

APPENDIX 'A'

GEOTECHNICAL REPORT

APPENDIX 'A' – GEOTECHNICAL REPORT

2014 CITY OF WINNIPEG STREET
PACKAGE CONTRACT 2
(14-R-02)

GEOTECHNICAL INVESTIGATION



Prepared for:
KGS Group Inc.
3rd Floor – 865 Waverley Street
Winnipeg, MB
R3T 5P4

Prepared by:
Stantec Consulting Ltd.
199 Henlow Bay
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April 15, 2014
Project No. 123301329

APPENDIX 'A' – GEOTECHNICAL REPORT

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The geotechnical report is provided to aid in Contractor's evaluation of the soil conditions. The information presented is considered accurate at the locations shown on the Drawings and at the time of drilling. However, variations in soil conditions may exist between test holes and fluctuations in groundwater levels can be expected seasonally and may occur as a result of construction activities. The nature and extent of variations may not become evident until construction commences.

**2014 CITY OF WINNIPEG
LOCAL STREETS PACKAGE
CONTRACT 2
(14-R-02)**

**MARIANNE ROAD BETWEEN
GARTON AVENUE AND
INKSTER GARDEN DRIVE**

GEOTECHNICAL INVESTIGATION



Prepared for:
KGS Group Inc.
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March 12, 2014
Project No. 123301336



Project No. 123301336

Drawn by: NB

Figure: 1

Date: March 7, 2014

Reviewed by: GL

Scale: NTS

Testhole Location Plan
 2014 City of Winnipeg Local Streets
 Package Contract 2 (14-R-02)
 Marianne Road between Garton Avenue
 and Inkster Garden Drive

TABLE 1
2014 CITY OF WINNIPEG LOCAL STREETS PACKAGE CONTRACT 2 (14-R-02)
MARIANNE ROAD BETWEEN GARTON AVENUE AND INKSTER GARDEN DRIVE
GEOTECHNICAL INVESTIGATION

Testhole ID	Testhole Location	Pavement Surface		Pavement Structure Material		Sample Description	Sample Depth (m)	Moisture Content (%)	Particle Size Analysis				Atterberg Limits		
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH1	UTM Coordinates: 14U 628861 m East, 5535009 m North	Concrete	150	-	-	Silt	0.6	15	0.0	16.9	71.0	12.1	20	14	6
TH2	UTM Coordinates: 14U 628907 m East, 5535106 m North	Concrete	130	-	-	Clay	0.9	41	0.0	0.6	3.7	95.7	101	28	73
TH3	UTM Coordinates: 14U 629088 m East, 5535110 m North	Concrete	145	-	-	-	-	-	-	-	-	-	-	-	-
TH4	UTM Coordinates: 14U 629202 m East, 5535104 m North	Concrete	165	-	-	Silty Clay	0.6	23	0.0	4.5	47.4	48.1	48	15	33

TESTHOLE TH1



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)

Date Drilled: January 29, 2014

Project Location: Marianne Road from Garton Street to Inkster Garden Drive

Depth of Testhole: 2.1 m

Client: KGS Group Inc.

Logged by: Sothea Bun

Drilling Contractor: Subterranean (Manitoba) Ltd.

Reviewed by: German Leal

Drilling Method: 125 mm Solid Stem Auger

UTM Coordinates: 14U 628861.0 m E, 5535009.0 m N

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
		Concrete							
		Clay Fill - black, firm, moist, medium plasticity - trace fine to coarse sand	BS						●25
			BS						●24
0.5		Silt - tan, soft, moist, low plasticity - some fine to medium sand	BS	0.0	16.9	71.0	12.1		●15
		Silty Clay - tan, firm, moist, medium plasticity - trace fine to medium sand	BS						●23
1.0		Clay - brown, stiff, moist, high plasticity - trace silt - trace fine to medium sand	BS						●45
1.5			BS						●47
2.0			BS						●57
			BS						●52

- The soil was frozen to a depth of 0.6 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

TESTHOLE TH2



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)

Date Drilled: January 29, 2014

Project Location: Marianne Road from Garton Street to Inkster Garden Drive

Depth of Testhole: 2.1 m

Client: KGS Group Inc.

Logged by: Sothea Bun

Drilling Contractor: Subterranean (Manitoba) Ltd.

Reviewed by: German Leal

Drilling Method: 125 mm Solid Stem Auger

UTM Coordinates: 14U 628907.0 m E, 5535106.0 m N

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
		Concrete							
		Clay Fill - black, firm, moist, medium plasticity - trace fine to coarse sand	BS						●26
			BS						●26
0.5		Clay - brown, firm, moist, high plasticity - trace silt - trace fine to medium sand - stiff below 1.1 m	BS						●37
1.0			BS	0.0	0.6	3.7	95.7		●41
1.5			BS						●38
			BS						●50
2.0			BS						●53
			BS						●50

- The soil was frozen to a depth of 0.6 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

TESTHOLE TH3



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)

Date Drilled: January 29, 2014

Project Location: Marianne Road from Garton Street to Inkster Garden Drive

Depth of Testhole: 2.1 m

Client: KGS Group Inc.

Logged by: Sothea Bun

Drilling Contractor: Subterranean (Manitoba) Ltd.

Reviewed by: German Leal

Drilling Method: 125 mm Solid Stem Auger

UTM Coordinates: 14U 629088.0 m E, 5535110.0 m N

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
		Concrete					
		Clay Fill - black, firm, moist, medium plasticity - trace fine to coarse sand	BS		●32		
			BS		●28		
0.5		Silty Clay - tan, firm, moist, medium plasticity - trace fine to medium sand	BS		●25		
1.0		Clay - brown, firm, moist, high plasticity - trace silt - trace fine to medium sand	BS		●38		
			BS		●36		
1.5			BS		●49		
			BS		●52		
2.0			BS		●56		

- The soil was frozen to a depth of 0.6 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

TESTHOLE TH4



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)

Date Drilled: January 29, 2014

Project Location: Marianne Road from Garton Street to Inkster Garden Drive

Depth of Testhole: 2.1 m

Client: KGS Group Inc.

Logged by: Sothea Bun

Drilling Contractor: Subterranean (Manitoba) Ltd.

Reviewed by: German Leal

Drilling Method: 125 mm Solid Stem Auger

UTM Coordinates: 14U 629202.0 m E, 5535104.0 m N

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
0.0 - 0.1		Concrete							
0.1 - 0.5		Clay Fill - black, firm, moist, medium plasticity - trace fine to coarse sand	BS					28	
0.5 - 2.0		Silty Clay - tan, firm, moist, medium plasticity - trace fine to medium sand - brown below 0.9 m	BS	0.0	4.5	47.4	48.1	23	
			BS					32	
			BS					25	
			BS					30	
			BS					27	
2.0 - 2.1		Clay - grey, firm, moist, high plasticity - trace silt - trace fine to medium sand	BS						60

- The soil was frozen to a depth of 0.6 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.



Core sample from Testhole TH1



Core sample from Testhole TH2



Core sample from Testhole TH3



Core sample from Testhole TH4



PARTICLE SIZE ANALYSIS ASTM D422

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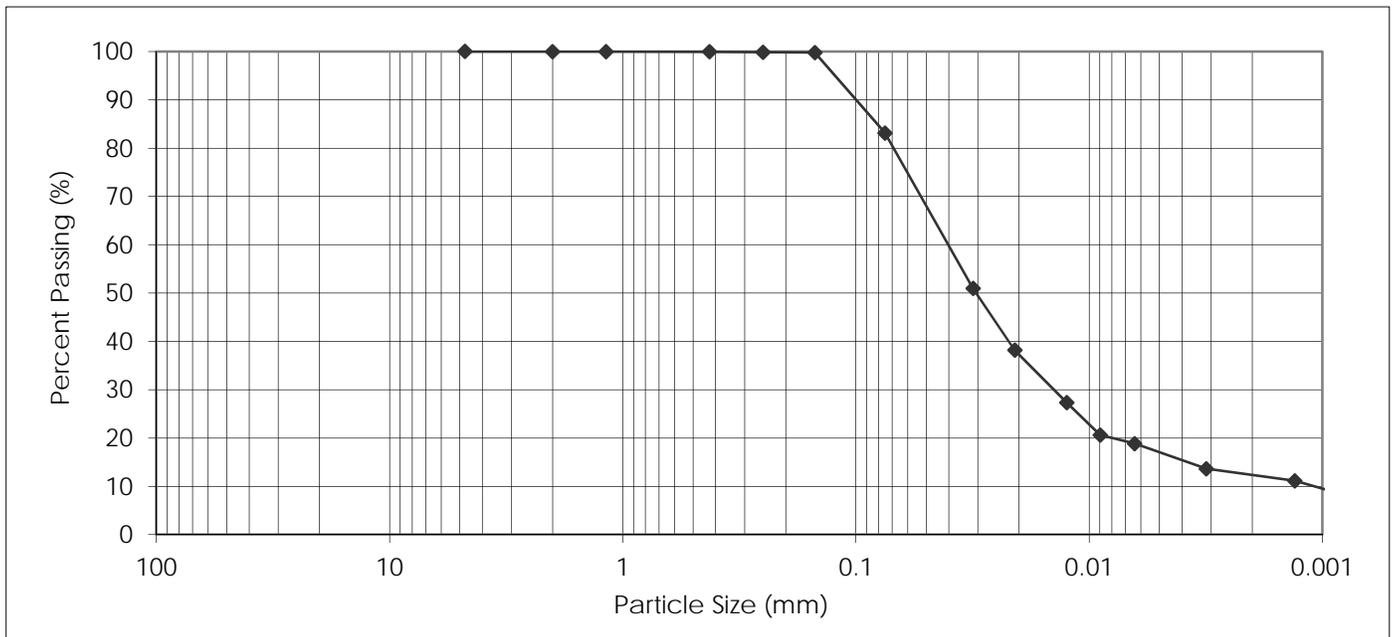
PROJECT: 2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
Marianne Road between Garton
Avenue and Inkster Garden Drive

Attention: Craig Rowbotham

PROJECT NO.: 123301336

SAMPLED BY: Sothea Bun
SAMPLE ID: TH1 @ 0.6 m

DATE RECEIVED: February 21, 2014
TESTED BY: Sothea Bun



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	100.0
2.00 mm	100.0

PARTICLE SIZE	PERCENT PASSING
1.18 mm	100.0
0.425 mm	99.9
0.250 mm	99.9
0.150 mm	99.8
0.075 mm	83.1
0.005 mm	16.6
0.002 mm	12.1
0.001 mm	9.5

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.0	0.0	0.1	16.8	71.0	12.1	9.5

February 26, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.



PARTICLE SIZE ANALYSIS ASTM D422

KGS Group Inc.
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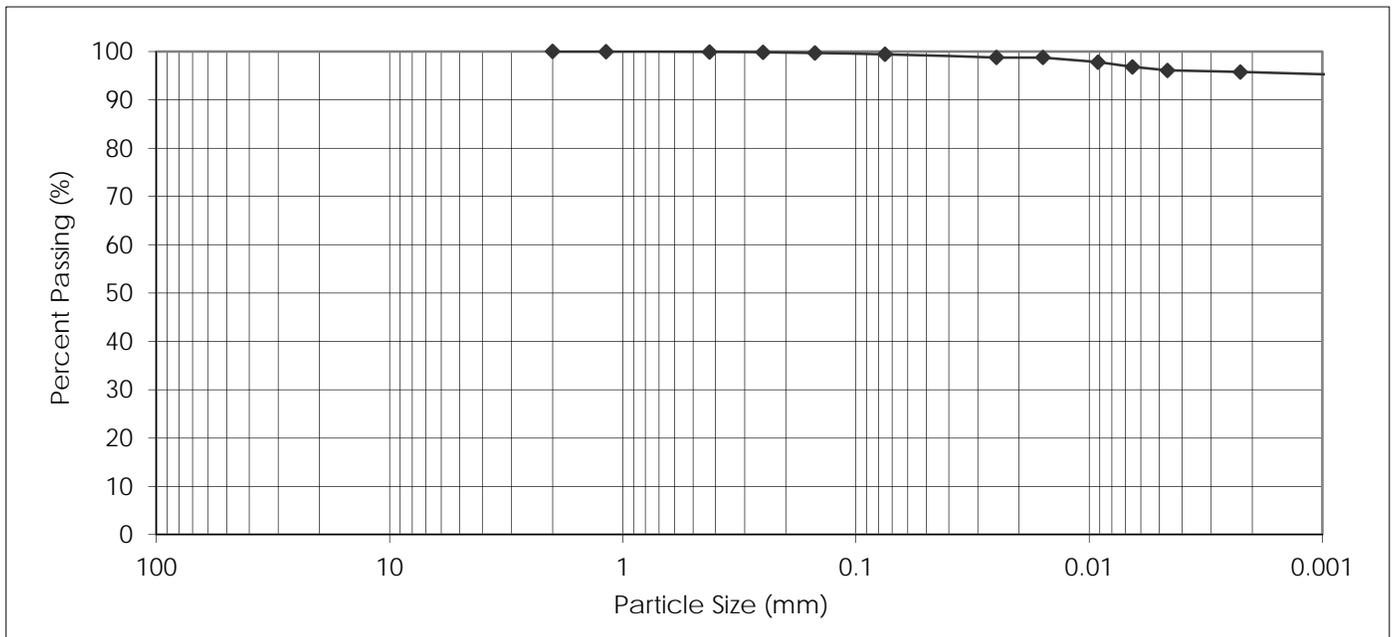
PROJECT: 2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
Marianne Road between Garton
Avenue and Inkster Garden Drive

Attention: Craig Rowbotham

PROJECT NO.: 123301336

SAMPLED BY: Sothea Bun
SAMPLE ID: TH2 @ 0.9 m

DATE RECEIVED: February 21, 2014
TESTED BY: Sothea Bun



PARTICLE SIZE		PERCENT PASSING		PARTICLE SIZE		PERCENT PASSING	
37.50 mm		100.0		1.18 mm		100.0	
25.00 mm		100.0		0.425 mm		99.9	
19.00 mm		100.0		0.250 mm		99.8	
16.00 mm		100.0		0.150 mm		99.7	
12.50 mm		100.0		0.075 mm		99.4	
9.50 mm		100.0		0.005 mm		96.2	
4.75 mm		100.0		0.002 mm		95.7	
2.00 mm		100.0		0.001 mm		95.3	
Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm	
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm				
0.0	0.0	0.1	0.5	3.7	95.7	95.3	

February 26, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.

