF TEST HOLE AT 3.0 m in SILT NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.588 m, solid stem augers to 3.0 m.				
4						

LOG OF TEST HOLE SUTHERLAND & DIPLOMAT.GPJ UMA WINN.GDT 6/11/13

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 3.00 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/16/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

PROJECT: Local Streets Package 13-R-05	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-11
LOCATION: Diplomat Drive; Northbound Lane, 55 m North of Leila Avenue, 2.0 m West of Curb		PROJECT NO.: 60299285
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #
0		CONCRETE (thickness = 160 mm)		
		GRAVEL - well graded (<16mm diameter) - brown		
		CLAY - trace silt, trace sand - dark brown, moist, firm - high plasticity		G41
		CLAYEY SILT - some sand - light brown and brown, moist, soft to firm - intermediate plasticity		G42
1				G43
				G44
				G45
		CLAY - trace silt - brown, moist, firm - high plasticity		G46
2				G47
		END OF TEST HOLE AT 2.3 m in CLAY NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.160 m, solid stem augers to 2.3 m.		
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 ×
☐ Lab Vane ☐
△ Pocket Pen. △
✣ Field Vane ✣
(kPa)
50 100 150 200

COMMENTS

DEPTH

AECOM	LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.30 m
	REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/27/13
	PROJECT ENGINEER: Kevin Rae	Page 1 of 1

LOG OF TEST HOLE SUTHERLAND & DIPLOMAT.GPJ UMA WINN.GDT 6/11/13

PROJECT: Local Streets Package 13-R-05	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-12
LOCATION: Diplomat Drive; Southbound Lane, 130 m North of Leila Avenue, 1.5 m East of Curb		PROJECT NO.: 60299285
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH
0		CONCRETE (thickness = 145 mm)				
		GRAVEL - well graded (<16mm diameter) - brown				
		CLAY - trace silt - dark grey, moist, firm to stiff - high plasticity		G48		
				G49		
		CLAYEY SILT - trace sand, trace gravel - light brown, moist, soft to firm - low to intermediate plasticity		G50	Gradation: Gravel = 0.4%, Sand = 9.2%, Silt = 67.4%, Clay = 23.0%	
1				G51		1
				G52		
				G53		
2		CLAY - trace silt - brown, moist, firm - high plasticity		G54		2
		END OF TEST HOLE AT 2.3 m in CLAY NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.145 m, solid stem augers to 2.3 m.				
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 × | □ Lab Vane □ | △ Pocket Pen. △ | ✣ Field Vane ✣ (kPa) 50 100 150 200

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.30 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/27/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

LOG OF TEST HOLE SUTHERLAND & DIPLOMAT.GPJ UMA WINN.GDT 6/11/13

PROJECT: Local Streets Package 13-R-05	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-13
LOCATION: Diplomat Drive; Northbound Lane, 189 m North of Leila Avenue, 1.0 m West of Curb		PROJECT NO.: 60299285
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

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 × ☐ Lab Vane ☐ △ Pocket Pen. △ ✣ Field Vane ✣ (kPa) 50 100 150 200

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH
0		CONCRETE (thickness = 160 mm)				
		GRAVEL - well graded (<16mm diameter) - brown				
		CLAY - trace silt - dark brown, moist, firm to stiff - high plasticity		G55		
				G56		
		SILT - some clay - light brown, moist, soft - low plasticity		G57		
1				G58		1
		CLAY - trace silt - brown, moist, firm - high plasticity		G59		
		SILT - trace to some clay - light brown, moist, soft - intermediate plasticity		G60		
2		CLAY - trace silt - brown, moist, firm - high plasticity		G61		2
		END OF TEST HOLE AT 2.3 m in CLAY NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.160 m, solid stem augers to 2.3 m.				
3						

LOG OF TEST HOLE SUTHERLAND & DIPLOMAT.GPJ UMA WINN.GDT 6/11/13

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.30 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/27/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

PROJECT: Local Streets Package 13-R-05	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-14
LOCATION: Diplomat Drive; Southbound Lane, 20 m South of Attache Drive, 2.0 m East of Curb		PROJECT NO.: 60299285
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

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 × ☐ Lab Vane ☐ △ Pocket Pen. △ ✪ Field Vane ✪ (kPa) 50 100 150 200

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH
0		CONCRETE (thickness = 135 mm)				
		GRAVEL - well graded (<16mm diameter) - brown				
		CLAY (FILL) - trace silt, trace sand, trace gravel - dark grey - high plasticity		G62		
		SILTY CLAY - trace sand, trace gravel - dark grey, moist, firm - high plasticity		G63	Gradation: Gravel = 0.1%, Sand = 4.6%, Silt = 31.5%, Clay = 63.8%	
1				G64		1
				G65		
		SILT - some sand, trace clay, grace gravel (<5mm diameter) - light brown, moist, soft - intermediate plasticity		G66		
				G67		
2		CLAY - trace silt - brown, moist, firm - high plasticity		G68		2
		SILT - some sand, trace clay - light brown, moist, soft - intermediate plasticity				
3		END OF TEST HOLE AT 2.36 m in SILT NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.135 m, solid stem augers to 2.36 m.				

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.36 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/27/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

LOG OF TEST HOLE SUTHERLAND & DIPLOMAT.GPJ UMA WINN.GDT 6/11/13

PROJECT: Local Streets Package 13-R-05	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-15
LOCATION: Diplomat Drive; Northbound Lane, 37 m North of Attache Drive, 2.0 m West of Curb		PROJECT NO.: 60299285
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	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 (thickness = 165 mm)					
		CLAY (FILL) - trace silt, trace sand, trace gravel - brown - high plasticity		G69			
				G70			
				G71			
1		CLAY - trace silt - brown, moist, firm - high plasticity		G72			1
		SILT - some clay, trace sand - light brown, moist, soft - low plasticity		G73			
				G74			
2				G75			2
		END OF TEST HOLE AT 2.3 m in SILT NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.165 m, solid stem augers to 2.3 m.					
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 × ☐ Lab Vane ☐ △ Pocket Pen. △ ✣ Field Vane ✣ (kPa) 50 100 150 200

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.30 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/27/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

LOG OF TEST HOLE SUTHERLAND & DIPLOMAT.GPJ UMA WINN.GDT 6/11/13

PROJECT: Local Streets Package 13-R-05	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-16
LOCATION: Diplomat Drive; Southbound Lane, 24 m North of Ambassador Row, 2.0 m East of Curb		PROJECT NO.: 60299285
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	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 (thickness = 140 mm)					
		GRAVEL (FILL) - some clay - brown	■	G76			
		CLAY (FILL) - trace silt, trace sand, trace gravel - dark brown - high plasticity	■	G77			
			■	G78			
1							1
		CLAY - trace silt, trace oxidation - brown, moist, firm - high plasticity	■	G79			
			■	G80			
			■	G81			
2		SILT - some clay, trace sand - light brown, moist, soft - low plasticity	■	G82			2
		END OF TEST HOLE AT 2.3 m in SILT NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.140 m, solid stem augers to 2.3 m.					
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 × ☐ Lab Vane ☐ △ Pocket Pen. △ ✣ Field Vane ✣ (kPa) 50 100 150 200

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.30 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/27/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

LOG OF TEST HOLE SUTHERLAND & DIPLOMAT.GPJ UMA WINN.GDT 6/11/13

City of Winnipeg
Local Streets Package 13-R-05
Geotechnical Investigation

Test Hole No.	Test Hole Location	Pavement Surface	
		Type	Thickness (mm)
TH13-01	Watt Street; Northbound Lane, 23 m North of Sydney Avenue, 3.0 m West of Curb	Asphalt	110
		Concrete	180
TH13-02	Watt Street; Southbound Lane, 6 m South of Melbourne Avenue, 2.5 m East of Curb	Asphalt	110
		Concrete	180
TH13-03	Watt Street; Northbound Lane, 44 m North of Melbourne Avenue, 3.0 m West of Curb	Asphalt	75
		Concrete	190
TH13-04	Watt Street; Southbound Lane, Along North Edge of Chelsea Avenue, 2.0 m East of Curb	Asphalt	25
		Concrete	165
TH13-05	Watt Street; Northbound Lane, 66 m North of Chelsea Avenue, 3.0 m West of Curb	Asphalt	75
		Concrete	200

