Stantec Consulting Ltd.
500–311 Portage Avenue, Winnipeg MB R3B 2B9

December 17, 2019
File: 113708080

Attention: Rebecca Hewett
Stantec Consulting Ltd.
500-311 Portage Avenue
Winnipeg, Manitoba
R3B 2B9

Dear Rebecca,

Reference: Geotechnical Investigation for City of Winnipeg Roblin Boulevard Pavement Renewal – Winnipeg, Manitoba

On December 3 and 4, 2019, 14 pavement cores were collected and one testhole was drilled to 2.1 m on Roblin Boulevard from Windmill Way to Dieppe Road (noted as TH01 to TH15 on the attached figures 1, 2, 3, and 4). The locations for the cores and testhole were selected by Rebecca Hewett of Stantec. No pavement core was required at testhole TH15, therefore a core was not obtained for this testhole. The purpose of the geotechnical investigation was to determine the underlying soil, groundwater conditions, and thickness of pavement. Upon completion of the work, testhole TH15 was backfilled with bentonite and clay cuttings and all holes were topped with cold mix asphalt. Testhole log and the laboratory test reports are also provided in the attachments. A laboratory testing program was completed as part of this project which included moisture contents on all collected soil samples as well as selected samples were tested for Atterberg limits and particle size analysis. The laboratory testing results are summarized in the tables below and included on the attached testhole record.

Table 1 – Atterberg Limits Test Data

Testhole No.	Sample Depth	Soil Type	Liquid Limit	Plastic Limit	Plasticity Index
TH15	1.0 m	Clay	90	23	67

Table 2 – Summary of Particle Size Analyses Data

Testhole No.	Sample Depth	Soil Type	Particle Size			
			Gravel 75 to 4.75 mm	Sand <4.75 to 0.075 mm	Silt <0.075 to 0.002 mm	Clay <0.002 mm
TH15	1.0 m	Clay	0.0%	2.7%	14.6%	82.7%

December 17, 2019

Rebecca Hewett

Reference: **Geotechnical Investigation for City of Winnipeg Roblin Boulevard Pavement Renewal – Winnipeg, Manitoba**

We appreciate the opportunity to assist you on this project. Please contact the undersigned if you have any questions regarding our report.Regards,

Regards,

Stantec Consulting Ltd.

Lee Boughton
Geotechnical Technologist
Phone: 204 944-3795
lee.boughton@stantec.com

German Leal M.Eng., P.Eng.
Associate Geotechnical Engineer
Phone: (204) 928-4005
German.Leal@stantec.com

1. Attachment:
   1. Testhole Location Plan
   2. Core Photos
   3. Testhole Logs
   4. Laboratory Test Reports

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2019/12/17 11:30 AM By: Boughton, Lee

ORIGINAL SHEET - ISO 11x17 - v17.05

2019-12-17
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Stantec

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Legend

- APPROXIMATE TESTHOLE LOCATION (CORING ONLY)
- APPROXIMATE TESTHOLE LOCATION (DRILLING ONLY)

Notes

Client/Project
CITY OF WINNIPEG
ROBLIN BOULEVARD PAVEMENT RENEWAL
WINNIPEG, MB

Figure No.
1

Title
TESTHOLE LOCATION PLAN

ORIGINAL SHEET - ISO 11x17 - v17.05

2019-12-16
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2019/12/16 4:20 PM By: Boughton, Lee

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Legend

APPROXIMATE TESTHOLE LOCATION (CORING ONLY)

Notes

Client/Project
CITY OF WINNIPEG
ROBLIN BOULEVARD PAVEMENT RENEWAL
WINNIPEG, MB

Figure No.
2

Title
TESTHOLE LOCATION PLAN

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2019/12/16 4:20 PM By: Boughton, Lee

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Legend

APPROXIMATE TESTHOLE LOCATION (CORING ONLY)

Notes

Client/Project
CITY OF WINNIPEG
ROBLIN BOULEVARD PAVEMENT RENEWAL
WINNIPEG, MB

Figure No.
3

Title
TESTHOLE LOCATION PLAN

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2019/12/16 4:20 PM By: Boughton, Lee