**2014 CITY OF WINNIPEG
LOCAL STREETS PACKAGE
CONTRACT 2
(14-R-02)**

**GARTON AVENUE BETWEEN
MARIANNE ROAD AND OLD
COMMONWEALTH PATH**

GEOTECHNICAL INVESTIGATION



Prepared for:
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R3T 5P4

Prepared by:
Stantec Consulting Ltd.
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March 12, 2014
Project No. 123301336



Project No. 123301336

Drawn by: NB

Figure: 1

Date: March 6, 2014

Reviewed by: GL

Scale: NTS

Testhole Location Plan
2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
Garton Avenue between Marianne Road
and Old Commonwealth Path

TABLE 1
2014 CITY OF WINNIPEG LOCAL STREETS PACKAGE CONTRACT 2 (14-R-02)
GARTON AVENUE BETWEEN MARIANNE ROAD AND OLD COMMONWEALTH PATH
GEOTECHNICAL INVESTIGATION

Testhole ID	Testhole Location	Pavement Surface		Pavement Structure Material		Sample Description	Sample Depth (m)	Moisture Content (%)	Particle Size Analysis				Atterberg Limits		
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH1	UTM Coordinates: 14U 629232 m East, 5535107 m North	Concrete	200	-	-	Clayey Silt	0.9	26	0.4	3.3	63.2	33.1	37	15	22
TH2	UTM Coordinates: 14U 629257 m East, 5535148 m North	Concrete	190	-	-	Silt	0.6	23	0.1	7.4	80.4	12.1	20	15	5
						Clay	0.9	34	0.1	1.5	27.8	70.6	75	23	52
TH3	UTM Coordinates: 14U 629275 m East, 5535201 m North	Asphalt	50	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	205												

TESTHOLE TH1



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02) **Date Drilled:** January 29, 2014
Project Location: Garton Avenue from Marianne Road to Old Commonwealth Path **Depth of Testhole:** 2.1 m
Client: KGS Group Inc. **Logged by:** Sothea Bun
Drilling Contractor: Subterranean (Manitoba) Ltd. **Reviewed by:** German Leal
Drilling Method: 125 mm Solid Stem Auger
UTM Coordinates: 14U 629232.0 m E, 5535107.0 m N

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
		Concrete							
		Clay Fill - black, firm, moist, high plasticity - some fine to coarse sand - trace fine gravel	BS						●25
			BS						●26
0.5		Clayey Silt - tan, soft, moist, medium plasticity - trace fine to coarse sand - trace fine gravel							
			BS						●28
1.0			BS	0.4	3.3	63.2	33.1		●26
		Silt - tan, soft, moist, low plasticity - trace fine to coarse sand - trace fine gravel							
			BS						●24
1.5			BS						●23
			BS						●24
2.0			BS						●23

- The soil was frozen to a depth of 0.6 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

TESTHOLE TH2



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02) **Date Drilled:** January 29, 2014
Project Location: Garton Avenue from Marianne Road to Old Commonwealth Path **Depth of Testhole:** 2.1 m
Client: KGS Group Inc. **Logged by:** Sothea Bun
Drilling Contractor: Subterranean (Manitoba) Ltd. **Reviewed by:** German Leal
Drilling Method: 125 mm Solid Stem Auger
UTM Coordinates: 14U 629257.0 m E, 5535148.0 m N

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
0.0 - 0.1	[Concrete symbol]	Concrete							
0.1 - 0.2	[Clay Fill symbol]	Clay Fill - black, firm, moist, high plasticity - some fine to coarse sand - trace fine gravel	BS					30	
0.2 - 0.3	[Clayey Silt symbol]	Clayey Silt - tan, soft, moist, medium plasticity - trace fine to coarse sand - trace fine gravel	BS					30	
0.3 - 0.4	[Silt symbol]	Silt - tan, soft, moist, low plasticity - trace fine to coarse sand - trace fine gravel	BS	0.1	7.4	80.4	12.1	23	
0.4 - 0.6	[Clay symbol]	Clay - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand - trace fine gravel	BS	0.1	1.5	27.8	70.6	34	
0.6 - 0.8	[Clay symbol]		BS					38	
0.8 - 1.0	[Clay symbol]		BS					32	
1.0 - 1.2	[Clay symbol]		BS					25	
1.2 - 1.4	[Clay symbol]		BS					27	
1.4 - 1.6	[Clay symbol]		BS						
1.6 - 1.8	[Clay symbol]		BS						
1.8 - 2.0	[Clay symbol]		BS						
2.0 - 2.1	[Clay symbol]		BS						

- The soil was frozen to a depth of 0.6 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

TESTHOLE TH3



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02) **Date Drilled:** January 29, 2014
Project Location: Garton Avenue from Marianne Road to Old Commonwealth Path **Depth of Testhole:** 2.1 m
Client: KGS Group Inc. **Logged by:** Sothea Bun
Drilling Contractor: Subterranean (Manitoba) Ltd. **Reviewed by:** German Leal
Drilling Method: 125 mm Solid Stem Auger
UTM Coordinates: 14U 629275.0 m E, 5535201.0 m N

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
0.0 - 0.1		Concrete					
0.1 - 0.4		Clay Fill - black, firm, moist, high plasticity - some fine to coarse sand - trace fine gravel	BS BS	●24 ●25			
0.4 - 0.6		Clayey Silt - tan, soft, moist, medium plasticity - trace fine to coarse sand - trace fine gravel	BS	●25			
0.6 - 2.1		Clay - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand - trace fine gravel	BS BS BS BS	●34 ●30 ●31 ●32 ●38			

- The soil was frozen to a depth of 0.6 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.



Core sample from Testhole TH1



Core sample from Testhole TH2



Core sample from Testhole TH3



PARTICLE SIZE ANALYSIS ASTM D422

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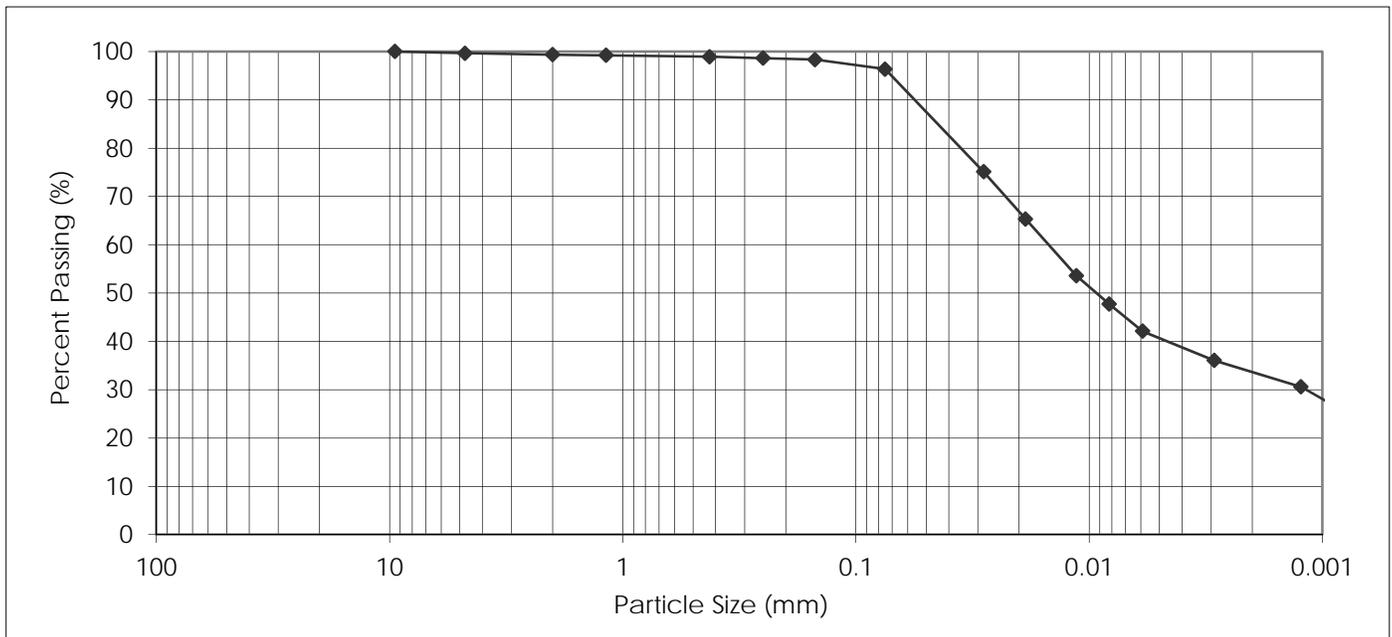
PROJECT: 2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
Garton Avenue between Marianne
Road and Old Commonwealth Path

Attention: Craig Rowbotham

PROJECT NO.: 123301336

SAMPLED BY: Sothea Bun
SAMPLE ID: TH1 @ 0.9 m

DATE RECEIVED: February 21, 2014
TESTED BY: Sothea Bun



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	99.6
2.00 mm	99.4

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.2
0.425 mm	98.9
0.250 mm	98.6
0.150 mm	98.3
0.075 mm	96.3
0.005 mm	40.3
0.002 mm	33.1
0.001 mm	27.9

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.4	0.2	0.5	2.6	63.2	33.1	27.9

February 26, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.

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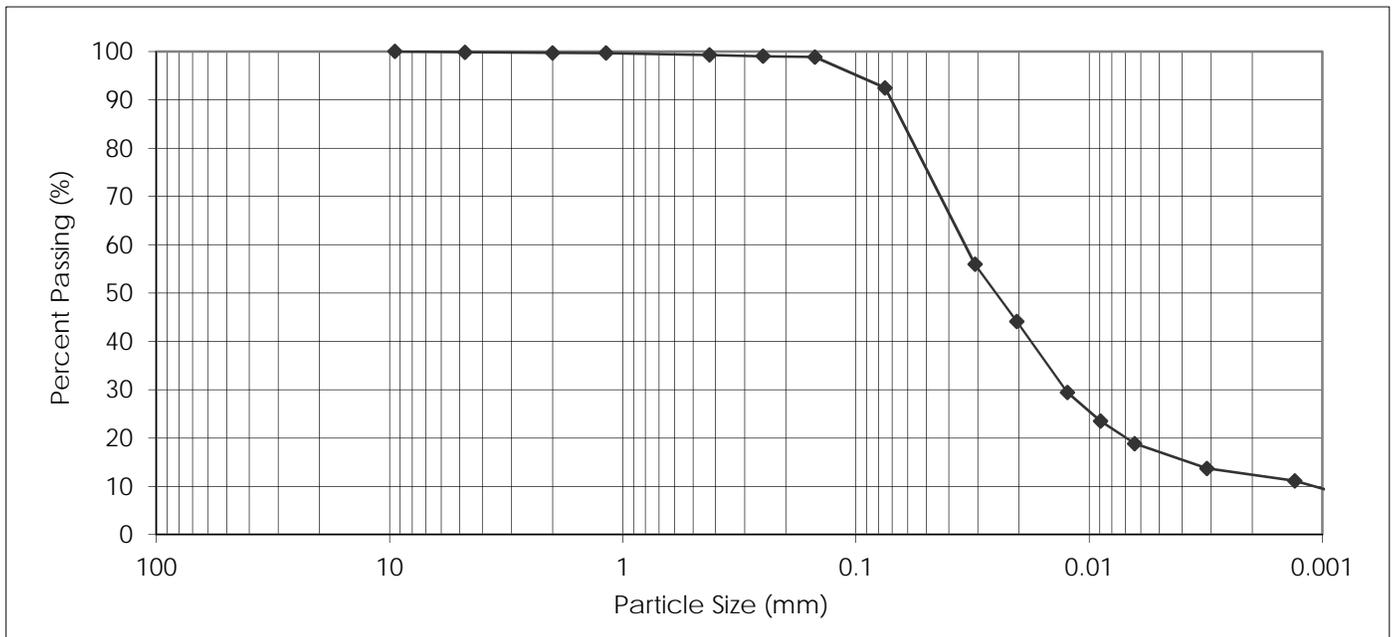
PROJECT: 2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
Garton Avenue between Marianne
Road and Old Commonwealth Path

Attention: Craig Rowbotham

PROJECT NO.: 123301336

SAMPLED BY: Sothea Bun
SAMPLE ID: TH2 @ 0.6 m

DATE RECEIVED: February 21, 2014
TESTED BY: Sothea Bun



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	99.9
2.00 mm	99.7

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.7
0.425 mm	99.3
0.250 mm	99.0
0.150 mm	98.9
0.075 mm	92.5
0.005 mm	16.7
0.002 mm	12.1
0.001 mm	9.5

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.1	0.2	0.4	6.8	80.4	12.1	9.5

February 26, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.

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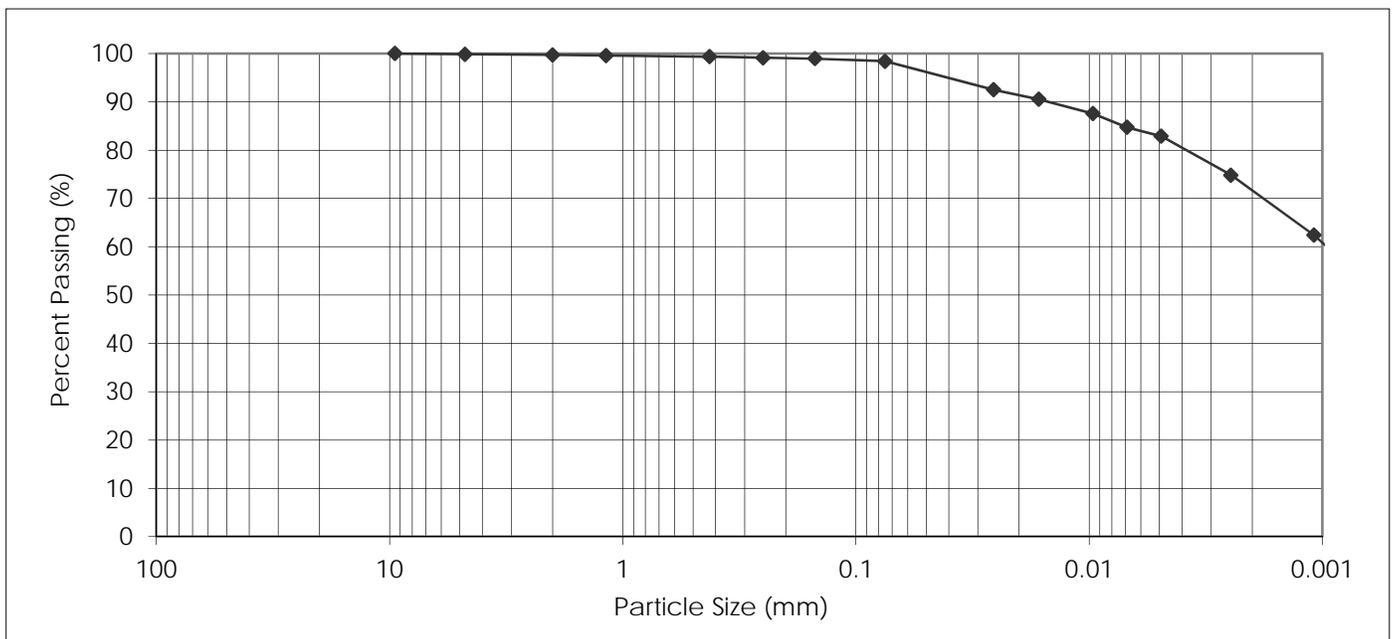
PROJECT: 2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
Garton Avenue between Marianne
Road and Old Commonwealth Path

Attention: Craig Rowbotham

PROJECT NO.: 123301336

SAMPLED BY: Sothea Bun
SAMPLE ID: TH2 @ 0.9 m

DATE RECEIVED: February 21, 2014
TESTED BY: Sothea Bun



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	99.9
2.00 mm	99.7

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.6
0.425 mm	99.4
0.250 mm	99.1
0.150 mm	99.0
0.075 mm	98.4
0.005 mm	83.0
0.002 mm	70.6
0.001 mm	60.7

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.1	0.2	0.3	1.0	27.8	70.6	60.7

February 26, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.