City of Winnipeg
Local Streets Package 13-R-05
Geotechnical Investigation

Test Hole No.	Test Hole 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
TH13-06	Sutherland Street; Eastbound Centre Lane, 25 m East of Stephens Street, 5.0 m North of Curb	Asphalt	162.5	Clean Crushed Limestone (<50 mm Diameter)	150	Clay	0.9	30.4							
						Clay	1.2	31.4							
						Clay	1.5	31.3							
		Concrete	387.5			Clay	1.8	31.6							
						Clay	2.1	33.1							
						Clay	2.4	31.7							
						Clay	2.7	33.5							
						Clay	2.95	36.5							
TH13-07	Sutherland Street; Westbound Centre Lane, 3 m East of Angus Street, 5.5 m South of Curb	Asphalt	100	Clean Crushed Limestone (<50 mm Diameter)	100	Clay	0.9	31.3							
						Clay	1.2	28.4							
						Clay	1.5	27.5							
		Concrete	450			Clay	1.8	27.6							
						Clay	2.1	26.9							
						Clay	2.4	28.0							
						Silt	2.7	30.6							
						Silt	2.95	29.9							
TH13-08	Sutherland Street; Eastbound Centre Lane, 42 m East of Angus Street, 5.0 m North of Curb	Asphalt	162.5	Clean Crushed Limestone (<50 mm Diameter)	75	Clay	0.9	28.2							
						Silty Clay	1.2	29.8	0.3	11.7	45.5	42.5	62.4	22.3	40.1
						Silty Clay	1.5	29.5							
		Concrete	387.5			Silty Clay	1.8	30.6							
						Silty Clay	2.1	30.2							
						Silty Clay	2.4	30.3							
						Silty Clay	2.7	29.9							
						Silty Clay	2.95	30.9							

City of Winnipeg
Local Streets Package 13-R-05
Geotechnical Investigation

Test Hole No.	Test Hole 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
TH13-09	Sutherland Street; Westbound Centre Lane, 68 m West of Higgins Avenue, 5.0 m South of Curb	Asphalt	75	Clean Crushed Limestone (<50 mm Diameter)	100	Clay	0.9	30.9							
						Clay	1.2	30.6							
						Clay	1.5	28.5							
		Concrete	100			Clay	1.8	29.0							
						Clay	2.1	32.1							
						Clay	2.4	30.2							
						Silt	2.7	29.0							
						Silt	2.95	29.9							
TH13-10	Sutherland Street; Eastbound Lane, 27 m West of Higgins Avenue, 3.5m North of Curb	Asphalt	150	Clean Crushed Limestone (<50 mm Diameter)	62.5	Silty Clay	0.9	31.5	1.1	15.8	48.8	34.3	54.5	19.1	35.4
						Silty Clay	1.2	27.8							
						Sand	1.5	9.2							
		Concrete	437.5			Silty Sand	1.8	29.4							
						Silty Sand	2.1	29.3							
						Silty Sand	2.4	29.3							
						Clayey Silt	2.7	31.3							
						Clayey Silt	2.95	35.7							

City of Winnipeg
Local Streets Package 13-R-05
Geotechnical Investigation

Test Hole No.	Test Hole 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
TH13-11	Diplomat Drive; Northbound Lane, 55 m North of Leila Avenue, 2.0 m West of Curb	Concrete	160	Granular (<16 mm diameter)	95	Clay	0.3	24.6							
						Clayey Silt	0.6	20.0							
						Clayey Silt	0.9	26.6							
						Clayey Silt	1.2	25.0							
						Clayey Silt	1.5	23.6							
						Clay	1.8	38.8							
						Clay	2.1	44.7							
TH13-12	Diplomat Drive; Southbound Lane, 130 m North of Leila Avenue, 1.5 m East of Curb	Concrete	145	Granular (<16 mm diameter)	110	Clay	0.3	29.8							
						Clay	0.6	33.6							
						Clayey Silt	0.9	24.3	0.4	9.2	67.4	23.0	30.6	16.8	13.7
						Clayey Silt	1.2	25.1							
						Clayey Silt	1.5	24.1							
						Clayey Silt	1.8	22.9							
						Clay	2.1	39.1							
TH13-13	Diplomat Drive; Northbound Lane, 189 m North of Leila Avenue, 1.0 m West of Curb	Concrete	160	Granular (<16 mm diameter)	70	Clay	0.3	21.9							
						Clay	0.6	23.5							
						Silt	0.9	20.5							
						Silt	1.2	14.4							
						Clay	1.5	39.3							
						Silt	1.8	24.5							
						Clay	2.1	34.3							

City of Winnipeg
Local Streets Package 13-R-05
Geotechnical Investigation

Test Hole No.	Test Hole 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
TH13-14	Diplomat Drive; Southbound Lane, 20 m South of Attache Drive, 2.0 m East of Curb	Concrete	135	Granular (<16 mm diameter)	125	Clay Fill	0.3	22.7							
						Silty Clay	0.6	29.9	0.1	4.6	31.5	63.8	74.8	22.0	52.7
						Silty Clay	0.9	32.2							
						Silty Clay	1.2	25.9							
						Silt	1.5	18.7							
						Silt	1.8	22.6							
						Clay	2.1	36.8							
TH13-15	Diplomat Drive; Northbound Lane, 37 m North of Attache Drive, 2.0 m West of Curb	Concrete	165	None	n/a	Clay Fill	0.3	21.1							
						Clay Fill	0.6	28.9							
						Clay Fill	0.9	22.4							
						Clay	1.2	29.2							
						Silt	1.5	23.0							
						Silt	1.8	21.9							
						Silt	2.1	22.5							
TH13-16	Diplomat Drive; Southbound Lane, 24 m North of Ambassador Row, 2.0 m East of Curb	Concrete	140	None	n/a	Gravel Fill	0.3	6.9							
						Clay Fill	0.6	16.3							
						Clay Fill	0.9	29.6							
						Clay	1.2	32.5							
						Clay	1.5	35.1							
						Clay	1.8	35.9							
						Silt	2.1	25.6							

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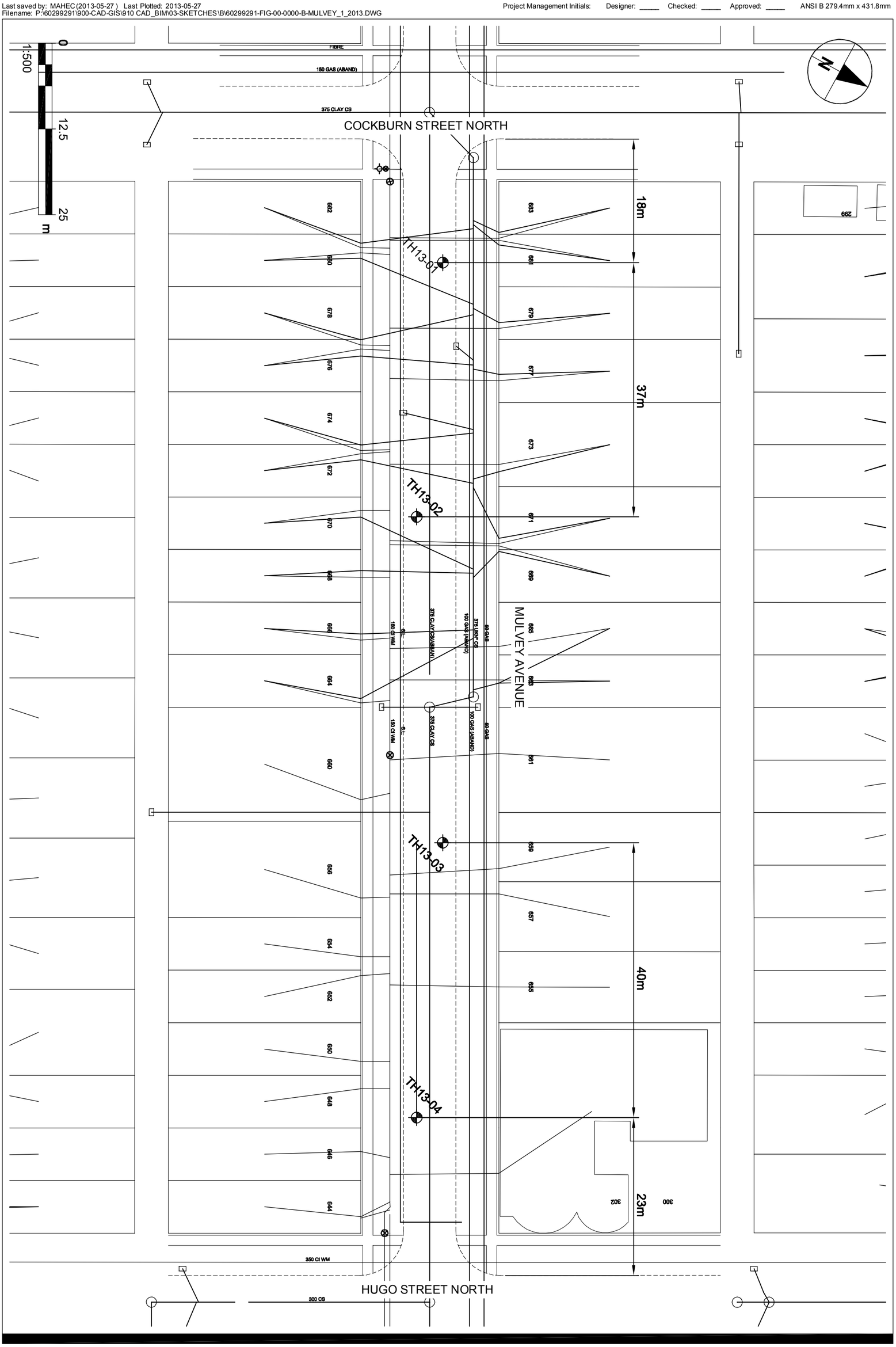
Project Management Initials: Designer: ____ Checked: ____ Approved: ____ ANSI B 279.4mm x 431.8mm



