

APPENDIX 'A'

GEOTECHNICAL REPORT

APPENDIX 'A' - GEOTECHNICAL REPORT

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The geotechnical report is provided to aid in the Contractor's evaluation of the existing soil conditions. The information presented is considered accurate at the locations shown on the Drawings and at the time of drilling. However, variations in pavement structure and/or 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.

**2015 CITY OF WINNIPEG
ALLEY PACKAGE CONTRACT 1
(15-RL-01)**

**CORK AVENUE AND
ARMSTRONG AVENUE ALLEY
BETWEEN SALTER STREET AND
SLY DRIVE**

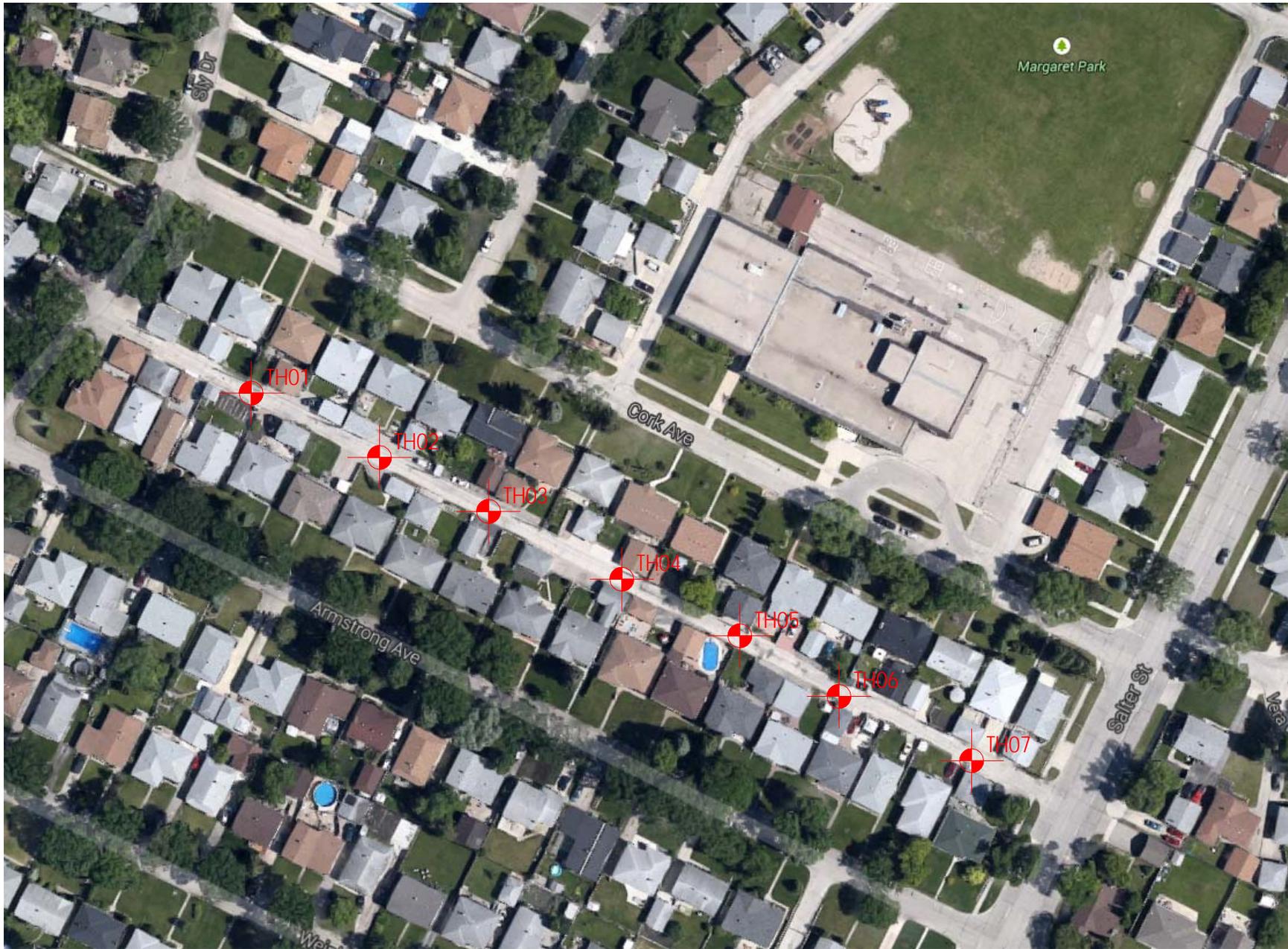
GEOTECHNICAL INVESTIGATION



Prepared for:
KGS Group Inc.
3rd Floor - 865 Waverley Street
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199 Henlow Bay
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January 22, 2015
Project No. 123311678



Project No. 123311678

Drawn by: SB

Figure: 1

Date: January 9, 2015

Reviewed by: GL

Scale: NTS

Testhole Location Plan
2015 City of Winnipeg Alley Package
Contract (15-RL-01)
Cork Ave and Armstrong Ave Alley
between Salter St and Sly Rd

TESTHOLE RECORD TH01

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Cork Ave and Armstrong Ave Alley between Salter St and Sly Dr ELEVATION _____
 DRILLING DATE December 16, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	<input type="checkbox"/> Insitu Shear Vane (kPa) <input type="checkbox"/> Torvane on Grab Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa) <input checked="" type="checkbox"/>	50kPa	100kPa	150kPa		200kPa
0		CO	Concrete	CORE								0
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material	AS	30							
		ML	Silt - tan, soft, moist, low plasticity - some clay - trace fine to medium sand	AS	22							2
1			Particle Size Analysis at 0.9 m: 0.0% Gravel, 2.9% Sand, 83.2% Silt, 13.9% Clay	AS	22							4
				AS	21							6
2				AS	23							8
				AS	25							10
3			TESTHOLE LOCATION: 41.0 m East of Sly Drive on Centreline. • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.									12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH02

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Cork Ave and Armstrong Ave Alley between Salter St and Sly Dr ELEVATION _____
 DRILLING DATE December 16, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	×	
0		CO	Concrete	CORE							0
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material	AS	39						
		CH	Clay - brown, firm, moist, high plasticity	AS	37						2
		CH		AS	34						
1		CH		AS	32						4
		CH		AS	33						
2		ML	Silt - tan, soft, moist, low plasticity - some clay - trace fine to medium sand	AS	20						6
			TESTHOLE LOCATION: 67.0 m East of Sly Drive on Centreline.	AS	24						
			<ul style="list-style-type: none"> The soil was frozen to a depth of 0.9 m. No groundwater seepage or soil sloughing was observed during or upon completion of drilling. Testhole terminated at a depth of 2.1 m. 								8
3											10
											12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH04

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Cork Ave and Armstrong Ave Alley between Salter St and Sly Dr ELEVATION _____
 DRILLING DATE December 16, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕	
0		CO	Concrete	CORE							0
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material	AS	38						
		CH	Clay - brown, stiff, moist, high plasticity - silty	AS	31						2
		CH		AS	29						4
		CH		AS	28						6
		CH		AS	30						8
		ML	Silt - tan, soft, moist, low plasticity - some clay - trace fine to medium sand	AS	25						10
			TESTHOLE LOCATION: 133.0 m East of Sly Drive on Centreline. • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.	AS	25						12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: ■ Bentonite ⊠ Drill Cuttings □ Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH05

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Cork Ave and Armstrong Ave Alley between Salter St and Sly Dr ELEVATION _____
 DRILLING DATE December 16, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕	
0		CO	Concrete	CORE							0
		CH	Clay - brown, stiff, moist, high plasticity	AS	36						2
		CH		AS	34						2
1		ML	Silt - tan, soft, moist, low plasticity - some clay - trace fine to medium sand	AS	26						4
		ML		AS	25						4
		ML		AS	26						6
2		ML		AS	24						6
		ML		AS	25						8
3			<p>TESTHOLE LOCATION: 155.0 m East of Sly Drive on Centreline.</p> <ul style="list-style-type: none"> The soil was frozen to a depth of 0.9 m. No groundwater seepage or soil sloughing was observed during or upon completion of drilling. Testhole terminated at a depth of 2.1 m. 								10
											12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH06

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Cork Ave and Armstrong Ave Alley between Salter St and Sly Dr ELEVATION _____
 DRILLING DATE December 16, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕	
0		CO	Concrete	CORE							0
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material	AS	61						
		CH	Clay - brown, stiff, moist, high plasticity	AS	33						2
1		CH		AS	32						4
		CH		AS	33						6
		CH		AS	30						8
2		ML	Silt - tan, soft, moist, low plasticity - some clay - trace fine to medium sand	AS	26						10
			TESTHOLE LOCATION: 188.0 m East of Sly Drive, approximately 1.0 m South of Centreline.	AS	22						12
3			<ul style="list-style-type: none"> The soil was frozen to a depth of 0.9 m. No groundwater seepage or soil sloughing was observed during or upon completion of drilling. Testhole terminated at a depth of 2.1 m. 								