PARTICLE SIZE ANALYSIS ASTM D422

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Winnipeg, MB
R3T 5P4

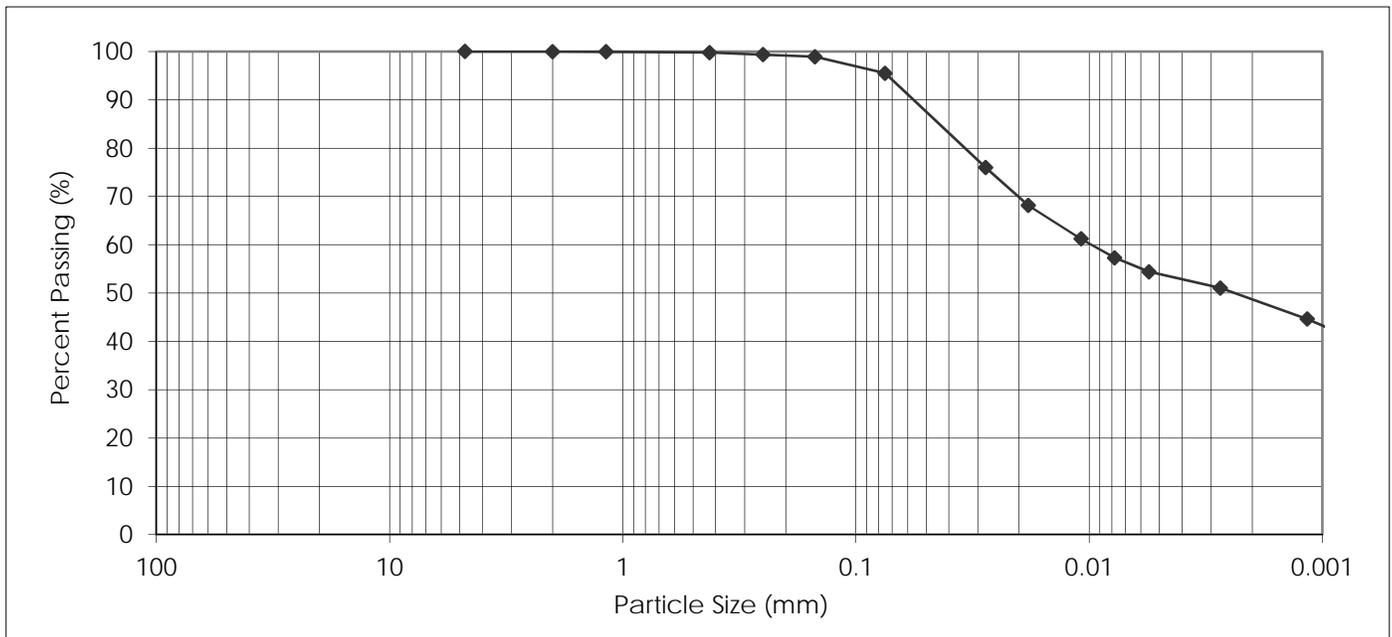
PROJECT: 2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
Marianne Road between Garton
Avenue and Inkster Garden Drive

Attention: Craig Rowbotham

PROJECT NO.: 123301336

SAMPLED BY: Sothea Bun
SAMPLE ID: TH4 @ 0.6 m

DATE RECEIVED: February 21, 2014
TESTED BY: Sothea Bun



PARTICLE SIZE	PERCENT PASSING	PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0	1.18 mm	99.9
25.00 mm	100.0	0.425 mm	99.8
19.00 mm	100.0	0.250 mm	99.4
16.00 mm	100.0	0.150 mm	98.9
12.50 mm	100.0	0.075 mm	95.5
9.50 mm	100.0	0.005 mm	53.8
4.75 mm	100.0	0.002 mm	48.1
2.00 mm	100.0	0.001 mm	43.2

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.0	0.0	0.2	4.3	47.4	48.1	43.2

February 26, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.

**2014 CITY OF WINNIPEG
LOCAL STREETS PACKAGE
CONTRACT 2
(14-R-02)**

**ROSE HILL WAY BETWEEN
WILDES LANE AND ROSE HILL
PLACE**

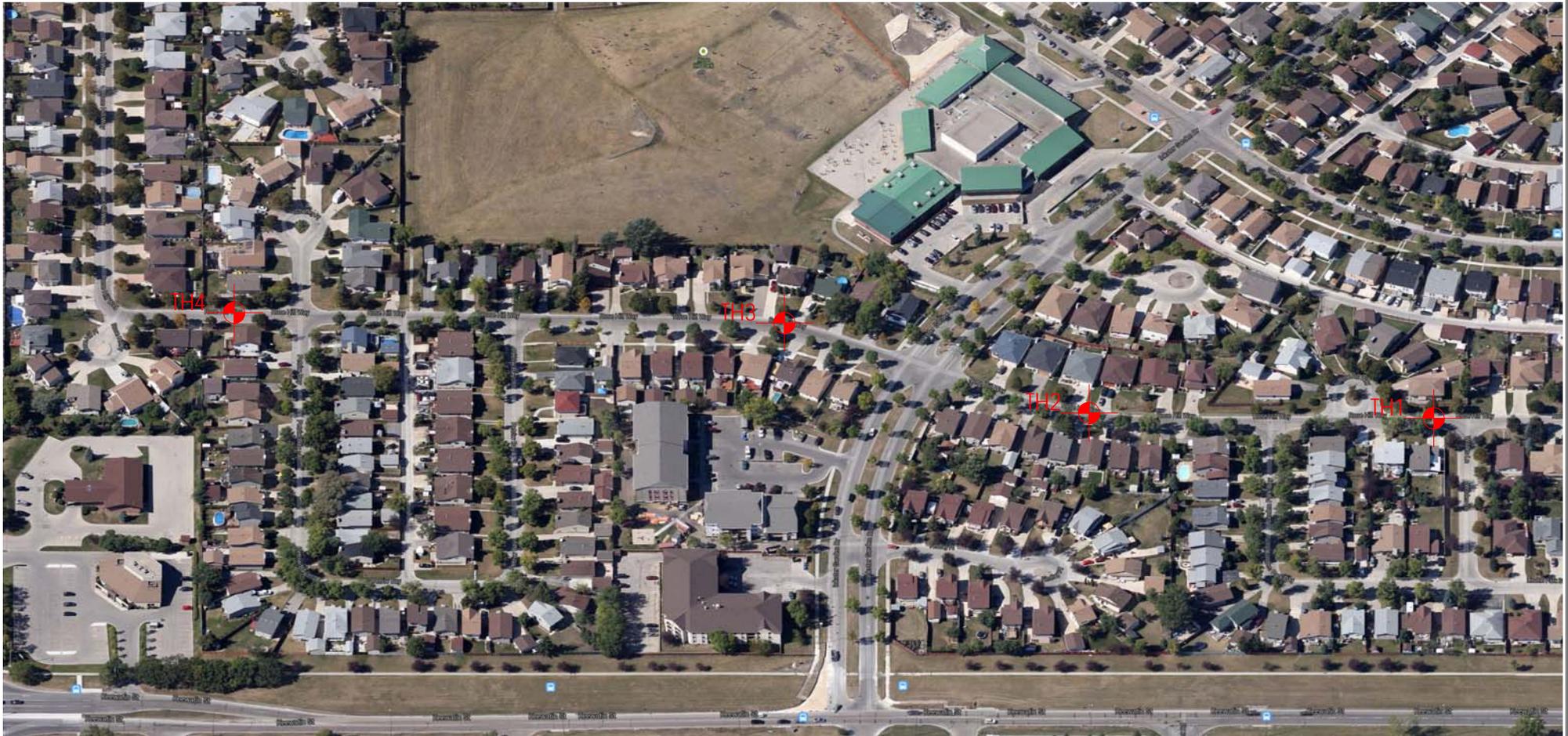
GEOTECHNICAL INVESTIGATION



Prepared for:
KGS Group Inc.
3rd Floor – 865 Waverley Street
Winnipeg, MB
R3T 5P4

Prepared by:
Stantec Consulting Ltd.
199 Henlow Bay
Winnipeg, MB
R3Y 1G4

March 12, 2014
Project No. 123301336



Project No. 123301336

Drawn by: NB

Figure: 1

Testhole Location Plan
2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
Rose Hill Way between Wildes Lane
and Rose Hill Place

Date: March 7, 2014

Reviewed by: GL

Scale: NTS

TABLE 1
2014 CITY OF WINNIPEG LOCAL STREETS PACKAGE CONTRACT 2 (14-R-02)
ROSE HILL WAY BETWEEN WILDES LANE AND ROSE HILL PLACE
GEOTECHNICAL INVESTIGATION

Testhole ID	Testhole Location	Pavement Surface		Pavement Structure Material		Sample Description	Sample Depth (m)	Moisture Content (%)	Particle Size Analysis				Atterberg Limits		
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH1	UTM Coordinates: 14U 629306 m East, 5534779 m North	Concrete	160	-	-	Silt	0.9	20	0.0	1.9	81.3	16.8	24	15	9
TH2	UTM Coordinates: 14U 629306 m East, 5534640 m North	Concrete	145	-	-	-	-	-	-	-	-	-	-	-	-
TH3	UTM Coordinates: 14U 629258 m East, 5534516 m North	Concrete	195	-	-	Clay	0.9	46	0.0	1.0	13.9	85.1	101	26	75
TH4	UTM Coordinates: 14U 629259 m East, 5534296 m North	Concrete	160	-	-	-	-	-	-	-	-	-	-	-	-

TESTHOLE TH1



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)

Date Drilled: January 29, 2014

Project Location: Rose Hill Way from Wildes Lane to Rose Hill Place

Depth of Testhole: 2.1 m

Client: KGS Group Inc.

Logged by: Sothea Bun

Drilling Contractor: Subterranean (Manitoba) Ltd.

Reviewed by: German Leal

Drilling Method: 125 mm Solid Stem Auger

UTM Coordinates: 14U 629306.0 m E, 5534779.0 m N

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
0.0 - 0.1		Concrete							
0.1 - 0.5		Clay Fill - black, firm, moist, high plasticity - some fine to coarse sand - trace fine gravel	BS						32
0.5 - 0.6		Silt - tan, soft, moist, low plasticity - some clay - trace fine to medium sand	BS						29
0.6 - 1.0			BS	0.0	1.9	81.3	16.8		20
1.0 - 1.5			BS						20
1.5 - 2.0			BS						20
2.0 - 2.1		Clay - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand	BS						40

- The soil was frozen to a depth of 0.6 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

TESTHOLE TH2



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)
Project Location: Rose Hill Way from Wildes Lane to Rose Hill Place
Client: KGS Group Inc.
Drilling Contractor: Subterranean (Manitoba) Ltd.
Drilling Method: 125 mm Solid Stem Auger
UTM Coordinates: 14U 629306.0 m E, 5534640.0 m N

Date Drilled: January 29, 2014
Depth of Testhole: 2.1 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
		Concrete					
		Clay Fill - black, firm, moist, high plasticity - some fine to coarse sand - trace fine gravel	BS		●27		
			BS		●28		
0.5		Clay - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand	BS		●36		
			BS		●39		
1.0			BS		●41		
			BS		●48		
1.5			BS		●48		
2.0			BS				
			BS				
					●53		

- The soil was frozen to a depth of 0.6 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

TESTHOLE TH3



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)

Date Drilled: January 29, 2014

Project Location: Rose Hill Way from Wildes Lane to Rose Hill Place

Depth of Testhole: 2.1 m

Client: KGS Group Inc.

Logged by: Sothea Bun

Drilling Contractor: Subterranean (Manitoba) Ltd.

Reviewed by: German Leal

Drilling Method: 125 mm Solid Stem Auger

UTM Coordinates: 14U 629258.0 m E, 5534516.0 m N

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
		Concrete							
		Clay Fill - black, firm, moist, high plasticity - some fine to coarse sand - trace fine gravel	BS						25
			BS						30
0.5		Clay - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand	BS						40
			BS	0.0	1.0	13.9	85.1		46
1.0			BS						48
1.5			BS						51
			BS						55
2.0			BS						54

- The soil was frozen to a depth of 0.6 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

TESTHOLE TH4



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)

Date Drilled: January 29, 2014

Project Location: Rose Hill Way from Wildes Lane to Rose Hill Place

Depth of Testhole: 2.1 m

Client: KGS Group Inc.

Logged by: Sothea Bun

Drilling Contractor: Subterranean (Manitoba) Ltd.

Reviewed by: German Leal

Drilling Method: 125 mm Solid Stem Auger

UTM Coordinates: 14U 629259.0 m E, 5534296.0 m N

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
		Concrete					
		Clay Fill - black, firm, moist, high plasticity - some fine to coarse sand - trace fine gravel	BS		●30		
			BS		●31		
0.5		Clay - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand	BS		●30		
			BS		●30		
1.0			BS		●40		
			BS		●40		
1.5			BS		●45		
			BS		●41		
2.0							

- The soil was frozen to a depth of 0.6 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.



Core sample from Testhole TH1



Core sample from Testhole TH2



Core sample from Testhole TH3



Core sample from Testhole TH4

KGS Group Inc.
3rd Floor - 865 Waverley Street
Winnipeg, MB
R3T 5P4

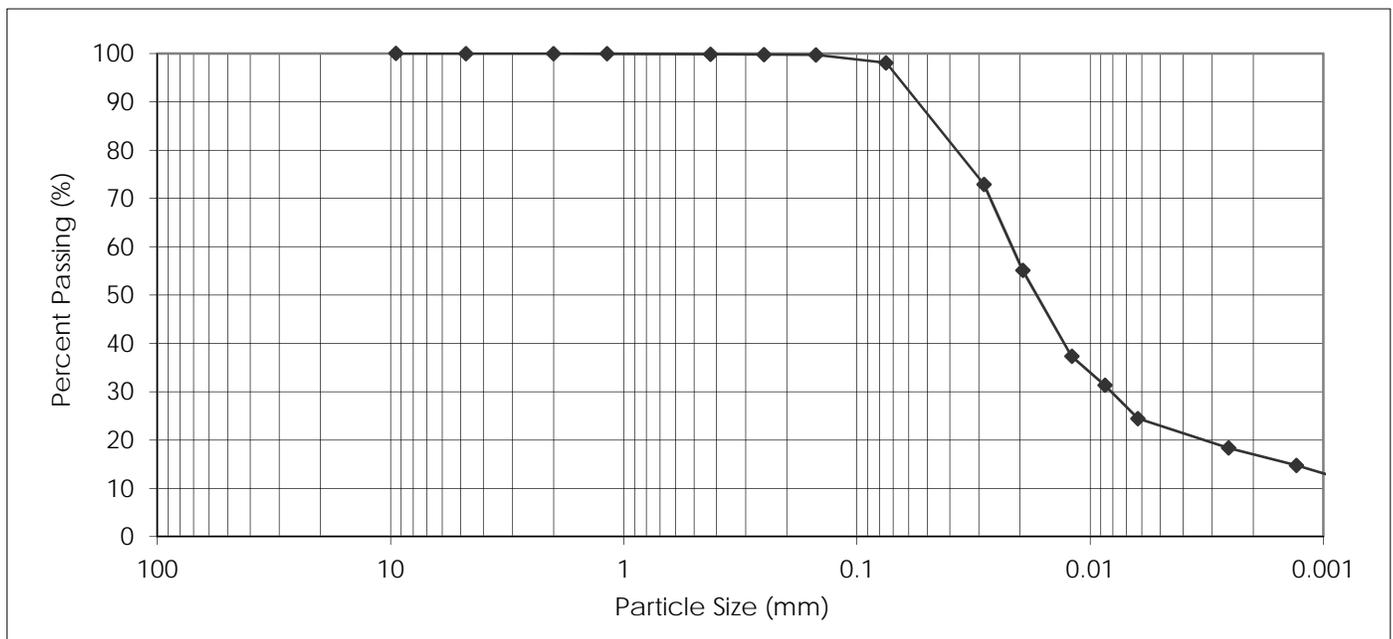
PROJECT: 2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
Rose Hill Way between Wildes Lane
and Rose Hill Place

Attention: Craig Rowbotham

PROJECT NO.: 123301336

SAMPLED BY: Sothea Bun
SAMPLE ID: TH1 @ 0.9 m

DATE RECEIVED: February 24, 2014
TESTED BY: Nestor Abarca



PARTICLE SIZE	PERCENT PASSING	PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0	1.18 mm	99.9
25.00 mm	100.0	0.425 mm	99.9
19.00 mm	100.0	0.250 mm	99.8
16.00 mm	100.0	0.150 mm	99.7
12.50 mm	100.0	0.075 mm	98.1
9.50 mm	100.0	0.005 mm	22.4
4.75 mm	100.0	0.002 mm	16.8
2.00 mm	100.0	0.001 mm	13.1

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.0	0.0	0.1	1.8	81.3	16.8	13.1

March 6, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.