2013 Local Streets Package
Mulvey Avenue
City of Winnipeg

Test Hole Locations

AECOM

Figure: 1

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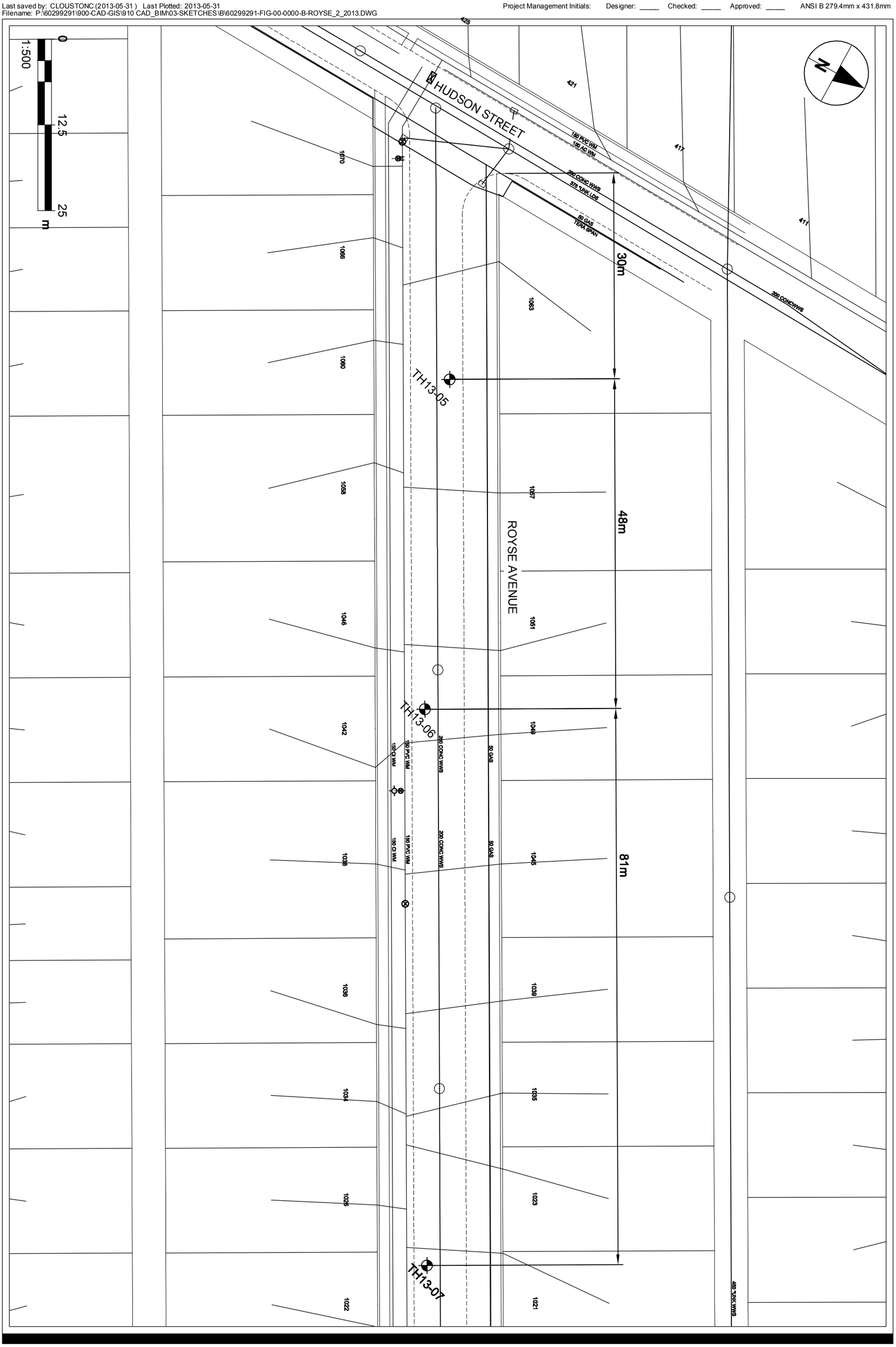
Project Management Initials: Designer: ____ Checked: ____ Approved: ____ ANSI B 279.4mm x 431.8mm



