

# **APPENDIX 'A'**

# **GEOTECHNICAL REPORT**

## APPENDIX 'A' – GEOTECHNICAL REPORT

2014 CITY OF WINNIPEG ALLEY  
PACKAGE CONTRACT 1  
(14-RL-01)

### 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

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 ALLEY  
PACKAGE CONTRACT 1  
(14-RL-01)**

**FULHAM AVENUE AND  
ACADEMY ROAD ALLEY  
BETWEEN KENASTON  
BOULEVARD AND LOCKWOOD  
STREET**

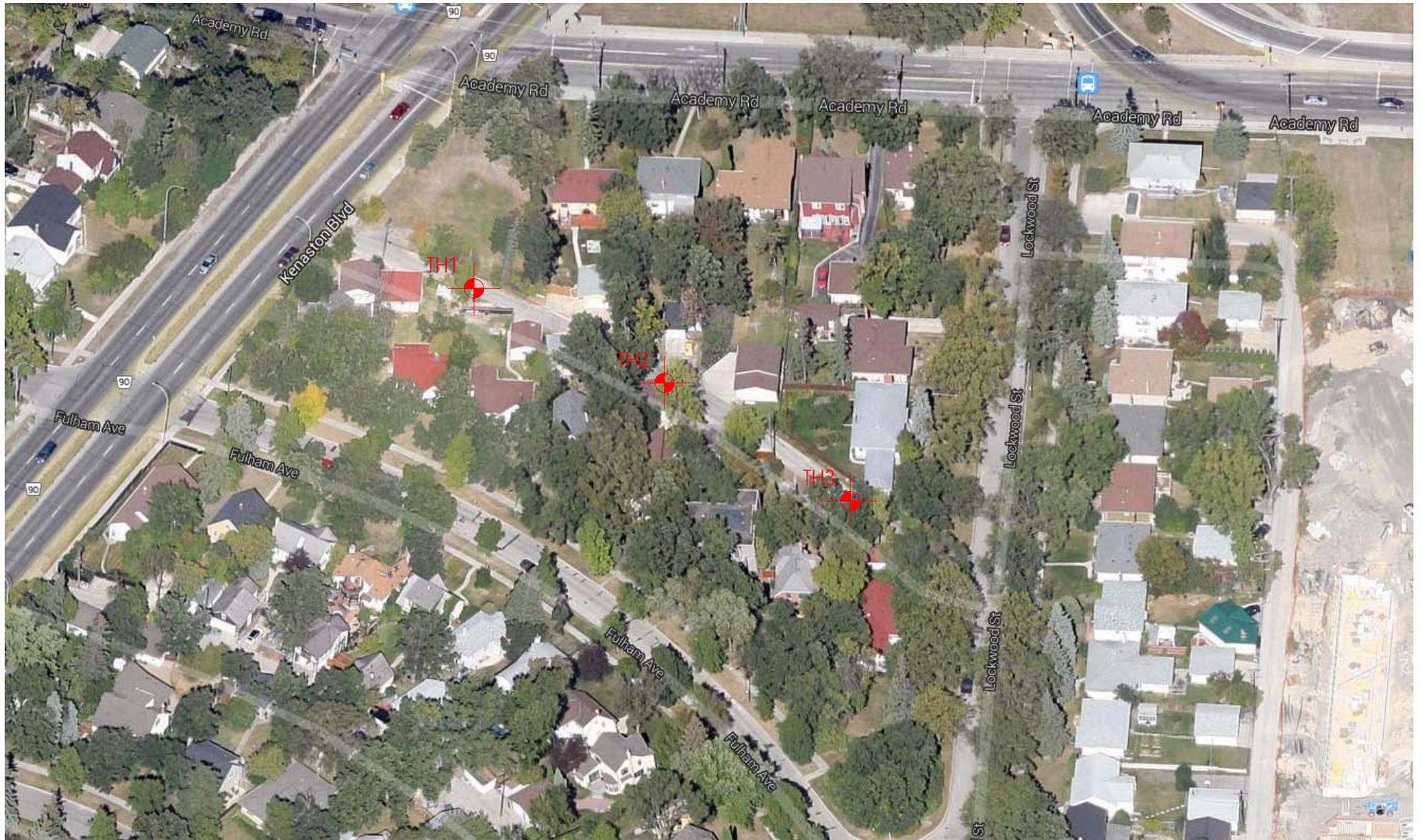
**GEOTECHNICAL INVESTIGATION**



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R3T 5P4

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199 Henlow Bay  
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R3Y 1G4

February 20, 2014  
Project No. 123301329



Project No. 123301329

Drawn by: NB

Figure: 1

Testhole Location Plan  
2014 City of Winnipeg Alley Package  
Contract 1 (14-RL-01)  
Fulham Ave & Academy Rd Alley between  
Kenaston Blvd & Lockwood St

Date: Feb 13, 2014

Reviewed by: GL

Scale: NTS

**TABLE 1**  
**2014 CITY OF WINNIPEG ALLEY PACKAGE CONTRACT 1 (14-RL-01)**  
**FULHAM AVENUE AND ACADEMY ROAD ALLEY BETWEEN KENASTON BOULEVARD AND LOCKWOOD 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 629084 m East, 5526168 m North	Concrete	165	-	-	-	-	-	-	-	-	-	-	-	-
TH2	UTM Coordinates: 14U 629120 m East, 5526145 m North	Asphalt	35	Granular Fill	115	Clay Fill	0.9	29	5.8	18.5	32.5	43.2	59	20	39
		Concrete	165												
TH3	UTM Coordinates: 14U 629156 m East, 5526113 m North	Asphalt	220	-	-	Silty Clay	0.6	41	0.2	2.1	32.5	65.2	83	27	56

# TESTHOLE TH1



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Fulham and Academy Alley from Kenaston to Lockwood  
**Client:** KGS Group  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 629084.0 m E, 5526168.0 m N

**Date Drilled:** January 20, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
		<b>Concrete</b>					
		<b>Clay Fill</b> - brown, firm, moist, high plasticity - some sand - trace fine gravel	BS		●37		
			BS		●42		
0.5		<b>Silty Clay</b> - brown, firm, moist, high plasticity					
			BS		●33		
			BS		●33		
1.0							
		<b>Clay</b> - brown, stiff, moist, high plasticity					
			BS		●37		
1.5			BS		●37		
			BS		●38		
2.0			BS		●41		

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

# TESTHOLE TH2



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Fulham and Academy Alley from Kenaston to Lockwood  
**Client:** KGS Group  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 629120.0 m E, 5526145.0 m N

**Date Drilled:** January 20, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				● Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
		Asphalt							
		Concrete							
		Granular Fill - 20 mm maximum size aggregate							
0.5		Clay Fill - brown, stiff, moist, high plasticity - some sand - trace fine gravel	BS						●26
			BS						●24
			BS						●36
1.0			BS	5.8	18.5	32.5	43.2		●29
1.5		Clay - brown, stiff, moist, high plasticity	BS						●38
			BS						●44
			BS						●36
2.0			BS						●43

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

# TESTHOLE TH3



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Fulham and Academy Alley from Kenaston to Lockwood  
**Client:** KGS Group  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 629156.0 m E, 5526113.0 m N

**Date Drilled:** January 20, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				● Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
		<b>Concrete</b>							
		<b>Clay Fill</b> - brown, firm, moist, high plasticity - some sand - trace fine gravel	BS					●26	
0.5			BS					●37	
		<b>Silty Clay</b> - brown, stiff, moist, high plasticity	BS	0.2	2.1	32.5	65.2	●41	
1.0			BS					●36	
		<b>Clay</b> - brown, stiff, moist, high plasticity	BS					●36	
1.5			BS					●44	
			BS					●43	
2.0			BS					●45	

- The soil was frozen to a depth of 1.2 m.
- No groundwater or soil sloughing was observed during or upon completion of drilling.
- Testhole terminate 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  
3rd Floor - 865 Waverley Street  
Winnipeg, MB  
R3T 5P4

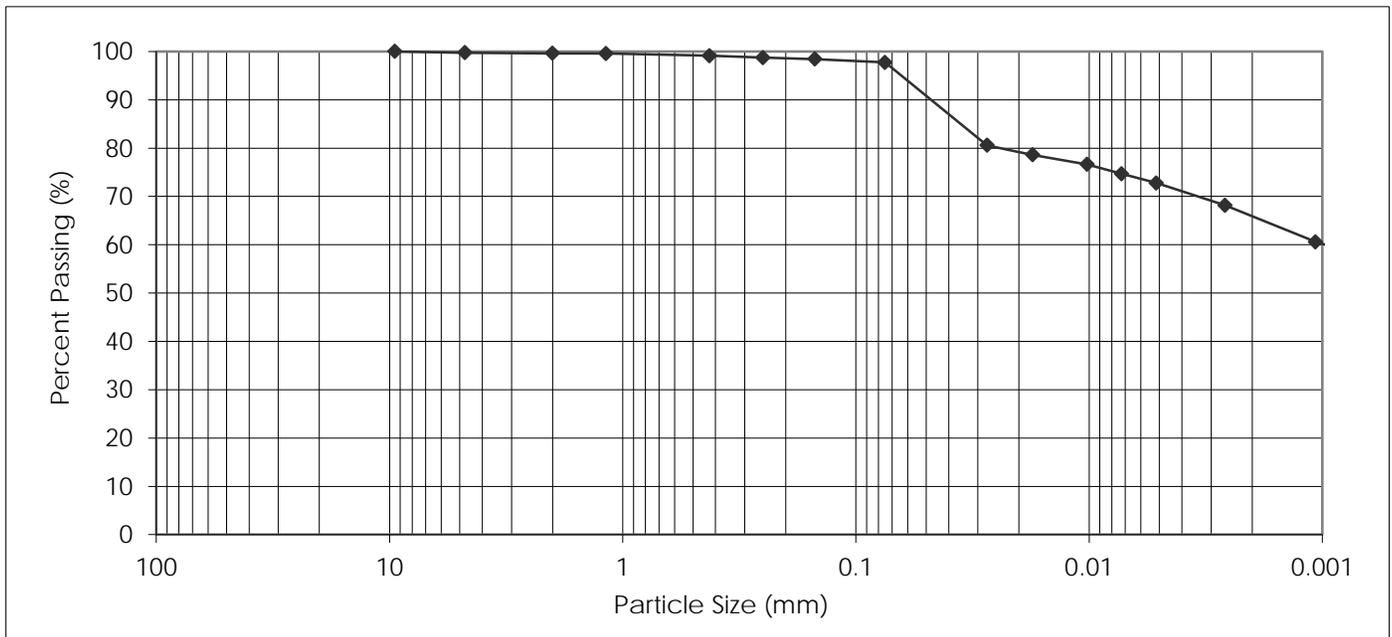
PROJECT: 2014 City of Winnipeg Alley Package  
Contract 1 (14-RL-01)  
Fulham Ave & Academy Rd Alley  
between Kenaston Blvd & Lockwood St

Attention: Craig Rowbotham

PROJECT NO.: 123301329

SAMPLED BY: Nestor Abarca  
SAMPLE ID: TH3 at 2'

DATE RECEIVED: January 20, 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	99.8
2.00 mm	99.6

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.6
0.425 mm	99.1
0.250 mm	98.7
0.150 mm	98.4
0.075 mm	97.7
0.005 mm	72.5
0.002 mm	65.2
0.001 mm	60.1

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	0.2	0.5	1.4	32.5	65.2	60.1

February 13, 2014

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



# PARTICLE SIZE ANALYSIS ASTM D422

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

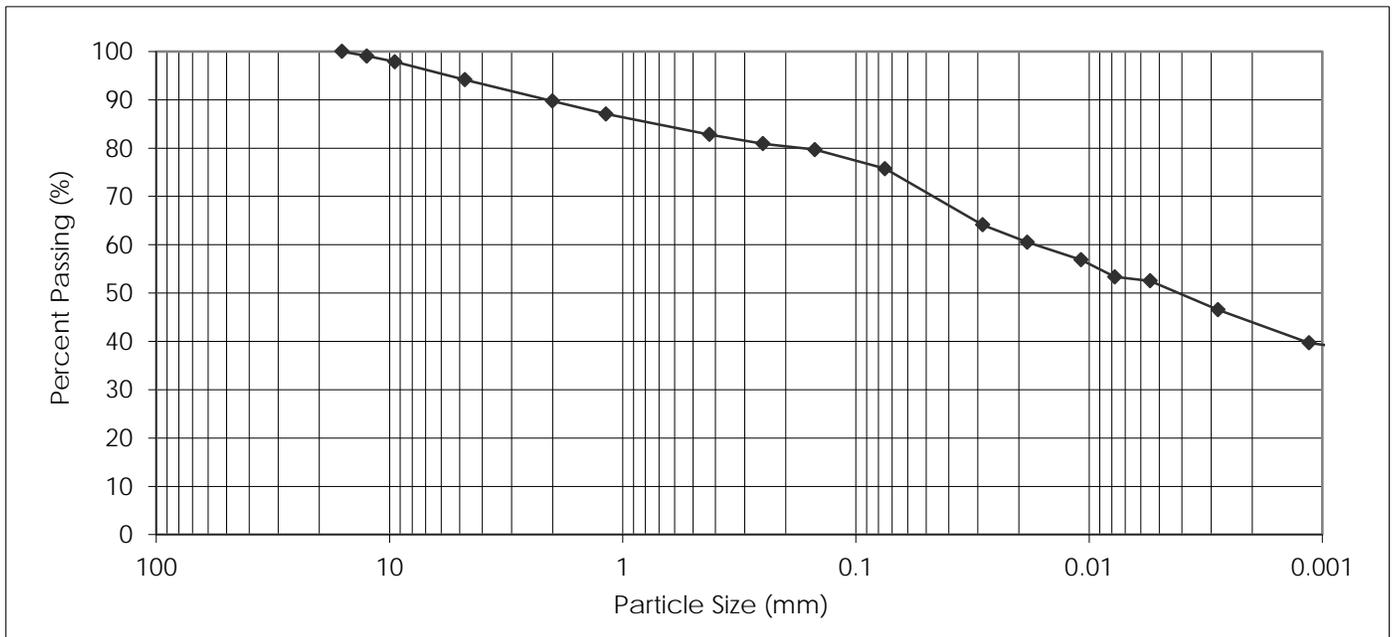
PROJECT: 2014 City of Winnipeg Alley Package  
Contract 1 (14-RL-01)  
Fulham Ave & Academy Rd Alley  
between Kenaston Blvd & Lockwood St

Attention: Craig Rowbotham

PROJECT NO.: 123301329

SAMPLED BY: Nestor Abarca  
SAMPLE ID: TH2 at 3'

DATE RECEIVED: January 20, 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	99.1
9.50 mm	97.9
4.75 mm	94.2
2.00 mm	89.7