ORIGINAL SHEET - ISO 11x17 - v17.05

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APPROXIMATE TESTHOLE LOCATION (CORING ONLY)

Notes

Client/Project
CITY OF WINNIPEG
ROBLIN BOULEVARD PAVEMENT RENEWAL
WINNIPEG, MB

Figure No.
4

Title
TESTHOLE LOCATION PLAN

December 17, 2019

Reference: **City of Winnipeg Roblin Boulevard Pavement Renewal – Roblin Boulevard From Windmill Way to Dieppe Road - Winnipeg, Manitoba**

TH01 Core

TH02 Core

December 17, 2019

Reference: **City of Winnipeg Roblin Boulevard Pavement Renewal – Roblin Boulevard From Windmill Way to Dieppe Road - Winnipeg, Manitoba**

TH03 Core

TH04 Core

December 17, 2019

Reference: **City of Winnipeg Roblin Boulevard Pavement Renewal – Roblin Boulevard From Windmill Way to Dieppe Road - Winnipeg, Manitoba**

TH05 Core

TH06 Core

December 17, 2019

Reference: **City of Winnipeg Roblin Boulevard Pavement Renewal – Roblin Boulevard From Windmill Way to Dieppe Road - Winnipeg, Manitoba**

TH07 Core

TH08 Core

December 17, 2019

Reference: **City of Winnipeg Roblin Boulevard Pavement Renewal – Roblin Boulevard From Windmill Way to Dieppe Road - Winnipeg, Manitoba**

TH09 Core

TH10 Core

December 17, 2019

Reference: **City of Winnipeg Roblin Boulevard Pavement Renewal – Roblin Boulevard From Windmill Way to Dieppe Road - Winnipeg, Manitoba**

TH11 Core

TH12 Core

December 17, 2019

Reference: **City of Winnipeg Roblin Boulevard Pavement Renewal – Roblin Boulevard From Windmill Way to Dieppe Road - Winnipeg, Manitoba**

TH13 Core

TH14 Core

Table 3 – City of Winnipeg Roblin Boulevard Pavement Renewal – Roblin Boulevard From Windmill Way to Dieppe Road - Winnipeg, Manitoba

Testhole ID	Testhole Location	Pavement Surface		Comments
		Type	Thickness (mm)	
TH01	Roblin Boulevard Eastbound Median Lane, 65 m east of Dale Blvd 1 m south of median curb	Asphalt	55	• crushed limestone below concrete pavement
		Concrete	190	
TH02	Roblin Boulevard Eastbound Median Lane, 45 m east of Malone St 1 m south of median curb	Asphalt	85	• crushed limestone below concrete pavement
		Concrete	185	
TH03	Roblin Boulevard Eastbound Curb Lane, 132 m east of Charleswood Dr 1 m north of south curb	Asphalt	165	• crushed limestone below concrete pavement
		Concrete	175	
TH04	Roblin Boulevard Eastbound Curb Lane, 132 m east of Berkley St 1 m north of south curb	Asphalt	155	• crushed limestone below concrete pavement
		Concrete	165	
TH05	Roblin Boulevard Eastbound Median Lane, 14 m east of Scottswood Dr 1 m south of median curb	Asphalt	65	• crushed limestone below concrete pavement
		Concrete	165	
TH06	Roblin Boulevard Eastbound Curb Lane, 22 m west of Pepperloaf Way 1 m north of south curb	Asphalt	130	• crushed limestone below concrete pavement
		Concrete	150	
TH07	Roblin Boulevard Eastbound Median Lane, 40 m west of Dieppe Rd 1 m south of median curb	Asphalt	80	• crushed limestone below concrete pavement
		Concrete	175	
TH08	Roblin Boulevard Westbound Median Lane, 65 m west of Dieppe Rd 5 m south of north curb	Asphalt	75	• crushed limestone below concrete pavement
		Concrete	185	
TH09	Roblin Boulevard Westbound Curb Lane, 18 m west of William Marshall 1 m south of north curb	Asphalt	60	• crushed limestone below concrete pavement
		Concrete	175	
TH10	Roblin Boulevard Westbound Median Lane, 16 m east of Scottswood Dr 6 m south of north curb	Asphalt	65	• crushed limestone below concrete pavement
		Concrete	195	
TH11	Roblin Boulevard Westbound Curb Lane, 13 m east of Municipal Rd 1 m south of north curb	Asphalt	85	• crushed limestone below concrete pavement
		Concrete	150	
TH12	Roblin Boulevard Westbound Median Lane, 12 m west of Charleswood Dr 5 m south of north curb	Asphalt	45	• crushed limestone below concrete pavement
		Concrete	185	
TH13	Roblin Boulevard Westbound Curb Lane, 19 m east of Malone St 1 m south of north curb	Asphalt	70	• crushed limestone below concrete pavement
		Concrete	205	
TH14	Roblin Boulevard Westbound Median Lane, 25 m west of Stack St 1 m north of median curb	Asphalt	90	• crushed limestone below concrete pavement
		Concrete	155	