PARTICLE SIZE ANALYSIS ASTM D422

KGS Group Inc.
3rd Floor - 865 Waverley Street
Winnipeg, MB
R3T 5P4

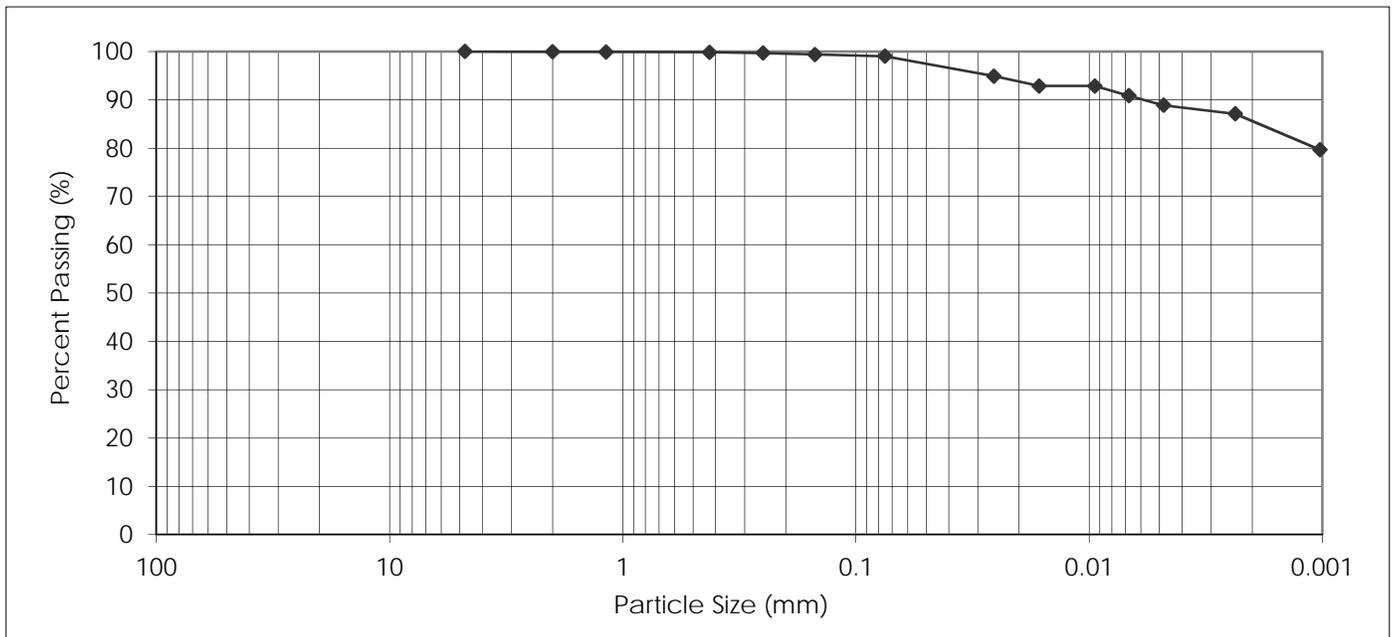
PROJECT: 2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
Rose Hill Way between Wildes Lane
and Rose Hill Place

Attention: Craig Rowbotham

PROJECT NO.: 123301336

SAMPLED BY: Sothea Bun
SAMPLE ID: TH3 @ 0.9 m

DATE RECEIVED: February 24, 2014
TESTED BY: Nestor Abarca



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	100.0
2.00 mm	99.9

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.9
0.425 mm	99.8
0.250 mm	99.7
0.150 mm	99.4
0.075 mm	99.0
0.005 mm	89.1
0.002 mm	85.1
0.001 mm	79.3

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.0	0.1	0.1	0.8	13.9	85.1	79.3

February 26, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.

**2014 CITY OF WINNIPEG
LOCAL STREETS PACKAGE
CONTRACT 2
(14-R-02)**

**MANILA ROAD BETWEEN
ADSUM DRIVE AND JEFFERSON
AVENUE**

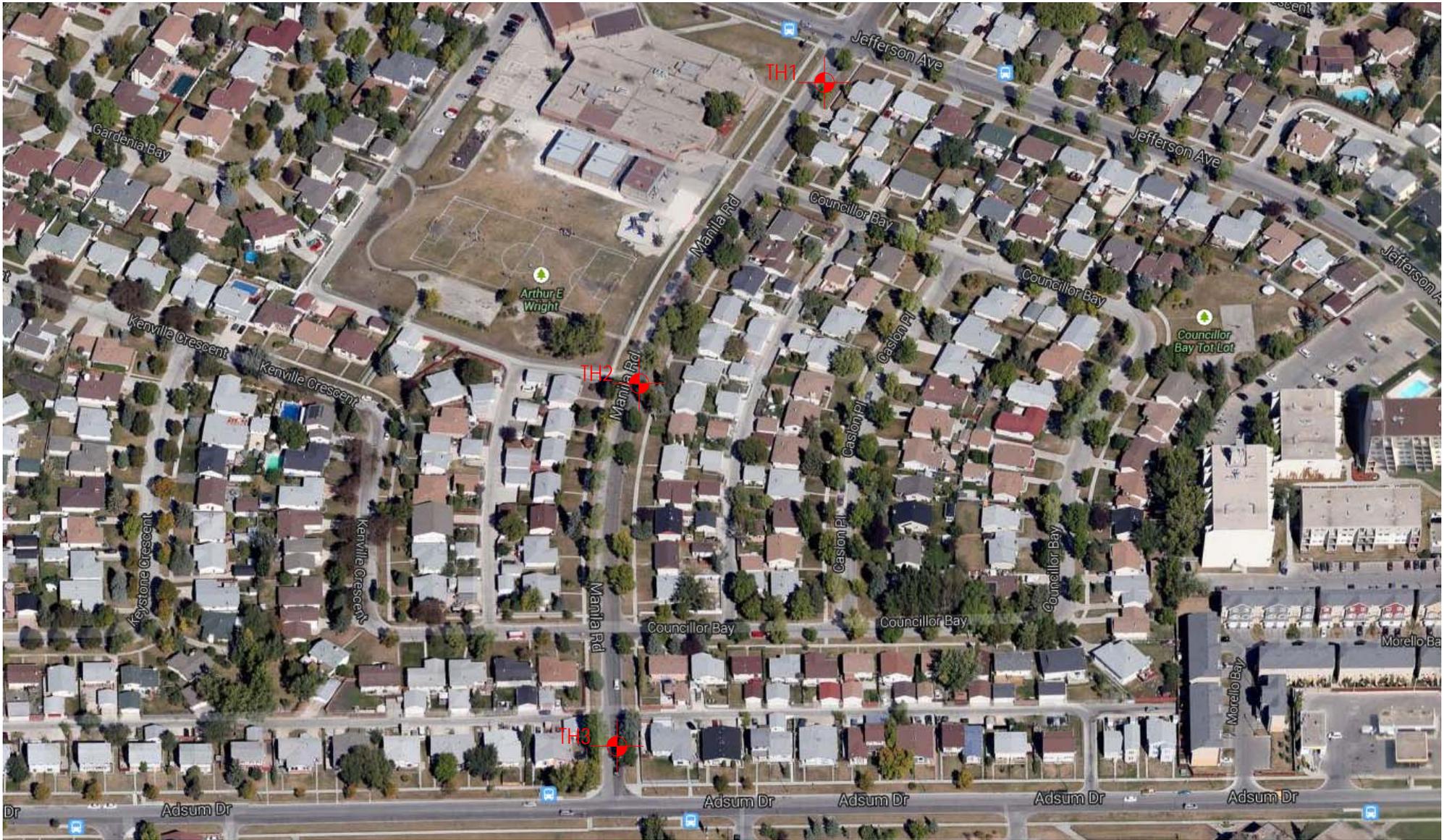
GEOTECHNICAL INVESTIGATION



Prepared for:
KGS Group Inc.
3rd Floor – 865 Waverley Street
Winnipeg, MB
R3T 5P4

Prepared by:
Stantec Consulting Ltd.
199 Henlow Bay
Winnipeg, MB
R3Y 1G4

March 12, 2014
Project No. 123301336



Project No. 123301336

Drawn by: NB

Figure: 1

Date: March 6, 2014

Reviewed by: GL

Scale: NTS

Testhole Location Plan
2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
Manila Road between Adsum Drive
and Jefferson Avenue

TABLE 1
2014 CITY OF WINNIPEG LOCAL STREETS PACKAGE CONTRACT 2 (14-R-02)
MANILA ROAD BETWEEN ADSUM DRIVE AND JEFFERSON AVENUE
GEOTECHNICAL INVESTIGATION

Testhole ID	Testhole Location	Pavement Surface		Pavement Structure Material		Sample Description	Sample Depth (m)	Moisture Content (%)	Particle Size Analysis				Atterberg Limits		
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH1	UTM Coordinates: 14U 630907 m East, 5535594 m North	Concrete	145	-	-	-	-	-	-	-	-	-	-	-	-
TH2	UTM Coordinates: 14U 630844 m East, 5535442 m North	Concrete	145	Granular Fill	160	Clayey Silt	0.9	25	0.1	5.0	67.8	27.1	32	15	17
TH3	UTM Coordinates: 14U 630840 m East, 5535255 m North	Asphalt	50	-	-	Silty Clay	0.9	40	0.0	0.2	34.4	65.4	82	22	60
		Concrete	110												

TESTHOLE TH1



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)

Date Drilled: January 29, 2014

Project Location: Manila Road from Adsum Drive to Jefferson Avenue

Depth of Testhole: 2.1 m

Client: KGS Group Inc.

Logged by: Sothea Bun

Drilling Contractor: Subterranean (Manitoba) Ltd.

Reviewed by: German Leal

Drilling Method: 125 mm Solid Stem Auger

UTM Coordinates: 14U 630907.0 m E, 5535594.0 m N

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
		Concrete					
		Clay Fill - black, firm, moist, high plasticity - some fine to coarse sand - trace fine gravel	BS		●26		
		Clayey Silt - tan, soft, moist, medium plasticity - firm below 0.8 m - trace fine to coarse sand - trace fine gravel	BS		●23		
0.5			BS		●20		
1.0			BS		●22		
1.5			BS		●23		
2.0			BS		●24		
		Clay - brown, firm, moist, high plasticity - some silt - trace fine sand	BS		●36		
			BS		●38		

- The soil was frozen to a depth of 0.6 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

TESTHOLE TH2



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)

Date Drilled: January 29, 2014

Project Location: Manila Road from Adsum Drive to Jefferson Avenue

Depth of Testhole: 2.1 m

Client: KGS Group Inc.

Logged by: Sothea Bun

Drilling Contractor: Subterranean (Manitoba) Ltd.

Reviewed by: German Leal

Drilling Method: 125 mm Solid Stem Auger

UTM Coordinates: 14U 630844.0 m E, 5535442.0 m N

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
		Concrete							
		Granular Fill - 20 mm maximum aggregate size	BS						● 13
0.5		Clayey Silt - tan, firm, moist, medium plasticity - trace fine to coarse sand - trace fine gravel	BS						● 22
			BS						● 23
1.0			BS	0.1	5.0	67.8	27.1		● 25
1.5		Clay - brown, firm, moist, high plasticity - some silt - trace fine sand	BS						● 34
			BS						● 34
2.0			BS						● 41
			BS						● 50

- The soil was frozen to a depth of 0.6 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

TESTHOLE TH3



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)

Date Drilled: January 29, 2014

Project Location: Manila Road from Adsum Drive to Jefferson Avenue

Depth of Testhole: 2.1 m

Client: KGS Group Inc.

Logged by: Sothea Bun

Drilling Contractor: Subterranean (Manitoba) Ltd.

Reviewed by: German Leal

Drilling Method: 125 mm Solid Stem Auger

UTM Coordinates: 14U 630840.0 m E, 5535255.0 m N

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
0.0 - 0.05		Asphalt							
0.05 - 0.1		Concrete							
0.1 - 0.2		Clay Fill - black, firm, moist, high plasticity - some fine to coarse sand - trace fine gravel	BS						●24
0.2 - 0.3		Silty Clay - brown, firm, moist, high plasticity - trace fine sand	BS						●32
0.3 - 0.6		Silty Clay - brown, firm, moist, high plasticity - trace fine sand	BS						●36
0.6 - 1.2		Clayey Silt - tan, firm, moist, medium plasticity - trace fine to coarse sand - trace fine gravel	BS	0.0	0.2	34.4	65.4		●40
1.2 - 1.4		Clayey Silt - tan, firm, moist, medium plasticity - trace fine to coarse sand - trace fine gravel	BS						●29
1.4 - 1.6		Clay - brown, firm, moist, high plasticity - some silt - trace fine sand	BS						●44
1.6 - 1.8		Clay - brown, firm, moist, high plasticity - some silt - trace fine sand	BS						●46
1.8 - 2.1		Clay - brown, firm, moist, high plasticity - some silt - trace fine sand	BS						●49

- The soil was frozen to a depth of 0.6 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.



Core sample from Testhole TH1



Core sample from Testhole TH2



Core sample from Testhole TH3



PARTICLE SIZE ANALYSIS ASTM D422

KGS Group Inc.
3rd Floor - 865 Waverley Street
Winnipeg, MB
R3T 5P4

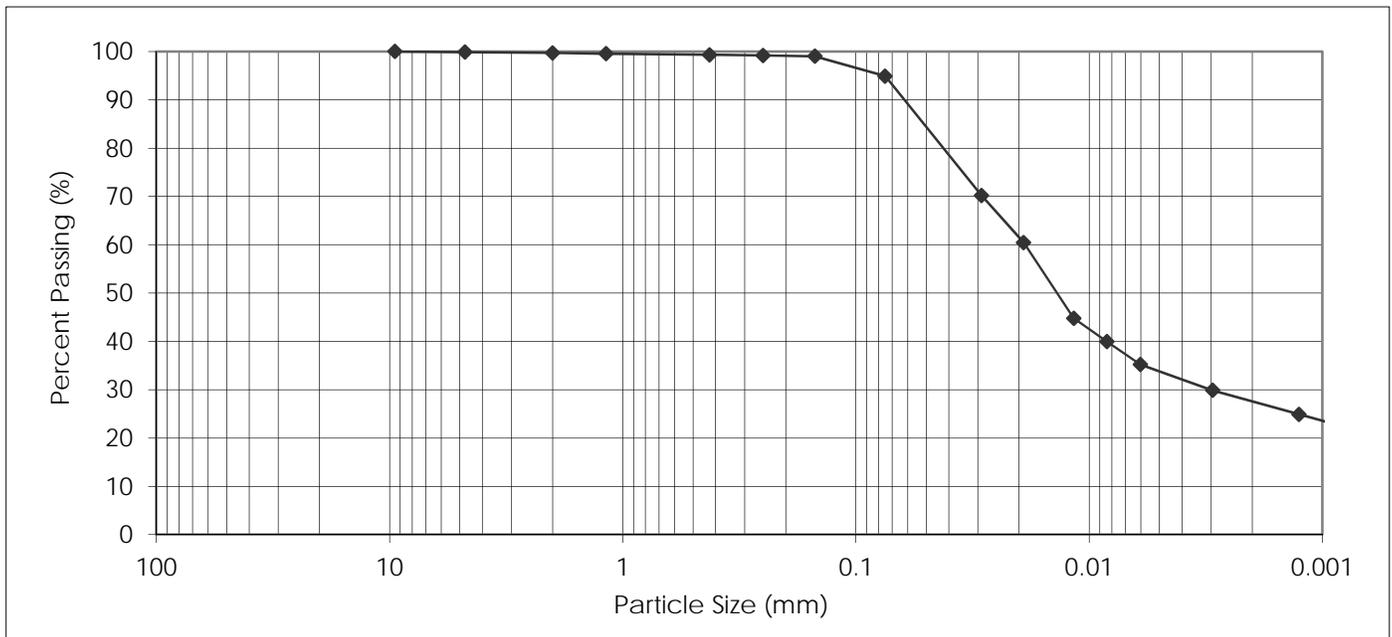
PROJECT: 2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
Manila Road between Adsum Drive
and Jefferson Avenue

Attention: Craig Rowbotham

PROJECT NO.: 123301336

SAMPLED BY: Sothea Bun
SAMPLE ID: TH2 @ 0.9 m

DATE RECEIVED: February 24, 2014
TESTED BY: Nestor Abarca



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	99.9
2.00 mm	99.7

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.5
0.425 mm	99.3
0.250 mm	99.2
0.150 mm	99.0
0.075 mm	94.9
0.005 mm	33.4
0.002 mm	27.1
0.001 mm	23.5

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.1	0.2	0.4	4.4	67.8	27.1	23.5

February 26, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.