PARTICLE SIZE	PERCENT PASSING
1.18 mm	87.1
0.425 mm	82.8
0.250 mm	80.9
0.150 mm	79.7
0.075 mm	75.7
0.005 mm	51.5
0.002 mm	43.2
0.001 mm	39.3

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			
5.8	4.5	6.9	7.1	32.5	43.2	39.3

February 13, 2014

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

**2014 CITY OF WINNIPEG ALLEY  
PACKAGE CONTRACT 1  
(14-RL-01)**

**LINDSAY STREET AND  
BOREBANK STREET ALLEY  
BETWEEN KINGSWAY AND  
ACADEMY ROAD**

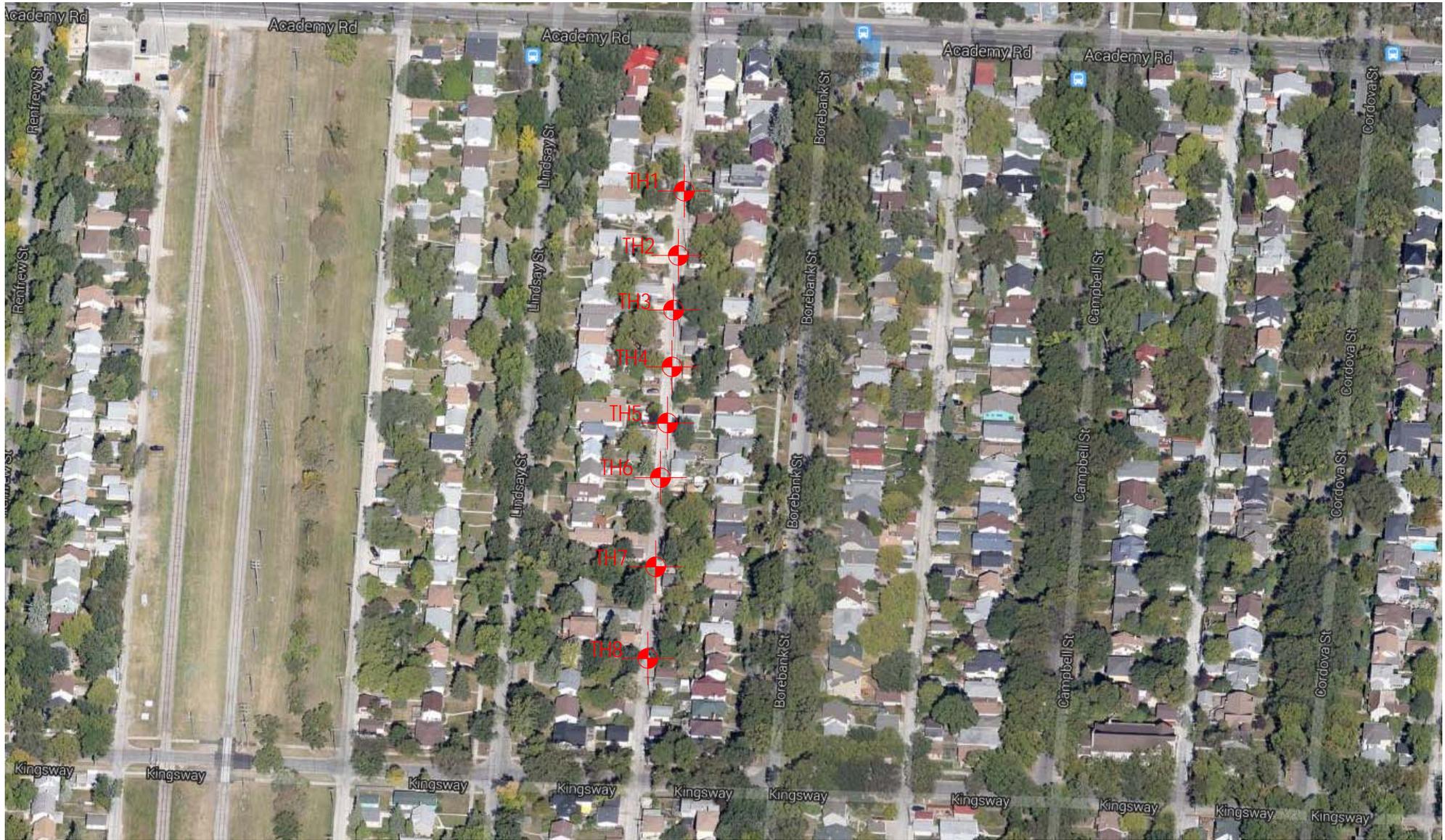
**GEOTECHNICAL INVESTIGATION**



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

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

February 26, 2014  
Project No. 123301329



Project No. 123301329

Drawn by: NB

Figure: 1

**Testhole Location Plan**  
**2014 City of Winnipeg Alley Package**  
**Contract 1 (14-RL-01)**  
**Lindsay St & Borebank St Alley between**  
**Kingsway & Academy Rd**

Date: Feb 19, 2014

Reviewed by: GL

Scale: NTS

**TABLE 1**  
**2014 CITY OF WINNIPEG ALLEY PACKAGE CONTRACT 1 (14-RL-01)**  
**LINDSAY STREET AND BOREBANK STREET ALLEY BETWEEN KINGSWAY AND ACADEMY ROAD**  
**GEO TECHNICAL 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 629883 m East, 5526118 m North	Concrete	240	-	-	-	-	-	-	-	-	-	-	-	-
TH2	UTM Coordinates: 14U 629882 m East, 5526084 m North	Asphalt	80	-	-	Silty Clay	0.9	30	0.1	5.7	36.5	57.7	62	20	42
		Concrete	170												
TH3	UTM Coordinates: 14U 629881 m East, 5526056 m North	Asphalt	15	-	-	Clay Fill	0.6	15	22.6	39.0	21.3	17.1	39	16	23
		Concrete	255												
TH4	UTM Coordinates: 14U 629879 m East, 5526028 m North	Concrete	190	-	-	-	-	-	-	-	-	-	-	-	-
TH5	UTM Coordinates: 14U 629878 m East, 5525999 m North	Concrete	230	-	-	Clayey Silt	0.9	23	0.4	8.4	65.9	25.3	33	16	17
TH6	UTM Coordinates: 14U 629877 m East, 5525971 m North	Asphalt	80	Granular Fill	115	-	-	-	-	-	-	-	-	-	-
		Concrete	110												
TH7	UTM Coordinates: 14U 629877 m East, 5525925 m North	Asphalt	20	Granular Fill	65	-	-	-	-	-	-	-	-	-	-
		Concrete	220												
TH8	UTM Coordinates: 14U 629874 m East, 5525880 m North	Asphalt	20	Granular Fill	820	-	-	-	-	-	-	-	-	-	-
		Concrete	230												

# TESTHOLE TH1



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Lindsay and Borebank Alley from Kingsway to Academy  
**Client:** KGS Group Inc.  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 629883.0 m E, 5526118.0 m N

**Date Drilled:** January 20, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
		<b>Concrete</b>					
0.5		<b>Clay Fill</b> - black, firm, moist, medium plasticity - some fine to coarse sand - some fine gravel	BS		●26		
			BS		●30		
		<b>Silty Clay</b> - grey, firm, moist, high plasticity - trace fine to coarse sand	BS		●30		
1.0		<b>Clay</b> - grey, stiff, moist, high plasticity - some silt - trace fine to coarse sand - brown below 1.7 m	BS		●28		
1.5			BS		●31		
			BS		●34		
2.0			BS		●40		
			BS		●42		

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

# TESTHOLE TH2



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Lindsay and Borebank Alley from Kingsway to Academy  
**Client:** KGS Group Inc.  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 629882.0 m E, 5526084.0 m N

**Date Drilled:** January 20, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				● Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
		<b>Asphalt</b>							
		<b>Concrete</b>							
0.5		<b>Clay Fill</b> - black, firm, moist, medium plasticity - some fine to coarse sand - some fine gravel	BS					●26	
1.0		<b>Silty Clay</b> - grey, firm, moist, high plasticity - trace fine to coarse sand - trace fine gravel	BS					●27	
1.0		<b>Clay</b> - grey, stiff, moist, high plasticity - some silt - trace fine to coarse sand - brown below 1.9 m	BS	0.1	5.7	36.5	57.7	●30	
1.5			BS					●32	
1.5			BS					●34	
2.0			BS					●40	
2.1			BS					●44	

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

# TESTHOLE TH3



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Lindsay and Borebank Alley from Kingsway to Academy  
**Client:** KGS Group Inc.  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 629881.0 m E, 5526056.0 m N

**Date Drilled:** January 20, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

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 - 0.8	[Clay Fill symbol]	<b>Clay Fill</b> - black, firm, moist, medium plasticity - some fine to coarse sand - some fine gravel	BS BS					13	27
0.8 - 1.1	[Clayey Silt symbol]	<b>Clayey Silt</b> - tan, soft, moist, medium plasticity - some fine to coarse sand - trace fine gravel	BS					15	1
1.1 - 1.3	[Silty Clay symbol]	<b>Silty Clay</b> - brown, firm, moist, high plasticity - trace fine to coarse sand	BS					22	
1.3 - 1.6	[Clay symbol]	<b>Clay</b> - grey, stiff, moist, high plasticity - some silt - trace fine to coarse sand - brown below 2.0 m	BS					30	
1.6 - 1.9	[Clay symbol]		BS					41	
1.9 - 2.0	[Clay symbol]		BS					41	
2.0 - 2.1	[Clay symbol]		BS					45	

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

# TESTHOLE TH4



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Lindsay and Borebank Alley from Kingsway to Academy  
**Client:** KGS Group Inc.  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 629879.0 m E, 5526028.0 m N

**Date Drilled:** January 20, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
		<b>Concrete</b>					
		<b>Clay Fill</b> - black, firm, moist, medium plasticity - some fine to coarse sand - some fine gravel	BS		50		
0.5			BS		35		
		<b>Clayey Silt</b> - tan, soft, moist, medium plasticity - trace fine to coarse sand - trace fine gravel	BS		34		
1.0			BS		30		
		<b>Silty Clay</b> - brown, firm, moist, high plasticity - trace fine to coarse sand - trace fine gravel	BS		29		
1.5			BS		36		
		<b>Clay</b> - grey, stiff, moist, high plasticity - some silt - trace fine to coarse sand - brown below 2.0 m	BS		42		
2.0			BS		44		

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

# TESTHOLE TH5



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Lindsay and Borebank Alley from Kingsway to Academy  
**Client:** KGS Group Inc.  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 629878.0 m E, 5525999.0 m N

**Date Drilled:** January 20, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
0.0 - 0.1		<b>Concrete</b>							
0.1 - 0.8		<b>Clay Fill</b> - black, firm, moist, medium plasticity - some fine to coarse sand - some fine gravel	BS						44
0.8 - 1.0		<b>Clayey Silt</b> - tan, soft, moist, medium plasticity - trace fine to coarse sand - trace fine gravel	BS	0.4	8.4	65.9	25.3		2B
1.0 - 1.9		<b>Clay</b> - grey, firm, moist, high plasticity - some silt - trace fine to coarse sand - stiff below 1.6 m - brown below 1.9 m	BS						31
1.9 - 2.1			BS						30
2.1			BS						31
2.1			BS						44

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

# TESTHOLE TH6



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Lindsay and Borebank Alley from Kingsway to Academy  
**Client:** KGS Group Inc.  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 629877.0 m E, 5525971.0 m N

**Date Drilled:** January 20, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
		<b>Asphalt</b>					
		<b>Concrete</b>					
		<b>Granular Fill</b> - 20 mm maximum aggregate size					
0.5		<b>Clay Fill</b> - black, firm, moist, medium plasticity - some fine to coarse sand - some fine gravel	BS		●31		
			BS	●17			
1.0		<b>Clayey Silt</b> - tan, soft, moist, medium plasticity - trace fine to coarse sand - trace fine gravel	BS		●26		
		<b>Silty Clay</b> - brown, firm, moist, high plasticity - some fine to coarse sand - trace fine gravel	BS		●23		
1.5		<b>Clay</b> - grey, stiff, moist, high plasticity - some silt - trace fine to coarse sand - brown below 1.7 m	BS		●33		
2.0			BS		●43		
			BS		●44		

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

# TESTHOLE TH7



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Lindsay and Borebank Alley from Kingsway to Academy  
**Client:** KGS Group Inc.  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 629877.0 m E, 5525925.0 m N

**Date Drilled:** January 20, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
		Asphalt					
		Concrete					
		Granular Fill - 20 mm maximum aggregate size	BS	●17			
		Clay Fill - black, firm, moist, medium plasticity - some fine to coarse sand - some fine gravel	BS	●23			
0.5			BS			●30	
		Silty Clay - brown, firm, moist, high plasticity - trace fine to coarse sand - trace fine gravel	BS			●24	
1.0			BS			●30	
		Clay - grey, stiff, moist, high plasticity - some silt - trace fine to coarse sand - brown below 1.9 m	BS			●37	
1.5			BS			●40	
2.0			BS			●46	

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

# TESTHOLE TH8



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Lindsay and Borebank Alley from Kingsway to Academy  
**Client:** KGS Group Inc.  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 629874.0 m E, 5525880.0 m N

**Date Drilled:** January 20, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
		Asphalt					
		Concrete					
		Granular Fill - 20 mm maximum aggregate size	BS	●10			
0.5			BS	●12			
1.0			BS	●5			
		Clay Fill - black, firm, moist, medium plasticity - some fine to coarse sand - some fine gravel - high organic content (wood chips) below 1.1 m	BS	●20			
1.5			BS	●23			
		Silty Clay - brown, firm, moist, high plasticity - some fine to coarse sand - trace fine gravel	BS	●21			
2.0		Clay - brown, stiff, moist, high plasticity - some silt - trace fine to coarse sand	BS	●32			
<ul style="list-style-type: none"> <li>Hydrocarbon odour detected between a depth of 1.2 m and 1.5 m.</li> <li>The soil was frozen to a depth of 1.2 m.</li> <li>No groundwater or soil sloughing was observed during or upon completion of drilling.</li> <li>Testhole terminate at a depth of 2.1 m.</li> </ul>							