BOREHOLE RECORD

TH15

CLIENT: **City of Winnipeg**

PROJECT NO. : **113708080**

PROJECT: **Geotechnical Investigation for Roblin Boulevard Pavement Renewal (Phase 1)**

BH ELEVATION: **N/A**

LOCATION: **Winnipeg, MB**

DATUM: **N/A**

DATE BORED: **12/03/2019**

WATER LEVEL: **N/A**

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (USCS)	STRATA PLOT	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm) or TCR %	SAMPLES N-VALUE or RQD %	OTHER TESTS / REMARKS
0		ASPHALT						
		CRUSHED LIMESTONE: 3/4 down		GS				
		FILL: black fat clay, silty		GS				
				GS				
		Stiff grey fat CLAY (CH) - some silt, trace fine sand		GS				Sieve/Hydro at 1.0 m G 0% S 3% M 15% C 83%
1				GS				
		- brown, no fine sand, trace silt inclusions below 1.5 m		GS				
				GS				
2		• Frozen to 0.3 m. • No soil sloughing or groundwater seepage was observed during or upon completion of drilling. • Testhole terminated at a depth of 2.1 m.						
3								

UNDRAINED SHEAR STRENGTH, Cu (kPa)

LABORATORY TEST ▲ FIELD VANE TEST ◆

POCKET PEN. ★ POCKET SHEAR VANE ◘

50 kPa 100 kPa 150 kPa 200 kPa

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

SPT (N-value) BLOWS/0.3m ●

Water Content (%) and Blow Count

10 20 30 40 50 60 70 80

BACKFILL/ MONITOR WELL/ PIEZOMETER

ELEVATION (m)

BACKFILL SYMBOL: ASPHALT, GROUT, CONCRETE, BENTONITE, DRILL CUTTINGS, SAND, SLOUGH

Drilling Contractor: Maple Leaf Drilling Ltd. | Logged By: L.B.

Drilling Method: 125 mm SSA | Reviewed By: G.L.