2013 Local Streets Package
Royse Avenue
City of Winnipeg

Test Hole Locations

AECOM

Figure: 2

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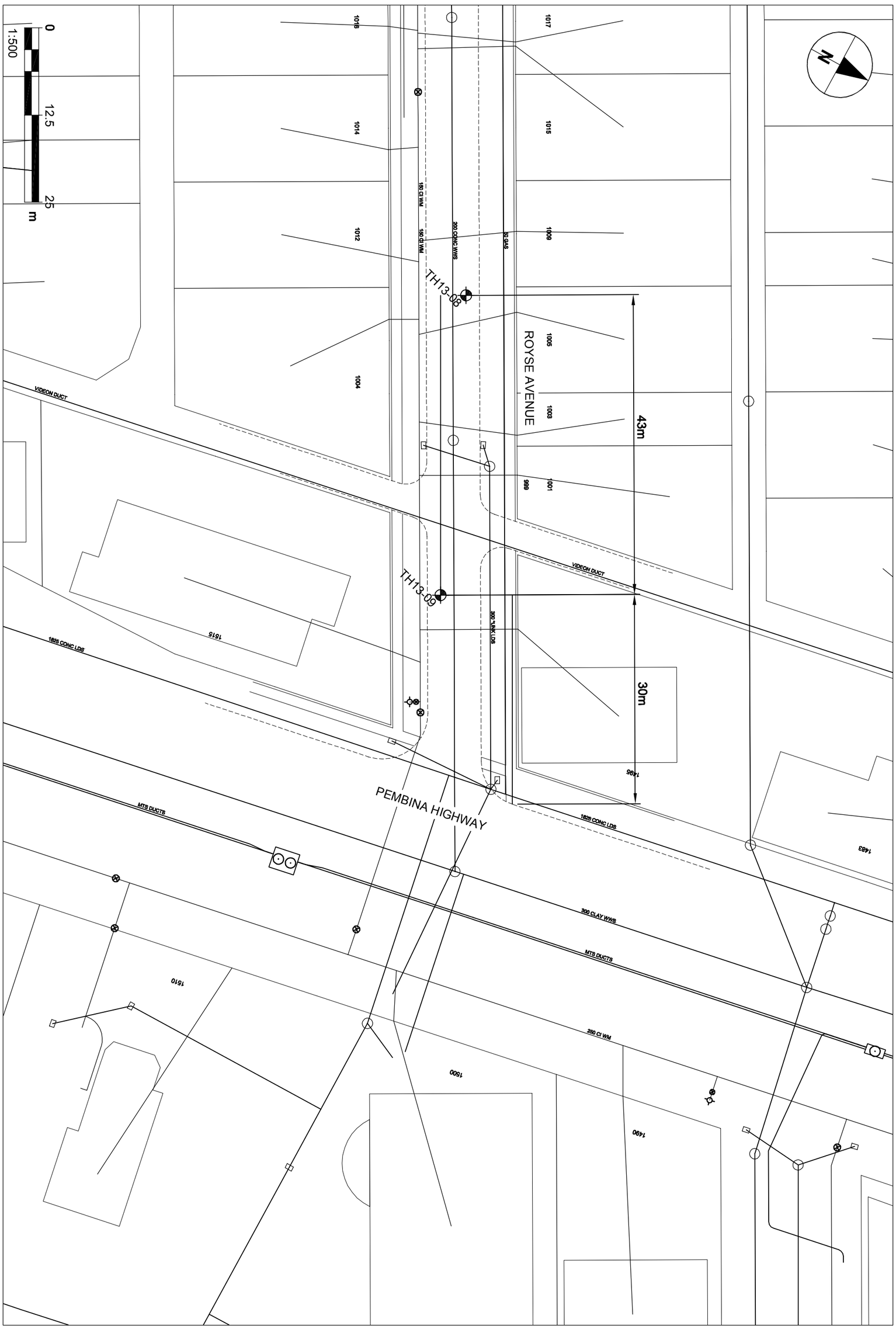
Project Management Initials: Designer: _____ Checked: _____ Approved: _____ ANSI B 279.4mm x 431.8mm



2013 Local Streets Package
Royse Avenue
City of Winnipeg

Test Hole Locations

AECOM

Figure: 3

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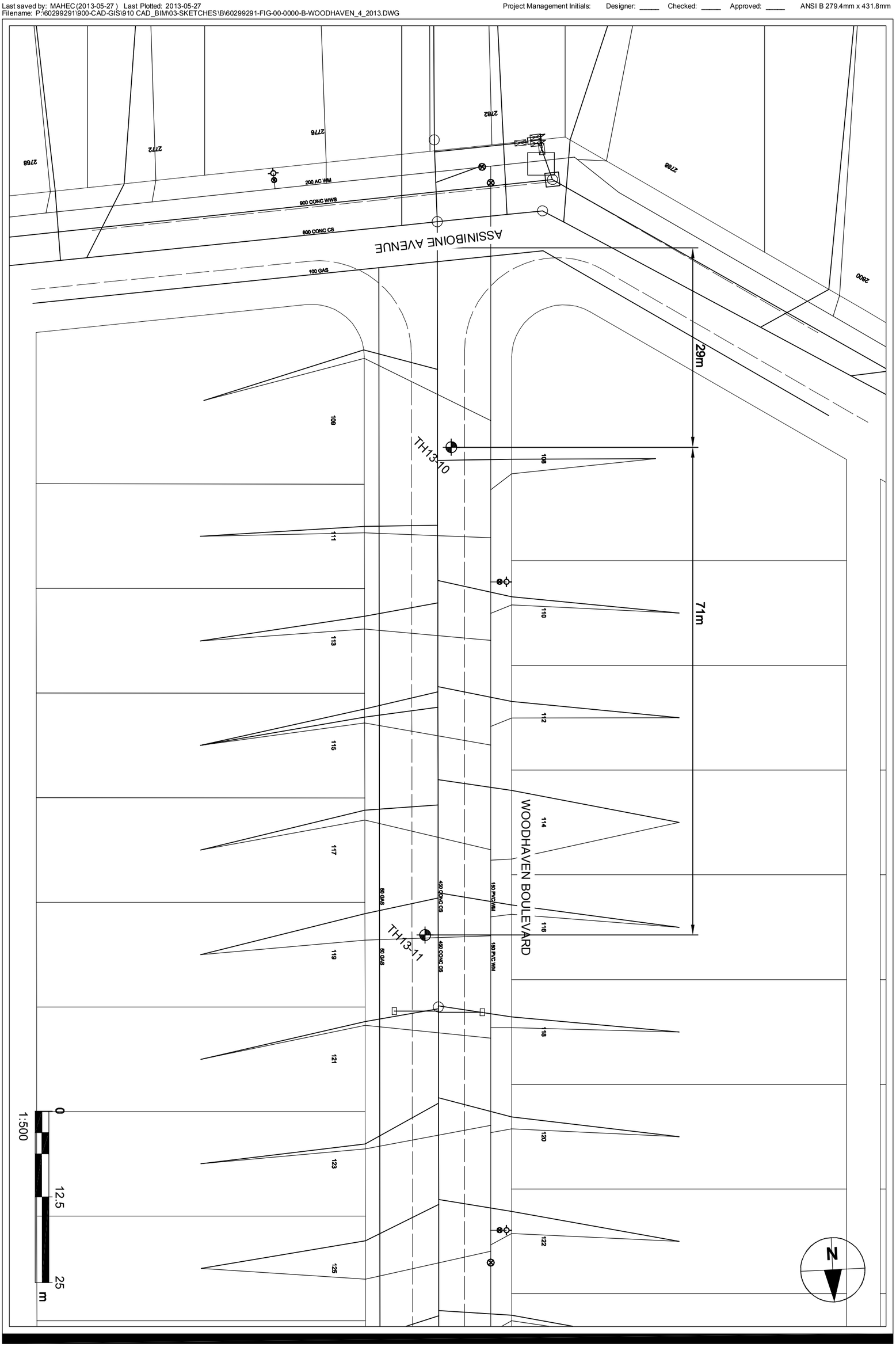
Project Management Initials: Designer: _____ Checked: _____ Approved: _____ ANSI B 279.4mm x 431.8mm