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



Core sample from Testhole TH7



Core sample from Testhole TH8



# PARTICLE SIZE ANALYSIS ASTM D422

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

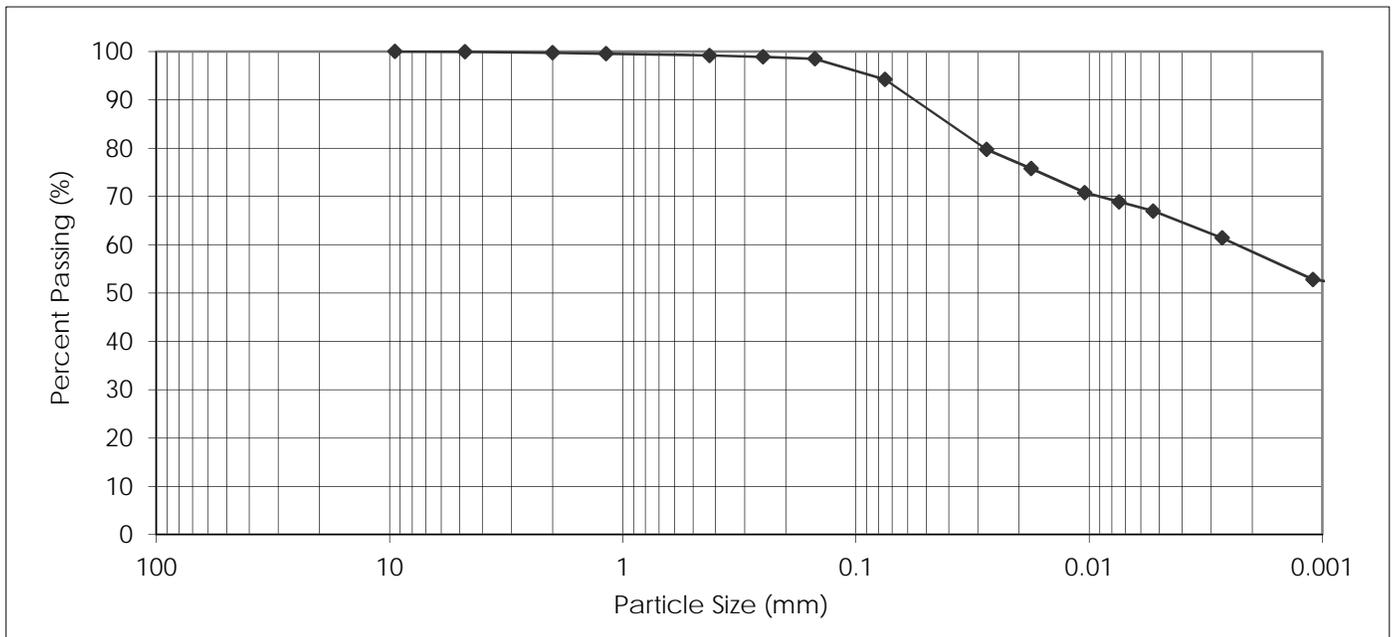
PROJECT: 2014 City of Winnipeg Alley Package  
Contract 1 (14-RL-01)  
Lindsay St & Borebank St Alley  
between Kingsway & Academy Rd

Attention: Craig Rowbotham

PROJECT NO.: 123301329

SAMPLED BY: Nestor Abarca  
SAMPLE ID: TH2 at 3'

DATE RECEIVED: January 20, 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	99.8

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.6
0.425 mm	99.2
0.250 mm	98.9
0.150 mm	98.5
0.075 mm	94.2
0.005 mm	66.3
0.002 mm	57.7
0.001 mm	52.5

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	0.1	0.6	5.0	36.5	57.7	52.5

February 18, 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

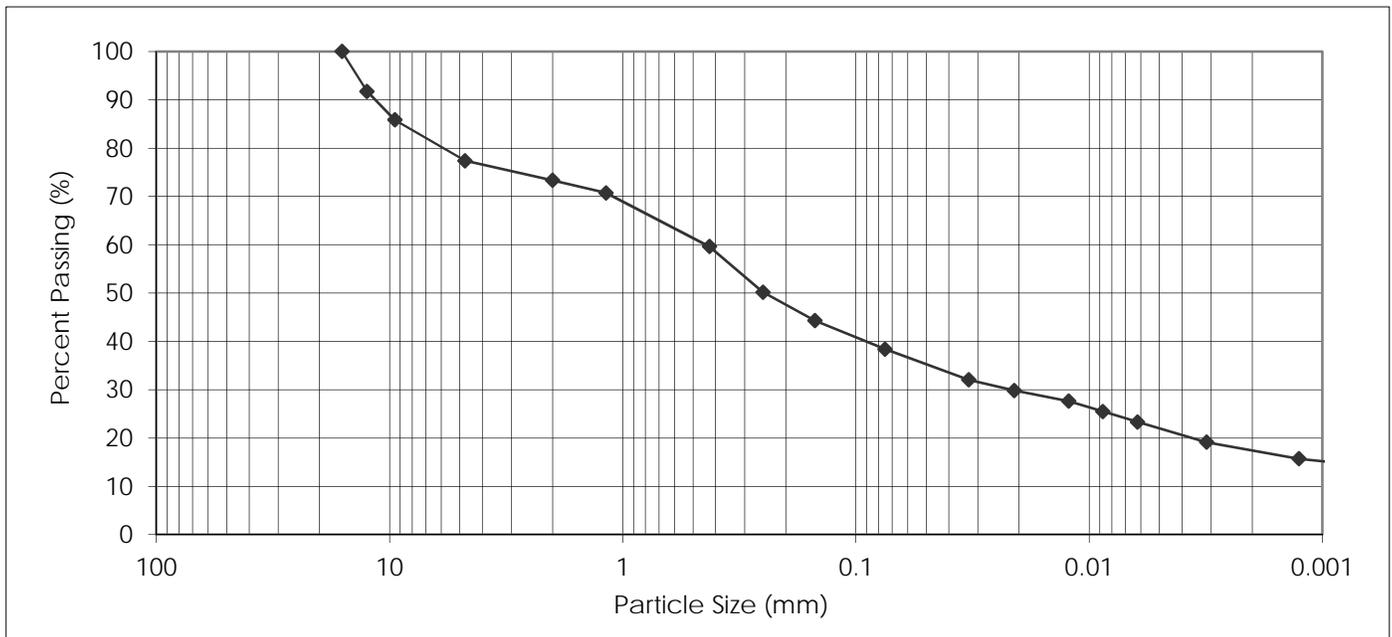
PROJECT: 2014 City of Winnipeg Alley Package  
Contract 1 (14-RL-01)  
Lindsay St & Borebank St Alley  
between Kingsway & Academy Rd

Attention: Craig Rowbotham

PROJECT NO.: 123301329

SAMPLED BY: Nestor Abarca  
SAMPLE ID: TH3 at 2'

DATE RECEIVED: January 20, 2014  
TESTED BY: Sothea Bun



PARTICLE SIZE	PERCENT PASSING	PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0	1.18 mm	70.8
25.00 mm	100.0	0.425 mm	59.6
19.00 mm	100.0	0.250 mm	50.1
16.00 mm	100.0	0.150 mm	44.3
12.50 mm	91.8	0.075 mm	38.4
9.50 mm	85.9	0.005 mm	21.7
4.75 mm	77.4	0.002 mm	17.1
2.00 mm	73.3	0.001 mm	15.2

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			
22.6	4.1	13.7	21.2	21.3	17.1	15.2

February 18, 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

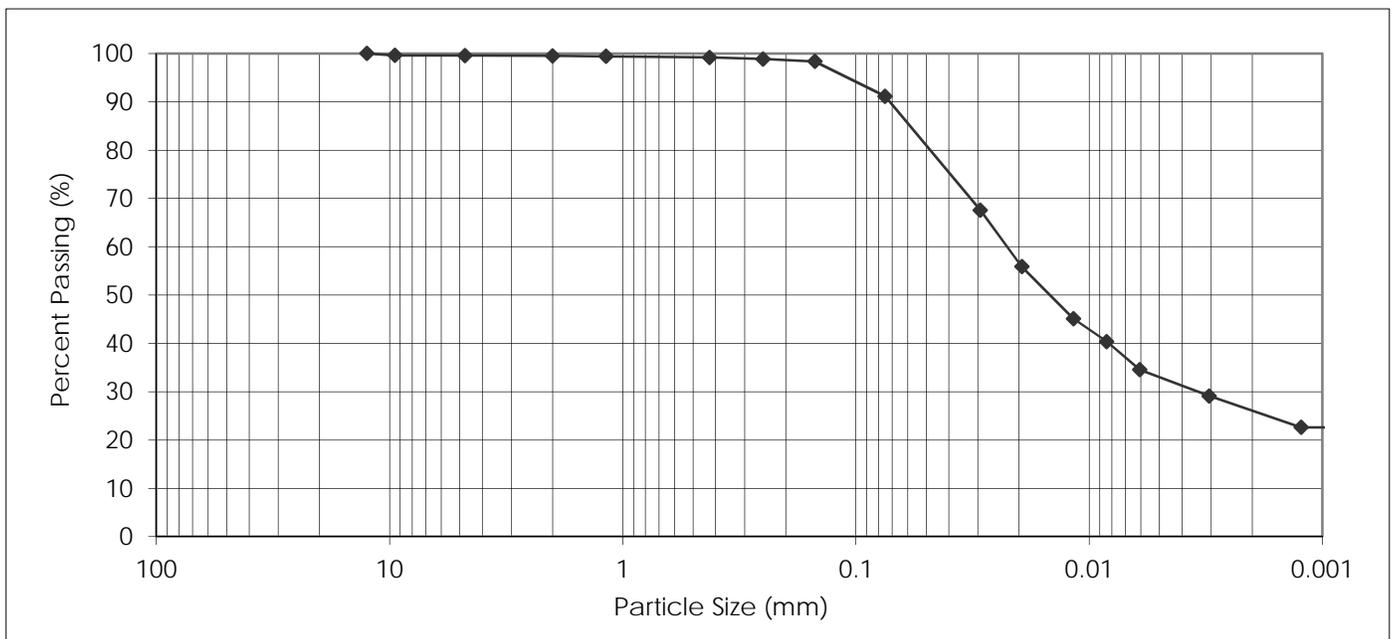
PROJECT: 2014 City of Winnipeg Alley Package  
Contract 1 (14-RL-01)  
Lindsay St & Borebank St Alley  
between Kingsway & Academy Rd

Attention: Craig Rowbotham

PROJECT NO.: 123301329

SAMPLED BY: Nestor Abarca  
SAMPLE ID: TH5 at 3'

DATE RECEIVED: January 20, 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	99.6
4.75 mm	99.6
2.00 mm	99.5

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.4
0.425 mm	99.2
0.250 mm	98.9
0.150 mm	98.4
0.075 mm	91.2
0.005 mm	32.6
0.002 mm	25.3
0.001 mm	22.6

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	0.1	0.3	8.0	65.9	25.3	22.6

February 18, 2014

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

**2014 CITY OF WINNIPEG ALLEY  
PACKAGE CONTRACT 1  
(14-RL-01)**

**ELM STREET AND MONTROSE  
STREET ALLEY BETWEEN  
GROSVENOR AVENUE AND  
KINGSWAY**

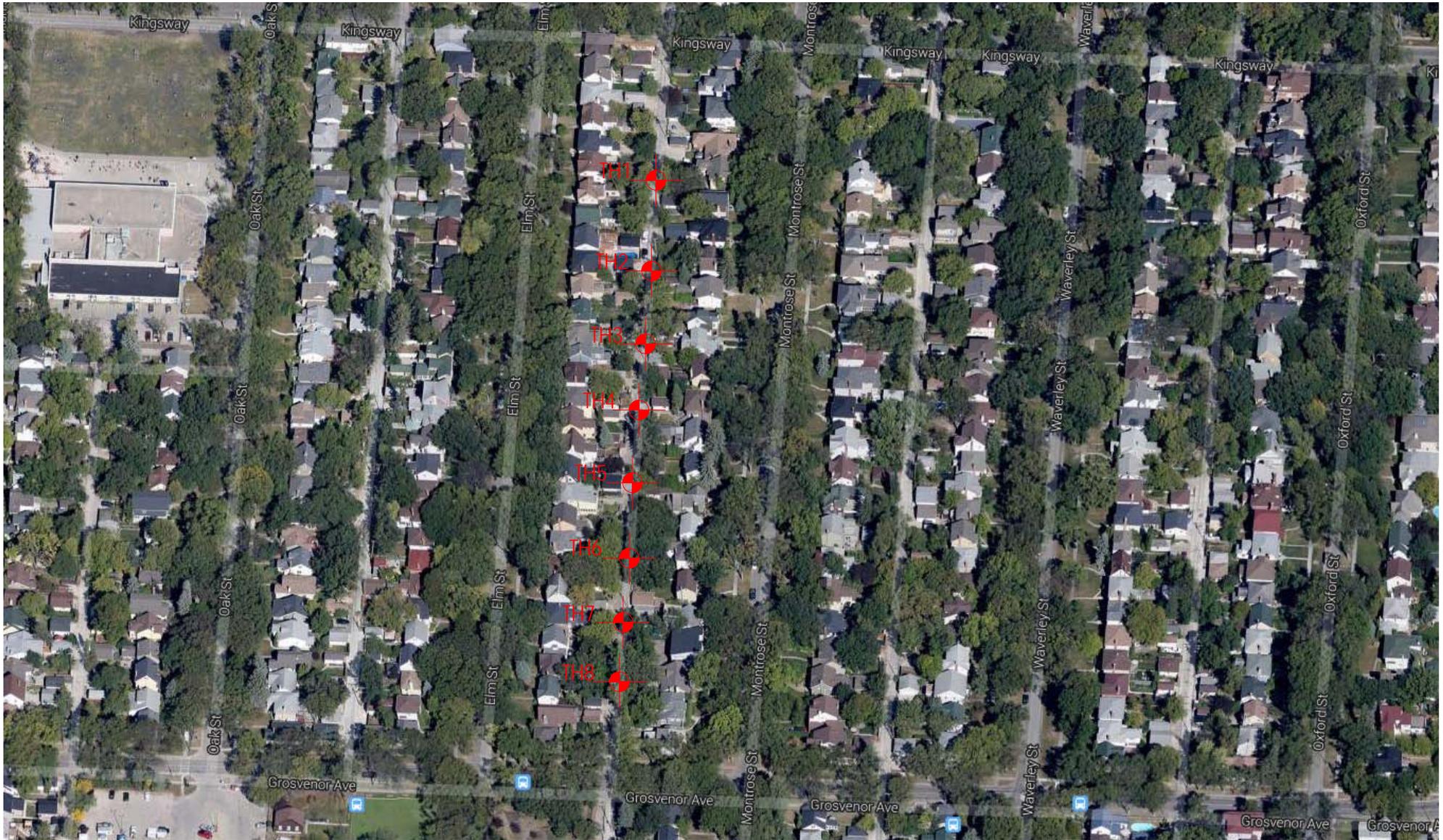
**GEOTECHNICAL INVESTIGATION**



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

February 20, 2014  
Project No. 123301329



Project No. 123301329

Drawn by: NB

Figure: 1

Date: Feb 14, 2014

Reviewed by: GL

Scale: NTS

**Testhole Location Plan**  
**2014 City of Winnipeg Alley Package**  
**Contract 1 (14-RL-01)**  
**Elm St & Montrose St Alley between**  
**Grosvenor Ave & Kingsway**