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH07

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Cork Ave and Armstrong Ave Alley between Salter St and Sly Dr ELEVATION _____
 DRILLING DATE December 16, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕	
0		CO	Concrete	CORE							0
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material	AS	31						
		CH	Clay - brown, stiff, moist, high plasticity	AS	36						2
1		CH		AS	34						
		CH		AS	30						4
		CH		AS	30						
		CH		AS	30						6
2		ML	Silt - tan, soft, moist, low plasticity - some clay - trace fine to medium sand	AS	25						
			TESTHOLE LOCATION: 226.0 m East of Sly Drive, approximately 1.0 m South of Centreline.								8
			<ul style="list-style-type: none"> The soil was frozen to a depth of 0.9 m. No groundwater seepage or soil sloughing was observed during or upon completion of drilling. Testhole terminated at a depth of 2.1 m. 								10
3											12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: ■ Bentonite ⊠ Drill Cuttings □ Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal





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



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**PARTICLE SIZE ANALYSIS
ASTM D422**

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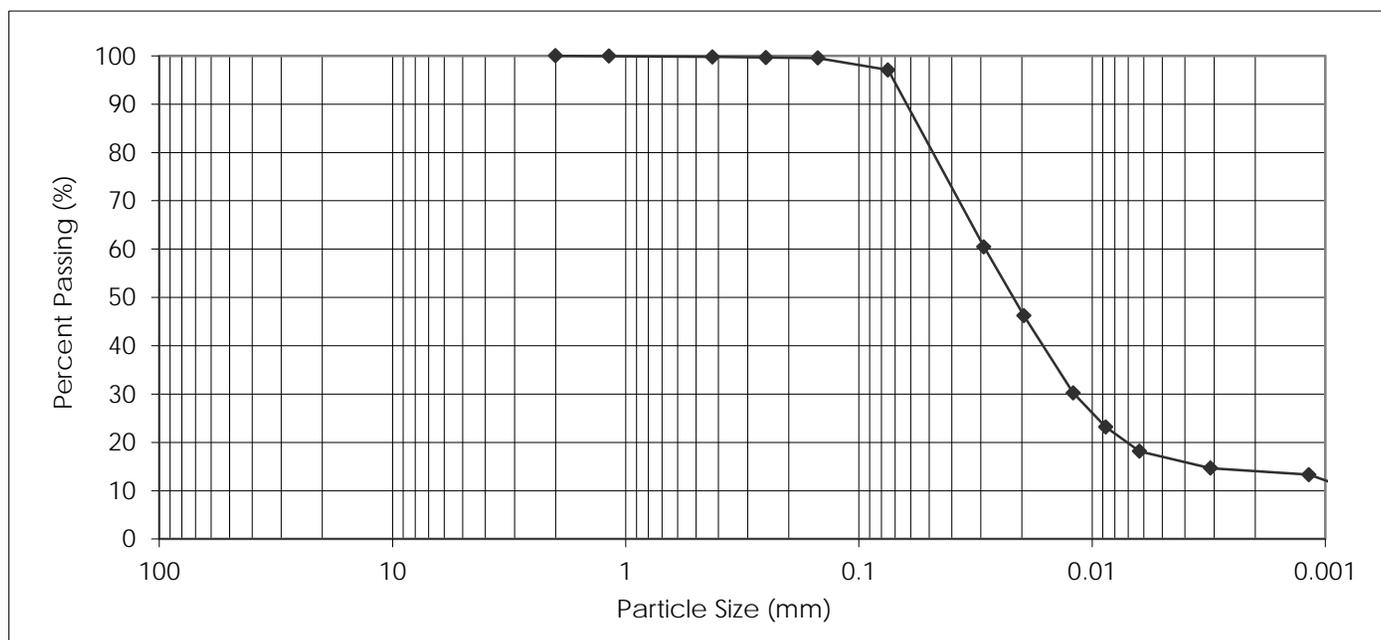
PROJECT: 2015 City of Winnipeg Alley Package
Contract (15-RL-01)
Cork Ave and Armstrong Ave Alley
between Salter St and Sly Rd

Attention: Michael Turko

PROJECT NO.: 123311678

SAMPLED BY: Nestor Abarca
SAMPLE ID: TH1 @ 0.91 m

DATE RECEIVED: January 13, 2015
TESTED BY: Sothea Bun, C.E.T.



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	99.8
0.250 mm	99.6
0.150 mm	99.6
0.075 mm	97.1
0.005 mm	16.8
0.002 mm	13.9
0.001 mm	12.1

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	0.2	2.7	83.2	13.9	12.1

January 19, 2015



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

**2015 CITY OF WINNIPEG
ALLEY PACKAGE CONTRACT 1
(15-RL-01)**

**PARTRIDGE AVENUE AND
ROYAL AVENUE BETWEEN
POWERS STREET AND SALTER
STREET**

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, Manitoba
R3Y 1G4

January 23, 2015
Project No. 123311678



 Soft Digging of Gas Line

 Testholes



Project No. 123311678

Drawn by: SB

Figure: 1

Date: January 9, 2015

Reviewed by: GL

Scale: NTS

Testhole Location Plan
2015 City of Winnipeg Alley Package
Contract (15-RL-01)
Partridge Ave and Royal Ave Alley
between Powers St and Salter St



**TABLE 2
PARTRIDGE AVENUE AND ROYAL AVENUE ALLEY BETWEEN POWERS STREET AND SALTER STREET
GAS LINE SOFT DIG**

Soft Dig ID	Soft Dig Location	Depth from Top of pavement to Gas Main (mm)
SD1	35.0 m West of Salter Street on Centreline	1000
SD2	80.0 m West of Salter Street on Centreline	1000
SD3	115.0 m West of Salter Street on Centreline	1000
SD4	48.0 m East of Powers Street on Centreline	1000

TESTHOLE RECORD TH01

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract (15-RL-01) DATUM _____
 LOCATION Partridge Ave and Royal Ave between Powers St and Salter St ELEVATION _____
 DRILLING DATE December 18, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	<input type="checkbox"/> Insitu Shear Vane (kPa)	<input type="checkbox"/> Torvane on Grab Samples (kPa)	<input type="checkbox"/> Pocket Penetrometer (kPa)	<input type="checkbox"/> X		
0		CO	Concrete	CORE							0	
		CH	Clay - black, stiff, moist, high plasticity - brown below 0.6 m - silty - trace fine gravel - trace fine to coarse sand	AS	29							2
		CH		AS	29							4
		CH		AS	29							6
		CH		AS	29							8
		ML	Silt - tan, soft, moist, low plasticity	AS	26							10
		ML		AS	24							12
			TESTHOLE LOCATION: 158.0 m West of Salter Street, approximately 2.2 m South of Centreline.									
			<ul style="list-style-type: none"> The soil was frozen to a depth of 1.1 m. No groundwater seepage or soil sloughing was observed during or upon completion of drilling. Testhole terminated at a depth of 2.1 m. 									