2013 Local Streets Package
Woodhaven Boulevard
City of Winnipeg

Test Hole Locations

AECOM

Figure: 4

Last saved by: CLOUSTONC (2013-05-31) Last Plotted: 2013-05-31
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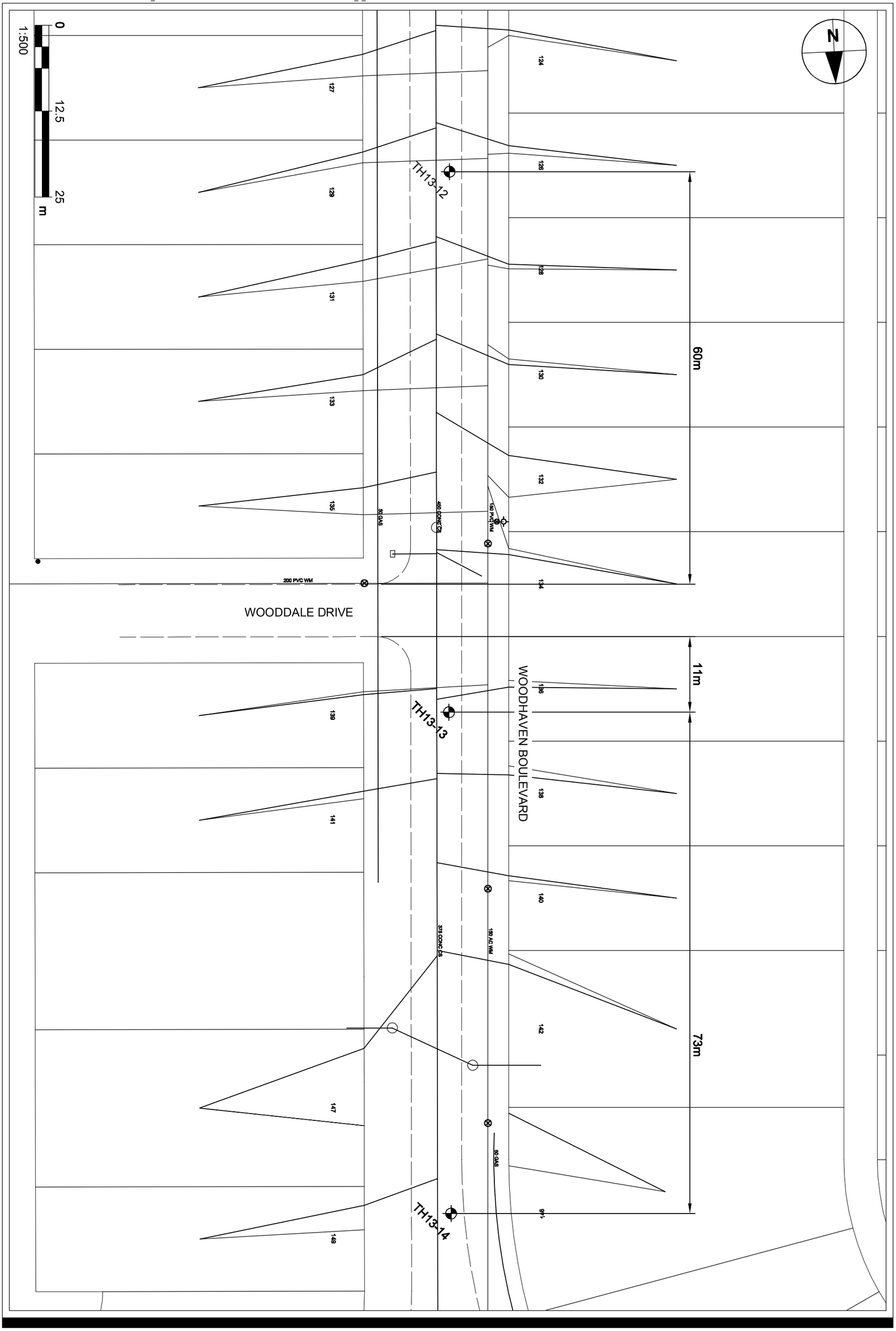
Project Management Initials: Designer: ____ Checked: ____ Approved: ____ ANSI B 279.4mm x 431.8mm



2013 Local Streets Package
Woodhaven Boulevard
City of Winnipeg

Test Hole Locations

AECOM

Figure: 5

Last saved by: MAHEC (2013-05-30) Last Plotted: 2013-05-30
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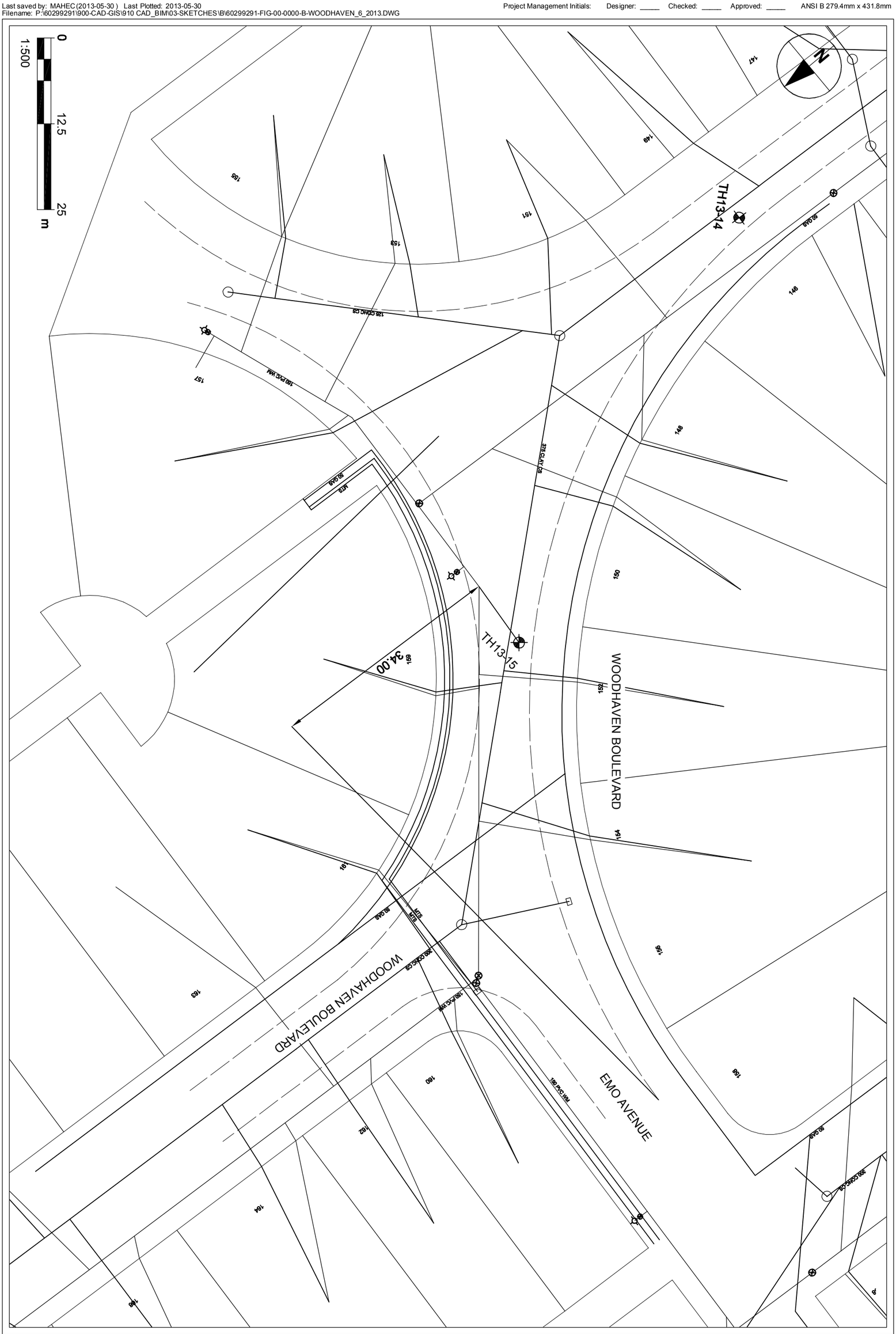
Project Management Initials: Designer: ____ Checked: ____ Approved: ____ ANSI B 279.4mm x 431.8mm



2013 Local Streets Package
Woodhaven Boulevard
City of Winnipeg

Test Hole Locations

AECOM

Figure: 6

Photograph 1. Mulvey Avenue – TH13-01

Photograph 2. Mulvey Avenue – TH13-02

Photograph 3. Mulvey Avenue – TH13-03

Photograph 4. Mulvey Avenue – TH13-04

Photograph 5. Royse Avenue – TH13-05

Photograph 6. Royse Avenue – TH13-06

Photograph 7. Royse Avenue – TH13-07

Photograph 8. Royse Avenue – TH13-08

Photograph 9. Royse Avenue – TH13-09

Photograph 10. Woodhaven Boulevard – TH13-10

Photograph 11. Woodhaven Boulevard – TH13-11

Photograph 12. Woodhaven Boulevard – TH13-12

Photograph 13. Woodhaven Boulevard – TH13-13

Photograph 14. Woodhaven Boulevard – TH13-14

Photograph 15. Woodhaven Boulevard – TH13-15

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.