**TABLE 1**  
**2014 CITY OF WINNIPEG ALLEY PACKAGE CONTRACT 1 (14-RL-01)**  
**ELM STREET AND MONTROSE STREET ALLEY BETWEEN GROSVENOR AVENUE AND KINGSWAY**  
**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 630830 m East, 5525708 m North	Concrete	185	-	-	-	-	-	-	-	-	-	-	-	-
TH2	UTM Coordinates: 14U 630829 m East, 5525662 m North	Asphalt	20	-	-	Clay Fill	0.9	34	4.1	45.1	20.4	30.4	50	17	33
		Concrete	200												
TH3	UTM Coordinates: 14U 630825 m East, 5525621 m North	Concrete	185	-	-	-	-	-	-	-	-	-	-	-	-
TH4	UTM Coordinates: 14U 630823 m East, 5525587 m North	Concrete	170	-	-	-	-	-	-	-	-	-	-	-	-
TH5	UTM Coordinates: 14U 630824 m East, 5525552 m North	Concrete	160	-	-	Clay	0.9	36	0.2	4.2	17.5	78.1	78	24	54
TH6	UTM Coordinates: 14U 630823 m East, 5525514 m North	Asphalt	50	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	190												
TH7	UTM Coordinates: 14U 630823 m East, 5525478 m North	Asphalt	60	-	-	Clayey Silt	0.9	32	0.5	10.8	56.8	31.9	36	15	21
		Concrete	180												
TH8	UTM Coordinates: 14U 630821 m East, 5525446 m North	Concrete	195	-	-	-	-	-	-	-	-	-	-	-	-

# TESTHOLE TH1



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Elm and Montrose Alley from Grosvenor to Kingsway  
**Client:** KGS Group  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 630830.0 m E, 5525708.0 m N

**Date Drilled:** January 23, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

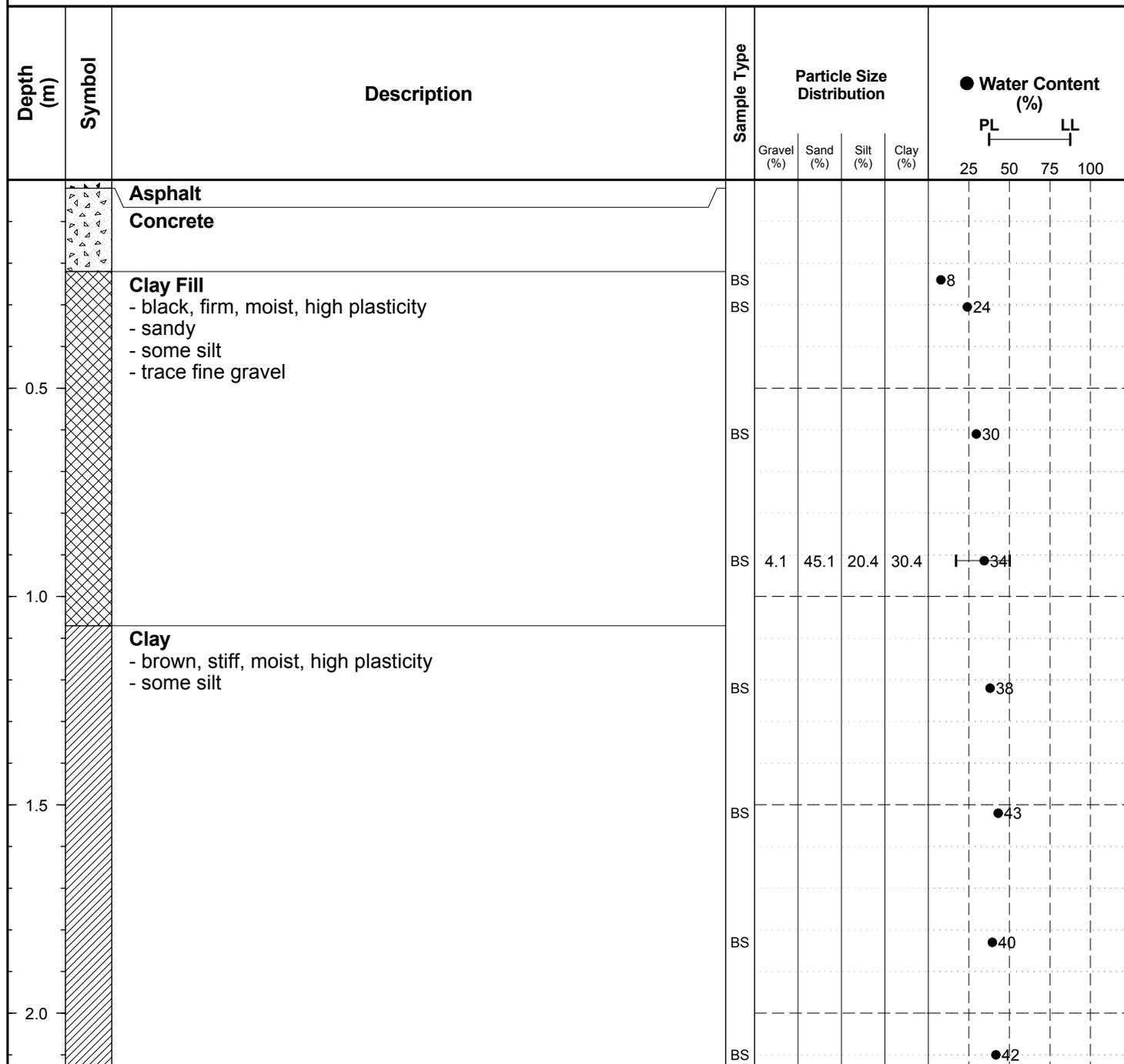
Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
		<b>Concrete</b>					
0.5		<b>Clay Fill</b> - black, firm, moist, high plasticity - sandy - some silt - trace fine gravel	BS		●36		
			BS		●36		
1.0			BS		●34		
1.5		<b>Clay</b> - brown, stiff, moist, high plasticity - some silt	BS		●33		
			BS		●33		
2.0		<b>Silty Clay</b> - brown, firm, moist, high plasticity	BS		●37		
			BS		●39		
<ul style="list-style-type: none"> <li>• The soil was frozen to a depth of 1.2 m.</li> <li>• No groundwater or soil sloughing was observed during or upon completion of drilling.</li> <li>• Testhole terminate at a depth of 2.1 m.</li> </ul>							

# TESTHOLE TH2



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Elm and Montrose Alley from Grosvenor to Kingsway  
**Client:** KGS Group  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 630829.0 m E, 5525662.0 m N

**Date Drilled:** January 23, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal



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

# TESTHOLE TH3



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Elm and Montrose Alley from Grosvenor to Kingsway  
**Client:** KGS Group  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 630825.0 m E, 5525621.0 m N

**Date Drilled:** January 23, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
0.0 - 0.1		<b>Concrete</b>					
0.1 - 1.3		<b>Clay Fill</b> - black, firm, moist, high plasticity - sandy - some silt - trace fine gravel	BS	●17			
			BS	●16			
			BS	●33			
			BS	●39			
1.3 - 2.1		<b>Clay</b> - brown, stiff, moist, high plasticity - some silt	BS	●35			
			BS	●38			
			BS	●40			

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

# TESTHOLE TH4



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Elm and Montrose Alley from Grosvenor to Kingsway  
**Client:** KGS Group  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 630823.0 m E, 5525587.0 m N

**Date Drilled:** January 23, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
0.0 - 0.1		<b>Concrete</b>					
0.1 - 1.1		<b>Clay Fill</b> - black, firm, moist, high plasticity - sandy - some silt - trace fine gravel	BS	●12			
0.5			BS		●36		
1.0			BS		●31		
1.1 - 2.1		<b>Clay</b> - brown, stiff, moist, high plasticity - some silt	BS		●35		
1.5			BS		●36		
2.0			BS		●39		
2.1			BS		●41		

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

# TESTHOLE TH5



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Elm and Montrose Alley from Grosvenor to Kingsway  
**Client:** KGS Group  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 630824.0 m E, 5525552.0 m N

**Date Drilled:** January 23, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				● Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
		<b>Concrete</b>							
		<b>Clay Fill</b> - black, firm, moist, high plasticity - sandy - some silt - trace fine gravel	BS						45
			BS						35
0.5			BS						44
		<b>Clay</b> - brown, firm, moist, high plasticity - some silt - stiff below 1.1 m	BS	0.2	4.2	17.5	78.1		36
1.0			BS						34
1.5			BS						47
2.0			BS						40
			BS						44

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

# TESTHOLE TH6



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Elm and Montrose Alley from Grosvenor to Kingsway  
**Client:** KGS Group  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 630823.0 m E, 5525514.0 m N

**Date Drilled:** January 23, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
		<b>Asphalt</b>					
		<b>Concrete</b>					
0.5		<b>Clay Fill</b> - black, firm, moist, high plasticity - sandy - some silt - trace fine gravel - brown below 0.8 m	BS	●21			
			BS	●13			
1.0			BS	●11			
			BS	●17			
1.5		<b>Clay</b> - brown, stiff, moist, high plasticity - some silt	BS	●34			
			BS	●35			
2.0			BS	●37			

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

# TESTHOLE TH7



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Elm and Montrose Alley from Grosvenor to Kingsway  
**Client:** KGS Group  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 630823.0 m E, 5525478.0 m N

**Date Drilled:** January 23, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				● Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
		Asphalt							
		Concrete							
0.5		<b>Clay Fill</b> - brown, firm, moist, high plasticity - sandy - some silt - trace fine gravel	BS					●30	
			BS					●33	
1.0		<b>Clayey Silt</b> - tan, firm, moist, medium plasticity - trace sand	BS	0.5	10.8	56.8	31.9	—●B2	
			BS					●22	
1.5		<b>Clay</b> - brown, stiff, moist, high plasticity - some silt	BS					●43	
			BS					●38	
2.0			BS					●43	

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

# TESTHOLE TH8



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Elm and Montrose Alley from Grosvenor to Kingsway  
**Client:** KGS Group  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 630821.0 m E, 5525446.0 m N

**Date Drilled:** January 23, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
		<b>Concrete</b>					
0.5		<b>Clay Fill</b> - brown, firm, moist, high plasticity - sandy - some silt - trace fine gravel	BS	●27			
			BS	●24			
			BS	●20			
1.0		<b>Clayey Silt</b> - tan, firm, moist, medium plasticity - trace sand	BS	●24			
1.5		<b>Clay</b> - brown, stiff, moist, high plasticity - silty to 1.3 m - some silt below 1.3 m	BS	●23			
			BS	●36			
			BS	●35			
2.0			BS	●43			

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



Core sample from Testhole TH7



Core sample from Testhole TH8



# PARTICLE SIZE ANALYSIS ASTM D422

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

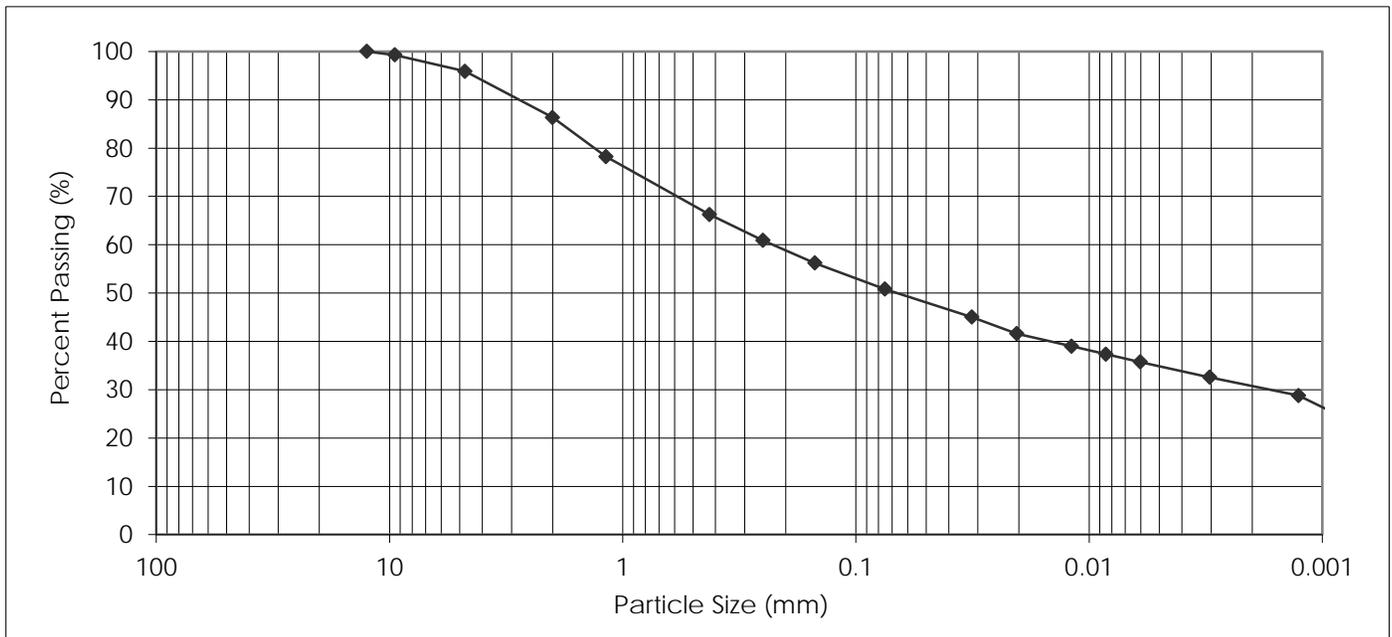
PROJECT: 2014 City of Winnipeg Alley Package  
Contract 1 (14-RL-01)  
Elm St & Montrose St Alley  
between Grosvenor Ave & Kingsway

Attention: Craig Rowbotham

PROJECT NO.: 123301329

SAMPLED BY: Nestor Abarca  
SAMPLE ID: TH2 at 3'

DATE RECEIVED: January 24, 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	99.3
4.75 mm	95.9
2.00 mm	86.3

PARTICLE SIZE	PERCENT PASSING
1.18 mm	78.2
0.425 mm	66.3
0.250 mm	60.9
0.150 mm	56.2
0.075 mm	50.8
0.005 mm	34.6
0.002 mm	30.4
0.001 mm	26.3

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			
4.1	9.6	20.0	15.5	20.4	30.4	26.3