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Sothea Bun
 Reviewed by: German Leal



TESTHOLE RECORD TH02

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract (15-RL-01) DATUM _____
 LOCATION Partridge Ave and Royal Ave between Powers St and Salter St ELEVATION _____
 DRILLING DATE December 18, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕		
0		CO	Concrete	CORE							0	
		CH	Clay - black, stiff, moist, high plasticity - brown below 0.6 m - silty - trace fine gravel - trace fine to coarse sand	AS	32							2
		CH		AS	30							2
1		CH		AS	29							1
		ML	Silt - tan, soft, moist, low plasticity	AS	25							4
		ML		AS	25							6
2		ML		AS	25							6
				AS	23							6
3			<p>TESTHOLE LOCATION: 126.0 m West of Salter Street, approximately 1.7 m South of Centreline.</p> <ul style="list-style-type: none"> The soil was frozen to a depth of 0.9 m. No groundwater seepage or soil sloughing was observed during or upon completion of drilling. Testhole terminated at a depth of 2.1 m. 									10
												12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Sothea Bun
 Reviewed by: German Leal



TESTHOLE RECORD TH03

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract (15-RL-01) DATUM _____
 LOCATION Partridge Ave and Royal Ave between Powers St and Salter St ELEVATION _____
 DRILLING DATE December 18, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕		
0			Concrete	CORE							0	
			Clay - black, stiff, moist, high plasticity - brown below 0.6 m - silty - trace fine gravel - trace fine to coarse sand	AS	34							
			Particle Size Analysis at 0.9 m: 0.4% Gravel, 2.4% Sand, 25.1% Silt, 72.1% Clay	AS	31							2
1		CH		AS	31							4
				AS	30							
				AS	29							
2		ML	Silt - tan, soft, moist, low plasticity	AS	25							6
			TESTHOLE LOCATION: 88.0 m West of Salter Street, approximately 1.7 m South of Centreline.	AS	24							8
3				<ul style="list-style-type: none"> • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated 								10
												12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Sothea Bun
 Reviewed by: German Leal



TESTHOLE RECORD TH04

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract (15-RL-01) DATUM _____
 LOCATION Partridge Ave and Royal Ave between Powers St and Salter St ELEVATION _____
 DRILLING DATE December 18, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕		
0		CO	Concrete	CORE							0	
		CH	Clay - black, stiff, moist, high plasticity - brown below 0.6 m - silty - trace fine gravel - trace fine to coarse sand	AS	37							2
		CH		AS	30							4
		CH		AS	29							6
		CH		AS	30							8
		ML	Silt - tan, soft, moist, low plasticity	AS	26							10
		ML		AS	28							12
			TESTHOLE LOCATION: 52.0 m West of Salter Street, approximately 1.9 m South of Centreline. • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated	AS	24							

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Sothea Bun
 Reviewed by: German Leal



TESTHOLE RECORD TH05

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract (15-RL-01) DATUM _____
 LOCATION Partridge Ave and Royal Ave between Powers St and Salter St ELEVATION _____
 DRILLING DATE December 18, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕		
0		CO	Concrete	CORE							0	
		CH	Clay - black, stiff, moist, high plasticity - brown below 0.6 m - silty - trace fine gravel - trace fine to coarse sand	AS	26							2
		CH		AS	32							4
		CH		AS	32							6
		CH		AS	30							8
		ML	Silt - tan, soft, moist, low plasticity	AS	25							10
		ML		AS	29							12
			TESTHOLE LOCATION: 25.0 m West of Salter Street, approximately 1.7 m South of Centreline.									
			<ul style="list-style-type: none"> The soil was frozen to a depth of 0.9 m. No groundwater seepage or soil sloughing was observed during or upon completion of drilling. Testhole terminated 									

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Sothea Bun
 Reviewed by: German Leal





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



LABORATORY
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**PARTICLE SIZE ANALYSIS
ASTM D422**

KGS Group Inc.
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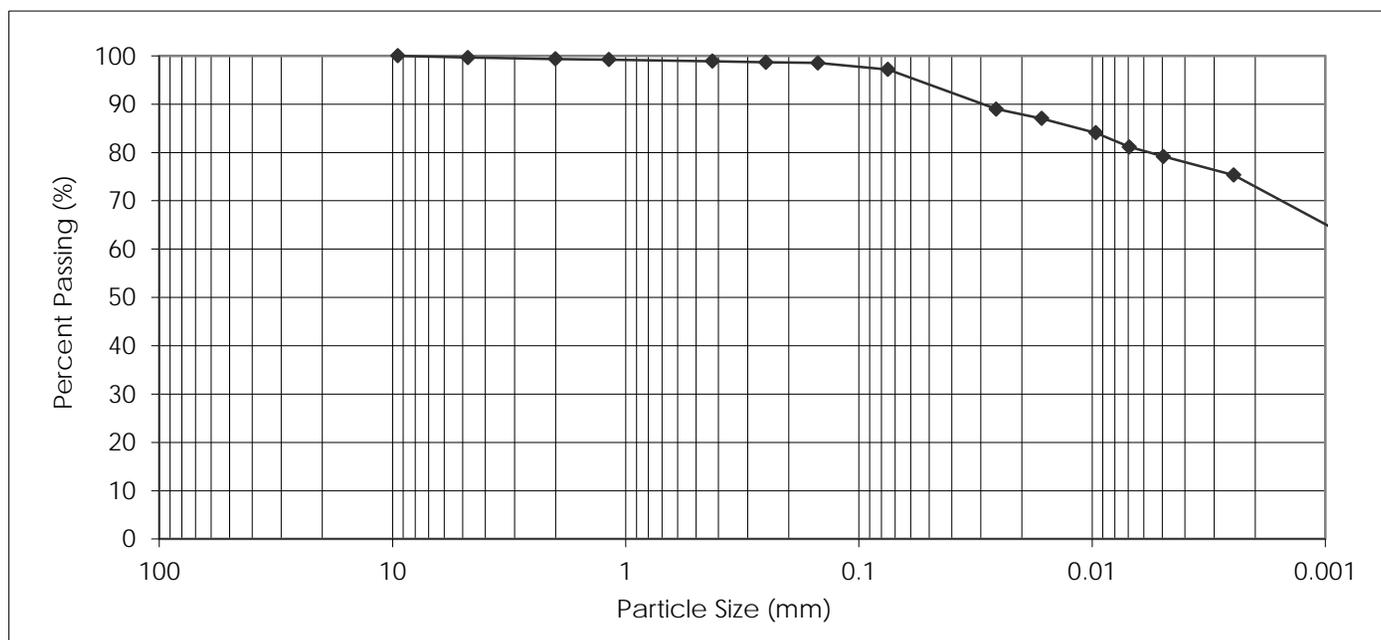
PROJECT: 2015 City of Winnipeg Alley Package
Contract (15-RL-01)
Partridge Ave and Royal Ave Alley
between Powers St and Salter St

Attention: Michael Turko

PROJECT NO.: 123311678

SAMPLED BY: Nestor Abarca
SAMPLE ID: TH3 @ 0.91 m

DATE RECEIVED: January 13, 2015
TESTED BY: Sothea Bun, C.E.T.



PARTICLE SIZE	PERCENT PASSING	PARTICLE SIZE	PERCENT PASSING
37.50 mm	100.0	1.18 mm	99.2
25.00 mm	100.0	0.425 mm	98.9
19.00 mm	100.0	0.250 mm	98.7
16.00 mm	100.0	0.150 mm	98.5
12.50 mm	100.0	0.075 mm	97.2
9.50 mm	100.0	0.005 mm	79.2
4.75 mm	99.6	0.002 mm	72.1
2.00 mm	99.4	0.001 mm	65.1

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			
0.4	0.2	0.5	1.7	25.1	72.1	65.1

January 19, 2015



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

**2015 CITY OF WINNIPEG
ALLEY PACKAGE CONTRACT 1
(15-RL-01)**

**WELLINGTON CRESCENT AND
RUSKIN ROW ALLEY BETWEEN
GROSVENOR AVENUE AND
PALK ROAD**

GEOTECHNICAL INVESTIGATION



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

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

January 23, 2015
Project No. 123311678



Project No. 123311678

Drawn by: SB

Figure: 1

Date: January 8, 2014

Reviewed by: GL

Scale: NTS

**Testhole Location Plan
2015 City of Winnipeg Alley
Package Contract (15-RL-01)
Wellington Cres and Ruskin Row Alley
between Grosvenor Ave and Palk Rd**

