



August 20, 2019
File: 113708020

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

Dear Scott,

**Reference: Geotechnical Investigation for City of Winnipeg Safford and Corydon Pavement
Renewal – Winnipeg, Manitoba**

On July 22 to 26, 2019, a geotechnical investigation was conducted for City of Winnipeg Safford and Corydon Pavement Renewal project. The purpose of the geotechnical investigation was to determine the underlying soil and groundwater conditions. A total of 25 testholes were drilled and cored on Corydon Avenue and Stafford Street. Testholes TH01 to TH18 were drilled on Corydon Avenue and testholes TH19 to TH25 were drilled on Stafford Street, the testhole locations are shown in Figures 1, 2, 3, and 4 of the Testhole Location Plans attached to this document. Upon completion of the work, the testholes were backfilled with bentonite and clay cuttings; the upper four inches were repaired with cold mix asphalt. Core photos, pavement structure thickness (shown in table 6 and 7), testhole logs, 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, particle size analysis, standard proctor density and California Bearing Ratio (CBR) tests. A composite sample from 0.3 m to 1.5 m consisting of clay or clay fill was combined for the purpose of determining the proctor and CBR tests. The laboratory testing results are summarized in the table below and included on the attached testhole records.

Table 1 – Atterberg Limits Test Data

Testhole No.	Sample Depth	Soil Type	Liquid Limit	Plastic Limit	Plasticity Index
TH05	0.9 m	Silt	30	19	11
TH08	0.75 m	Clay (fill)	68	20	48
TH09	0.9 m	Silty Clay	54	15	39
TH19	1.1 m	Clay	74	23	51
TH21	0.75 m	Silt	27	19	8
TH22	0.9 m	Clay (fill)	73	21	52

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Scott Suderman

Reference: Geotechnical Investigation for City of Winnipeg Safford and Corydon Pavement Renewal – Winnipeg, Manitoba

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
TH05	0.9 m	Silt	0.1%	5.2%	75.3%	19.4%
TH08	0.75 m	Clay (fill)	0.1%	5.1%	35.5%	59.3%
TH09	0.9 m	Silt/Clay	0.1%	0.8%	49.9%	49.2%
TH19	1.1 m	Clay	0.6%	4.5%	24.8%	70.1%
TH21	0.75 m	Silt	1.3%	7.3%	73.3%	18.1%
TH22	0.9 m	Clay (fill)	0.0%	3.2%	29.2%	67.6%

Table 3 – Summary of Standard Proctor Density Test Data

Testhole No.	Sample Depth	Soil Type	Standard Maximum Dry Density	Optimum Moisture Content
TH03 and TH04	0.8 to 1.5 m	Clay	1448 kg/m ³	28.5%
TH13 and TH15	0.6 to 1.5 m	Clay	1468 kg/m ³	26.5%
TH01-04, TH06-07, TH10-15, TH17, and TH22-23	0.3 to 0.9 m	Clay (Fill)	1477 kg/m ³	27.5%
TH19 and TH22	0.7 to 1.5 m	Clay	1516 kg/m ³	26.5%

Table 4 – Summary of California Bearing Ratio Test Data

Testhole No.	Sample Depth	Soil Type	Wet Density	Dry Density	Final Moisture content	CBR at 0.1-inch Penetration	CBR at 0.2-inch Penetration
TH03 and TH04	0.8 to 1.5 m	Clay	1775 kg/m ³	1377 kg/m ³	28.9%	1.3	1.0
TH13 and TH15	0.6 to 1.5 m	Clay	1923 kg/m ³	1513 kg/m ³	27.1%	2.8	2.3
TH01-04, TH06-07, TH10-15, TH17, and TH22-23	0.3 to 0.9 m	Clay (Fill)	1867 kg/m ³	1484 kg/m ³	25.8%	3.7	2.8
TH19 and TH22	0.7 to 1.5 m	Clay	1924 kg/m ³	1517 kg/m ³	26.8%	2.8	2.3

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Scott Suderman

Reference: Geotechnical Investigation for City of Winnipeg Safford and Corydon Pavement Renewal – Winnipeg, Manitoba

Table 5 – Observed Short-Term Groundwater Seepage and Sloughing Conditions

Testhole No.	Groundwater Seepage	Observed Depth of Groundwater Seepage	Depth to Groundwater Upon Completion of Drilling	Observed Depth of Soil Sloughing
TH01 to TH25	No groundwater seepage or soil sloughing was observed during or upon completion of excavation.			