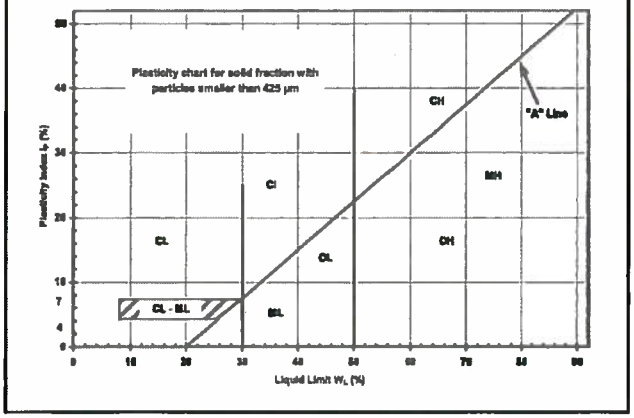
EXPLANATION OF FIELD & LABORATORY TEST DATA

Description				AECOM 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		
	Concrete		Bedrock (Undifferentiated)		AECOM
	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. 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

PROJECT: Local Streets Package 13-R-06	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-01
LOCATION: Mulvey Avenue; Westbound Lane, 18 m East of Cockburn Street North, 2.5 m South of Curb		PROJECT NO.: 60299291
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	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 (thickness = 75 mm)					
		CONCRETE (thickness = 200 mm)					
		GRAVEL - well graded (<20 mm diameter) - brown					
		CLAY - trace silt - dark grey, moist, stiff - high plasticity					
		- brown below 0.6 m		G129			
				G130			
1				G131			1
				G132			
				G133			
2				G134			2
		END OF TEST HOLE AT 2.3 m in CLAY NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.275 m, solid stem augers to 2.3 m.					
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 × ☐ Lab Vane ☐ △ Pocket Pen. △ ✣ Field Vane ✣ (kPa) 50 100 150 200

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.30 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/15/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

AECOM

LOG OF TEST HOLE WOODHAVEN, ROYSE & MULVEY.GPJ UMA WINN.GDT 6/11/13

PROJECT: Local Streets Package 13-R-06	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-02
LOCATION: Mulvey Avenue; Eastbound Lane, 55 m East of Cockburn Street North, 2.0 m North of Curb		PROJECT NO.: 60299291
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH
0		ASPHALT (thickness = 95 mm)				
		CONCRETE (thickness = 125 mm)				
		CLAY - some silt, trace organics - brown to dark grey, moist, firm to stiff - high plasticity		G135		
				G136		
				G137	Gradation: Silt = 20.1%, Clay = 79.9%	
1						1
				G138		
				G139		
		- brown below 1.8 m		G140		
2						2
				G141		
		END OF TEST HOLE AT 2.3 m in CLAY NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.220 m, solid stem augers to 2.3 m.				
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 × | ☐ Lab Vane ☐ | △ Pocket Pen. △ | ✣ Field Vane ✣ (kPa) 50 100 150 200

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.30 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/15/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

AECOM

LOG OF TEST HOLE WOODHAVEN, ROYSE & MULVEY.GPJ UMA WINN.GDT 6/11/13

PROJECT: Local Streets Package 13-R-06	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-03
LOCATION: Mulvey Avenue; Westbound Lane, 63 m West of Hugo Street North, 2.0 m South of Curb		PROJECT NO.: 60299291
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH
0		ASPHALT (thickness = 62.5 mm)				
		CONCRETE (thickness = 162.5 mm)				
		CLAY - some silt - dark grey to brown, moist, firm - high plasticity		G142		
				G143	Gradation: Silt = 13.6%, Clay = 86.4%	
				G144		
1						1
		- firm to soft, some silt to silty below 1.2 m		G145		
				G146		
				G147		
2						2
				G148		
		END OF TEST HOLE AT 2.3 m in CLAY NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.225 m, solid stem augers to 2.3 m.				
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 × | ☐ Lab Vane ☐ | △ Pocket Pen. △ | ✣ Field Vane ✣ (kPa) 50 100 150 200

LOG OF TEST HOLE WOODHAVEN, ROYSE & MULVEY.GPJ UMA WINN.GDT 6/11/13

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.30 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/15/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

PROJECT: Local Streets Package 13-R-06	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-04
LOCATION: Mulvey Avenue; Eastbound Lane, 23 m West of Hugo Street North, 2.0 m North of Curb		PROJECT NO.: 60299291
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

PENETRATION TESTS: 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

UNDRAINED SHEAR STRENGTH: Torvane; QU; Lab Vane; Pocket Pen.; Field Vane (kPa) 50 100 150 200

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH
0		ASPHALT (thickness = 75 mm)				
		CONCRETE (thickness = 100 mm)				
		GRAVEL - well graded (<20 mm diameter) - brown				
		CLAY - trace to some silt - brown, moist, firm - high plasticity		G149		
1				G150		1
				G151		
		- silty below 1.8 m		G152		
2				G153		2
		END OF TEST HOLE AT 2.3 m in CLAY				
3		NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.175 m, solid stem augers to 2.3 m.				

LOG OF TEST HOLE WOODHAVEN, ROYSE & MULVEY.GPJ UMA WINN.GDT 6/11/13

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.30 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/15/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

PROJECT: Local Streets Package 13-R-06	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-05
LOCATION: Royse Avenue; Westbound Lane, 30 m East of Hudson Street, 2.0 m South of Curb		PROJECT NO.: 60299291
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

PENETRATION TESTS: ✳ 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

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

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH
0		ASPHALT (thickness = 75 mm)				
		GRAVEL - well graded (<20 mm diameter) - brown		G90		
		CLAY (FILL) - some silt, some sand, trace gravel (<10 mm diameter) - dark grey, moist, firm - high plasticity		G91		
				G92		
		CLAYEY SILT - some sand, trace gravel - light brown, moist, soft - intermediate plasticity		G93	Gradation: Gravel = 0.7%, Sand = 10.0%, Silt = 55.3%, Clay = 34.0%	
1						1
		- trace clay below 1.2 m		G94		
		CLAY - silty, trace sand - brown, moist, firm - intermediate plasticity		G95		
				G96		
2		- silt layer at 2.0 m				2
				G97		
		END OF TEST HOLE AT 2.3 m in CLAY NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.075 m, solid stem augers to 2.3 m.				
3						

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.30 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/15/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

LOG OF TEST HOLE WOODHAVEN, ROYSE & MULVEY.GPJ UMA WINN.GDT 6/11/13

PROJECT: Local Streets Package 13-R-06	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-06
LOCATION: Royse Avenue; Eastbound Lane, 78 m East of Hudson Street, 2.5 m North of Curb		PROJECT NO.: 60299291
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	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 (thickness = 50 mm)					
		GRAVEL - well graded (<20 mm diameter) - brown					
		CLAY - some silt, trace sand - dark grey, moist, firm to stiff - high plasticity	■	G98			
			■	G99			
			■	G100			
1			■	G101			1
			■	G102			
		- brown below 1.8 m	■	G103			
2			■	G104			2
		END OF TEST HOLE AT 2.3 m in CLAY NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.050 m, solid stem augers to 2.3 m.					
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 × ☐ Lab Vane ☐ △ Pocket Pen. △ ✣ Field Vane ✣ (kPa) 50 100 150 200

LOG OF TEST HOLE WOODHAVEN, ROYSE & MULVEY.GPJ UMA WINN.GDT 6/11/13

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.30 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/15/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

PROJECT: Local Streets Package 13-R-06	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-07
LOCATION: Royse Avenue; Eastbound Lane, 159 m East of Hudson Street, 2.5 m North of Curb		PROJECT NO.: 60299291
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS: 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	UNDRAINED SHEAR STRENGTH: Torvane; QU; Lab Vane; Pocket Pen.; Field Vane (kPa) 50 100 150 200	COMMENTS	DEPTH
0		ASPHALT (thickness = 62.5 mm)						
		GRAVEL - well graded (<20 mm diameter) - brown		G105				
		CLAY (FILL) - some silt, some sand, trace gravel (<10 mm diameter) - dark grey, moist, firm - high plasticity		G106				
		CLAY - some silt, trace sand - dark grey, moist, firm - high plasticity		G107				
				G108				
1				G109				1
				G110				
		- brown, silty below 1.8 m		G111				
2				G112				2
		END OF TEST HOLE AT 2.3 m in CLAY NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.0625 m, solid stem augers to 2.3 m.						
3								

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.30 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/15/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

LOG OF TEST HOLE WOODHAVEN, ROYSE & MULVEY.GPJ UMA WINN.GDT 6/11/13

PROJECT: Local Streets Package 13-R-06	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-08
LOCATION: Royse Avenue; Westbound Lane, 73 m West of Pembina Highway, 1.5 m South of Curb		PROJECT NO.: 60299291
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	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 (thickness = 62.5 mm)					
		GRAVEL - well graded (<20 mm diameter) - brown		G113			
		CLAY - some silt, trace sand - brown, moist, firm - high plasticity		G114			
				G115		Gradation: Sand = 6.7%, Silt = 16.7%, Clay = 76.6%	
1				G116			1
				G117			
				G118			
		SILT - some clay - brown, moist, soft - low plasticity		G119			
2		CLAY - some silt - brown, moist, firm - high plasticity		G120			2
3		END OF TEST HOLE AT 2.3 m in CLAY NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.0625 m, solid stem augers to 2.3 m.					