TABLE 1
2015 CITY OF WINNIPEG ALLEY PACKAGE CONTRACT (15-RL-01)
WELLINGTON CRESCENT AND RUSKIN ROW ALLEY BETWEEN GROSVENOR AVENUE AND PALK ROAD
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	15.0 m Southeast of Palk Road, approximately 1.0 m West of Centreline	Concrete	170	-	-	-	-	-	-	-	-	-	-	-	-
TH2	50.0 m Southeast of Palk Road, approximately 1.0 m West of Centreline	Asphalt	110	-	-	Silt	0.9	24	0.0	6.8	73.0	20.2	31	16	15
		Concrete	210												
TH3	90.0 m Southeast of Palk Road, approximately 0.5 m West of Centreline	Asphalt	200	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	160												
TH4	117.0 m Southeast of Palk Road on Centreline	Asphalt	55	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	155												

TESTHOLE RECORD TH01

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Wellington Cres and Ruskin Row Alley between Grosvenor Ave and Palk Rd ELEVATION _____
 DRILLING DATE December 18, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕		
0		CO	Concrete	CORE							0	
		CH	Clay Fill - black, firm, moist, high plasticity - some fine to coarse sand - some fine gravel - brown below 0.6 m - concrete debris encountered at a depth of 0.9 m (no sample recovery) - some silt - brown, stiff below 1.5 m	AS	26							2
		CH	Clay - brown, stiff, moist, high plasticity - trace fine to medium sand - trace silt	AS	31							4
		CH		AS	33							6
				AS	20							6
				AS	27							8
3			TESTHOLE LOCATION: 15.0 m Southeast of Palk Road, approximately 1.0 m West of Centreline. • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.									10
												12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH02

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Wellington Cres and Ruskin Row Alley between Grosvenor Ave and Palk Rd ELEVATION _____
 DRILLING DATE December 18, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)		
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	×			
0	AS	■	Asphalt	CORE								0	
	CO	□	Concrete										
	CH	▨	Clay Fill - black, firm, moist, high plasticity - trace organic material - some fine to coarse sand		AS	28							
					AS	22							2
1			Silt - tan, soft, moist, low plasticity - some clay - trace fine to coarse sand		AS	24							
	ML	▨	Particle Size Analysis at 0.9 m: 0.0% Gravel, 6.8% Sand, 73.0% Silt, 20.2% Clay		AS	19							4
					AS	23							
2	CH	▨	Clay - brown, stiff, moist, high plasticity		AS	31							6
3			TESTHOLE LOCATION: 50.0 m Southeast of Palk Road, approximately 1.0 m West of Centreline. • The soil was frozen to a depth of 1.1 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.	AS	38							8	
												10	
												12	

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: ■ Bentonite ▨ Drill Cuttings □ Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH03

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Wellington Cres and Ruskin Row Alley between Grosvenor Ave and Palk Rd ELEVATION _____
 DRILLING DATE December 18, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	×	
0	AS	■	Asphalt	CORE							0
	CO	□	Concrete	AS	20						
	CH	⊗	Clay Fill - brown, firm, moist, high plasticity - trace organic material - some fine to coarse sand - trace fine gravel - concrete debris encountered at a depth of 0.9 m (no sample recovered)	AS	22						2
1	CH	▨	Clay - brown, stiff, moist, high plasticity	AS	31						4
	CH	▨		AS	34						
2	CH	▨		AS	35						6
				AS	35						
3			TESTHOLE LOCATION: 90.0 m Southeast of Palk Road, approximately 0.5 m West of Centreline. • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.								8
											10
											12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: ■ Bentonite ⊗ Drill Cuttings □ Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH04

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Wellington Cres and Ruskin Row Alley between Grosvenor Ave and Palk Rd ELEVATION _____
 DRILLING DATE December 18, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES					DEPTH (ft)			
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕					
0		AS	Asphalt	CORE									0		
		CO	Concrete												
		CH	Clay - brown, firm, moist, high plasticity - stiff below 0.9 m - trace silt below 1.8 m		AS	32									
					AS	34									
					AS	34									
1					AS	35									
					AS	35									
				AS	42										
2				AS	40										
3			TESTHOLE LOCATION: 117.0 m Southeast of Palk Road on Centreline. • The soil was frozen to a depth of 1.1 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.												

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal





Core sample from Testhole TH1



Core sample from Testhole TH2



Core sample from Testhole TH3



Core sample from Testhole TH4



LABORATORY
199 Henlow Bay
Winnipeg MB R3Y 1G4
Tel: (204) 488-6999

**PARTICLE SIZE ANALYSIS
ASTM D422**

KGS Group Inc.
3rd Floor - 865 Waverley St.
Winnipeg, Manitoba
R3T 5P4

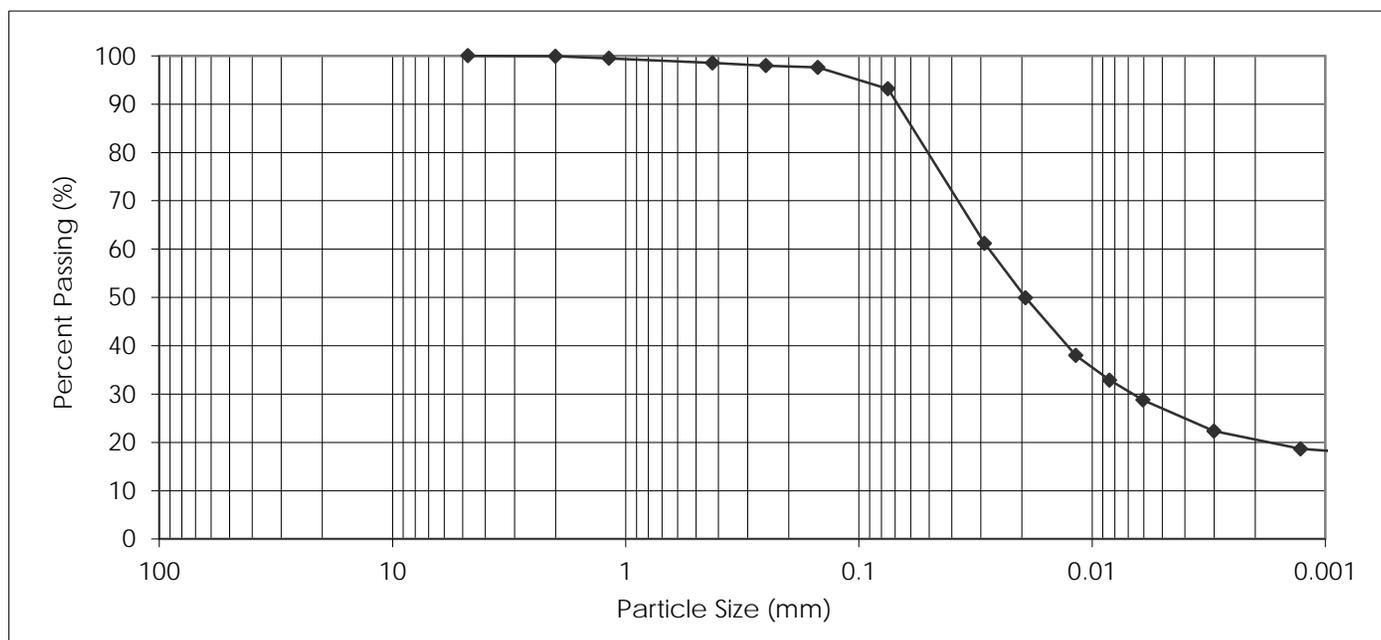
PROJECT: 2015 City of Winnipeg Alley Package
Contract (15-RL-01)
Wellington Cres And Ruskin Row Alley between
Palk Rd and Grosvenor Ave

Attention: Michael Turko

PROJECT NO.: 123311678

SAMPLED BY: Nestor Abarca
SAMPLE ID: TH2 @ 0.91 m

DATE RECEIVED: January 13, 2015
TESTED BY: Sothea Bun, C.E.T.