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

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

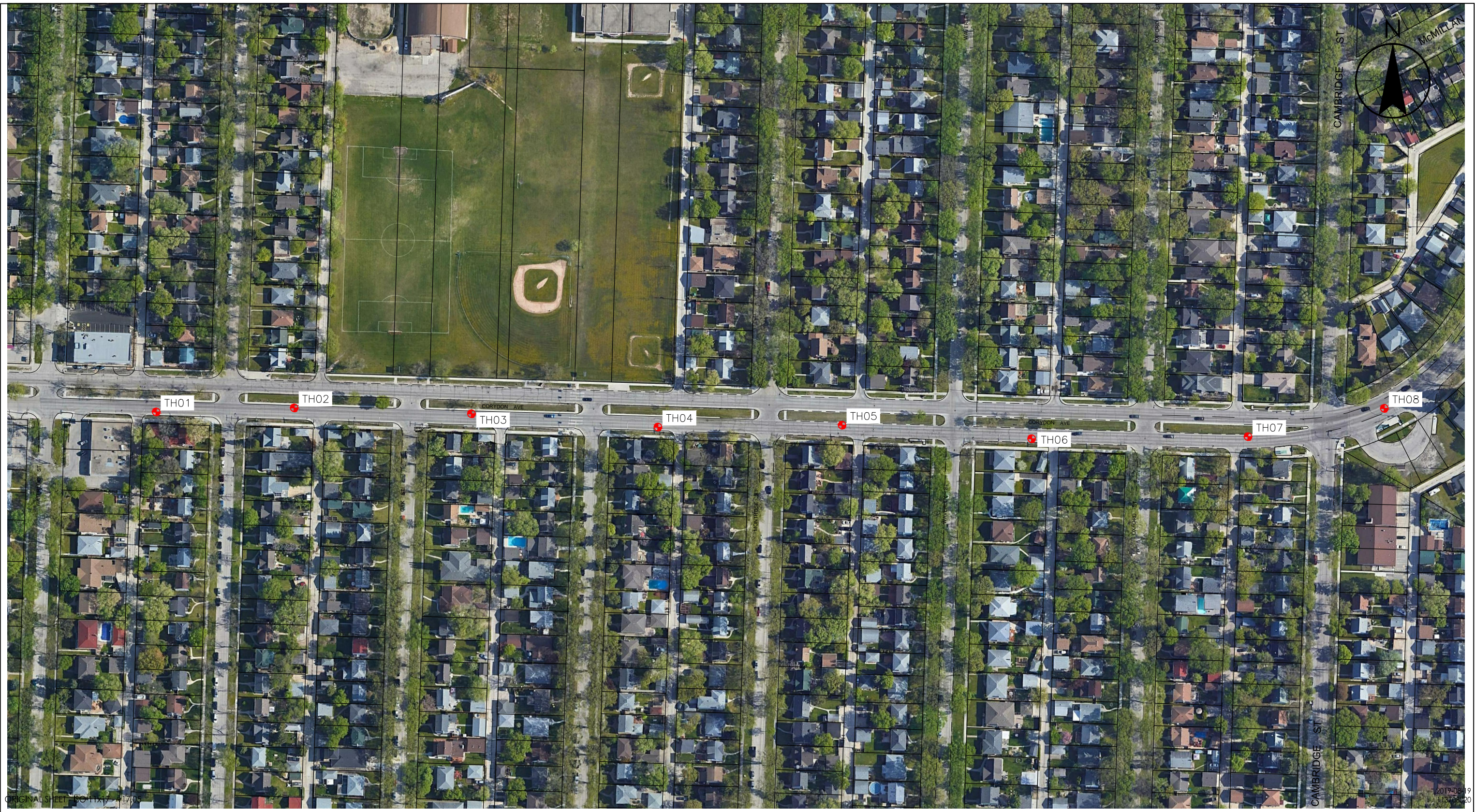
Phone: (204) 928-4005

German.Leal@stantec.com

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

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2019/08/20 9:34 AM By: Boughton, Lee



ORIGINAL SHEET: 5011x17-1705

2019-08-19
11:37:08 AM

 **Stantec**
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Legend

 TESTHOLE LOCATION

Notes

Client/Project
CITY OF WINNIPEG
COW STAFFORD/TAYLOR/CORYDON PAVEMENT RENEWAL
WINNIPEG, MB
Figure No.
1
Title
TESTHOLE LOCATION PLAN

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2017/08/20 9:35 AM By: Boughton, Lee