February 14, 2014

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



# PARTICLE SIZE ANALYSIS ASTM D422

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

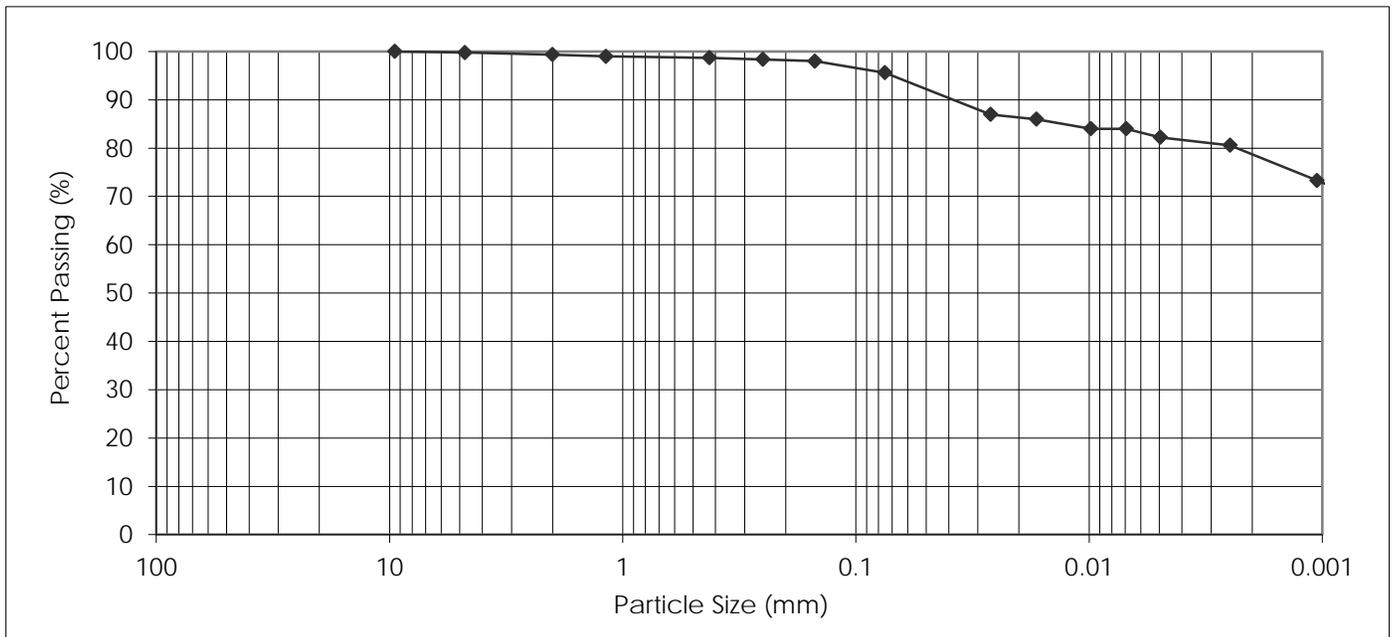
PROJECT: 2014 City of Winnipeg Alley Package  
Contract 1 (14-RL-01)  
Elm St & Montrose St Alley  
between Grosvenor Ave & Kingsway

Attention: Craig Rowbotham

PROJECT NO.: 123301329

SAMPLED BY: Nestor Abarca  
SAMPLE ID: TH5 at 3'

DATE RECEIVED: January 24, 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	99.8
2.00 mm	99.4

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.0
0.425 mm	98.7
0.250 mm	98.4
0.150 mm	98.0
0.075 mm	95.6
0.005 mm	82.3
0.002 mm	78.1
0.001 mm	72.8

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	0.4	0.7	3.1	17.5	78.1	72.8

February 14, 2014

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



# PARTICLE SIZE ANALYSIS ASTM D422

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

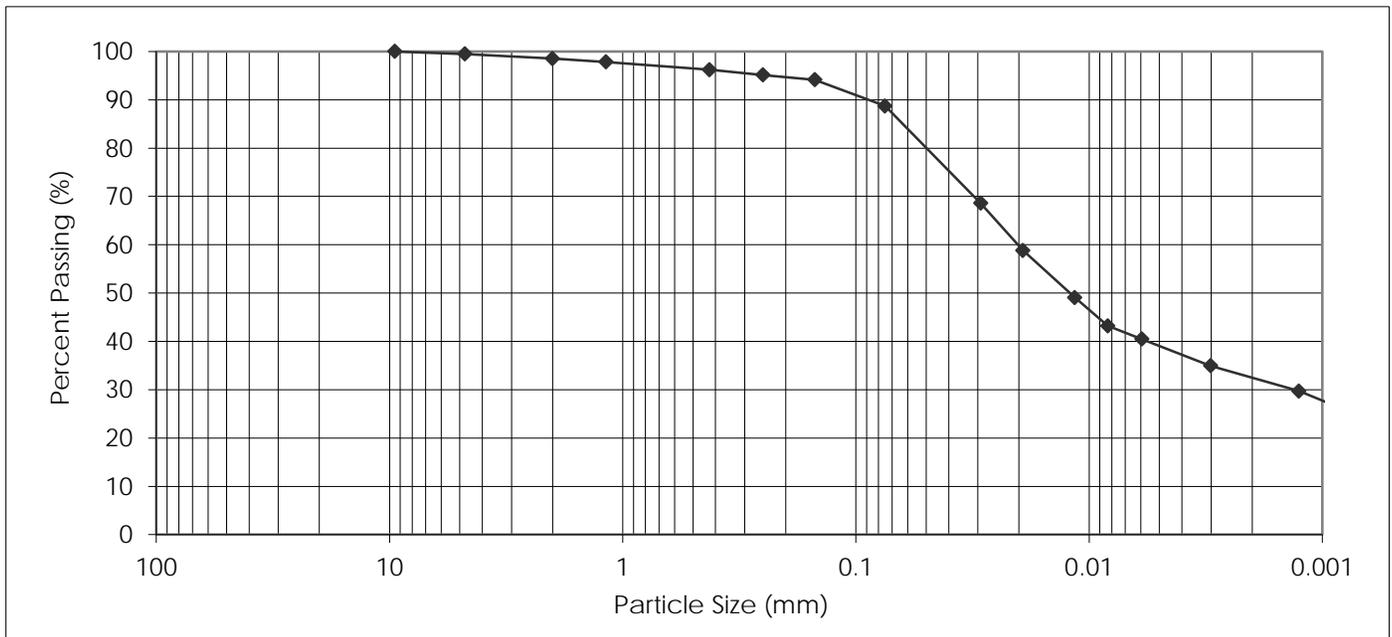
PROJECT: 2014 City of Winnipeg Alley Package  
Contract 1 (14-RL-01)  
Elm St & Montrose St Alley  
between Grosvenor Ave & Kingsway

Attention: Craig Rowbotham

PROJECT NO.: 123301329

SAMPLED BY: Nestor Abarca  
SAMPLE ID: TH7 at 3'

DATE RECEIVED: January 24, 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	99.5
2.00 mm	98.5

PARTICLE SIZE	PERCENT PASSING
1.18 mm	97.9
0.425 mm	96.2
0.250 mm	95.1
0.150 mm	94.1
0.075 mm	88.7
0.005 mm	38.7
0.002 mm	31.9
0.001 mm	27.6

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			
0.5	1.0	2.3	7.5	56.8	31.9	27.6

February 14, 2014

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

**2014 CITY OF WINNIPEG ALLEY  
PACKAGE CONTRACT 1  
(14-RL-01)**

**MCMILLAN AVENUE AND  
DORCHESTER AVENUE ALLEY  
BETWEEN WILTON STREET AND  
GUELPH STREET**

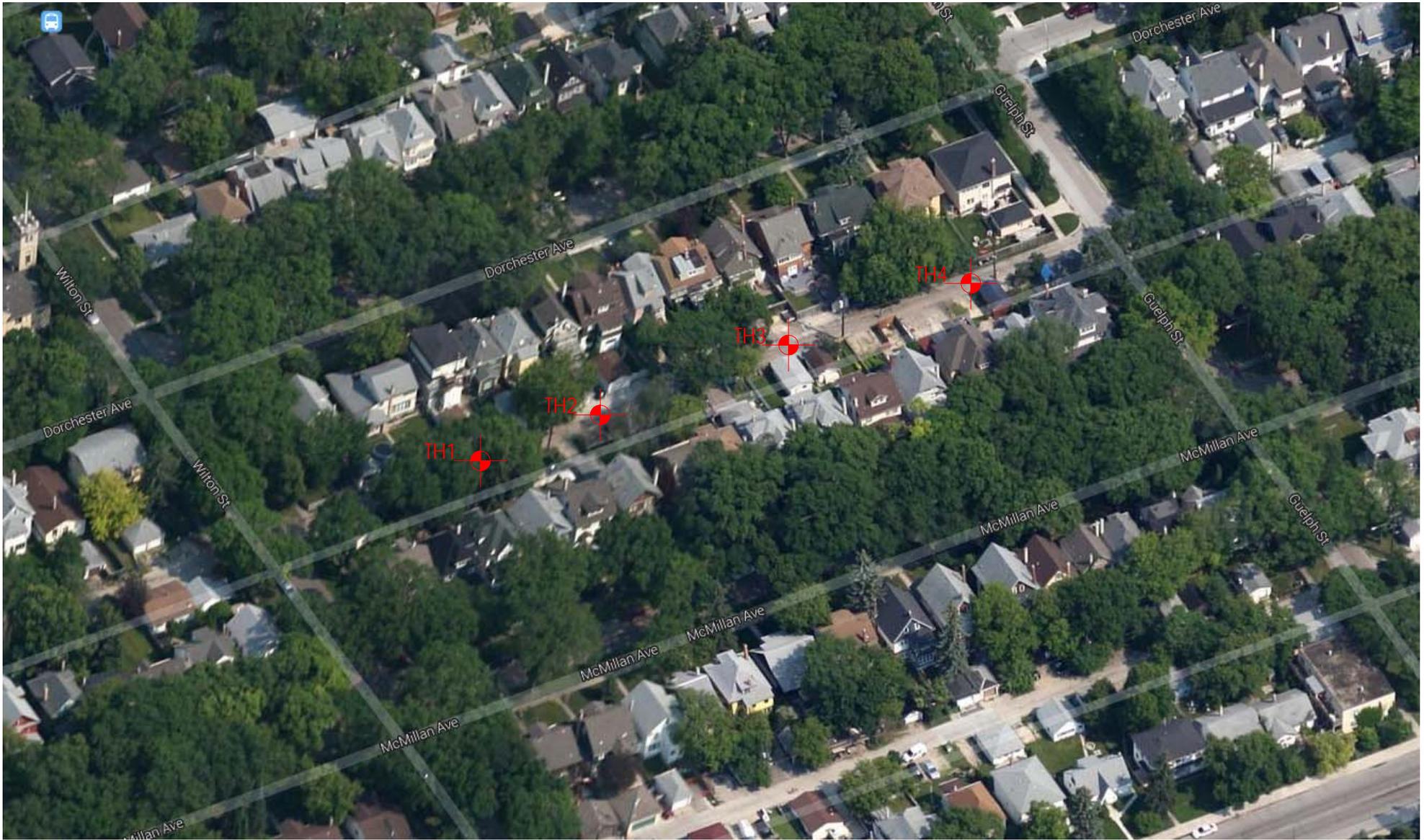
**GEOTECHNICAL INVESTIGATION**



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

February 24, 2014  
Project No. 123301329



Project No. 123301329

Drawn by: NB

Figure: 1

Date: Feb 14, 2014

Reviewed by: GL

Scale: NTS

**Testhole Location Plan**  
**2014 City of Winnipeg Alley Package**  
**Contract 1 (14-RL-01)**  
**McMillan Ave & Dorchester Ave Alley**  
**between Wilton St & Guelph St**

**TABLE 1**  
**2014 CITY OF WINNIPEG ALLEY PACKAGE CONTRACT 1 (14-RL-01)**  
**MCMILLAN AVENUE AND DORCHESTER AVENUE ALLEY BETWEEN WILTON STREET AND GUELPH 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 631634 m East, 5525498 m North	Asphalt	35	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	150	-	-	-	-	-	-	-	-	-	-	-	-
TH2	UTM Coordinates: 14U 631653 m East, 5525508 m North	Asphalt	45	-	-	Clayey Silt	0.9	26	0.0	6.6	66.8	26.6	35	16	19
TH3	UTM Coordinates: 14U 631687 m East, 5525525 m North	Asphalt	30	-	-	Clay Fill	0.9	23	0.2	21.3	48.5	30.0	33	15	17
		Concrete	175	-	-										
TH4	UTM Coordinates: 14U 631719 m East, 5525543 m North	Concrete	160	-	-	-	-	-	-	-	-	-	-	-	-

# TESTHOLE TH1



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** McMillan and Dorchester Alley from Wilton to Guelph  
**Client:** KGS Group Inc.  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 631634.0 m E, 5525498.0 m N

**Date Drilled:** January 23, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
0.0 - 0.1		Asphalt					
0.1 - 0.2		Concrete					
0.2 - 1.2		<b>Clay Fill</b> - brown, firm, moist, medium plasticity - some silt - some fine to coarse sand - trace fine gravel	BS	●10			
			BS		●27		
0.5			BS			●31	
1.0			BS	●12			
1.5			BS			●31	
2.0			BS			●35	
			BS			●40	
			BS			●40	

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

# TESTHOLE TH2



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** McMillan and Dorchester Alley from Wilton to Guelph  
**Client:** KGS Group Inc.  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 631653.0 m E, 5525508.0 m N

**Date Drilled:** January 23, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				● Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
0.0 - 0.1		<b>Asphalt</b>	BS						● 18
0.1 - 1.2		<b>Clay Fill</b> - brown, firm, moist, medium plasticity - some silt - some fine to coarse sand - trace fine gravel	BS						● 29
0.5			BS						● 34
1.0			BS	0.0	6.6	66.8	26.6		● 26
1.5			BS						● 28
1.5 - 2.1		<b>Clay</b> - brown, firm, moist, high plasticity - trace silt	BS						● 31
2.0			BS						● 30
2.1			BS						● 41

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

# TESTHOLE TH3



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** McMillan and Dorchester Alley from Wilton to Guelph  
**Client:** KGS Group Inc.  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 631687.0 m E, 5525525.0 m N

**Date Drilled:** January 23, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**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							
		- brown, firm, moist, medium plasticity	BS						●29
		- silty	BS						●27
		- some fine to coarse sand							
		- trace fine gravel							
		- firm below 0.8 m							
0.5			BS						●25
			BS	0.2	21.3	48.5	30.0		●2B
1.0									
		Clay							
		- brown, firm, moist, high plasticity	BS						●29
		- trace silt							
1.5			BS						●35
			BS						●38
2.0			BS						●42