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	99.5
0.425 mm	98.5
0.250 mm	98.0
0.150 mm	97.6
0.075 mm	93.2
0.005 mm	26.5
0.002 mm	20.2
0.001 mm	18.3

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	1.4	5.3	73.0	20.2	18.3

January 19, 2015



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

**2015 CITY OF WINNIPEG
ALLEY PACKAGE CONTRACT 1
(15-RL-01)**

**CORDOVA STREET AND
CAMPBELL STREET ALLEY
BETWEEN KINGSWAY AND
GROSVENOR AVENUE**

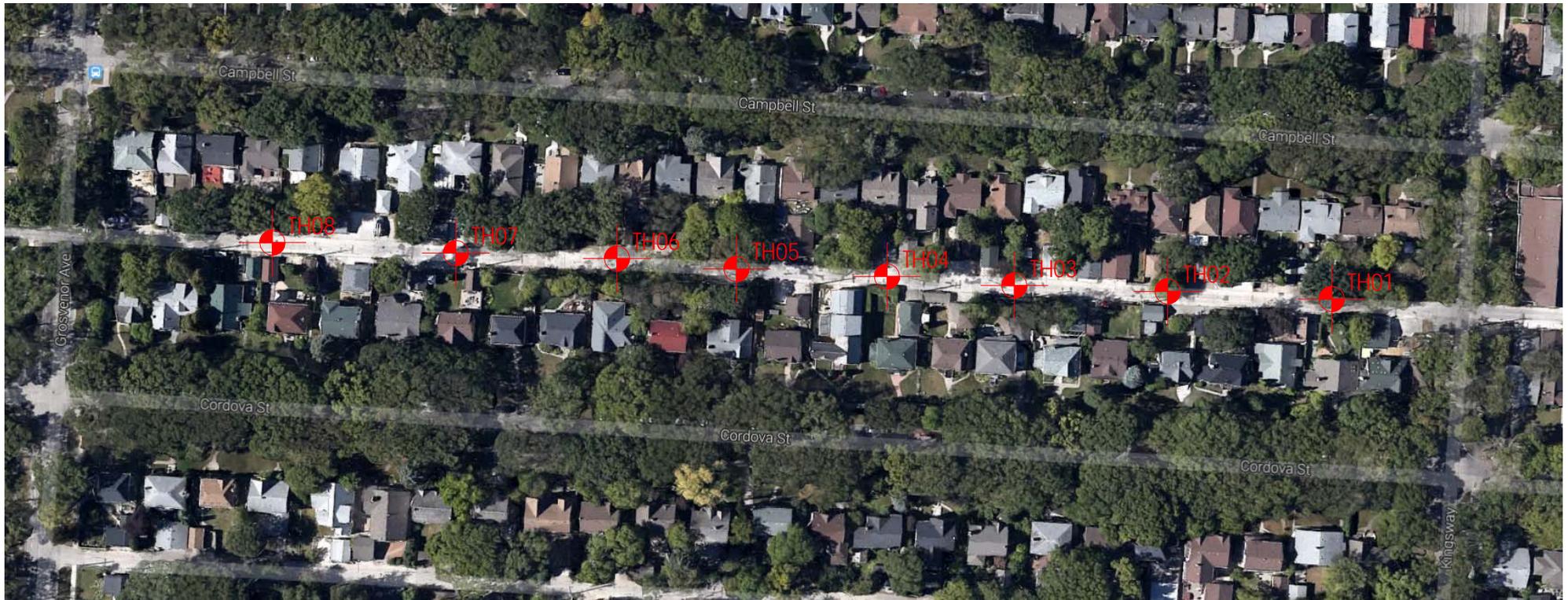
GEOTECHNICAL INVESTIGATION



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

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

January 22, 2015
Project No. 123311678



Project No. 123311678

Drawn by: SB

Figure: 1

Date: January 9, 2015

Reviewed by: GL

Scale: NTS

Testhole Location Plan
2015 City of Winnipeg Alley Package
Contract (15-RL-01)
Cordova St and Campbell St Alley
between Kingsway and Grosvenor Ave

TESTHOLE RECORD TH01

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Cordova St and Campbell St Alley between Kingsway and Grosvenor Ave ELEVATION _____
 DRILLING DATE December 17, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕	
0			Concrete	CORE							0
			Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand	AS	28						
				AS	32						2
				AS	24						
1			Silt - tan, soft, moist, low plasticity - trace clay - some fine to medium sand	AS	18						4
				AS	21						
			Clay - brown, stiff, moist, high plasticity	AS	41						6
2				AS	42						
			TESTHOLE LOCATION: 41.0 m South of Kingsway, approximately 1.0 m West of Centreline. • The soil was frozen to a depth of 1.1 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.								8
3											10
											12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: ■ Bentonite ⊠ Drill Cuttings □ Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH02

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Cordova St and Campbell St Alley between Kingsway and Grosvenor Ave ELEVATION _____
 DRILLING DATE December 17, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	×	
0	CO		Concrete	CORE							0
	CH		Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand	AS	28						2
	AS			AS	27						
1	ML		Silt - tan, soft, moist, low plasticity - trace clay - some fine to medium sand	AS	21						4
	AS			AS	20						
	AS			AS	20						
2	CH		Clay - brown, stiff, moist, high plasticity	AS	39						6
	AS			AS	41						
3			<p>TESTHOLE LOCATION: 62.0 m South of Kingsway, approximately 1.0 m West of Centreline.</p> <ul style="list-style-type: none"> The soil was frozen to a depth of 0.9 m. No groundwater seepage or soil sloughing was observed during or upon completion of drilling. Testhole terminated at a depth of 2.1 m. 								8
											10
											12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH03

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Cordova St and Campbell St Alley between Kingsway and Grosvenor Ave ELEVATION _____
 DRILLING DATE December 17, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕	
0			Concrete	CORE							0
		CO									
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand	AS	26						
			Clay - brown, stiff, moist, high plasticity - silty to a depth of 0.9 m	AS	23						2
1				AS	28						
		CH		AS	28						4
				AS	35						
2				AS	40						6
				AS	41						
3			<p>TESTHOLE LOCATION: 130.0 m South of Kingsway on Centreline.</p> <ul style="list-style-type: none"> The soil was frozen to a depth of 0.9 m. No groundwater seepage or soil sloughing was observed during or upon completion of drilling. Testhole terminated at a depth of 2.1 m. 								8
											10
											12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: ■ Bentonite ⊠ Drill Cuttings □ Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH04

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Cordova St and Campbell St Alley between Kingsway and Grosvenor Ave ELEVATION _____
 DRILLING DATE December 17, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕	
0			Concrete	CORE							0
			Clay Fill - black, firm, moist, high plasticity - trace organic material - some silt	AS	40						
			Silt - tan, soft, moist, low plasticity - trace clay - some fine to medium sand	AS	30						2
1			Clay - brown, stiff, moist, high plasticity - trace silt below 1.2 m	AS	20						
				AS	26						4
				AS	29						
2				AS	38						6
				AS	40						
3			TESTHOLE LOCATION: 170.0 m South of Kingsway on Centreline. • The soil was frozen to a depth of 1.1 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.								8
											10
											12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: ■ Bentonite ⊠ Drill Cuttings □ Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH05

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Cordova St and Campbell St Alley between Kingsway and Grosvenor Ave ELEVATION _____
 DRILLING DATE December 17, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	×		
0		CO	Concrete	CORE							0	
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material - silty below 0.6 m	AS	34							
				AS	43							2
				AS	27							
				AS	37							
1		CH	Clay - brown, stiff, moist, high plasticity	AS	31							4
				AS	35							
				AS	39							6
2				AS	41							
			TESTHOLE LOCATION: 195.0 m South of Kingsway on Centreline. • The soil was frozen to a depth of 1.1 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.									8
3												10
												12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: ■ Bentonite ⊠ Drill Cuttings □ Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH06

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Cordova St and Campbell St Alley between Kingsway and Grosvenor Ave ELEVATION _____
 DRILLING DATE December 17, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕		
0	CO	[Concrete Symbol]	Concrete	CORE							0	
	CH	[Clay Fill Symbol]	Clay Fill - black, firm, moist, high plasticity - trace organic material - trace fine to coarse sand	AS	28							
	CH	[Clay Fill Symbol]		AS	41							2
1	ML	[Silt Symbol]	Silt - tan, soft, moist, low plasticity - trace clay - some fine to medium sand	AS	27							
	ML	[Silt Symbol]		AS	23							4
	CH	[Clay Symbol]	Clay - brown, stiff, moist, high plasticity	AS	38							
2	ML	[Silt Symbol]	Silt - tan, soft, moist, low plasticity - some clay	AS	23							6
	ML	[Silt Symbol]		AS	22							
3			TESTHOLE LOCATION: 240.0 m South of Kingsway on Centreline. • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.									8
												10
												12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: ■ Bentonite ⊠ Drill Cuttings □ Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH07