PARTICLE SIZE ANALYSIS ASTM D422

KGS Group Inc.
3rd Floor - 865 Waverley Street
Winnipeg, MB
R3T 5P4

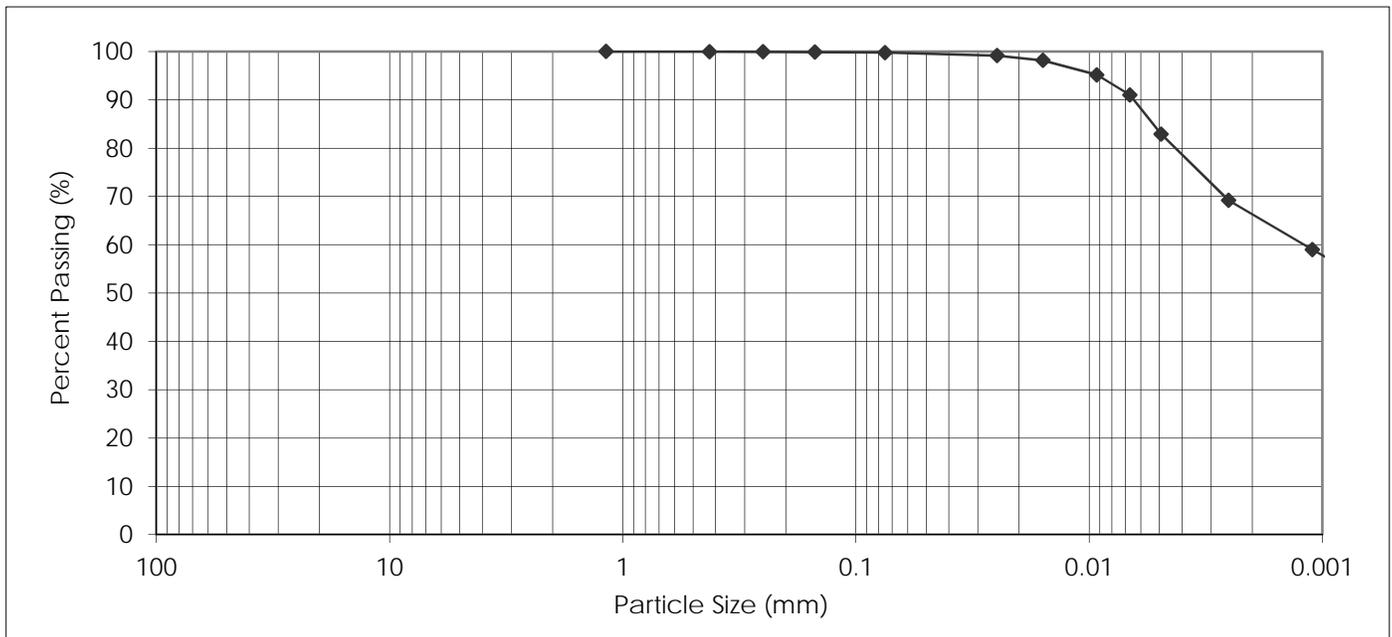
PROJECT: 2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
Manila Road between Adsum Drive
and Jefferson Avenue

Attention: Craig Rowbotham

PROJECT NO.: 123301336

SAMPLED BY: Sothea Bun
SAMPLE ID: TH3 @ 0.9 m

DATE RECEIVED: February 24, 2014
TESTED BY: Nestor Abarca



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	100.0
2.00 mm	100.0

PARTICLE SIZE	PERCENT PASSING
1.18 mm	100.0
0.425 mm	100.0
0.250 mm	99.9
0.150 mm	99.9
0.075 mm	99.8
0.005 mm	83.3
0.002 mm	65.4
0.001 mm	57.7

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.0	0.0	0.0	0.2	34.4	65.4	57.7

February 26, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.

**2014 CITY OF WINNIPEG
LOCAL STREETS PACKAGE
CONTRACT 2
(14-R-02)**

**COLLEGE AVENUE BETWEEN
MCPHILLIPS STREET AND
RADFORD STREET**

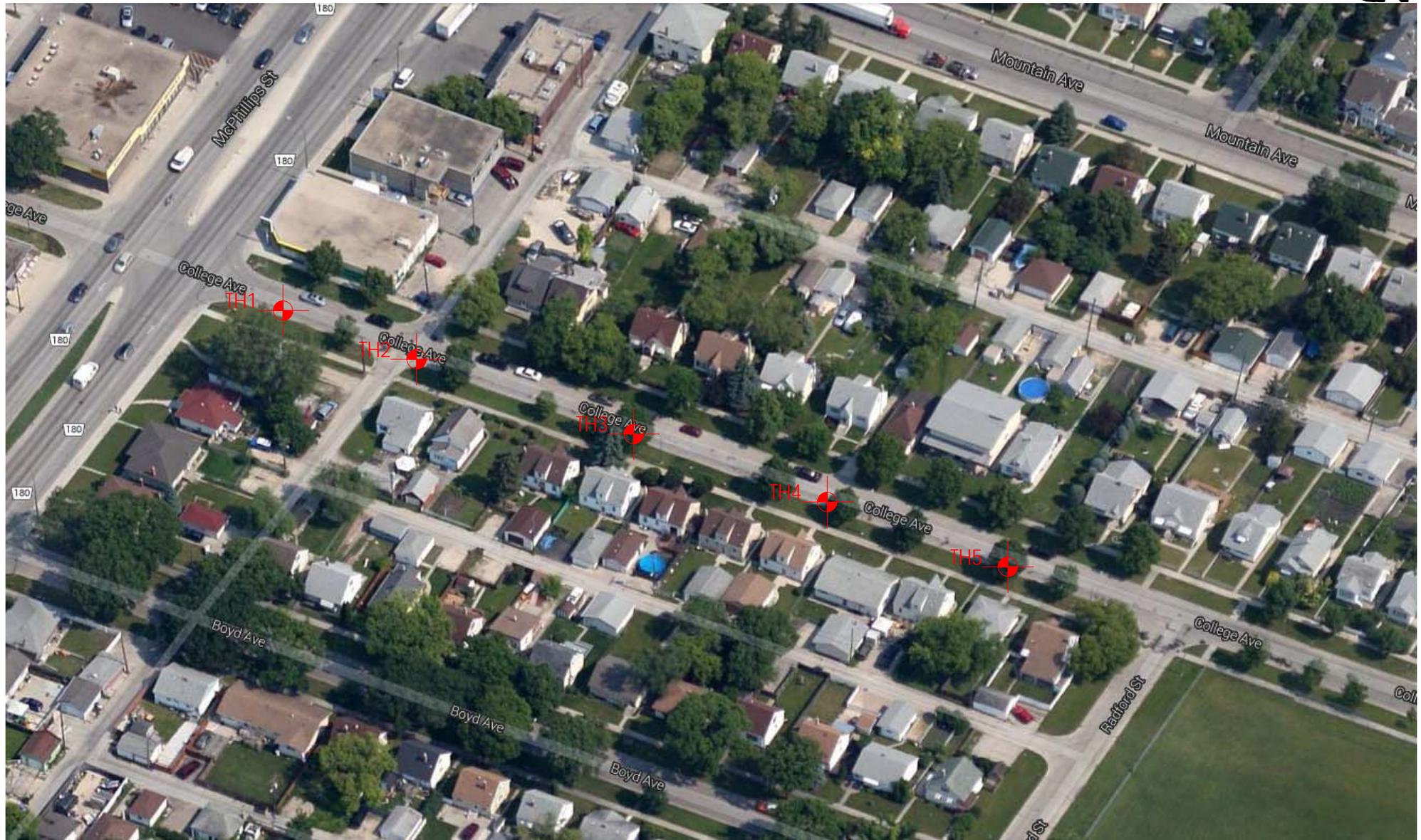
GEOTECHNICAL INVESTIGATION



Prepared for:
KGS Group Inc.
3rd Floor – 865 Waverley Street
Winnipeg, MB
R3T 5P4

Prepared by:
Stantec Consulting Ltd.
199 Henlow Bay
Winnipeg, MB
R3Y 1G4

March 12, 2014
Project No. 123301336



Project No. 123301336

Drawn by: NB

Figure: 1

Date: March 4, 2014

Reviewed by: GL

Scale: NTS

Testhole Location Plan
2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
College Avenue between McPhillips
Street and Radford Street

TABLE 1
2014 CITY OF WINNIPEG LOCAL STREETS PACKAGE CONTRACT 2 (14-R-02)
COLLEGE AVENUE BETWEEN MCPHILLIPS STREET AND RADFORD STREET
GEOTECHNICAL INVESTIGATION

Testhole ID	Testhole Location	Pavement Surface		Pavement Structure Material		Sample Description	Sample Depth (m)	Moisture Content (%)	Particle Size Analysis				Atterberg Limits		
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH1	UTM Coordinates: 14U 631533 m East, 5532521 m North	Asphalt	45	-	-	Clay Fill	0.6	26	0.0	2.0	40.1	57.9	49	16	33
		Concrete	245												
TH2	UTM Coordinates: 14U 631557 m East, 5532509 m North	Asphalt	25	-	-	Silt	0.6	21	0.2	8.0	73.4	18.4	21	15	6
		Concrete	265												
TH3	UTM Coordinates: 14U 631597 m East, 5532491 m North	Asphalt	35	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	250												
TH4	UTM Coordinates: 14U 631633 m East, 5532474 m North	Asphalt	70	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	150												
TH5	UTM Coordinates: 14U 631666 m East, 5532459 m North	Asphalt	50	-	-	Clay	0.9	37	0.2	1.2	20.1	78.5	87	23	64
		Concrete	180												

TESTHOLE TH1



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)

Date Drilled: January 31, 2014

Project Location: College Avenue from McPhillips Street to Radford Street

Depth of Testhole: 2.1 m

Client: KGS Group Inc.

Logged by: Sothea Bun

Drilling Contractor: Subterranean (Manitoba) Ltd.

Reviewed by: German Leal

Drilling Method: 125 mm Solid Stem Auger

UTM Coordinates: 14U 631533.0 m E, 5532521.0 m N

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
0.0 - 0.1	[Asphalt symbol]	Asphalt							
0.1 - 0.2	[Concrete symbol]	Concrete							
0.2 - 0.6	[Clay Fill symbol]	Clay Fill - black, firm, moist, medium plasticity - trace fine to coarse sand	BS BS					34 32	
0.6 - 1.1	[Clay symbol]	Clay - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand - trace fine gravel - stiff below 1.1 m	BS	0.0	2.0	40.1	57.9	26	
1.1 - 1.4	[Clay symbol]		BS					32	
1.4 - 1.7	[Clay symbol]		BS					39	
1.7 - 2.0	[Clay symbol]		BS					45	
2.0 - 2.1	[Clay symbol]		BS					49	
2.1	[Clay symbol]		BS					39	

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

TESTHOLE TH2



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)

Date Drilled: January 31, 2014

Project Location: College Avenue from McPhillips Street to Radford Street

Depth of Testhole: 2.1 m

Client: KGS Group Inc.

Logged by: Sothea Bun

Drilling Contractor: Subterranean (Manitoba) Ltd.

Reviewed by: German Leal

Drilling Method: 125 mm Solid Stem Auger

UTM Coordinates: 14U 631557.0 m E, 5532509.0 m N

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				Water Content (%)					
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL		LL			
										25	50	75	100
		Asphalt											
		Concrete											
0.5		Silt - tan, soft, moist, low plasticity - some clay - trace fine to medium sand - trace fine gravel	BS BS							●22 ●21			
			BS	0.2	8.0	73.4	18.4			●21			
1.0			BS							●21			
			BS							●20			
1.5			BS							●22			
2.0		Clay - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand - trace fine gravel	BS							●30			
			BS							●31			

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

TESTHOLE TH3



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)

Date Drilled: January 31, 2014

Project Location: College Avenue from McPhillips Street to Radford Street

Depth of Testhole: 2.1 m

Client: KGS Group Inc.

Logged by: Sothea Bun

Drilling Contractor: Subterranean (Manitoba) Ltd.

Reviewed by: German Leal

Drilling Method: 125 mm Solid Stem Auger

UTM Coordinates: 14U 631597.0 m E, 5532491.0 m N

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
0.0 - 0.05		Asphalt					
0.05 - 0.1		Concrete					
0.1 - 0.3		Clay Fill - black, firm, moist, medium plasticity - trace fine to coarse sand	BS BS		33 30		
0.3 - 0.9		Silt - tan, soft, moist, low plasticity - some clay - trace fine to medium sand - trace fine gravel	BS		28		
0.9 - 2.1		Clay - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand - trace fine gravel	BS BS BS BS		38 41 43 46 44		

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

TESTHOLE TH4



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)

Date Drilled: January 31, 2014

Project Location: College Avenue from McPhillips Street to Radford Street

Depth of Testhole: 2.1 m

Client: KGS Group Inc.

Logged by: Sothea Bun

Drilling Contractor: Subterranean (Manitoba) Ltd.

Reviewed by: German Leal

Drilling Method: 125 mm Solid Stem Auger

UTM Coordinates: 14U 631633.0 m E, 5532474.0 m N

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
0.0 - 0.1		Asphalt					
		Concrete					
0.1 - 0.5		Clay Fill - black, firm, moist, medium plasticity - trace fine to coarse sand	BS		●29		
			BS		●34		
0.5 - 1.5		Silt - tan, soft, moist, low plasticity - some clay - trace fine to medium sand - trace fine gravel	BS		●26		
			BS		●24		
			BS		●24		
1.5 - 2.1		Clay - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand - trace fine gravel	BS		●42		
			BS		●43		
2.1			BS		●48		

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

TESTHOLE TH5



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)

Date Drilled: January 31, 2014

Project Location: College Avenue from McPhillips Street to Radford Street

Depth of Testhole: 2.1 m

Client: KGS Group Inc.

Logged by: Sothea Bun

Drilling Contractor: Subterranean (Manitoba) Ltd.

Reviewed by: German Leal

Drilling Method: 125 mm Solid Stem Auger

UTM Coordinates: 14U 631666.0 m E, 5532459.0 m N

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				● Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
		Asphalt							
		Concrete							
0.5		Silt - tan, soft, moist, low plasticity - some clay - trace fine to medium sand - trace fine gravel	BS BS					●22 ●20	
1.0		Clay - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand - trace fine gravel	BS BS	0.2	1.2	20.1	78.5	●29 ●37	
1.5			BS					●34 ●46	
2.0			BS					●49	
2.1			BS					●50	

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.



Core sample from Testhole TH1



Core sample from Testhole TH2



Core sample from Testhole TH3



Core sample from Testhole TH4



Core sample from Testhole TH5

KGS Group Inc.
3rd Floor - 865 Waverley Street
Winnipeg, MB
R3T 5P4

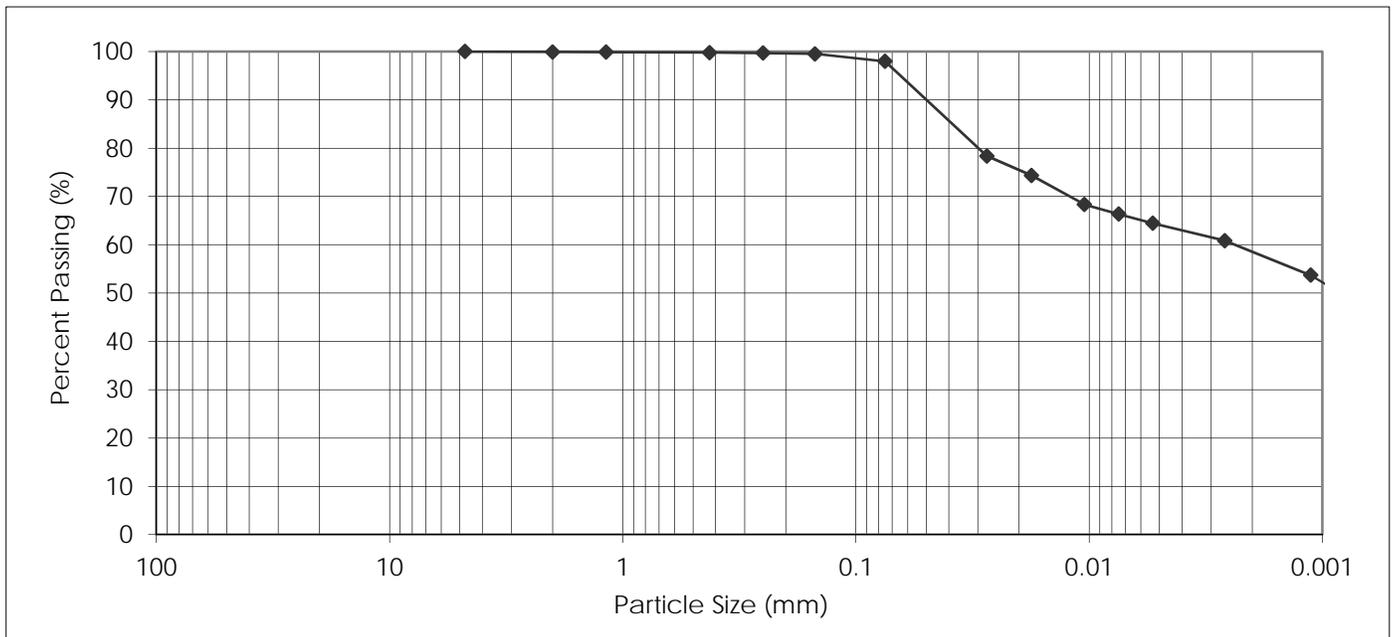
PROJECT: 2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
College Avenue between McPhillips
Street and Radford Street

Attention: Craig Rowbotham

PROJECT NO.: 123301336

SAMPLED BY: Sothea Bun
SAMPLE ID: TH1 @ 0.6 m

DATE RECEIVED: February 24, 2014
TESTED BY: Nestor Abarca



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	100.0
2.00 mm	99.9

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.9
0.425 mm	99.8
0.250 mm	99.7
0.150 mm	99.5
0.075 mm	98.0
0.005 mm	64.0
0.002 mm	57.9
0.001 mm	52.1

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.0	0.1	0.1	1.8	40.1	57.9	52.1

February 26, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.