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

# TESTHOLE TH4



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** McMillan and Dorchester Alley from Wilton to Guelph  
**Client:** KGS Group Inc.  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 631719.0 m E, 5525543.0 m N

**Date Drilled:** January 23, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
0.0 - 0.1		<b>Concrete</b>					
0.1 - 1.1		<b>Clay Fill</b> - brown, firm, moist, medium plasticity - some silt - some fine to coarse sand - trace fine gravel	BS	●27			
			BS	●36			
			BS	●21			
			BS	●41			
1.1 - 1.7		<b>Clayey Silt</b> - tan, firm, moist, medium plasticity - trace fine to coarse sand	BS	●24			
			BS	●24			
1.7 - 2.1		<b>Clay</b> - brown, stiff, moist, high plasticity - trace silt	BS	●29			
			BS	●40			

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

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

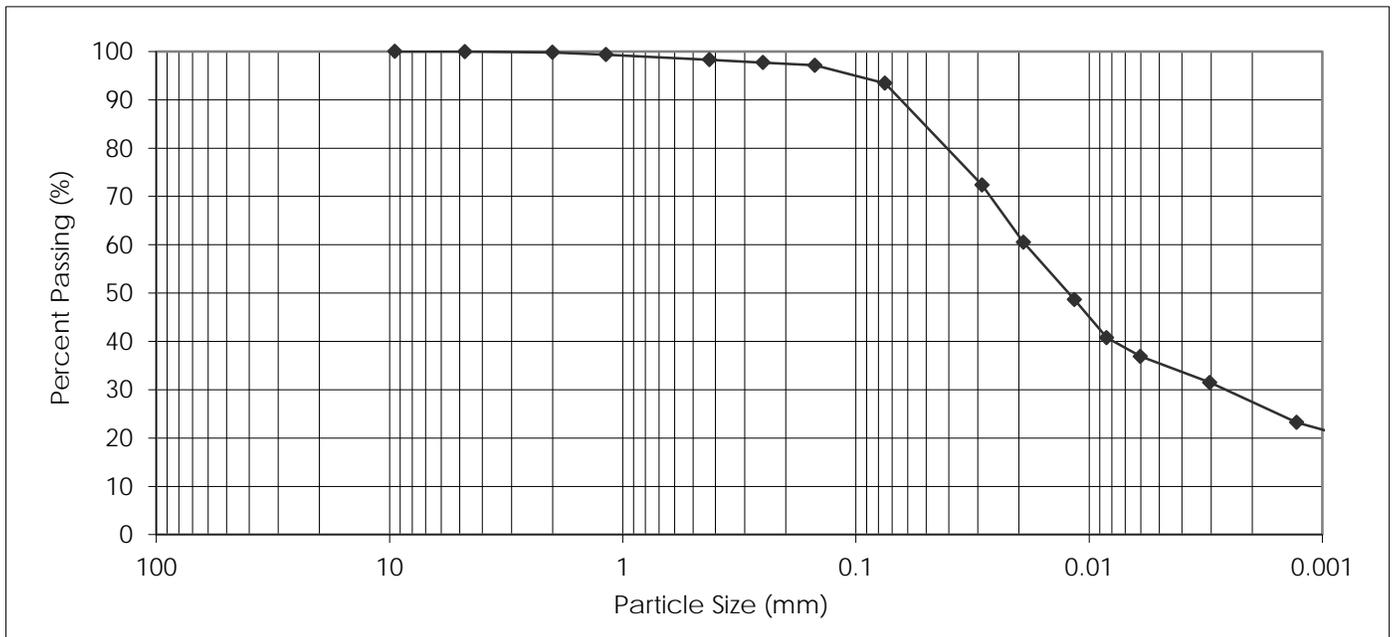
PROJECT: 2014 City of Winnipeg Alley Package  
Contract 1 (14-RL-01)  
McMillan Ave & Dorchester Ave Alley  
between Wilton St & Guelph St

Attention: Craig Rowbotham

PROJECT NO.: 123301329

SAMPLED BY: Nestor Abarca  
SAMPLE ID: TH2 at 3'

DATE RECEIVED: January 24, 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	99.8

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.4
0.425 mm	98.3
0.250 mm	97.7
0.150 mm	97.2
0.075 mm	93.4
0.005 mm	35.1
0.002 mm	26.6
0.001 mm	21.7

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	0.2	1.5	4.9	66.8	26.6	21.7

February 18, 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

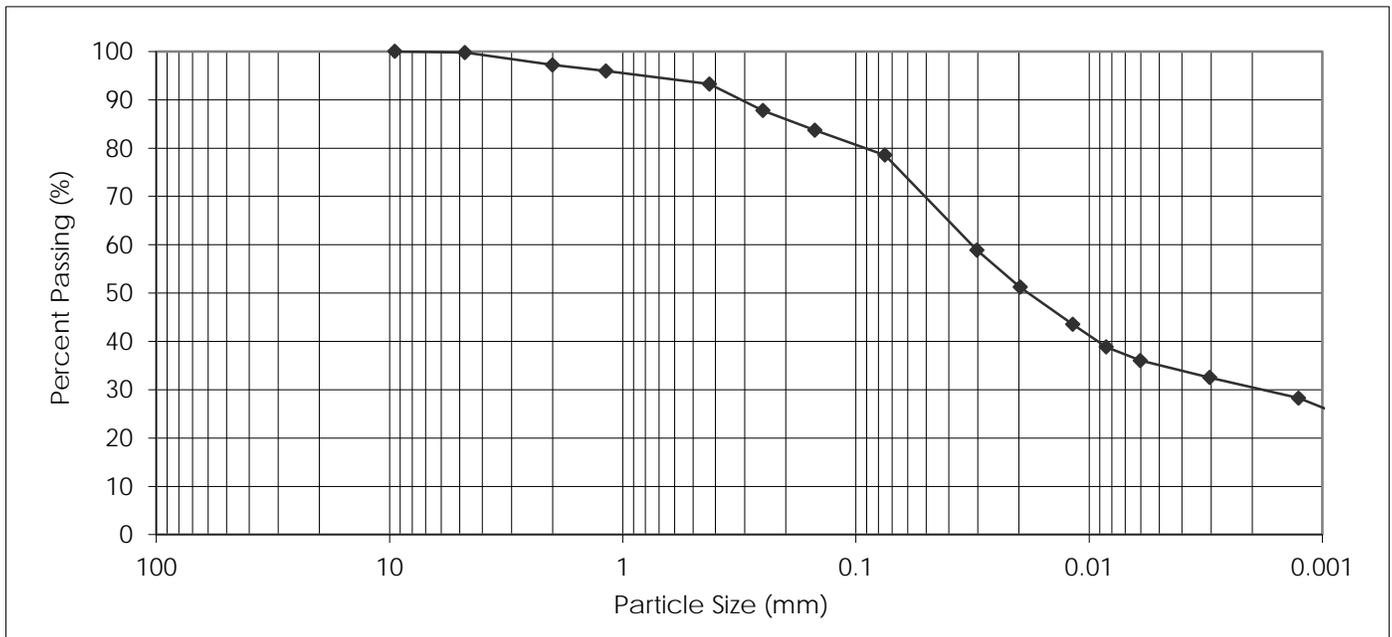
PROJECT: 2014 City of Winnipeg Alley Package  
Contract 1 (14-RL-01)  
McMillan Ave & Dorchester Ave Alley  
between Wilton St & Guelph St

Attention: Craig Rowbotham

PROJECT NO.: 123301329

SAMPLED BY: Nestor Abarca  
SAMPLE ID: TH3 at 3'

DATE RECEIVED: January 24, 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	99.8
2.00 mm	97.2

PARTICLE SIZE	PERCENT PASSING
1.18 mm	96.0
0.425 mm	93.3
0.250 mm	87.8
0.150 mm	83.7
0.075 mm	78.5
0.005 mm	34.8
0.002 mm	30.0
0.001 mm	26.2

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			
0.2	2.6	3.9	14.8	48.5	30.0	26.2

February 18, 2014

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

**2014 CITY OF WINNIPEG ALLEY  
PACKAGE CONTRACT 1  
(14-RL-01)**

**DORCHESTER AVENUE AND  
GROSVENOR AVENUE ALLEY  
BETWEEN STAFFORD STREET  
AND WENTWORTH STREET**

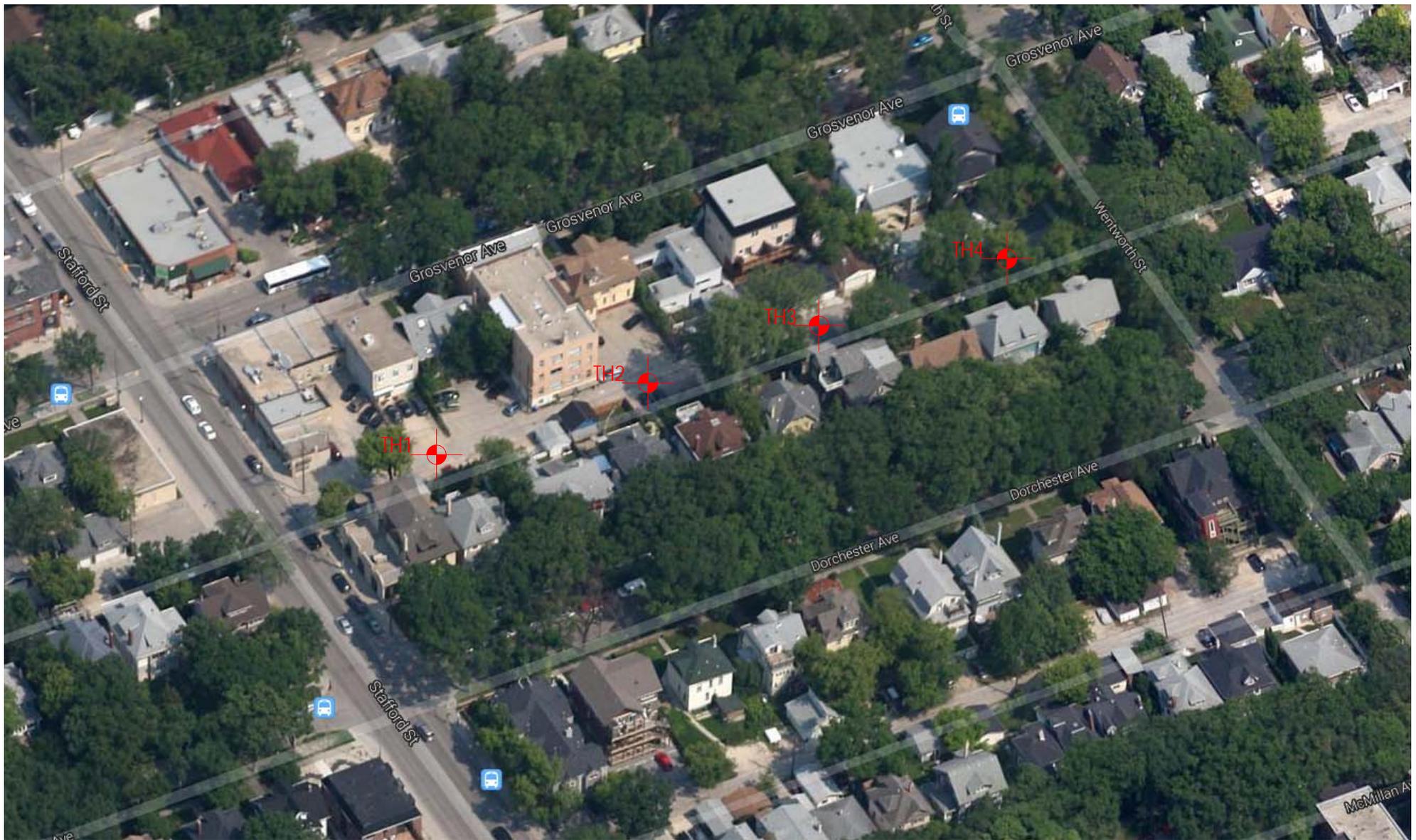
**GEOTECHNICAL INVESTIGATION**



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

February 24, 2014  
Project No. 123301329



Project No. 123301329

Drawn by: NB

Figure: 1

Date: Feb 14, 2014

Reviewed by: GL

Scale: NTS

**Testhole Location Plan**  
**2014 City of Winnipeg Alley Package**  
**Contract 1 (14-RL-01)**  
**Dorchester Ave & Grosvenor Ave Alley**  
**between Stafford St & Wentworth St**

**TABLE 1**  
**2014 CITY OF WINNIPEG ALLEY PACKAGE CONTRACT 1 (14-RL-01)**  
**DORCHESTER AVENUE AND GROSVENOR AVENUE ALLEY BETWEEN STAFFORD STREET AND WENTWORTH STREET**  
**GEOTECHNICAL INVESTIGATION**