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Cordova St and Campbell St Alley between Kingsway and Grosvenor Ave ELEVATION _____
 DRILLING DATE December 17, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕	
0			Concrete	CORE							0
	CO										
	CH		Clay Fill - black, firm, moist, high plasticity - trace organic material	AS	20						
	ML		Silt - tan, soft, moist, low plasticity - trace clay - some fine to medium sand	AS	23						2
1	ML		Particle Size Analysis at 0.9 m: 0.0% Gravel, 15.0% Sand, 75.4% Silt, 9.6% Clay	AS	18						
	AS			AS	16						4
	CH		Clay - brown, stiff, moist, high plasticity	AS	35						
2	CH			AS	39						6
	AS			AS	40						
3			TESTHOLE LOCATION: 112.0 m North of Grosvenor Avenue on Centreline. • The soil was frozen to a depth of 1.1 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.								8
											10
											12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH08

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Cordova St and Campbell St Alley between Kingsway and Grosvenor Ave ELEVATION _____
 DRILLING DATE December 17, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕	
0			Concrete	CORE							0
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material	AS	28						
		ML	Silt - tan, soft, moist, low plasticity - trace clay - some fine to medium sand	AS	27						2
1				AS	21						
		CH	Clay - brown, stiff, moist, high plasticity	AS	31						4
				AS	31						
2				AS	37						6
				AS	40						
3			TESTHOLE LOCATION: 62.0 m North of Grosvenor Avenue on Centreline. • The soil was frozen to a depth of 1.1 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.								8
											10
											12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal





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



LABORATORY
199 Henlow Bay
Winnipeg MB R3Y 1G4
Tel: (204) 488-6999

**PARTICLE SIZE ANALYSIS
ASTM D422**

KGS Group Inc.
3rd Floor - 865 Waverley St.
Winnipeg, Manitoba
R3T 5P4

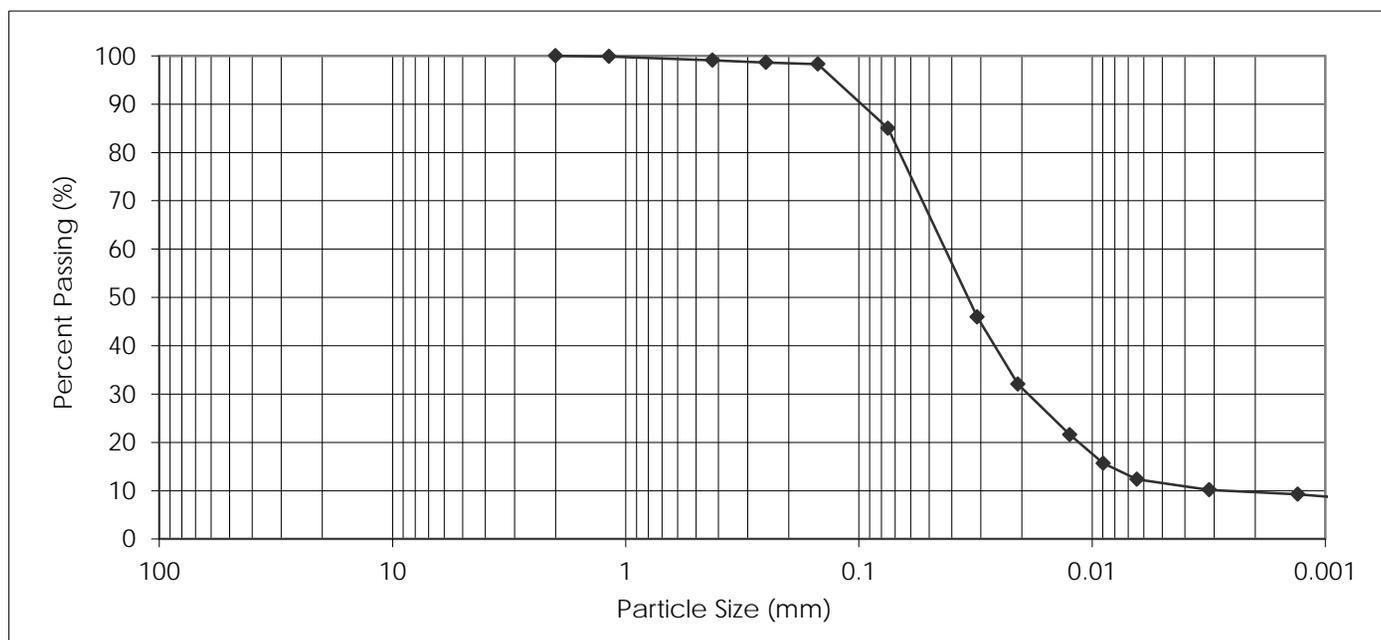
PROJECT: 2015 City of Winnipeg Alley Package
Contract (15-RL-01)
Cordova St and Campbell St Alley between
Kingsway St and Grosvenor Ave

Attention: Michael Turko

PROJECT NO.: 123311678

SAMPLED BY: Nestor Abarca
SAMPLE ID: TH7 @ 0.91 m

DATE RECEIVED: January 13, 2015
TESTED BY: Sothea Bun, C.E.T.



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	99.9
0.425 mm	99.1
0.250 mm	98.6
0.150 mm	98.3
0.075 mm	85.0
0.005 mm	11.4
0.002 mm	9.6
0.001 mm	8.8

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			
0.0	0.0	0.9	14.1	75.4	9.6	8.8

January 19, 2015



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

**2015 CITY OF WINNIPEG
ALLEY PACKAGE CONTRACT 1
(15-RL-01)**

**RENFREW BAY ALLEY BETWEEN
TAYLOR AVENUE AND CNR
TRACKS**

GEOTECHNICAL INVESTIGATION



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

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

January 23, 2015
Project No. 123311678



Project No. 123311678

Drawn by: SB

Figure: 1

Date: January 9, 2015

Reviewed by: GL

Scale: NTS

Testhole Location Plan
2015 City of Winnipeg Alley Package
Contract (15-RL-01)
Renfrew Bay Alley between
Taylor Ave and CNR Tracks

TESTHOLE RECORD TH01

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Renfrew Bay Alley between Taylor Ave and CNR Tracks ELEVATION _____
 DRILLING DATE December 17, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕	
0	AS	■	Asphalt	CORE							0
	CO	□	Concrete								
	CH	⊗	Clay Fill - black, firm, moist, high plasticity - trace organic material - some silt below 0.6 m	AS	28						
	CH	⊗		AS	34						2
1	CH	⊗		AS	34						
	CH	⊗		AS	36						4
	CL ML	▨	Clayey Silt - tan, soft, moist, medium plasticity - trace fine to medium sand	AS	29						
2	CH	▨	Clay - brown, stiff, moist, high plasticity	AS	38						6
	AS			AS	46						
3			TESTHOLE LOCATION: 153.0 m South of Taylor Avenue, approximately 18.0 m West from property line 966 / 968 and 970 / 972 Renfrew Bay on Centreline. • The soil was frozen to a depth 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.								8
											10
											12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: ■ Bentonite ⊗ Drill Cuttings □ Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH02

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Renfrew Bay Alley between Taylor Ave and CNR Tracks ELEVATION _____
 DRILLING DATE December 17, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	×	
0			Concrete	CORE							0
			Clay Fill - black, firm, moist, high plasticity - trace organic material	AS	43						
				AS	36						2
1			Clayey Silt - tan, soft, moist, medium plasticity - trace fine to medium sand	AS	28						
			Particle Size Analysis at 0.9 m: 0.0% Gravel 6.9% Sand, 67.9% Silt, 25.2% Clay	AS	29						4
				AS	28						
2			Clay - brown, stiff, moist, high plasticity	AS	39						6
				AS	40						
3			TESTHOLE LOCATION: 153.0 m South of Taylor Avenue, approximately 9.0 m East from property line 964 and 966 / 968 Renfrew Bay on Centreline. • The soil was frozen to a depth 1.1 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.								8
											10
											12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: ■ Bentonite ⊠ Drill Cuttings □ Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH03

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Renfrew Bay Alley between Taylor Ave and CNR Tracks ELEVATION _____
 DRILLING DATE December 17, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕		
0		CO	Concrete	CORE							0	
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material	AS	39							
		CH	Clay - brown, firm, moist, high plasticity - some silt	AS	27							2
		CH		AS	30							4
		CH		AS	30							4
		CH		AS	35							6
		CH		AS	43							6
		CH		AS	39							7
			TESTHOLE LOCATION: 153.0 m South of Taylor Avenue, approximately 7.0 m East from property line 946 / 948 and 950 Renfrew Bay on Centreline.									8
			<ul style="list-style-type: none"> The soil was frozen to a depth 1.1 m. No groundwater seepage or soil sloughing was observed during or upon completion of drilling. Testhole terminated at a depth of 2.1 m. 									10
												12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: ■ Bentonite ⊠ Drill Cuttings □ Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH05

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Renfrew Bay Alley between Taylor Ave and CNR Tracks ELEVATION _____
 DRILLING DATE December 17, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕	
0			Concrete	CORE							0
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material	AS	34						2
		CH	Clay - brown, stiff, moist, high plasticity	AS	35						4
		CH		AS	38						6
		CH		AS	37						8
		CH		AS	42						10
		CH		AS	40						12
			TESTHOLE LOCATION: 70.0 m South of Taylor Avenue on East side of Renfrew Bay Alley on Centreline. • The soil was frozen to a depth 1.1 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.								