PARTICLE SIZE ANALYSIS ASTM D422

KGS Group Inc.
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Winnipeg, MB
R3T 5P4

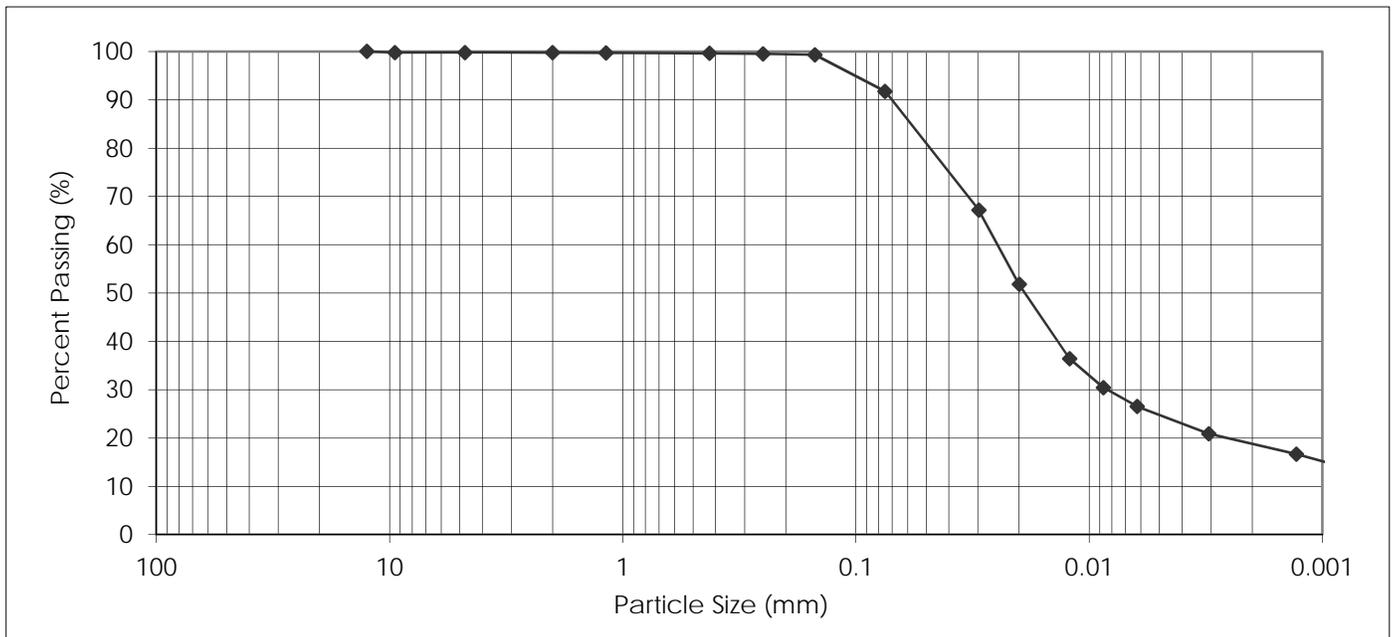
PROJECT: 2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
College Avenue between McPhillips
Street and Radford Street

Attention: Craig Rowbotham

PROJECT NO.: 123301336

SAMPLED BY: Sothea Bun
SAMPLE ID: TH2 @ 0.6 m

DATE RECEIVED: February 24, 2014
TESTED BY: Nestor Abarca



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	99.8
4.75 mm	99.8
2.00 mm	99.8

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.7
0.425 mm	99.6
0.250 mm	99.5
0.150 mm	99.3
0.075 mm	91.8
0.005 mm	24.3
0.002 mm	18.4
0.001 mm	15.1

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.2	0.0	0.2	7.8	73.4	18.4	15.1

February 26, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.

KGS Group Inc.
3rd Floor - 865 Waverley Street
Winnipeg, MB
R3T 5P4

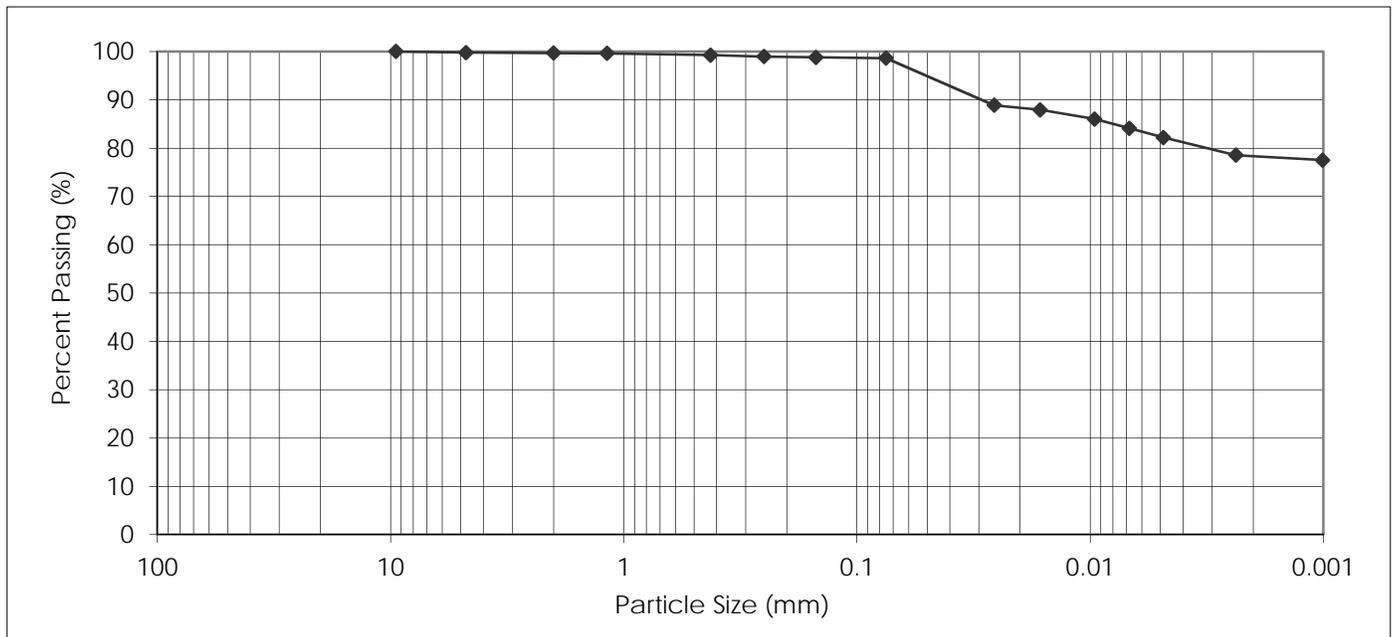
PROJECT: 2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
College Avenue between McPhillips
Street and Radford Street

Attention: Craig Rowbotham

PROJECT NO.: 123301336

SAMPLED BY: Sothea Bun
SAMPLE ID: TH5 @ 0.9 m

DATE RECEIVED: February 24, 2014
TESTED BY: Nestor Abarca



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	99.8
2.00 mm	99.7

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.6
0.425 mm	99.3
0.250 mm	99.0
0.150 mm	98.8
0.075 mm	98.6
0.005 mm	82.4
0.002 mm	78.3
0.001 mm	77.5

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.2	0.1	0.4	0.7	20.3	78.3	77.5

February 26, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.

**2014 CITY OF WINNIPEG
LOCAL STREETS PACKAGE
CONTRACT 2
(14-R-02)**

**BANNERMAN AVENUE
BETWEEN ARLINGTON STREET
AND SINCLAIR STREET**

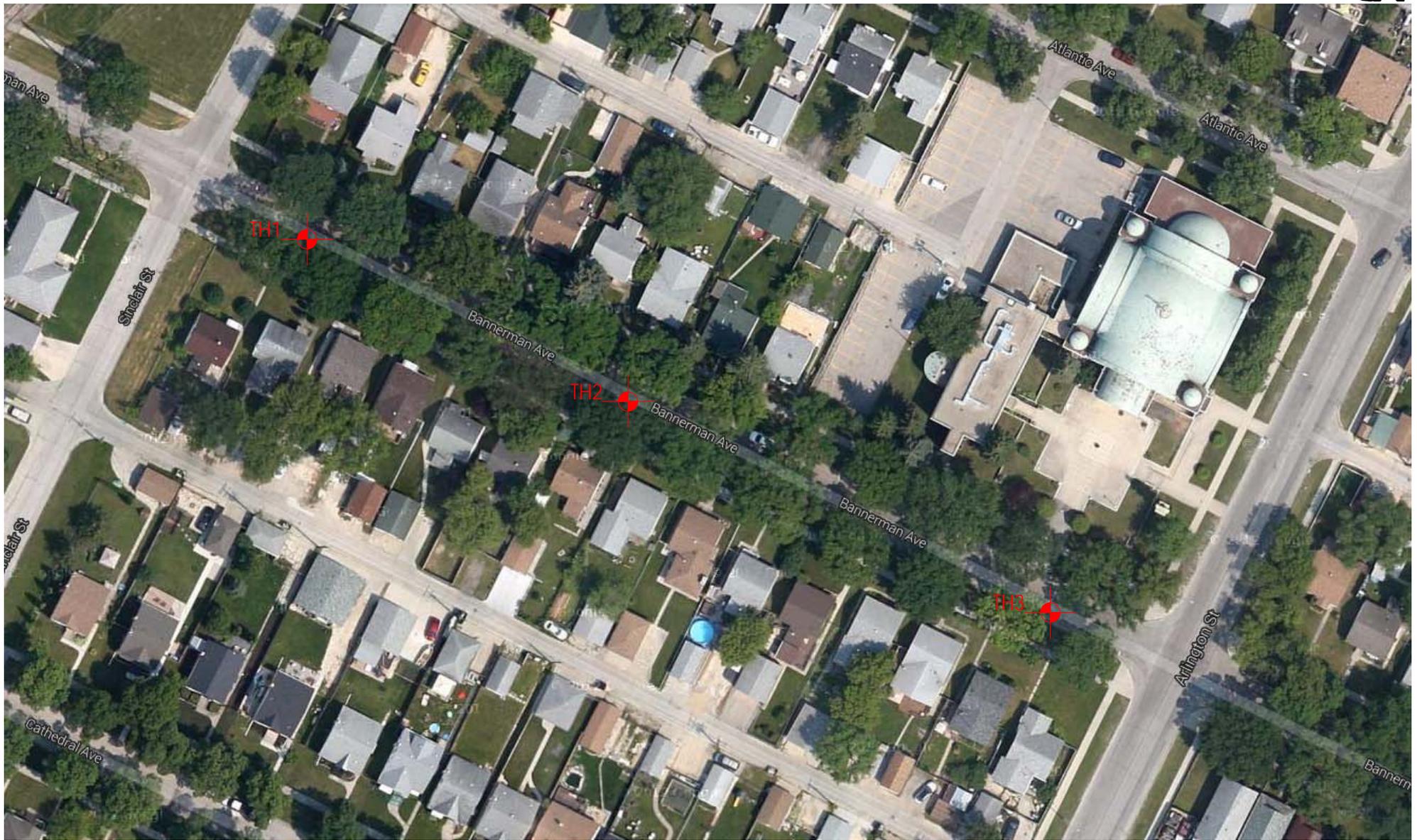
GEOTECHNICAL INVESTIGATION



Prepared for:
KGS Group Inc.
3rd Floor – 865 Waverley Street
Winnipeg, MB
R3T 5P4

Prepared by:
Stantec Consulting Ltd.
199 Henlow Bay
Winnipeg, MB
R3Y 1G4

March 12, 2014
Project No. 123301336



Project No. 123301336

Drawn by: NB

Figure: 1

Date: March 3, 2014

Reviewed by: GL

Scale: NTS

Testhole Location Plan
2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
Bannerman Avenue between Arlington
Street and Sinclair Street

TABLE 1
2014 CITY OF WINNIPEG LOCAL STREETS PACKAGE CONTRACT 2 (14-R-02)
BANNERMAN AVENUE BETWEEN ARLINGTON STREET AND SINCLAIR STREET
GEOTECHNICAL INVESTIGATION

Testhole ID	Testhole Location	Pavement Surface		Pavement Structure Material		Sample Description	Sample Depth (m)	Moisture Content (%)	Particle Size Analysis				Atterberg Limits		
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH1	UTM Coordinates: 14U 632822 m East, 5532758 m North	Asphalt	50	-	-	Silt	0.9	24	0.2	2.1	70.0	27.7	31	15	16
		Concrete	210												
TH2	UTM Coordinates: 14U 632881 m East, 5532730 m North	Asphalt	60	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	180												
TH3	UTM Coordinates: 14U 632959 m East, 5532693 m North	Asphalt	85	-	-	Silty Clay	0.9	32	0.0	0.6	31.6	67.8	81	23	58
		Concrete	135												

TESTHOLE TH1



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)

Date Drilled: January 31, 2014

Project Location: Bannerman Avenue from Arlington Street to Sinclair Street

Depth of Testhole: 2.1 m

Client: KGS Group Inc.

Logged by: Sothea Bun

Drilling Contractor: Subterranean (Manitoba) Ltd.

Reviewed by: German Leal

Drilling Method: 125 mm Solid Stem Auger

UTM Coordinates: 14U 632822.0 m E, 5532758.0 m N

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
0.0 - 0.1		Asphalt							
0.1 - 0.2		Concrete							
0.2 - 0.4		Clay Fill - black, firm, moist, high plasticity - some fine to coarse sand - trace fine gravel	BS BS					24	32
0.4 - 0.5		Silty Clay - brown, firm, moist, high plasticity - trace fine to coarse sand	BS					28	
0.5 - 1.2		Silt - tan, soft, moist, medium plasticity - trace fine to coarse sand - trace fine gravel	BS	0.2	2.1	70.0	27.7	24	
1.2 - 1.8			BS					23	
1.8 - 2.0		Clay - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand	BS					44	
2.0 - 2.1			BS					42	

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

TESTHOLE TH2



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)
Project Location: Bannerman Avenue from Arlington Street to Sinclair Street
Client: KGS Group Inc.
Drilling Contractor: Subterranean (Manitoba) Ltd.
Drilling Method: 125 mm Solid Stem Auger
UTM Coordinates: 14U 632881.0 m E, 5532730.0 m N

Date Drilled: January 31, 2014
Depth of Testhole: 2.1 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
		Asphalt					
		Concrete					
		Clay Fill - black, firm, moist, high plasticity - some fine to coarse sand - trace fine gravel	BS		●30		
0.5		Silty Clay - brown, firm, moist, high plasticity - trace fine to coarse sand	BS		●28		
1.0		Clay - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand	BS		●26		
1.5			BS		●29		
			BS		●35		
			BS		●38		
2.0			BS		●36		
			BS		●40		

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

TESTHOLE TH3



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)
Project Location: Bannerman Avenue from Arlington Street to Sinclair Street
Client: KGS Group Inc.
Drilling Contractor: Subterranean (Manitoba) Ltd.
Drilling Method: 125 mm Solid Stem Auger
UTM Coordinates: 14U 632959.0 m E, 5532693.0 m N

Date Drilled: January 31, 2014
Depth of Testhole: 2.1 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				● Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
		Asphalt							
		Concrete							
		Clay Fill - black, firm, moist, high plasticity - some fine to coarse sand - trace fine gravel	BS					●30	
0.5		Silty Clay - black, firm, moist, high plasticity - trace fine to coarse sand	BS					●32	
1.0			BS	0.0	0.6	31.6	67.8	●32	
1.5		Clay - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand	BS					●30	
2.0			BS					●30	
			BS					●34	

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.