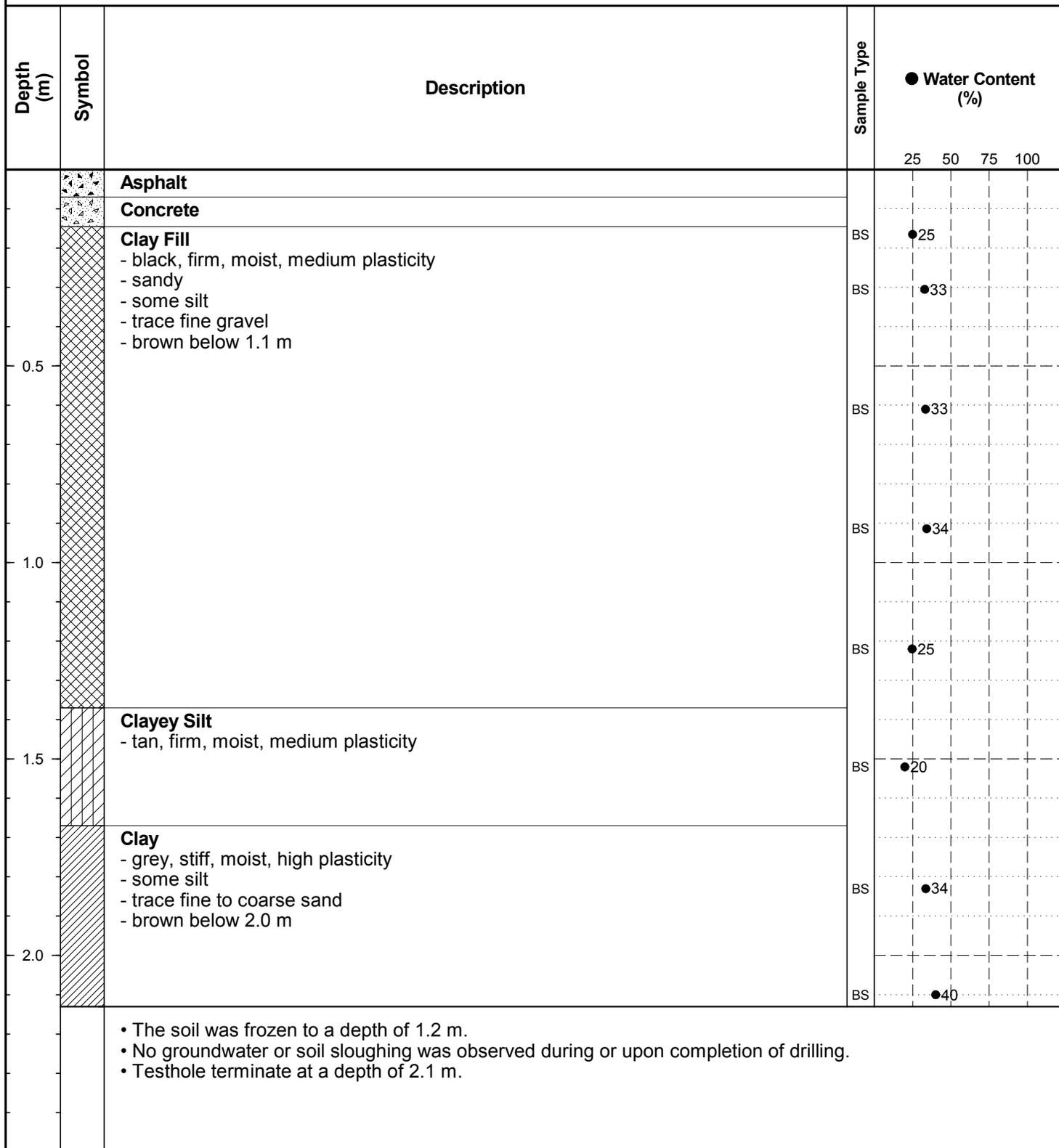
Testhole ID	Testhole Location	Pavement Surface		Pavement Structure Material		Sample Description	Sample Depth (m)	Moisture Content (%)	Particle Size Analysis				Atterberg Limits		
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH1	UTM Coordinates: 14U 632032 m East, 5525827 m North	Asphalt	70	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	75												
TH2	UTM Coordinates: 14U 632068 m East, 5525847 m North	Asphalt	25	-	-	Clay	1.2	32	0.0	2.0	24.5	73.5	73	24	49
		Concrete	140												
TH3	UTM Coordinates: 14U 632099 m East, 5525861 m North	Asphalt	30	-	-	Clay Fill	0.6	26	1.7	49.8	26.5	22.0	37	16	21
		Concrete	160												
TH4	UTM Coordinates: 14U 632135 m East, 5525883 m North	Asphalt	15	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	145												

# TESTHOLE TH1



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Dorchester and Grosvenor Alley from Stafford to Wentworth  
**Client:** KGS Group Inc.  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 632032.0 m E, 5525827.0 m N

**Date Drilled:** January 23, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal



# TESTHOLE TH2



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Dorchester and Grosvenor Alley from Stafford to Wentworth  
**Client:** KGS Group Inc.  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 632068.0 m E, 5525847.0 m N

**Date Drilled:** January 23, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**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, medium plasticity - sandy - some silt - trace fine gravel - brown below 0.8 m	BS					19	
0.5			BS					35	
		Clay - grey, stiff, moist, high plasticity - some silt - trace fine to coarse sand - brown below 2.0 m	BS					28	
1.0			BS	0.0	2.0	24.5	73.5	32	
1.5			BS					30	
			BS					35	
2.0			BS					36	

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

# TESTHOLE TH3



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Dorchester and Grosvenor Alley from Stafford to Wentworth  
**Client:** KGS Group Inc.  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 632099.0 m E, 5525861.0 m N

**Date Drilled:** January 23, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

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 - 1.0	[Clay Fill symbol]	<b>Clay Fill</b> - black, firm, moist, medium plasticity - sandy - some silt - trace fine gravel	BS						●13
0.5			BS	1.7	49.8	26.5	22.0		●26
1.0			BS						●31
1.0 - 2.1	[Clay symbol]	<b>Clay</b> - grey, stiff, moist, high plasticity - some silt - trace fine to coarse sand - brown below 2.0 m	BS						●33
1.5			BS						●32
2.0			BS						●35
2.1			BS						●39

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

# TESTHOLE TH4



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** Dorchester and Grosvenor Alley from Stafford to Wentworth  
**Client:** KGS Group Inc.  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 632135.0 m E, 5525883.0 m N

**Date Drilled:** January 23, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
0.0 - 0.1	[Asphalt symbol]	<b>Asphalt</b>					
0.1 - 0.2	[Concrete symbol]	<b>Concrete</b>					
0.2 - 1.1	[Clay Fill symbol]	<b>Clay Fill</b> - black, firm, moist, medium plasticity - sandy - some silt - trace fine gravel	BS	●11			
			BS		●40		
			BS			●41	
			BS	●22			
1.1 - 2.1	[Clay symbol]	<b>Clay</b> - black, stiff, moist, high plasticity - some silt - trace fine to coarse sand - grey below 1.7 m - brown below 2.0 m	BS			●36	
			BS			●33	
			BS			●36	
			BS				●44

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

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

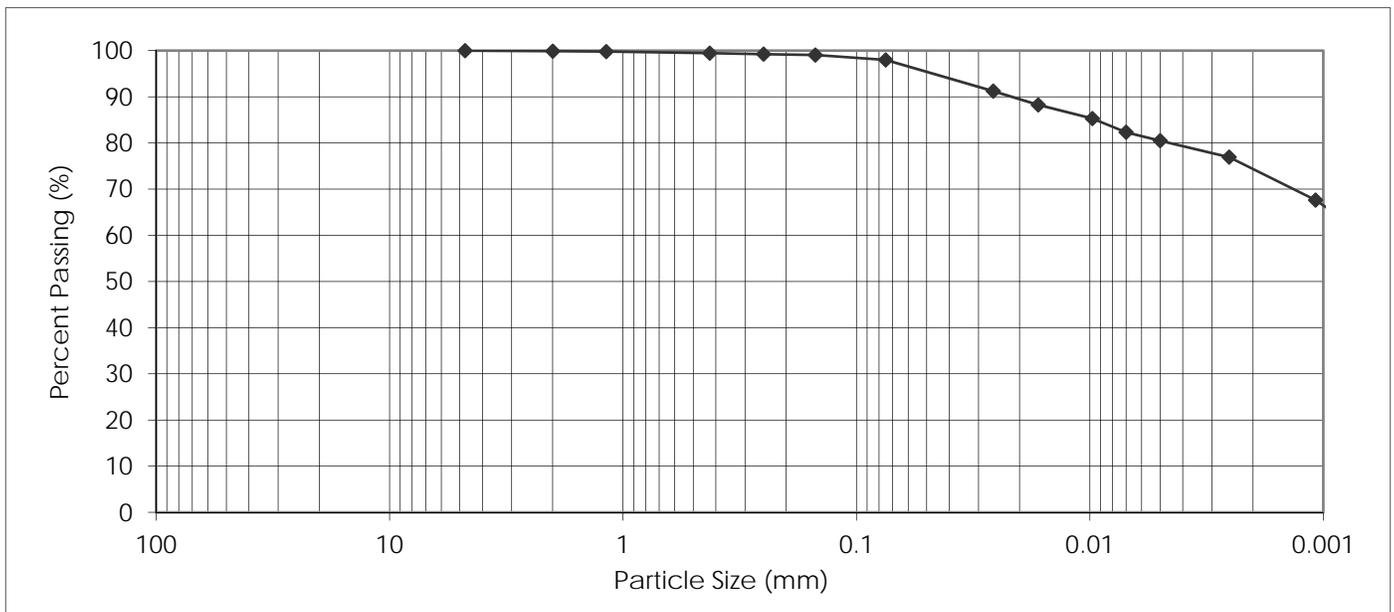
PROJECT: 2014 City of Winnipeg Alley Package  
Contract 1 (14-RL-01)  
Dorchester Ave & Grosvenor Ave Alley  
between Stafford St & Wentworth St

Attention: Craig Rowbotham

PROJECT NO.: 123301329

SAMPLED BY: Nestor Abarca  
SAMPLE ID: TH2 at 4'

DATE RECEIVED: January 24, 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	99.9

PARTICLE SIZE	PERCENT PASSING
1.18 mm	99.8
0.425 mm	99.5
0.250 mm	99.2
0.150 mm	99.1
0.075 mm	98.0
0.005 mm	80.5
0.002 mm	73.5
0.001 mm	66.3

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	0.4	1.5	24.5	73.5	66.3

February 18, 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

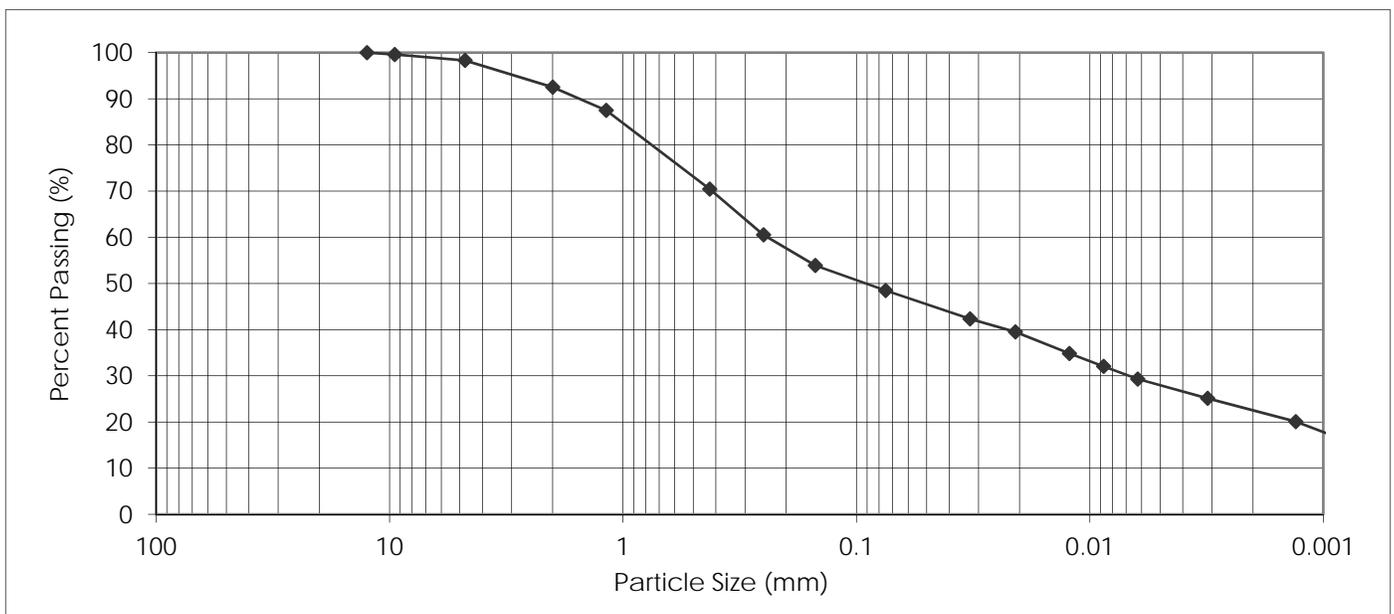
PROJECT: 2014 City of Winnipeg Alley Package  
Contract 1 (14-RL-01)  
Dorchester Ave & Grosvenor Ave Alley  
between Stafford St & Wentworth St

Attention: Craig Rowbotham

PROJECT NO.: 123301329

SAMPLED BY: Nestor Abarca  
SAMPLE ID: TH3 at 2'

DATE RECEIVED: January 24, 2014  
TESTED BY: Sothea Bun



PARTICLE SIZE	PERCENT PASSING	PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0	1.18 mm	87.5
25.00 mm	100.0	0.425 mm	70.4
19.00 mm	100.0	0.250 mm	60.5
16.00 mm	100.0	0.150 mm	53.9
12.50 mm	100.0	0.075 mm	48.5
9.50 mm	99.6	0.005 mm	27.6
4.75 mm	98.3	0.002 mm	22.0
2.00 mm	92.5	0.001 mm	17.8

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			
1.7	5.8	22.1	21.9	26.5	22.0	17.8

February 18, 2014

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

**2014 CITY OF WINNIPEG ALLEY  
PACKAGE CONTRACT 1  
(14-RL-01)**

**MCMILLAN AVENUE AND  
DORCHESTER AVENUE ALLEY  
BETWEEN ARBUTHNOT STREET  
AND COCKBURN STREET**

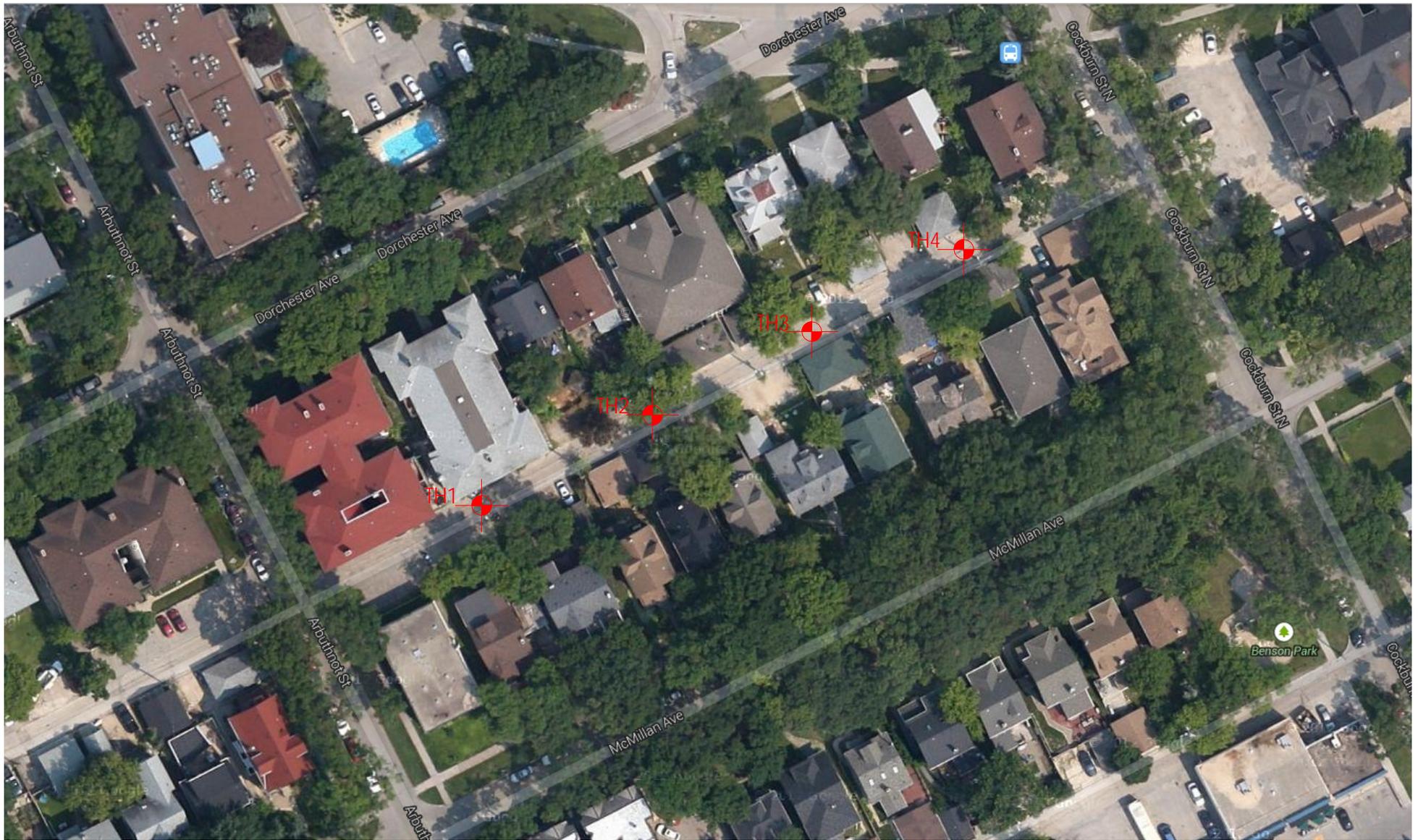
**GEOTECHNICAL INVESTIGATION**



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

Prepared by:  
Stantec Consulting Ltd.  
199 Henlow Bay  
Winnipeg, MB  
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February 24, 2014  
Project No. 123301329