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: ■ Bentonite ⊠ Drill Cuttings □ Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH06

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Renfrew Bay Alley between Taylor Ave and CNR Tracks ELEVATION _____
 DRILLING DATE December 17, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕	
0		CO	Concrete	CORE							0
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material	AS	26						2
		CH	Clay - brown, stiff, moist, high plasticity	AS	30						4
1		CH		AS	37						6
		CH		AS	39						8
		CH		AS	40						10
		CH		AS	43						12
		CH		AS	48						
2			TESTHOLE LOCATION: 40.0 m South of Taylor Avenue on East side of Renfrew Bay Alley on Centreline. • The soil was frozen to a depth 1.1 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.								
3											

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH07

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Renfrew Bay Alley between Taylor Ave and CNR Tracks ELEVATION _____
 DRILLING DATE December 17, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES		Moisture Content & Atterberg Limits				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	Moisture Content & Atterberg Limits	Standard Penetration Test, blows/0.3m	50kPa	100kPa	150kPa	200kPa	
0		CO	Concrete	CORE									0
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material	AS	37								2
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material	AS	40								2
1		CL	Clayey Silt - tan, soft, moist, medium plasticity - trace fine to medium sand	AS	31								4
		CL	Clayey Silt - tan, soft, moist, medium plasticity - trace fine to medium sand	AS	24								4
		ML	Clayey Silt - tan, soft, moist, medium plasticity - trace fine to medium sand	AS	26								6
2		ML	Clayey Silt - tan, soft, moist, medium plasticity - trace fine to medium sand	AS	22								6
		ML	Clayey Silt - tan, soft, moist, medium plasticity - trace fine to medium sand	AS	22								8
3			<p>TESTHOLE LOCATION: 15.0 m South of Taylor Avenue on East side of Renfrew Bay Alley on Centreline.</p> <ul style="list-style-type: none"> The soil was frozen to a depth 1.1 m. No groundwater seepage or soil sloughing was observed during or upon completion of drilling. Testhole terminated at a depth of 2.1 m. 										10
													12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal





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

**2015 CITY OF WINNIPEG
ALLEY PACKAGE CONTRACT 1
(15-RL-01)**

**CHANCELLOR DRIVE AND
WAVERLEY STREET ALLEY
BETWEEN LAKE LINDERO ROAD
AND LAKE CREST ROAD**

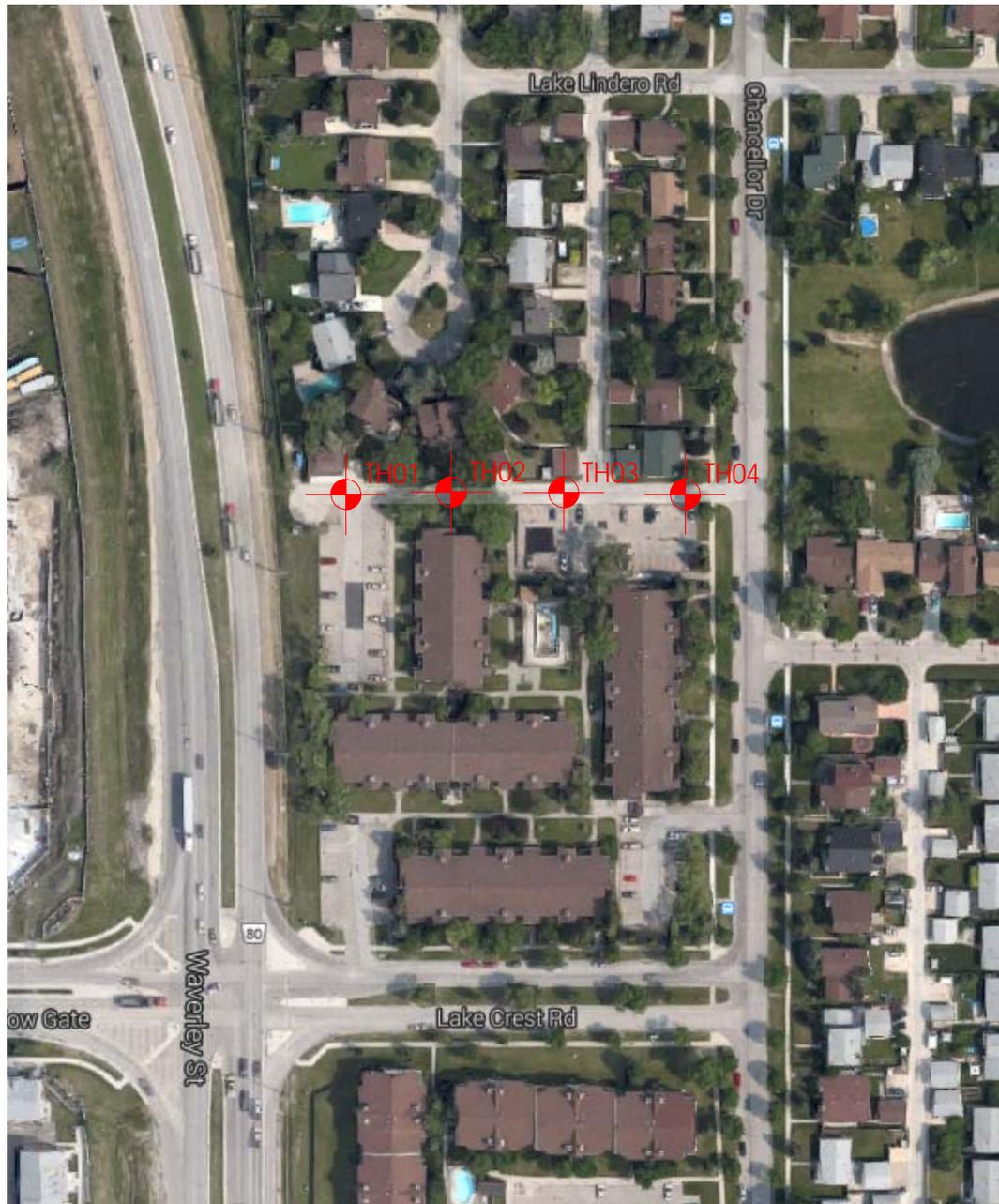
GEOTECHNICAL INVESTIGATION



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

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

January 23, 2015
Project No. 123311678



Project No. 123311678

Drawn by: SB

Figure: 1

Date: January 9, 2015

Reviewed by: GL

Scale: NTS

Testhole Location Plan
2015 City of Winnipeg Alley Package
Contract (15-RL-01)
Chancellor Dr and Waverley St Alley
between Lake Lindero Rd and Lake Crest Rd

TABLE 1
2015 CITY OF WINNIPEG ALLEY PACKAGE CONTRACT (15-RL-01)
CHANCELLOR DRIVE AND WAVERLEY STREET BETWEEN LAKE LINDERO ROAD AND LAKE CREST ROAD
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	125.0 m West of Chancellor Drive on Centreline	Concrete	150	-	-	-	-	-	-	-	-	-	-	-	-
TH2	90.0 m West of Chancellor Drive on Centreline	Concrete	160	-	-	Clayey Silt	0.9	19	0.0	10.0	63.9	26.1	36	15	21
TH3	55.0 m West of Chancellor Drive on Centreline	Asphalt	90	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	130												
TH4	15.0 m West of Chancellor Drive on Centreline	Asphalt	80	-	-	-	-	-	-	-	-	-	-	-	-
		Concrete	170												