ORIGINAL SHEET - ISO 11x17 - 17.05

2017-08-19
11:37:08 AM

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Legend

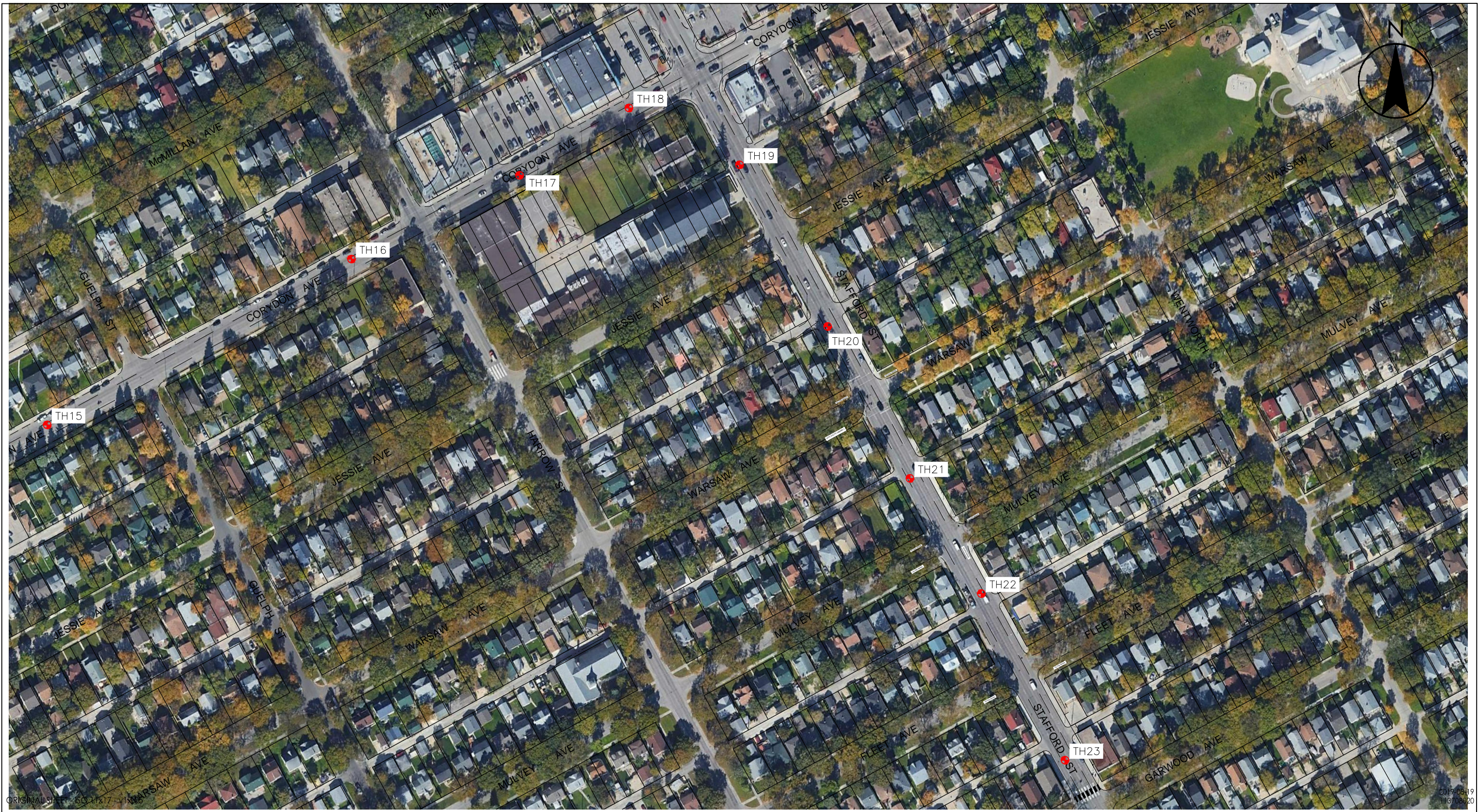
 TESTHOLE LOCATION

Notes

Client/Project
 CITY OF WINNIPEG
 COW STAFFORD/TAYLOR/CORYDON PAVEMENT RENEWAL
 WINNIPEG, MB

Figure No.
 2

Title
 TESTHOLE LOCATION PLAN



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11:37:08 AM

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Legend

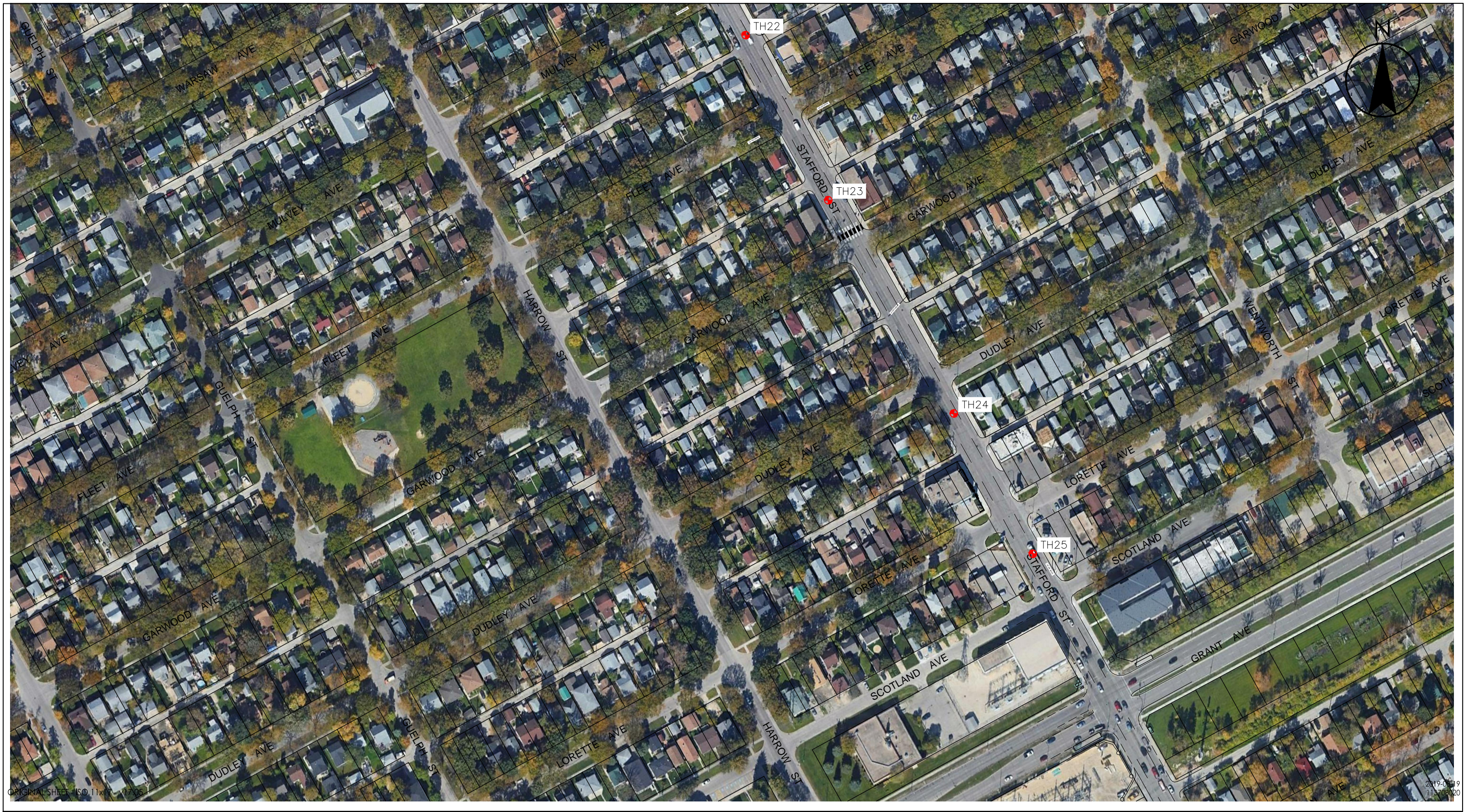
 TESTHOLE LOCATION

Notes

Client/Project
CITY OF WINNIPEG
COW STAFFORD/TAYLOR/CORYDON PAVEMENT RENEWAL
WINNIPEG, MB

Figure No.
3

Title
TESTHOLE LOCATION PLAN



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2019/08/20 9:36 AM By: Baughton, Lee

ORIGINAL SHEET - ISO 11x17 - 1/7/05

2019-08-19
11:37:08 AM

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Legend

 TESTHOLE LOCATION

Notes

Client/Project
 CITY OF WINNIPEG
 COW STAFFORD/TAYLOR/CORYDON PAVEMENT RENEWAL
 WINNIPEG, MB

Figure No.
 4

Title
 TESTHOLE LOCATION PLAN

August 20, 2019

Reference: City of Winnipeg Safford and Corydon Pavement Renewal – Corydon Avenue From Waterloo Street to Stafford Street - Winnipeg, Manitoba