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 × ☐ Lab Vane ☐ △ Pocket Pen. △ ✣ Field Vane ✣ (kPa) 50 100 150 200

LOG OF TEST HOLE WOODHAVEN, ROYSE & MULVEY.GPJ UMA WINN.GDT 6/11/13

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.30 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/15/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

PROJECT: Local Streets Package 13-R-06	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-09
LOCATION: Royse Avenue; Eastbound Lane, 30 m West of Pembina Highway, 2.0 m North of Curb		PROJECT NO.: 60299291
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

PENETRATION TESTS: 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

UNDRAINED SHEAR STRENGTH: Torvane; QU; Lab Vane; Pocket Pen.; Field Vane (kPa) 50 100 150 200

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH
0		ASPHALT (thickness = 62.5 mm)				
		GRAVEL - well graded (<20 mm diameter) - brown		G121		
		CLAY (FILL) - some silt, some sand, trace gravel (<10 mm diameter) - dark grey, moist, firm - high plasticity		G122		
		CLAY - trace to some silt - dark grey, moist, firm - high plasticity		G123		
				G124		
1						1
		- brown below 1.2 m		G125		
				G126		
				G127		
2						2
				G128		
		END OF TEST HOLE AT 2.3 m in CLAY NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.0625 m, solid stem augers to 2.3 m.				
3						

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.30 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/15/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

LOG OF TEST HOLE WOODHAVEN, ROYSE & MULVEY.GPJ UMA WINN.GDT 6/11/13

PROJECT: Local Streets Package 13-R-06	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-10
LOCATION: Woodhaven Boulevard; Northbound Lane, 29 m North of Assiniboine Avenue, 2.0 m East of Curb		PROJECT NO.: 60299291
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

PENETRATION TESTS: 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

UNDRAINED SHEAR STRENGTH: Torvane; QU; Lab Vane; Pocket Pen.; Field Vane (kPa) 50 100 150 200

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH
0		ASPHALT (thickness = 75 mm)				
		GRAVEL - well graded (<20 mm diameter) - brown		G45		
		GRAVEL (FILL) - some clay, some sand, trace silt - poorly graded (<12.5 mm diameter) - dark grey		G46		
		CLAY - some silt, trace sand - dark brown, frozen to 1.2 m, moist, firm when thawed - high plasticity		G47		
				G48	Gradation: Sand = 0.9%, Silt = 16.0%, Clay = 83.1%	
1				G49		1
				G50		
				G51		
2				G52		2
		END OF TEST HOLE AT 2.3 m in CLAY NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.075 m, solid stem augers to 2.3 m.				
3						

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.30 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/13/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

LOG OF TEST HOLE WOODHAVEN, ROYSE & MULVEY.GPJ UMA WINN.GDT 6/11/13

PROJECT: Local Streets Package 13-R-06	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-11
LOCATION: Woodhaven Boulevard; Southbound Lane, 100 m North of Assiniboine Avenue, 2.0 m West of Curb		PROJECT NO.: 60299291
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

PENETRATION TESTS: 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

UNDRAINED SHEAR STRENGTH (kPa): Torvane; QU; Lab Vane; Pocket Pen.; Field Vane 50 100 150 200

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH
0		ASPHALT (thickness = 88 mm)				
		GRAVEL - well graded (<12.5 mm diameter) - brown				
		CLAY/GRAVEL (FILL) - some sand, some silt - grey and brown		G53		
		CLAY - trace silt - brown, frozen to 0.9 m, moist, firm when thawed - high plasticity		G54		
				G55		
1				G56		1
				G57		
				G58		
		- trace gypsum below 1.8 m		G59		
2				G60		2
		END OF TEST HOLE AT 2.3 m in CLAY NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.088 m, solid stem augers to 2.3 m.				
3						

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.30 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/13/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

LOG OF TEST HOLE WOODHAVEN, ROYSE & MULVEY.GPJ UMA WINN.GDT 6/11/13

PROJECT: Local Streets Package 13-R-06	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-12
LOCATION: Woodhaven Boulevard; Northbound Lane, 176 m North of Assiniboine Avenue, 2.0 m East of Curb		PROJECT NO.: 60299291
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

PENETRATION TESTS: 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

UNDRAINED SHEAR STRENGTH: Torvane; QU; Lab Vane; Pocket Pen.; Field Vane (kPa) 50 100 150 200

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH
0		ASPHALT (thickness = 120 mm)				
		GRAVEL - well graded (<20 mm diameter) - brown				
		CLAY/GRAVEL (FILL) - some sand, some silt - grey and brown				
		CLAY - some silt, trace sand - brown, moist, firm to stiff - high plasticity		G61		
				G62	Gradation: Sand = 4.7%, Silt = 16.5%, Clay = 78.7%	
				G63		
1				G64		1
				G65		
		- silt pockets at 1.8 m		G66		
2				G67		2
		END OF TEST HOLE AT 2.3 m in CLAY NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.120 m, solid stem augers to 2.3 m.				
3						

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.30 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/13/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

LOG OF TEST HOLE WOODHAVEN, ROYSE & MULVEY.GPJ UMA WINN.GDT 6/11/13

PROJECT: Local Streets Package 13-R-06	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-13
LOCATION: Woodhaven Boulevard; Southbound Lane, 11 m North of Wooddale Drive, 2.0 m East of Curb		PROJECT NO.: 60299291
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

PENETRATION TESTS: 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

UNDRAINED SHEAR STRENGTH: Torvane; QU; Lab Vane; Pocket Pen.; Field Vane (kPa) 50 100 150 200

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH
0		ASPHALT (thickness = 138 mm)				
		GRAVEL - well graded (<20 mm diameter) - brown		G68		
		CLAY/GRAVEL (FILL) - some sand, some silt - grey and brown		G69		
		CLAY - trace silt - dark brown, moist, firm to stiff - high plasticity		G70		
				G71		
1		- light brown, some silt below 0.9 m		G72		1
				G73		
				G74		
2				G75		2
		END OF TEST HOLE AT 2.3 m in CLAY NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.138 m, solid stem augers to 2.3 m.				
3						

LOG OF TEST HOLE WOODHAVEN, ROYSE & MULVEY.GPJ UMA WINN.GDT 6/11/13

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.30 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/13/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

PROJECT: Local Streets Package 13-R-06	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-14
LOCATION: Woodhaven Boulevard; Southbound Lane, 84 m North of Wooddale Drive, 2.0 m East of Curb		PROJECT NO.: 60299291
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

PENETRATION TESTS: 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

UNDRAINED SHEAR STRENGTH: Torvane; QU; Lab Vane; Pocket Pen.; Field Vane (kPa) 50 100 150 200

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH
0		ASPHALT (thickness = 100 mm)				
		GRAVEL (FILL) - some clay, some sand, trace silt - poorly graded (<12.5 mm diameter) - brown				
		CLAY - some silt, trace sand - grey, moist, firm - high plasticity		G76		
				G77	Gradation: Sand = 2.3%, Silt = 12.3%, Clay = 85.4%	
		- light brown below 0.9 m		G78		
1				G79		1
		- silt pockets below 1.5 m		G80		
				G81		
2				G82		2
		END OF TEST HOLE AT 2.3 m in CLAY NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.100 m, solid stem augers to 2.3 m.				
3						

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.30 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/13/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

LOG OF TEST HOLE WOODHAVEN, ROYSE & MULVEY.GPJ UMA WINN.GDT 6/11/13

PROJECT: Local Streets Package 13-R-06	CLIENT: City of Winnipeg	TESTHOLE NO: TH13-15
LOCATION: Woodhaven Boulevard; Southbound Lane, 34 m South of Emo Avenue, 2.0 m East of Curb		PROJECT NO.: 60299291
CONTRACTOR: Maple Leaf Drilling Ltd	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

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 × ☐ Lab Vane ☐ △ Pocket Pen. △ ✪ Field Vane ✪ (kPa) 50 100 150 200