Completion Depth: 2.13 m | Page 1 of 1

Atterberg Limits
ASTM D4318
Method B- One Point

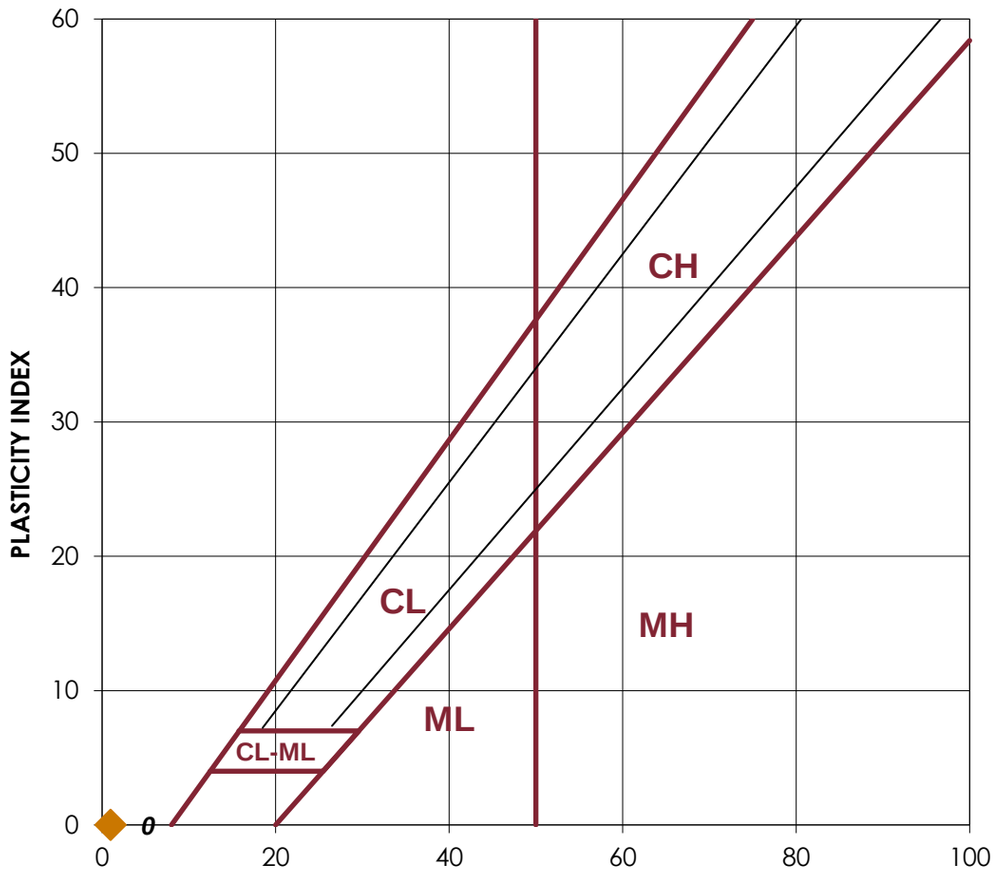
Client: Stantec Consulting Ltd.
Project Name: CoW Roblin Blvd Pvmt Renew

Project No: 113708080
Date Received: December 4, 2019
Date Tested: December 10, 2019
Tested By: Donald Eliazar

LABORATORY
199 Henlow Bay

Winnipeg, Manitoba
Canada R3Y 1G4
Tel: (204) 488-6999

Sample:			Sample:	
TH01 @ 3.5'				
LIQUID			LIQUID	
1	2	Trial No.	1	2
27	28	Number of Blows		
308	182	Container Number		
37.39	35.50	Wt. Sample (wet+tare)(g)		
29.20	27.63	Wt. Sample (dry+tare)(g)		
20.00	18.82	Wt. Tare (g)		
9.2	8.8	Wt. Dry Soil (g)		
8.2	7.9	Wt. Water (g)		
89.0%	89.3%	Water Content (%)		
89.9%	90.6%	Corrected Water Content (%		
PLASTIC			PLASTIC	
1	2	Trial No.	1	2
256	186	Container Number		
27.26	26.87	Wt. Sample (wet+tare)(g)		
26	25.39	Wt. Sample (dry+tare)(g)		
20.36	19.25	Wt. Tare (g)		
5.6	6.1	Wt. Dry Soil (g)		
1.3	1.5	Wt. Water (g)		
22.3%	24.1%	Water Content (%)		
AVERAGE VALUES			AVERAGE VALUES	
1	2		1	2
LL	90		LL	
PL	23		PL	
PI	67		PI	
Natural MC (%)	32.3%		Natural MC (%)	
CLASSIFICATION			CLASSIFICATION	
CH			**NON-PLASTIC**	



CERTIFIED BY CCIL Canadian Council of Independent Laboratories For specific tests as listed on www.ccil.com

Reviewed By: Guillaume Beauce, P.Eng.