Figure 1 - TH01 Core



Figure 2 - TH02 Core

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Reference: City of Winnipeg Safford and Corydon Pavement Renewal – Corydon Avenue From Waterloo Street to Stafford Street - Winnipeg, Manitoba



Figure 3 - TH03 Core



Figure 4 - TH04 Core

August 20, 2019

Reference: City of Winnipeg Safford and Corydon Pavement Renewal – Corydon Avenue From Waterloo Street to Stafford Street -
Winnipeg, Manitoba



Figure 5 - TH05 Core



Figure 6 - TH06 Core

August 20, 2019

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Winnipeg, Manitoba



Figure 7 - TH07 Core



Figure 8 - TH08 Core

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Figure 9 - TH09 Core



Figure 10 – TH10 Core

August 20, 2019

Reference: City of Winnipeg Safford and Corydon Pavement Renewal – Corydon Avenue From Waterloo Street to Stafford Street -
Winnipeg, Manitoba



Figure 11 – TH11 Core



Figure 12 – TH12 Core

August 20, 2019

Reference: City of Winnipeg Safford and Corydon Pavement Renewal – Corydon Avenue From Waterloo Street to Stafford Street -
Winnipeg, Manitoba



Figure 13 – TH13 Core



Figure 14 – TH14 Core

August 20, 2019

Reference: City of Winnipeg Safford and Corydon Pavement Renewal – Corydon Avenue From Waterloo Street to Stafford Street - Winnipeg, Manitoba



Figure 15 – TH15 Core



Figure 16 – TH16 Core

August 20, 2019

Reference: City of Winnipeg Safford and Corydon Pavement Renewal – Corydon Avenue From Waterloo Street to Stafford Street - Winnipeg, Manitoba



Figure 17 – TH17 Core



Figure 18 – TH18 Core

August 20, 2019

Reference: City of Winnipeg Safford and Corydon Pavement Renewal – Stafford Street From Corydon Avenue to Grant Avenue - Winnipeg, Manitoba



Figure 19 – TH19 Core



Figure 20 – TH20 Core

August 20, 2019

Reference: City of Winnipeg Safford and Corydon Pavement Renewal – Stafford Street From Corydon Avenue to Grant Avenue - Winnipeg, Manitoba



Figure 21 – TH21 Core



Figure 22 – TH22 Core

August 20, 2019

Reference: City of Winnipeg Safford and Corydon Pavement Renewal – Stafford Street From Corydon Avenue to Grant Avenue - Winnipeg, Manitoba



Figure 23 – TH23 Core



Figure 24 – TH24 Core

August 20, 2019

Reference: City of Winnipeg Safford and Corydon Pavement Renewal – Stafford Street From Corydon Avenue to Grant Avenue - Winnipeg, Manitoba



Figure 25 – TH25 Core

Table 6 – City of Winnipeg Safford and Corydon Pavement Renewal – Corydon Ave From Waterloo St to Stafford St

Testhole ID	Testhole Location	Pavement Surface		Comments
		Type	Thickness (mm)	
TH01	Corydon Avenue Eastbound Curb Lane, 35 m west of Ash Street 1 m north of south curb	Asphalt	60	• crushed limestone below concrete pavement
		Concrete	240	
TH02	Corydon Avenue Eastbound Median Lane, 32 m east of Ash Street 5 m north of south curb	Asphalt	90	• clay fill below concrete pavement
		Concrete	180	
TH03	Corydon Avenue Eastbound Median Lane, 62 m west of Elm Street 5 m north of south curb	Asphalt	90	• clay fill below concrete pavement
		Concrete	190	
TH04	Corydon Avenue Eastbound Curb Lane, 32 m east of Elm Street 1 m north of south curb	Asphalt	70	• crushed limestone below concrete pavement
		Concrete	190	
TH05	Corydon Avenue Eastbound Median Lane, 57 m west of Waverly Street 5 m north of south curb	Asphalt	120	• crushed limestone below concrete pavement
		Concrete	260	
TH06	Corydon Avenue Eastbound Curb Lane, 39 m east of Waverly Street 1 m north of south curb	Asphalt	90	• crushed limestone below concrete pavement
		Concrete	180	
TH07	Corydon Avenue Eastbound Median Lane, 35 m west of Cambridge St 5 m north of south curb	Asphalt	115	• clay fill below concrete pavement
		Concrete	215	
TH08	Corydon Avenue Eastbound Median Lane, 30 m east of Cambridge St 5 m north of south curb	Asphalt	70	• clay fill below concrete pavement
		Concrete	270	
TH09	Corydon Avenue Westbound Curb Lane, 140 m west of Thurso Street 1 m south of north curb	Asphalt	120	• clay below concrete pavement
		Concrete	260	
TH10	Corydon Avenue Eastbound Curb Lane, 37 m west of Thurso Street 1 m north of south curb	Asphalt	190	• clay fill below concrete pavement
		Concrete	150	
TH11	Corydon Avenue Westbound Median Lane, 112 m west of Rockwood St 5 m south of north curb	Asphalt	110	• clay fill below concrete pavement
		Concrete	240	
TH12	Corydon Avenue Eastbound Curb Lane, 28 m west of Rockwood St 1 m north of south curb	Asphalt	80	• clay fill below concrete pavement
		Concrete	250	
TH13	Corydon Avenue Westbound Median Lane, 98 m west of Wilton Street 5 m south of north curb	Asphalt	100	• clay fill below concrete pavement
		Concrete	340	
TH14	Corydon Avenue Eastbound Median Lane, 28 m west of Wilton Street 5 m north of south curb	Asphalt	100	• clay fill below concrete pavement
		Concrete	170	
TH15	Corydon Avenue Westbound Median Lane, 52 m west of Guelph Street 5 m south of north curb	Asphalt	90	• clay below concrete pavement
		Concrete	510	
TH16	Corydon Avenue Eastbound Median Lane, 128 m east of Guelph Street 5 m north of south curb	Asphalt	100	• clay fill below concrete pavement
		Concrete	500	
TH17	Corydon Avenue Westbound Median Lane, 101 m west of Stafford Street 5 m south of north curb	Asphalt	90	• clay fill below concrete pavement
		Concrete	150	
		Wood	150	
		Concrete	130	
TH18	Corydon Avenue Eastbound Median Lane, 33 m west of Stafford Street 5 m north of south curb	Asphalt	50	• clay below concrete pavement
		Concrete	200	
		Wood	150	
		Concrete	200	