Project No. 123301329

Drawn by: NB

Figure: 1

Testhole Location Plan  
2014 City of Winnipeg Alley Package  
Contract 1 (14-RL-01)  
McMillan Ave & Dorchester Ave Alley  
between Arbutnot St & Cockburn St

Date: Feb 14, 2014

Reviewed by: GL

Scale: NTS

**TABLE 1**  
**2014 CITY OF WINNIPEG ALLEY PACKAGE CONTRACT 1 (14-RL-01)**  
**MCMILLAN AVENUE AND DORCHESTER AVENUE ALLEY BETWEEN ARBUTHNOT STREET AND COCKBURN 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 632539 m East, 5525986 m North	Concrete	150	-	-	-	-	-	-	-	-	-	-	-	-
TH2	UTM Coordinates: 14U 632570 m East, 5526004 m North	Concrete	145	-	-	-	-	-	-	-	-	-	-	-	-
TH3	UTM Coordinates: 14U 632599 m East, 5526020 m North	Concrete	180	-	-	Clay	0.9	39	1.5	8.2	25.7	64.6	86	26	60
TH4	UTM Coordinates: 14U 632626 m East, 5526034 m North	Concrete	125	-	-	Clay Fill	0.6	29	0.3	19.4	38.7	41.6	58	21	37

# TESTHOLE TH1



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** McMillan and Dorchester Alley from Arbutnot to Cockburn  
**Client:** KGS Group Inc.  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 632539.0 m E, 5525986.0 m N

**Date Drilled:** January 23, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
0.0 - 0.1		<b>Concrete</b>					
0.1 - 1.6		<b>Clay Fill</b> - black, firm, moist, high plasticity - silty - some fine to coarse sand - trace fine gravel - brown below 0.8 m	BS	●23			
			BS	●35			
			BS	●35			
			BS	●26			
			BS	●27			
1.6 - 2.1		<b>Clay</b> - grey, stiff, moist, high plasticity - some silt - trace fine to coarse sand - trace fine gravel - brown below 1.7 m	BS	●40			
			BS	●41			
			BS	●43			

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

# TESTHOLE TH2



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** McMillan and Dorchester Alley from Arbutnot to Cockburn  
**Client:** KGS Group Inc.  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 632570.0 m E, 5526004.0 m N

**Date Drilled:** January 23, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	● Water Content (%)			
				25	50	75	100
0.0 - 0.1		<b>Concrete</b>					
0.1 - 1.1		<b>Clay Fill</b> - black, firm, moist, high plasticity - silty - some fine to coarse sand - trace fine gravel	BS	●19			
			BS	●15			
			BS	●18			
1.1 - 2.1		<b>Clay</b> - grey, stiff, moist, high plasticity - some silt - trace fine to coarse sand - trace fine gravel - brown below 2.0 m	BS	●33			
			BS	●34			
			BS	●35			
			BS	●37			

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

# TESTHOLE TH3



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** McMillan and Dorchester Alley from Arbuthnot to Cockburn  
**Client:** KGS Group Inc.  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 632599.0 m E, 5526020.0 m N

**Date Drilled:** January 23, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
0.0 - 0.1	[Concrete symbol]	<b>Concrete</b>							
0.1 - 0.8	[Clay Fill symbol]	<b>Clay Fill</b> - black, firm, moist, high plasticity - silty - some fine to coarse sand - trace fine gravel	BS					20	
0.8 - 1.3	[Clay symbol]	<b>Clay</b> - grey, firm, moist, high plasticity - some silt - trace fine to coarse sand - trace fine gravel	BS					24	
1.3 - 1.6	[Silt symbol]	<b>Silt</b> - tan, soft, moist, low plasticity	BS	1.5	8.2	25.7	64.6	39	
1.6 - 1.8	[Silty Clay symbol]	<b>Silty Clay</b> - brown, firm, moist, medium plasticity	BS					45	
1.8 - 2.0	[Silty Clay symbol]	<b>Silty Clay</b> - brown, firm, moist, medium plasticity	BS					24	
2.0 - 2.1	[Silty Clay symbol]	<b>Silty Clay</b> - brown, firm, moist, medium plasticity	BS					33	
2.1	[Silty Clay symbol]	<b>Silty Clay</b> - brown, firm, moist, medium plasticity	BS					27	

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

# TESTHOLE TH4



**Project Name:** 2014 City of Winnipeg Alley Package Contract 1 (14-RL-01)  
**Project Location:** McMillan and Dorchester Alley from Arbuthnot to Cockburn  
**Client:** KGS Group Inc.  
**Drilling Contractor:** Active Drilling and Piling  
**Drilling Method:** 100 mm Solid Stem Auger  
**UTM Coordinates:** 14U 632626.0 m E, 5526034.0 m N

**Date Drilled:** January 23, 2014  
**Depth of Testhole:** 2.1 m  
**Logged by:** Nestor Abarca  
**Reviewed by:** German Leal

Depth (m)	Symbol	Description	Sample Type	Particle Size Distribution				Water Content (%)	
				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	PL	LL
0.0 - 0.1	[Concrete symbol]	<b>Concrete</b>							
0.1 - 1.1	[Clay Fill symbol]	<b>Clay Fill</b> - black, firm, moist, high plasticity - silty - some fine to coarse sand - trace fine gravel	BS						● 28
0.9			BS	0.3	19.4	38.7	41.6		● 29
1.0			BS						● 23
1.1 - 2.1	[Clay symbol]	<b>Clay</b> - grey, stiff, moist, high plasticity - some silt - trace fine to coarse sand - brown below 2.0 m	BS						● 34
1.5			BS						● 39
2.0			BS						● 38
2.1			BS						● 42

- The soil was frozen to a depth of 1.2 m.
- No groundwater or soil sloughing was observed during or upon completion of drilling.
- Testhole terminate 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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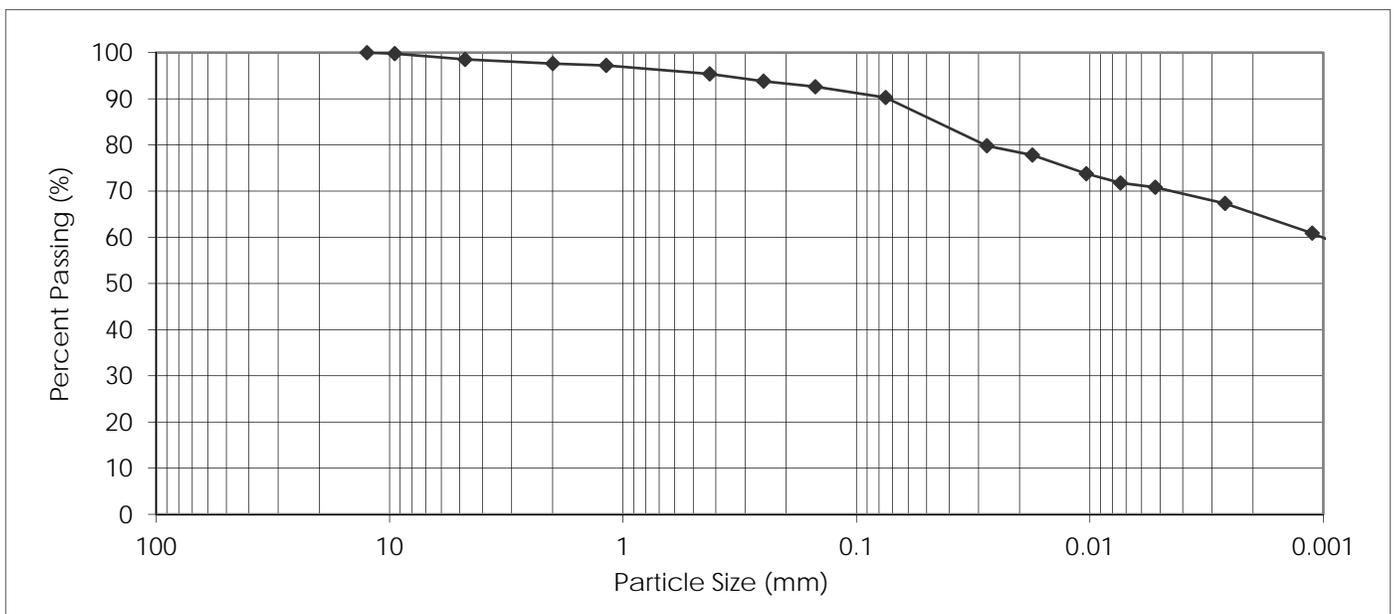
PROJECT: 2014 City of Winnipeg Alley Package  
Contract 1 (14-RL-01)  
McMillan Ave & Dorchester Ave Alley  
between Arbutnot St & Cockburn St

Attention: Craig Rowbotham

PROJECT NO.: 123301329

SAMPLED BY: Nestor Abarca  
SAMPLE ID: TH3 at 3'

DATE RECEIVED: January 24, 2014  
TESTED BY: Sothea Bun



PARTICLE SIZE	PERCENT PASSING	PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0	1.18 mm	97.2
25.00 mm	100.0	0.425 mm	95.4
19.00 mm	100.0	0.250 mm	93.8
16.00 mm	100.0	0.150 mm	92.6
12.50 mm	100.0	0.075 mm	90.3
9.50 mm	99.8	0.005 mm	70.5
4.75 mm	98.5	0.002 mm	64.6
2.00 mm	97.6	0.001 mm	59.8

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			
1.5	0.9	2.2	5.1	25.7	64.6	59.8

February 18, 2014

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



# PARTICLE SIZE ANALYSIS ASTM D422

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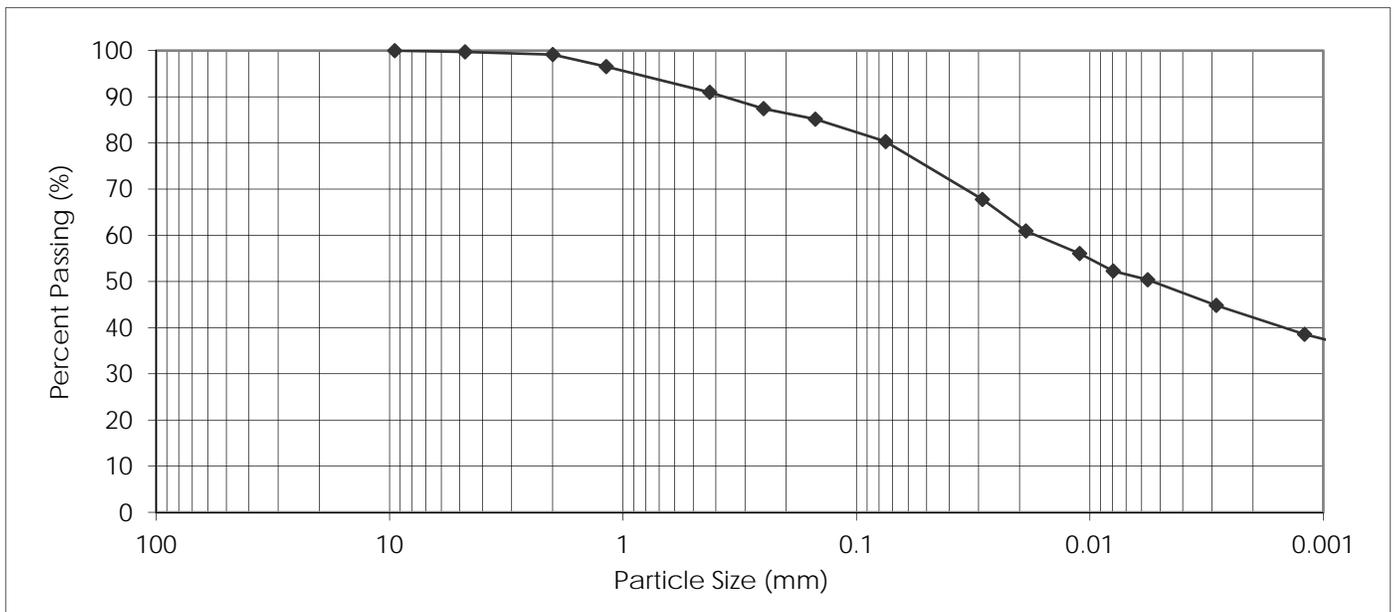
PROJECT: 2014 City of Winnipeg Alley Package  
Contract 1 (14-RL-01)  
McMillan Ave & Dorchester Ave Alley  
between Arbutnot St & Cockburn St

Attention: Craig Rowbotham

PROJECT NO.: 123301329

SAMPLED BY: Nestor Abarca  
SAMPLE ID: TH4 at 2'

DATE RECEIVED: January 24, 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	99.7
2.00 mm	99.2

PARTICLE SIZE	PERCENT PASSING
1.18 mm	96.5
0.425 mm	91.0
0.250 mm	87.4
0.150 mm	85.2
0.075 mm	80.3
0.005 mm	49.1
0.002 mm	41.6
0.001 mm	37.5

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			
0.3	0.5	8.2	10.7	38.7	41.6	37.5

February 18, 2014

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