Core sample from Testhole TH1



Core sample from Testhole TH2



Core sample from Testhole TH3



PARTICLE SIZE ANALYSIS ASTM D422

KGS Group Inc.
3rd Floor - 865 Waverley Street
Winnipeg, MB
R3T 5P4

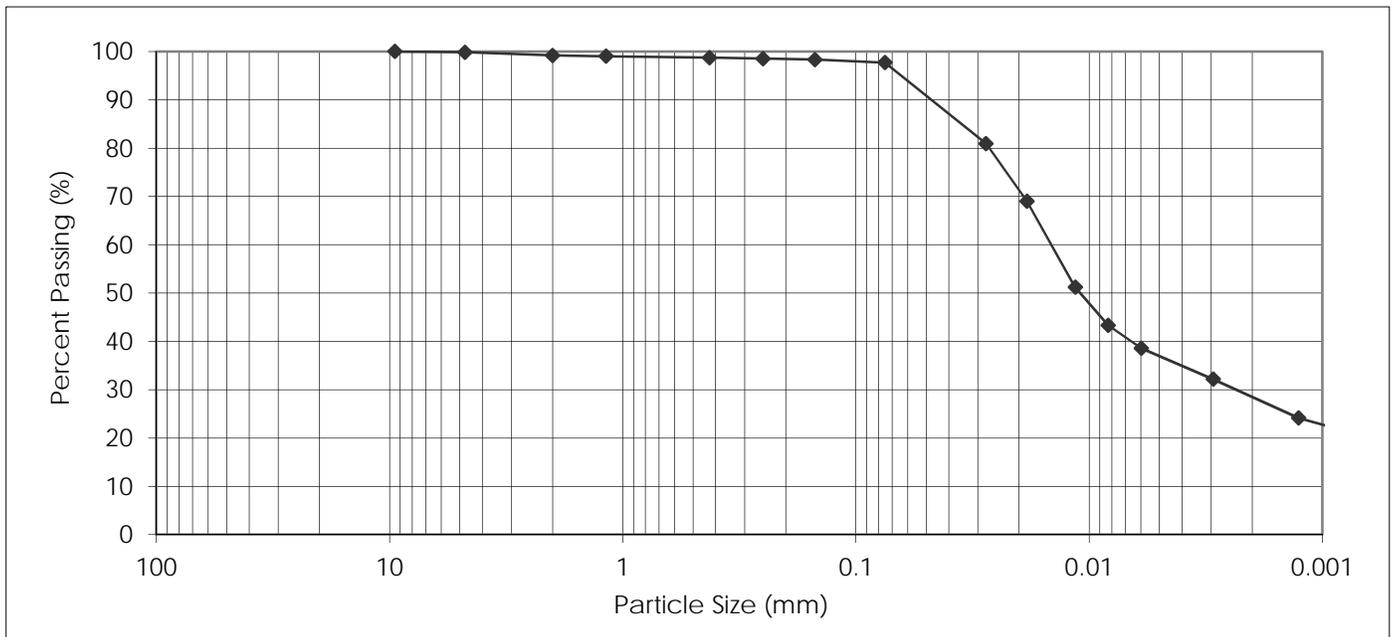
PROJECT: 2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
Bannerman Avenue between Arlington
Street and Sinclair Street

Attention: Craig Rowbotham

PROJECT NO.: 123301336

SAMPLED BY: Sothea Bun
SAMPLE ID: TH1 @ 0.9 m

DATE RECEIVED: February 24, 2014
TESTED BY: Nestor Abarca



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	99.8
2.00 mm	99.2

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.0
0.425 mm	98.7
0.250 mm	98.5
0.150 mm	98.3
0.075 mm	97.7
0.005 mm	36.5
0.002 mm	27.7
0.001 mm	22.7

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.2	0.6	0.5	1.0	70.0	27.7	22.7

February 26, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.



PARTICLE SIZE ANALYSIS ASTM D422

KGS Group Inc.
3rd Floor - 865 Waverley Street
Winnipeg, MB
R3T 5P4

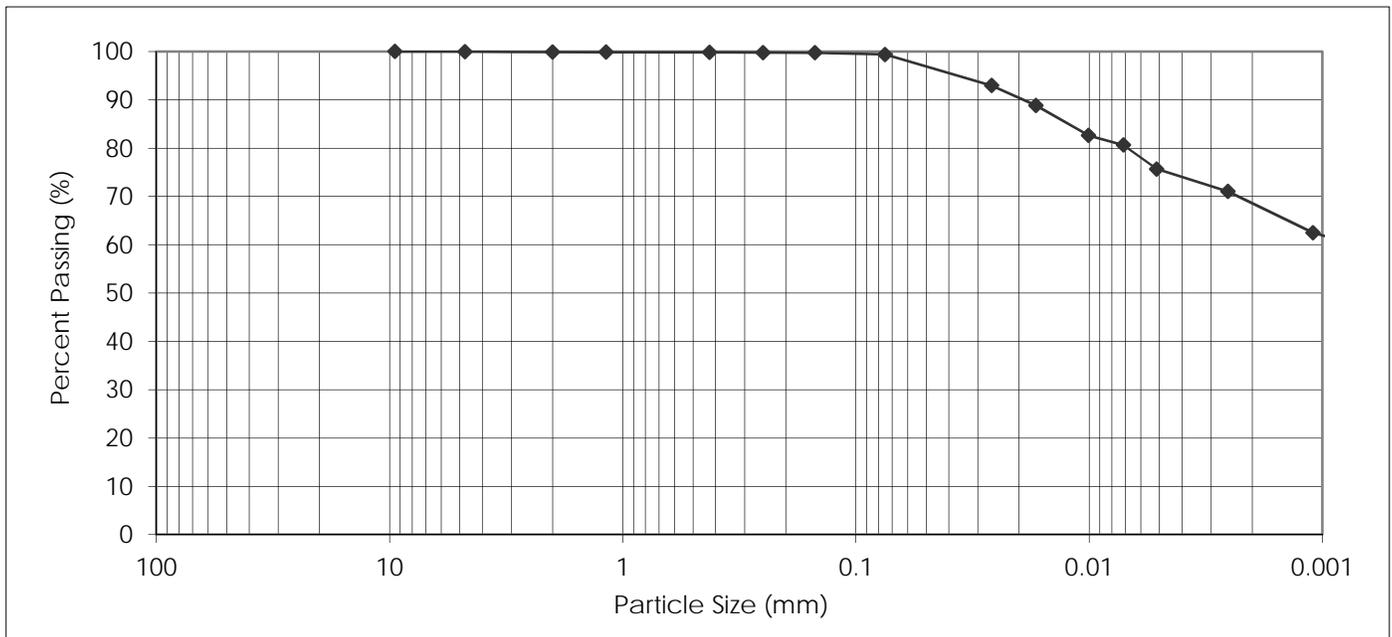
PROJECT: 2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
Bannerman Avenue between Arlington
Street and Sinclair Street

Attention: Craig Rowbotham

PROJECT NO.: 123301336

SAMPLED BY: Sothea Bun
SAMPLE ID: TH3 @ 0.9 m

DATE RECEIVED: February 24, 2014
TESTED BY: Nestor Abarca



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	100.0
2.00 mm	99.9

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.9
0.425 mm	99.8
0.250 mm	99.8
0.150 mm	99.7
0.075 mm	99.4
0.005 mm	75.4
0.002 mm	67.8
0.001 mm	61.9

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.0	0.1	0.1	0.4	31.6	67.8	61.9

February 26, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.

**2014 CITY OF WINNIPEG
LOCAL STREETS PACKAGE
CONTRACT 2
(14-R-02)**

**AIKINS STREET BETWEEN
ATLANTIC AVENUE AND
MACHRAY AVENUE**

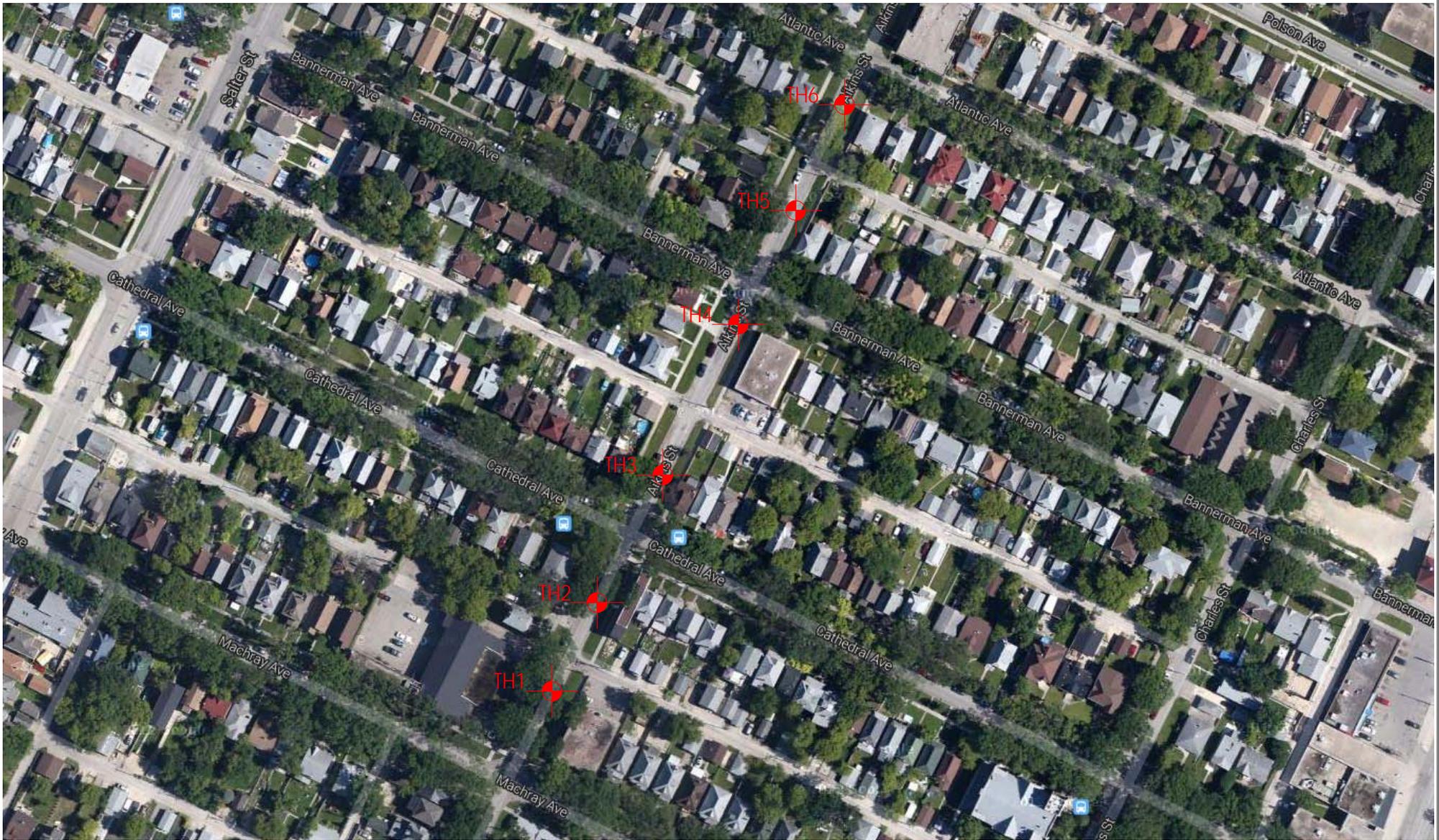
GEOTECHNICAL INVESTIGATION



Prepared for:
KGS Group Inc.
3rd Floor – 865 Waverley Street
Winnipeg, MB
R3T 5P4

Prepared by:
Stantec Consulting Ltd.
199 Henlow Bay
Winnipeg, MB
R3Y 1G4

March 12, 2014
Project No. 123301336



Project No. 123301336

Drawn by: NB

Figure: 1

Date: March 3, 2014

Reviewed by: GL

Scale: NTS

Testhole Location Plan
2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
Aikins Street between Atlantic Avenue
and Machray Avenue

**TABLE 1
2014 CITY OF WINNIPEG LOCAL STREETS PACKAGE CONTRACT 2 (14-R-02)
AIKINS STREET BETWEEN ATLANTIC AVENUE AND MACHRAY AVENUE
GEOTECHNICAL INVESTIGATION**

Testhole ID	Testhole Location	Pavement Surface		Pavement Structure Material		Sample Description	Sample Depth (m)	Moisture Content (%)	Particle Size Analysis				Atterberg Limits		
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH1	UTM Coordinates: 14U 634193 m East, 5531937 m North	Asphalt	35	-	-	Clay	0.9	29	0.0	0.5	23.4	76.1	81	25	56
		Concrete	140												
TH2	UTM Coordinates: 14U 634208 m East, 5531967 m North	Asphalt	35	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	150												
TH3	UTM Coordinates: 14U 634222 m East, 5532007 m North	Asphalt	115	Granular Fill	950	-	-	-	-	-	-	-	-	-	-
TH4	UTM Coordinates: 14U 634257 m East, 5532071 m North	Asphalt	20	-	-	Silt	0.9	18	0.0	4.2	79.0	16.8	22	16	6
		Concrete	160												
TH5	UTM Coordinates: 14U 634277 m East, 5532113 m North	Asphalt	30	-	-	Silty Clay	0.6	28	0.1	1.4	34.1	64.4	69	21	48
		Concrete	140												
TH6	UTM Coordinates: 14U 634294 m East, 5532152 m North	Asphalt	45	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	195												

TESTHOLE TH1



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)

Date Drilled: January 31, 2014

Project Location: Aikins Street from Atlantic Avenue to Machray Avenue

Depth of Testhole: 2.1 m

Client: KGS Group Inc.

Logged by: Sothea Bun

Drilling Contractor: Subterranean (Manitoba) Ltd.

Reviewed by: German Leal

Drilling Method: 125 mm Solid Stem Auger

UTM Coordinates: 14U 634193.0 m E, 5531937.0 m N

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
		Asphalt							
		Concrete							
		Clay Fill - black, firm, moist, high plasticity - some fine to coarse sand - trace fine gravel	BS						34
			BS						32
0.5		Clay - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand	BS						28
1.0			BS	0.0	0.5	23.4	76.1		29
			BS						27
1.5		Silt - tan, soft, moist, low plasticity - some clay - trace fine to medium sand	BS						22
			BS						22
2.0			BS						22

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

TESTHOLE TH2



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)

Date Drilled: January 31, 2014

Project Location: Aikins Street from Atlantic Avenue to Machray Avenue

Depth of Testhole: 2.1 m

Client: KGS Group Inc.

Logged by: Sothea Bun

Drilling Contractor: Subterranean (Manitoba) Ltd.