Stantec Consulting Ltd.
199 Henlow Bay, Winnipeg, MB R3Y 1G4
Tel: (204) 488-6999

ASTM D422 - PARTICLE-SIZE ANALYSIS OF SOILS

TO Stantec Consulting Ltd.
500-311 Portage Avenue
Winnipeg, MB
R3B 2B9

ATTN: Lee Boughton

PROJECT CoW Roblin Blvd Pvmt Renew

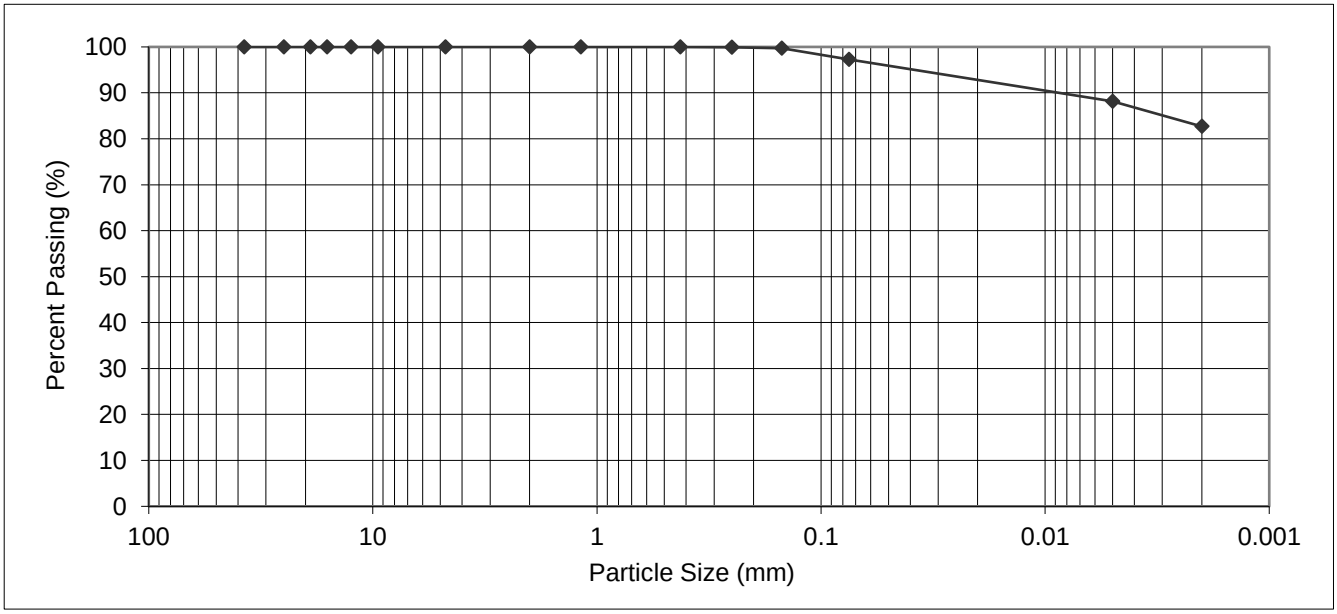
PROJECT NO. 113708080

REPORT NO. 1

DATE SAMPLED: 2019.Dec.03
SAMPLED BY: Lee Boughton

DATE RECEIVED: 2019.Dec.05
SAMPLE ID: TH01 @ 3.5'

DATE TESTED: 2019.Dec.09
TESTED BY: Donald Eliazar



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

PARTICLE SIZE		PERCENT PASSING
1.18	mm	100.0
0.425	mm	100.0
0.250	mm	99.9
0.150	mm	99.7
0.075	mm	97.3
0.005	mm	88.1
0.002	mm	82.7
0.001	mm	NT*

Gravel, % 75 to 4.75 mm	Sand, %			Silt, % <0.075 to 0.002 mm	Clay, % <0.002 mm	Colloids, % < 0.001 mm
	Coarse <4.75 to 2.0 mm	Medium <2.0 to 0.425 mm	Fine <0.425 to 0.075 mm			
0.0	0.0	0.0	2.7	14.6	82.7	NT*

NT* Sample not tested for colloids

REPORT DATE: 2019.Dec.11

REVIEWED BY: Guillaume Beauce, P.Eng.