TESTHOLE RECORD TH01

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Chancellor Dr and Waverley St Alley between Lake Lindero Rd and Lake Crest Rd ELEVATION _____
 DRILLING DATE December 19, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕	
0			Concrete	CORE							0
			Clay Fill - brown, firm, moist, high plasticity - trace fine to coarse sand	AS	29						
			Clay - brown, stiff, moist, high plasticity	AS	31						2
1				AS	31						
				AS	28						4
				AS	29						
				AS	34						6
2				AS	39						
			TESTHOLE LOCATION: 125.0 m West of Chancellor Drive on Centreline. • The soil was frozen to a depth of 0.9 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.								8
3											10
											12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH02

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Chancellor Dr and Waverley St Alley between Lake Lindero Rd and Lake Crest Rd ELEVATION _____
 DRILLING DATE December 19, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES										DEPTH (ft)		
				TYPE	NUMBER	MOISTURE CONTENT (%)	□	□	△	×	50kPa	100kPa	150kPa	200kPa					
0			Concrete	CORE															0
		CH	Clay Fill - black, firm, moist, high plasticity - trace organic material	AS	30														
			Clayey Silt - tan, soft, moist, medium plasticity - trace fine to medium sand	AS	19														2
1		CL ML	Particle Size Analysis at 0.9 m: 0.0% Gravel, 10.0% Sand, 63.9% Silt, 26.1% Clay	AS	19														
				AS	17														4
		CH	Clay - brown, stiff, moist, high plasticity - some silt below 2.0 m	AS	29														
2				AS	33														6
				AS	32														
3			TESTHOLE LOCATION: 90.0 m West of Chancellor Drive on Centreline. • The soil was frozen to a depth of 1.1 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.																8
																			10
																			12

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH03

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Chancellor Dr and Waverley St Alley between Lake Lindero Rd and Lake Crest Rd ELEVATION _____
 DRILLING DATE December 19, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)				
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	×					
0	AS	█	Asphalt	CORE							0				
	CO	▣	Concrete												
	CH	▨	Clay - brown, firm, moist, high plasticity - stiff below 0.9 m - some silt below 2.0 m		AS	31									
					AS	34								2	
					AS	36									
1					AS	38									4
					AS	40									
	AS	42									6				
2	AS	38													
	TESTHOLE LOCATION: 55.0 m West of Chancellor Drive on Centreline. • The soil was frozen to a depth of 1.1 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.										8				
3											10				
											12				

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: █ Bentonite ▣ Drill Cuttings ▣ Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal



TESTHOLE RECORD TH04

CLIENT KGS Group Inc. PROJECT No. 123311678
 PROJECT 2015 City of Winnipeg Alley Package Contract 1 (15-RL-01) DATUM _____
 LOCATION Chancellor Dr and Waverley St Alley between Lake Lindero Rd and Lake Crest Rd ELEVATION _____
 DRILLING DATE December 19, 2014 DRILLING CO. Maple Leaf Drilling Ltd. DRILLING METHOD 125 mm SSA

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES				DEPTH (ft)			
				TYPE	NUMBER	MOISTURE CONTENT (%)	□ Insitu Shear Vane (kPa)	□ Torvane on Grab Samples (kPa)	△ Pocket Penetrometer (kPa)	✕				
0	AS	■	Asphalt	CORE							0			
	CO	■	Concrete											
	CH	▨	Clay - brown, firm, moist, high plasticity - stiff below 0.9 m - trace silt below 1.4 m		AS	38								
					AS	40								2
1					AS	39								4
					AS	41								4
	AS	44												
2	AS	49									6			
	AS	51												
3	TESTHOLE LOCATION: 15.0 m West of Chancellor Drive on Centreline. • The soil was frozen to a depth of 1.1 m. • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.										8			
											10			
											12			

Sample Type: GS - Grab Sample SPT - Standard Penetration Test
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: ■ Bentonite ▨ Drill Cuttings ■ Sand

Logged by: Nestor Abarca
 Reviewed by: German Leal





Core sample from Testhole TH1



Core sample from Testhole TH2



Core sample from Testhole TH3



Core sample from Testhole TH4



LABORATORY
199 Henlow Bay
Winnipeg MB R3Y 1G4
Tel: (204) 488-6999

**PARTICLE SIZE ANALYSIS
ASTM D422**

KGS Group Inc.
3rd Floor - 865 Waverley St.
Winnipeg, Manitoba
R3T 5P4

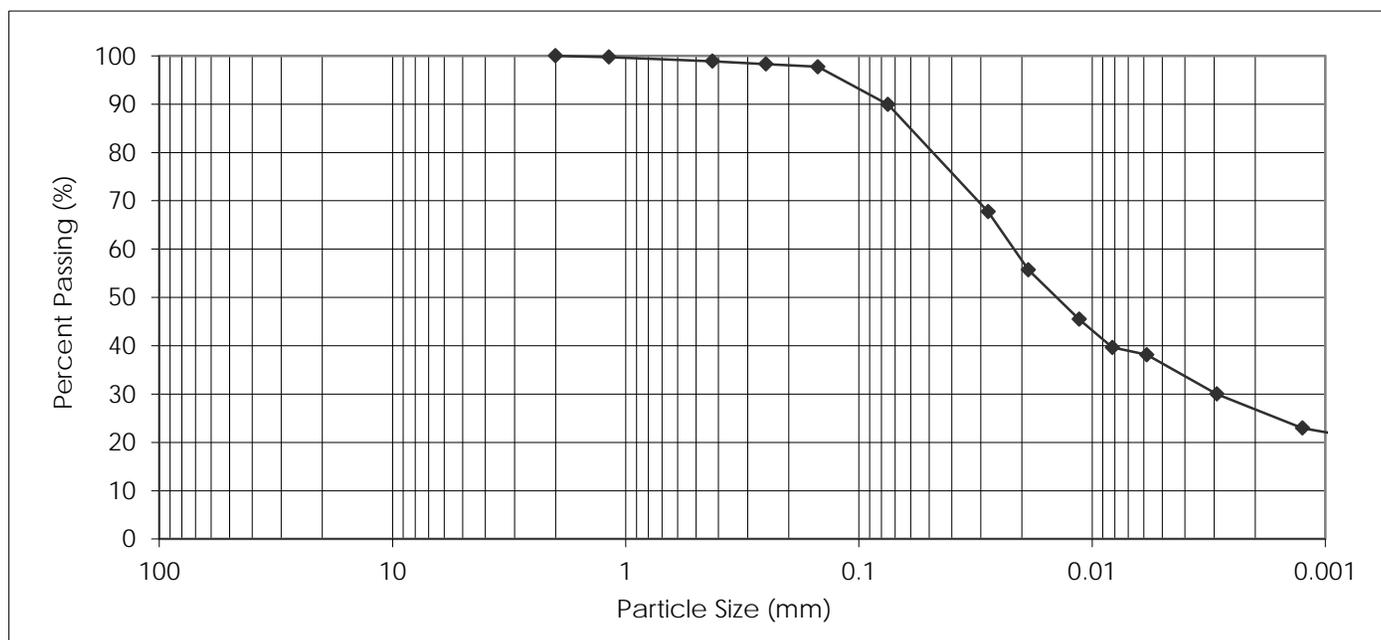
PROJECT: 2015 City of Winnipeg Alley Package
Contract (15-RL-01)
Chancellor Dr and Waverley St Alley between
Lake Lindero Rd and Lake Crest Rd

Attention: Michael Turko

PROJECT NO.: 123311678

SAMPLED BY: Nestor Abarca
SAMPLE ID: TH2 @ 0.91 m

DATE RECEIVED: January 13, 2015
TESTED BY: Sothea Bun, C.E.T.



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	99.7
0.425 mm	98.9
0.250 mm	98.3
0.150 mm	97.8
0.075 mm	90.0
0.005 mm	35.8
0.002 mm	26.1
0.001 mm	22.0

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	1.1	8.9	63.9	26.1	22.0

January 19, 2015



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