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH
0		ASPHALT (thickness = 95 mm)				
		GRAVEL - well graded (<20 mm diameter) - brown		G83		
				G84		
				G85		
1						1
				G86		
				G87		
		CLAY - trace silt - dark brown, moist, firm - high plasticity		G88		
2						2
				G89		
		END OF TEST HOLE AT 2.4 m in CLAY NOTES: 1. No sloughing observed. 2. No seepage observed. 3. Test hole backfilled with auger cuttings, bentonite and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.095 m, solid stem augers to 2.4 m.				
3						

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.40 m
REVIEWED BY: Jared Baldwin	COMPLETION DATE: 5/13/13
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

LOG OF TEST HOLE WOODHAVEN, ROYSE & MULVEY.GPJ UMA WINN.GDT 6/11/13

City of Winnipeg
Local Streets Package 13-R-06
Geotechnical Investigation

Test Hole No.	Test Hole 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
TH13-01	Mulvey Avenue; Westbound Lane, 18 m East of Cockburn Street North, 2.5 m South of Curb	Asphalt	75	Gravel	75	Clay	0.6	40.8							
						Clay	0.9	34.3							
		Concrete	200			Clay	1.2	34.0							
						Clay	1.5	37.0							
						Clay	1.8	40.9							
						Clay	2.1	43.3							
TH13-02	Mulvey Avenue; Eastbound Lane, 55 m East of Cockburn Street North, 2.0 m North of Curb	Asphalt	95	None	n/a	Clay	0.3	37.8							
						Clay	0.6	36.3							
		Concrete	125			Clay	0.9	32.3	0.0	0.0	20.1	79.9	72.5	22.1	50.3
						Clay	1.2	33.5							
						Clay	1.5	35.3							
						Clay	1.8	43.1							
						Clay	2.1	42.6							
TH13-03	Mulvey Avenue; Westbound Lane, 63 m West of Hugo Street North, 2.0 m South of Curb	Asphalt	62.5	None	n/a	Clay	0.3	36.3							
						Clay	0.6	37.0	0.0	0.0	13.6	86.4	88.5	23.3	65.1
		Concrete	162.5			Clay	0.9	39.0							
						Clay	1.2	40.3							
						Clay	1.5	42.0							
						Clay	1.8	45.5							
						Clay	2.1	50.7							
TH13-04	Mulvey Avenue; Eastbound Lane, 23 m West of Hugo Street North, 2.0 m North of Curb	Asphalt	75	Gravel	50	Clay	0.8	28.0							
						Clay	1.2	30.7							
		Concrete	100			Clay	1.5	36.4							
						Clay	1.8	42.7							
						Clay	2.1	47.8							

City of Winnipeg
Local Streets Package 13-R-06
Geotechnical Investigation

Test Hole No.	Test Hole 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
TH13-05	Royse Avenue; Westbound Lane, 30 m East of Hudson Street, 2.0 m South of Curb	Asphalt	75	Gravel	175	Gravel	0.15	4.5							
						Clay Fill	0.3	18.7							
						Clay Fill	0.6	18.5							
						Clayey Silt	0.9	18.5	0.7	10.0	55.3	34.0	32.7	14.0	18.6
						Clayey Silt	1.2	18.1							
						Clay	1.5	18.6							
						Clay	1.8	31.6							
						Clay	2.1	39.7							
TH13-06	Royse Avenue; Eastbound Lane, 78 m East of Hudson Street, 2.5 m North of Curb	Asphalt	50	Gravel	150	Clay	0.3	30.9							
						Clay	0.6	28.4							
						Clay	0.9	28.8							
						Clay	1.2	30.1							
						Clay	1.5	27.8							
						Clay	1.8	42.5							
						Clay	2.1	49.3							
TH13-07	Royse Avenue; Eastbound Lane, 159 m East of Hudson Street, 2.5 m North of Curb	Asphalt	62.5	Gravel	112.5	Gravel	0.15	4.9							
						Clay Fill	0.3	25.3							
						Clay	0.6	27.8							
						Clay	0.9	27.6							
						Clay	1.2	31.6							
						Clay	1.5	41.8							
						Clay	1.8	40.1							
						Clay	2.1	49.0							
TH13-08	Royse Avenue; Westbound Lane, 73 m West of Pembina Highway, 1.5 m South of Curb	Asphalt	62.5	Gravel	87.5	Gravel	0.1	6.1							
						Clay	0.3	34.4							
						Clay	0.6	31.9	0.0	6.7	16.7	76.6	77.6	21.6	56.0
						Clay	0.9	33.4							
						Clay	1.2	28.5							
						Clay	1.5	40.9							
						Silt	1.8	41.7							
						Clay	2.1	50.4							
TH13-09	Royse Avenue; Eastbound Lane, 30 m West of Pembina Highway, 2.0 m North of Curb	Asphalt	62.5	Gravel	112.5	Gravel	0.15	4.1							
						Clay Fill	0.3	27.5							
						Clay	0.6	28.5							
						Clay	0.9	31.6							
						Clay	1.2	35.7							
						Clay	1.5	40.5							
						Clay	1.8	42.7							
						Clay	2.1	49.7							

City of Winnipeg
Local Streets Package 13-R-06
Geotechnical Investigation

Test Hole No.	Test Hole 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
TH13-10	Woodhaven Boulevard; Northbound Lane, 29 m North of Assiniboine Avenue, 2.0 m East of Curb	Asphalt	75	Gravel	50	Gravel Fill	0.15	5.6							
						Clay	0.3	32.9							
						Clay	0.6	31.8							
						Clay	0.9	32.2	0.0	0.9	16.0	83.1	77.6	22.6	55.0
						Clay	1.2	34.0							
						Clay	1.5	33.2							
						Clay	1.8	43.4							
						Clay	2.1	39.8							
TH13-11	Woodhaven Boulevard; Southbound Lane, 100 m North of Assiniboine Avenue, 2.0 m West of Curb	Asphalt	88	Gravel	62.5	Clay/Gravel Fill	0.2	12.2							
						Clay	0.3	33.3							
						Clay	0.6	33.4							
						Clay	0.9	34.5							
						Clay	1.2	34.9							
						Clay	1.5	36.5							
						Clay	1.8	36.3							
						Clay	2.1	40.1							
TH13-12	Woodhaven Boulevard; Northbound Lane, 176 m North of Assiniboine Avenue, 2.0 m East of Curb	Asphalt	120	Gravel	56	Clay	0.3	31.9							
						Clay	0.6	31.0	0.0	4.7	16.5	78.7	81.5	22.8	58.7
						Clay	0.9	34.5							
						Clay	1.2	34.8							
						Clay	1.5	38.1							
						Clay	1.8	38.9							
						Clay	2.1	38.4							
TH13-13	Woodhaven Boulevard; Southbound Lane, 11 m North of Wooddale Drive, 2.0 m East of Curb	Asphalt	138	Gravel	37.5	Clay/Gravel Fill	0.2	4.0							
						Clay	0.3	39.2							
						Clay	0.6	40.8							
						Clay	0.9	38.4							
						Clay	1.2	36.4							
						Clay	1.5	35.7							
						Clay	1.8	36.0							
						Clay	2.1	40.2							

City of Winnipeg
Local Streets Package 13-R-06
Geotechnical Investigation

Test Hole No.	Test Hole 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
TH13-14	Woodhaven Boulevard; Southbound Lane, 84 m North of Wooddale Drive, 2.0 m East of Curb	Asphalt	100	Gravel	100	Clay	0.3	36.4							
						Clay	0.6	36.5	0.0	2.3	12.3	85.4	84.1	24.9	59.2
						Clay	0.9	36.5							
						Clay	1.2	36.5							
						Clay	1.5	40.3							
						Clay	1.8	41.6							
						Clay	2.1	47.1							
TH13-15	Woodhaven Boulevard; Southbound Lane, 34 m South of Emo Avenue, 2.0 m East of Curb	Asphalt	95	Gravel	1580	Gravel	0.3	4.7							
						Gravel	0.6	6.0							
						Gravel	0.9	5.9							
						Gravel	1.2	4.6							
						Gravel	1.5	9.3							
						Clay	1.8	34.1							
						Clay	2.1	34.2							