Reviewed by: German Leal

Drilling Method: 125 mm Solid Stem Auger

UTM Coordinates: 14U 634208.0 m E, 5531967.0 m N

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
		Asphalt					
		Concrete					
		Clay Fill - black, firm, moist, high plasticity - some fine to coarse sand - trace fine gravel	BS		●33		
		Clay - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand	BS		●29		
0.5		Silty Clay - brown, firm, moist, high plasticity - trace fine to medium sand - trace fine gravel	BS		●25		
		Silt - tan, soft, moist, low plasticity - some clay - trace fine to medium sand	BS		●18		
1.0			BS		●19		
		Silty Clay - brown, firm, moist, high plasticity - trace fine to medium sand	BS		●32		
1.5			BS		●19		
		Silt - tan, soft, moist, low plasticity - some clay - trace fine to medium sand	BS		●18		
2.0			BS		●18		

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

TESTHOLE TH3



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)

Date Drilled: February 14, 2014

Project Location: Aikins Street from Atlantic Avenue to Machray Avenue

Depth of Testhole: 2.1 m

Client: KGS Group Inc.

Logged by: Larry Presado

Drilling Contractor: Active Drilling and Piling

Reviewed by: German Leal

Drilling Method: 100 mm Solid Stem Auger

UTM Coordinates: 14U 634222.0 m E, 5532007.0 m N

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)				
				25	50	75	100	
0.5		Asphalt	BS	●7				
		Granular Fill - 20 mm maximum aggregate size						
1.0		Silt - tan, soft, moist, low plasticity - some clay - trace fine to medium sand	BS	●7				
1.5			BS	●15				
2.0			BS	●22				
			BS	●19				
			BS	●23				

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

TESTHOLE TH4



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)
Project Location: Aikins Street from Atlantic Avenue to Machray Avenue
Client: KGS Group Inc.
Drilling Contractor: Subterranean (Manitoba) Ltd.
Drilling Method: 125 mm Solid Stem Auger
UTM Coordinates: 14U 634257.0 m E, 5532071.0 m N

Date Drilled: January 31, 2014
Depth of Testhole: 2.1 m
Logged by: Sothea Bun
Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				Water Content (%)			
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL		LL	
								25	50	75	100
		Asphalt									
		Concrete									
		Clay Fill	BS								34
		- black, firm, moist, high plasticity	BS								29
		- some fine to coarse sand									
		- trace fine gravel									
0.5		Silt	BS								24
		- tan, soft, moist, low plasticity									
		- some clay									
		- trace fine to medium sand									
1.0			BS	0.0	4.2	79.0	16.8				18
			BS								24
1.5			BS								18
			BS								22
2.0			BS								24

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

TESTHOLE TH5



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)

Date Drilled: January 31, 2014

Project Location: Aikins Street from Atlantic Avenue to Machray Avenue

Depth of Testhole: 2.1 m

Client: KGS Group Inc.

Logged by: Sothea Bun

Drilling Contractor: Subterranean (Manitoba) Ltd.

Reviewed by: German Leal

Drilling Method: 125 mm Solid Stem Auger

UTM Coordinates: 14U 634277.0 m E, 5532113.0 m N

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
		Asphalt							
		Concrete							
		Clay Fill - black, firm, moist, high plasticity - some fine to coarse sand - trace fine gravel	BS						34
			BS						33
0.5		Silty Clay - brown, firm, moist, high plasticity - trace fine to medium sand - trace fine gravel	BS	0.1	1.4	34.1	64.4		28
			BS						33
1.0		Silt - tan, soft, moist, low plasticity - some clay - trace fine to medium sand	BS						18
1.5		Clay - brown, firm, moist, high plasticity - some silt - trace fine to coarse sand	BS						39
		Silt - tan, soft, moist, low plasticity - some clay - trace fine to medium sand	BS						22
2.0			BS						24

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.

TESTHOLE TH6



Project Name: 2014 City of Winnipeg Local Streets Package Contract 2 (14-R-02)

Date Drilled: January 31, 2014

Project Location: Aikins Street from Atlantic Avenue to Machray Avenue

Depth of Testhole: 2.1 m

Client: KGS Group Inc.

Logged by: Sothea Bun

Drilling Contractor: Subterranean (Manitoba) Ltd.

Reviewed by: German Leal

Drilling Method: 125 mm Solid Stem Auger

UTM Coordinates: 14U 634294.0 m E, 5532152.0 m N

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
		Asphalt					
		Concrete					
		Clay Fill - black, firm, moist, high plasticity - some fine to coarse sand - trace fine gravel	BS BS		●27 ●24		
0.5		Silty Clay - brown, firm, moist, high plasticity - trace fine to medium sand - trace fine gravel	BS		●31		
1.0		Silt - tan, soft, moist, low plasticity - some clay - trace fine to medium sand	BS		●21		
1.5			BS		●14		
			BS		●19		
2.0			BS		●20		
			BS		●22		

- The soil was frozen to a depth of 1.2 m.
- No groundwater seepage or soil sloughing was observed during or upon completion of drilling.
- Testhole terminated at a depth of 2.1 m.



Core sample from Testhole TH1



Core sample from Testhole TH2



Core sample from Testhole TH3



Core sample from Testhole TH4



Core sample from Testhole TH5



Core sample from Testhole TH6



PARTICLE SIZE ANALYSIS ASTM D422

KGS Group Inc.
3rd Floor - 865 Waverley Street
Winnipeg, MB
R3T 5P4

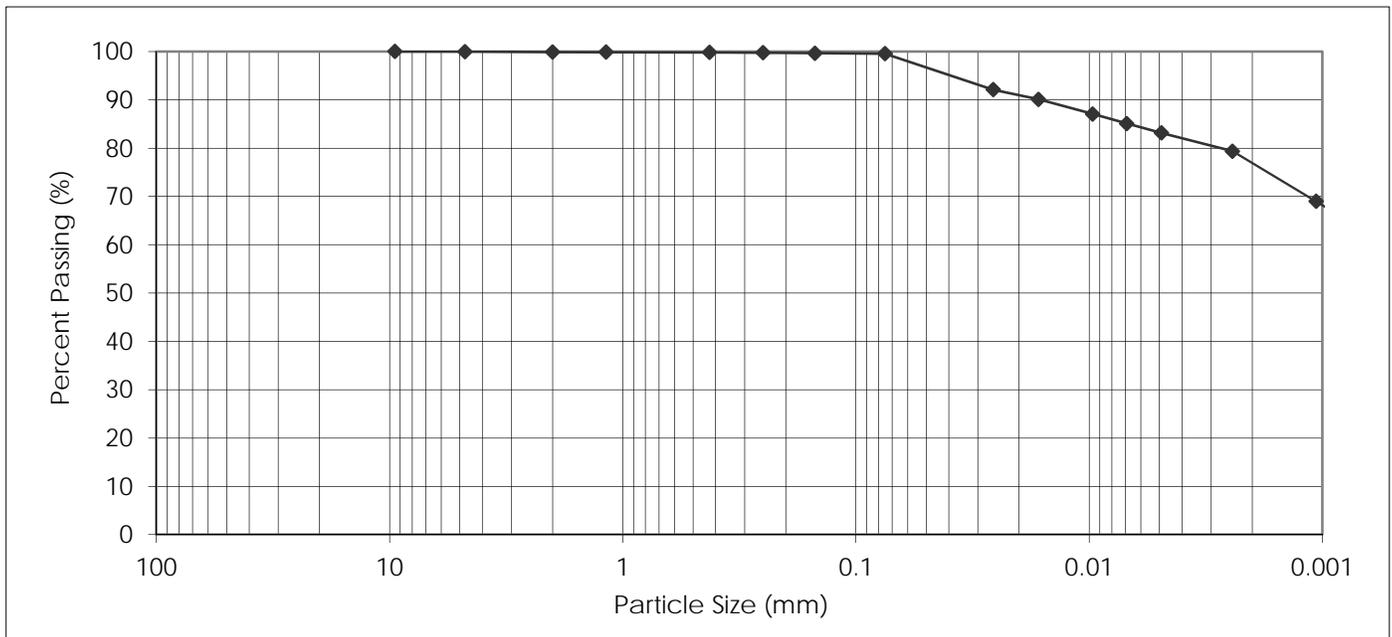
PROJECT: 2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
Aikins Street between Atlantic Avenue
and Machray Avenue

Attention: Craig Rowbotham

PROJECT NO.: 123301336

SAMPLED BY: Sothea Bun
SAMPLE ID: TH1 @ 0.9 m

DATE RECEIVED: February 24, 2014
TESTED BY: Nestor Abarca



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	100.0
2.00 mm	99.9

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.9
0.425 mm	99.8
0.250 mm	99.7
0.150 mm	99.7
0.075 mm	99.5
0.005 mm	83.3
0.002 mm	76.1
0.001 mm	68.1

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.0	0.1	0.1	0.3	23.4	76.1	68.1

February 26, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.



PARTICLE SIZE ANALYSIS ASTM D422

KGS Group Inc.
3rd Floor - 865 Waverley Street
Winnipeg, MB
R3T 5P4

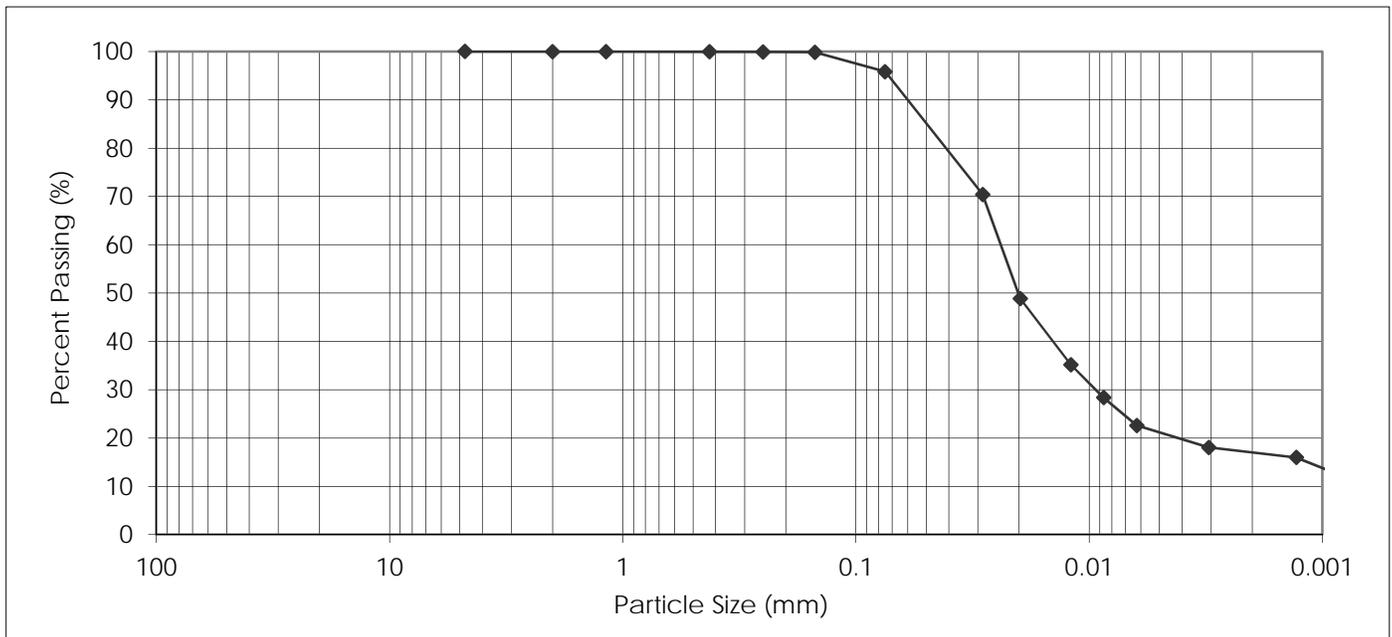
PROJECT: 2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
Aikins Street between Atlantic Avenue
and Machray Avenue

Attention: Craig Rowbotham

PROJECT NO.: 123301336

SAMPLED BY: Sothea Bun
SAMPLE ID: TH4 @ 0.9 m

DATE RECEIVED: February 24, 2014
TESTED BY: Nestor Abarca



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	100.0
2.00 mm	100.0

PARTICLE SIZE	PERCENT PASSING
1.18 mm	100.0
0.425 mm	99.9
0.250 mm	99.9
0.150 mm	99.9
0.075 mm	95.8
0.005 mm	20.8
0.002 mm	16.8
0.001 mm	13.7

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.0	0.0	0.1	4.1	79.0	16.8	13.7

February 26, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.



PARTICLE SIZE ANALYSIS ASTM D422

KGS Group Inc.
3rd Floor - 865 Waverley Street
Winnipeg, MB
R3T 5P4

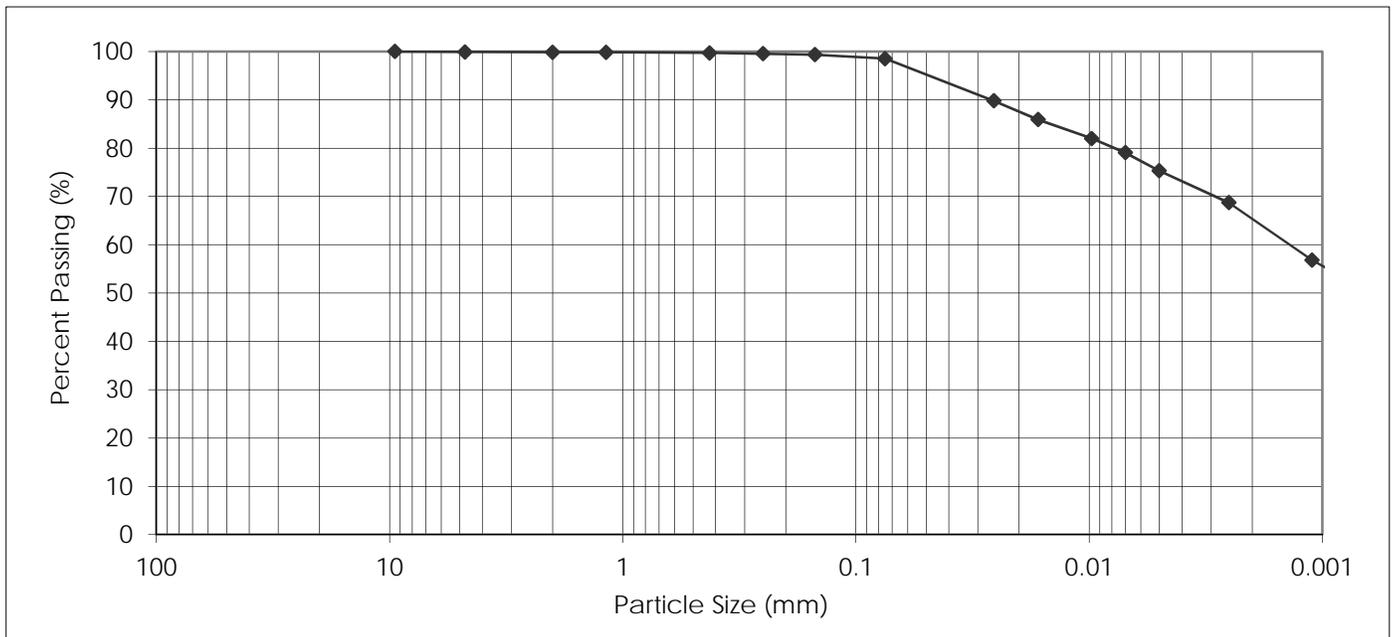
PROJECT: 2014 City of Winnipeg Local Streets
Package Contract 2 (14-R-02)
Aikins Street between Atlantic Avenue
and Machray Avenue

Attention: Craig Rowbotham

PROJECT NO.: 123301336

SAMPLED BY: Sothea Bun
SAMPLE ID: TH5 @ 0.6 m

DATE RECEIVED: February 24, 2014
TESTED BY: Nestor Abarca



PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0
25.00 mm	100.0
19.00 mm	100.0
16.00 mm	100.0
12.50 mm	100.0
9.50 mm	100.0
4.75 mm	99.9
2.00 mm	99.9

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.8
0.425 mm	99.7
0.250 mm	99.5
0.150 mm	99.4
0.075 mm	98.5
0.005 mm	75.3
0.002 mm	64.4
0.001 mm	55.5

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.1	0.0	0.2	1.2	34.1	64.4	55.5

February 26, 2014

REVIEWED BY: German E. Leal, B.Sc., P. Eng.