Reference: City of Winnipeg Safford and Corydon Pavement Renewal – Stafford Street From Corydon Avenue to Grant Avenue - Winnipeg, Manitoba

Table 7 – City of Winnipeg Safford and Corydon Pavement Renewal – Stafford St From Corydon Ave to Grant Ave

Testhole ID	Testhole Location	Pavement Surface		Comments
		Type	Thickness (mm)	
TH19	Stafford Street Southbound Median Lane, 41 m north of Jessie Ave 4.5 m east of west curb	Asphalt	90	• clay fill below concrete pavement
		Concrete	610	
TH20	Stafford Street Southbound Median Lane, 50m south of Jessie Ave 4.5 m east of west curb	Asphalt	110	• clay fill below concrete pavement
		Concrete	500	
TH21	Stafford Street Southbound Median Lane, 36 m north of Mulvey Ave 4.5 m east of west curb	Asphalt	60	• silt below concrete pavement
		Concrete	550	
TH22	Stafford Street Northbound Median Lane, 31 m south of Mulvey Ave 4.5 m west of east curb	Asphalt	120	• clay fill below concrete pavement
		Concrete	530	
TH23	Stafford Street Southbound Median Lane, 26 m north of Garwood Ave 4.5 m east of west curb	Asphalt	110	• silt below concrete pavement
		Concrete	490	
TH24	Stafford Street Northbound Median Lane, 60 m north of Lorette Ave 4.5 m west of east curb	Asphalt	190	• clay fill below concrete pavement
		Concrete	460	
TH25	Stafford Street Northbound Median Lane, 19 m south of Lorette Ave 4.5 m west of east curb	Asphalt	50	• clay fill below concrete pavement
		Concrete	250	

TH01 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5525005
 LOCATION Corydon Ave from Waterloo St to Stafford St ELEVATION 232.592 m EASTING 630524
 DRILLING DATE July 22, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA

DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES		DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	TYPE	NUMBER	
0	AS		Asphalt						0
	CO		Concrete						
	GW		Crushed Limestone	X	GS	14			
	CH		stiff brown fat CLAY (CH) - silty, some fine sand	X	GS	29			2
1	ML		soft tan SILT (ML) - some clay, trace fine sand	X	GS	23			4
				X	GS	23			
				X	GS	24			6
				X	GS	27			
2	CH		stiff grey fat CLAY (CH) - silty, trace fine sand	X	GS	35			6
			End of Testhole • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at depth of 2.3 m.						8
3									10

Insitu Shear Vane (kPa) Torvane on Grab Samples (kPa)
 Pocket Penetrometer (kPa)

50kPa 100kPa 150kPa 200kPa

W_p W W_L

Moisture Content & Atterberg Limits
 ● Standard Penetration Test, blows/0.3m

10 20 30 40 50 60 70 80 90

Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test

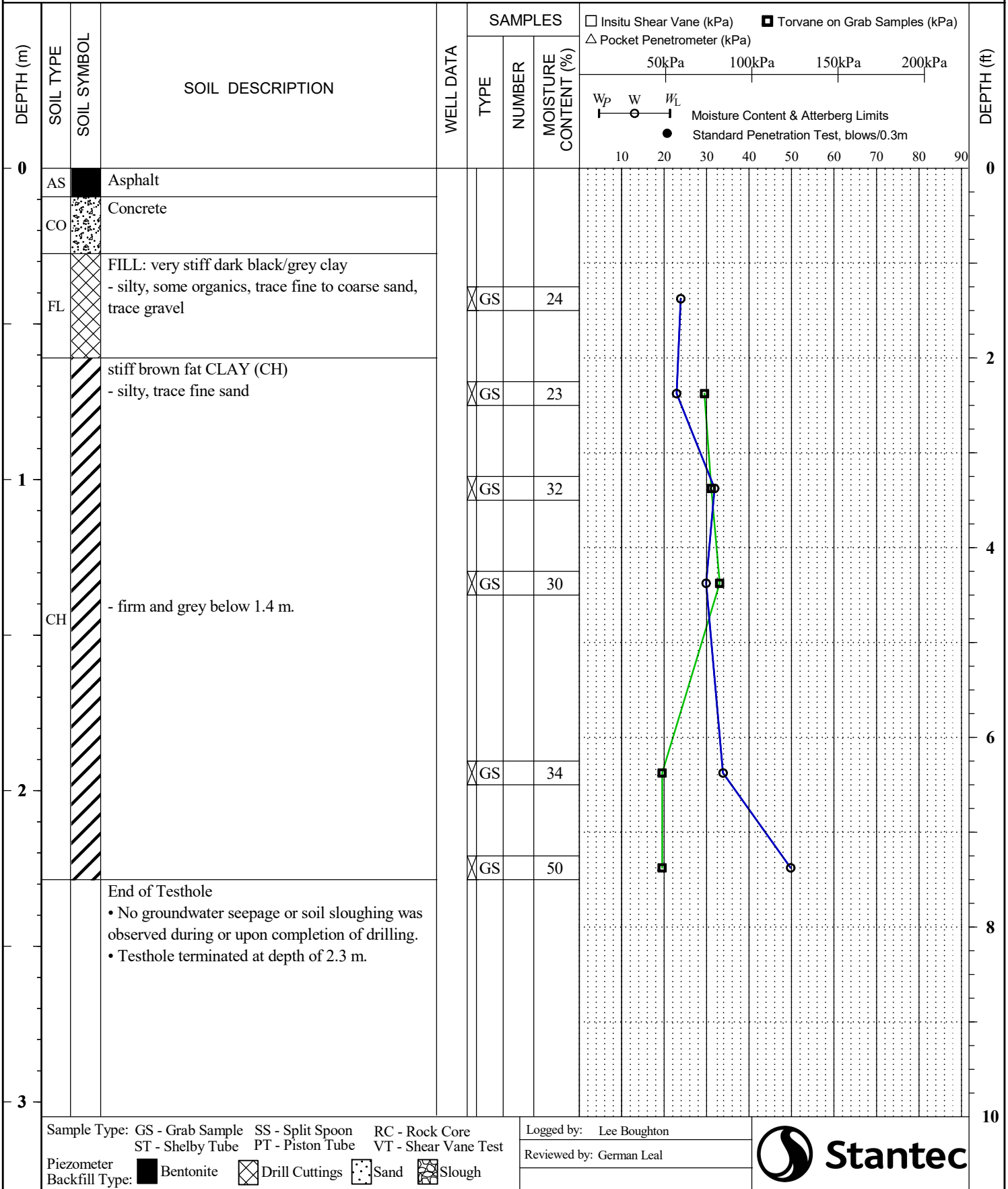
Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough

Logged by: Lee Boughton

Reviewed by: German Leal

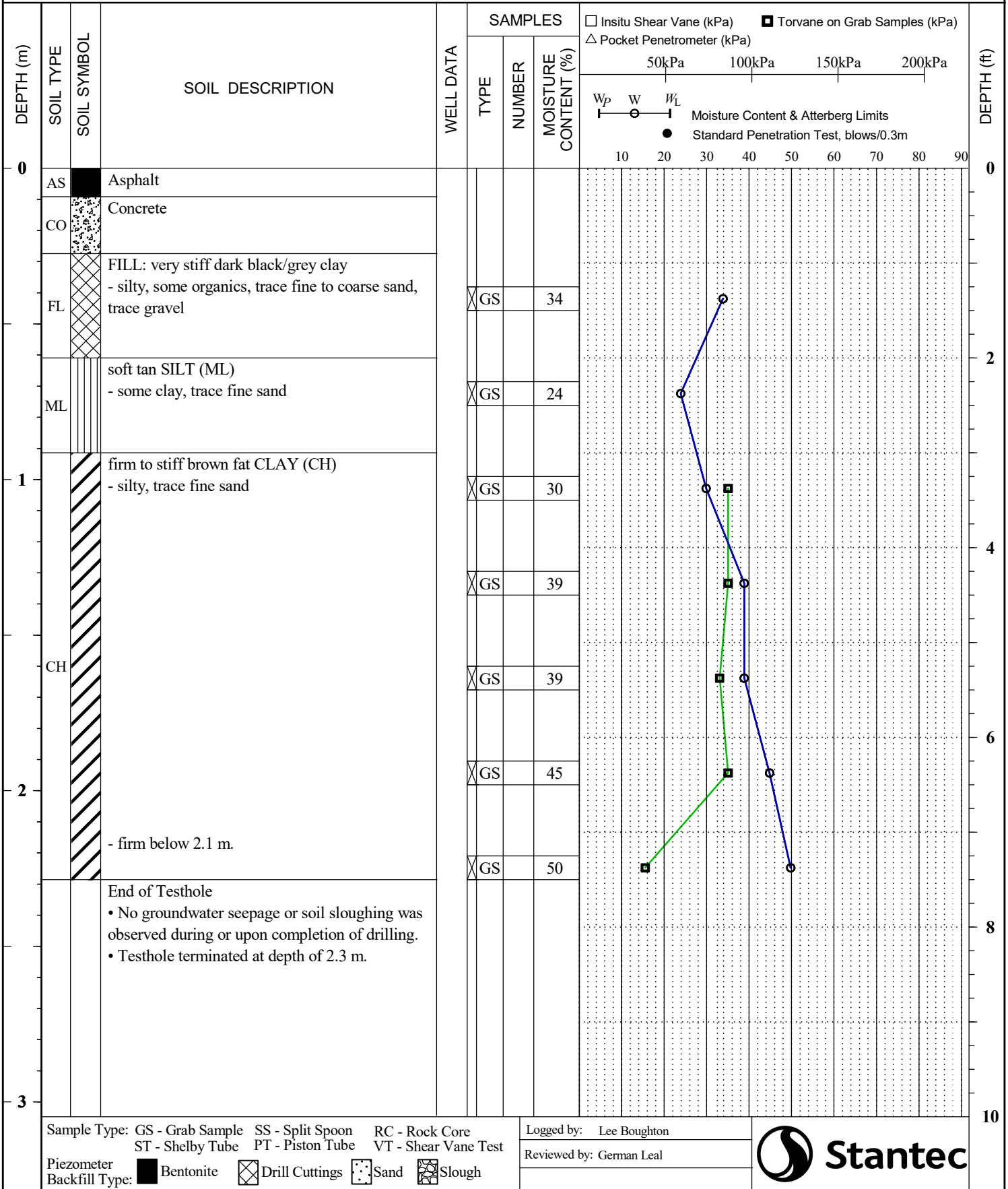
TH02 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5525007
 LOCATION Corydon Ave from Waterloo St to Stafford St ELEVATION 232.604 m EASTING 630599
 DRILLING DATE July 22, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA



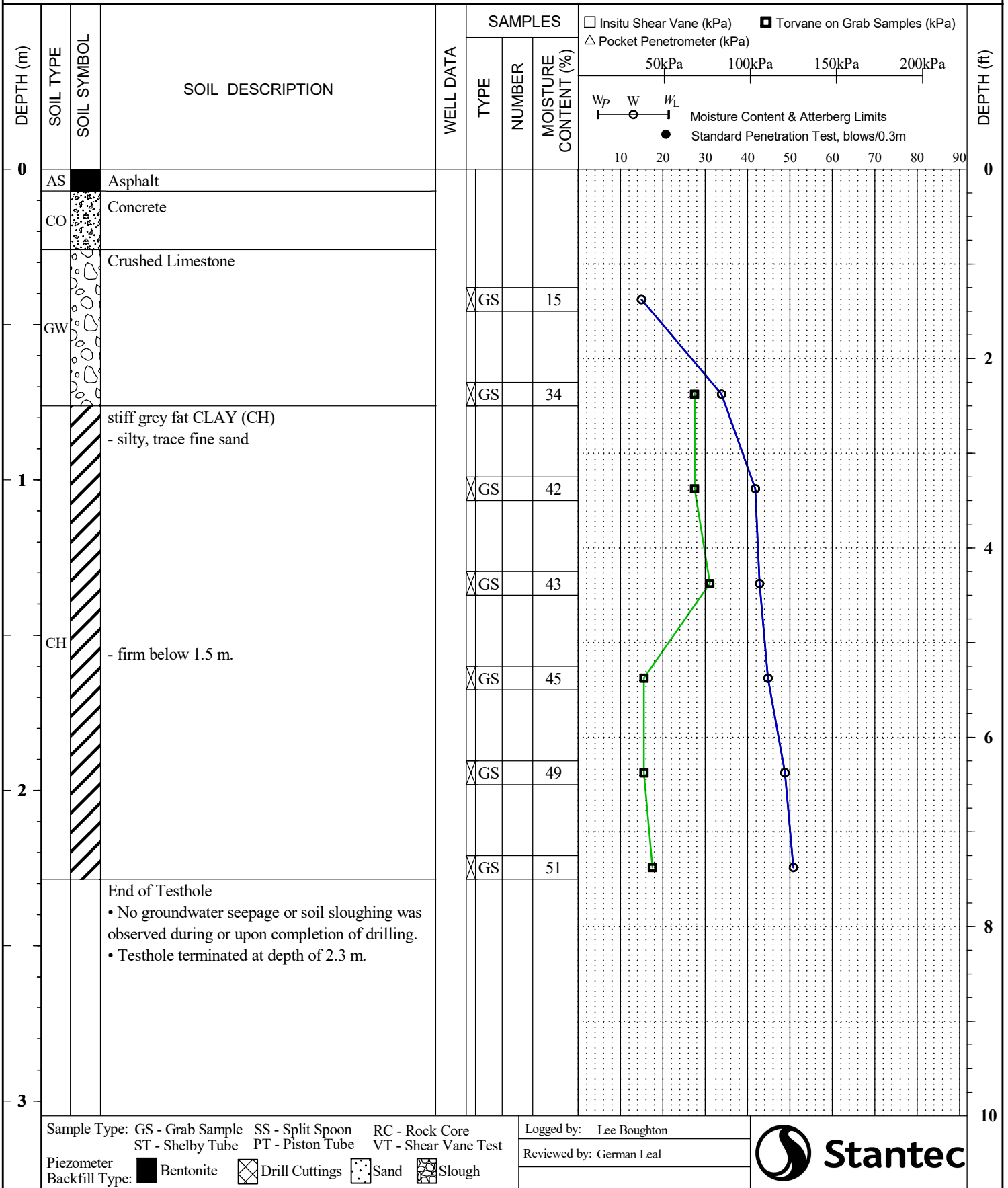
TH03 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5525004
 LOCATION Corydon Ave from Waterloo St to Stafford St ELEVATION 232.688 m EASTING 630696
 DRILLING DATE July 22, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA



TH04 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5524997
 LOCATION Corydon Ave from Waterloo St to Stafford St ELEVATION 232.625 m EASTING 630798
 DRILLING DATE July 22, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA



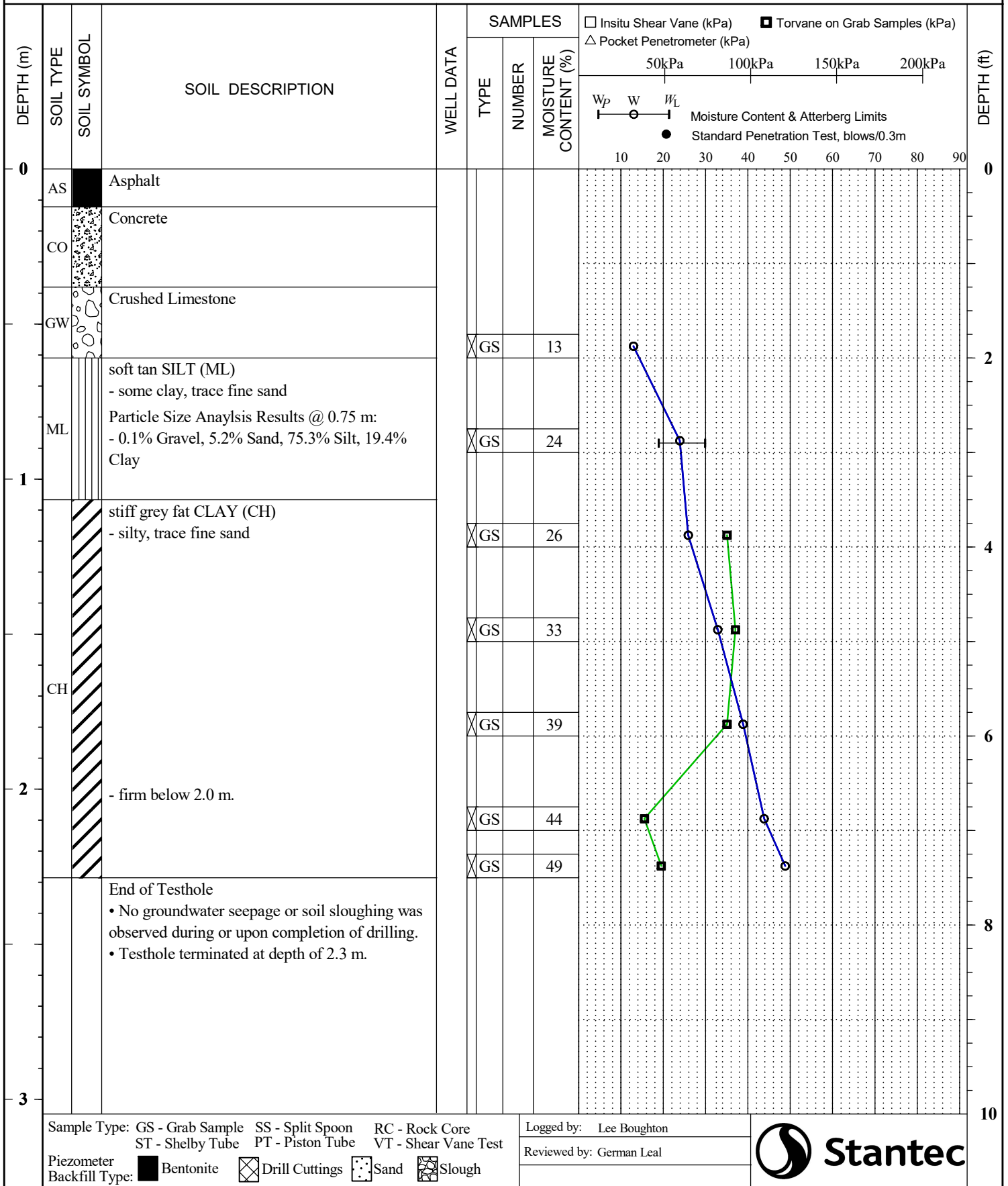
Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough

Logged by: Lee Boughton
 Reviewed by: German Leal



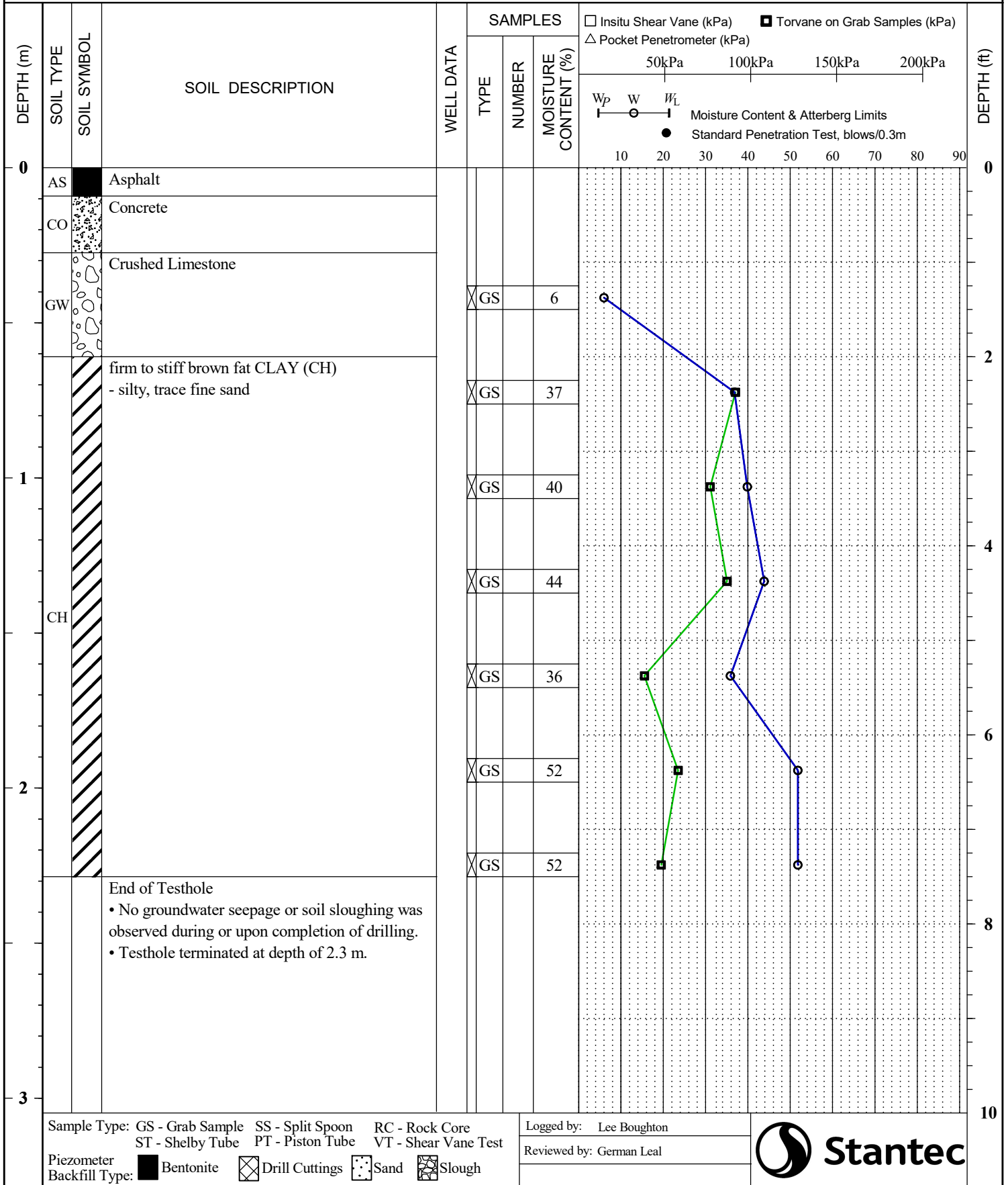
TH05 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5524998
 LOCATION Corydon Ave from Waterloo St to Stafford St ELEVATION 232.661 m EASTING 630899
 DRILLING DATE July 22, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA



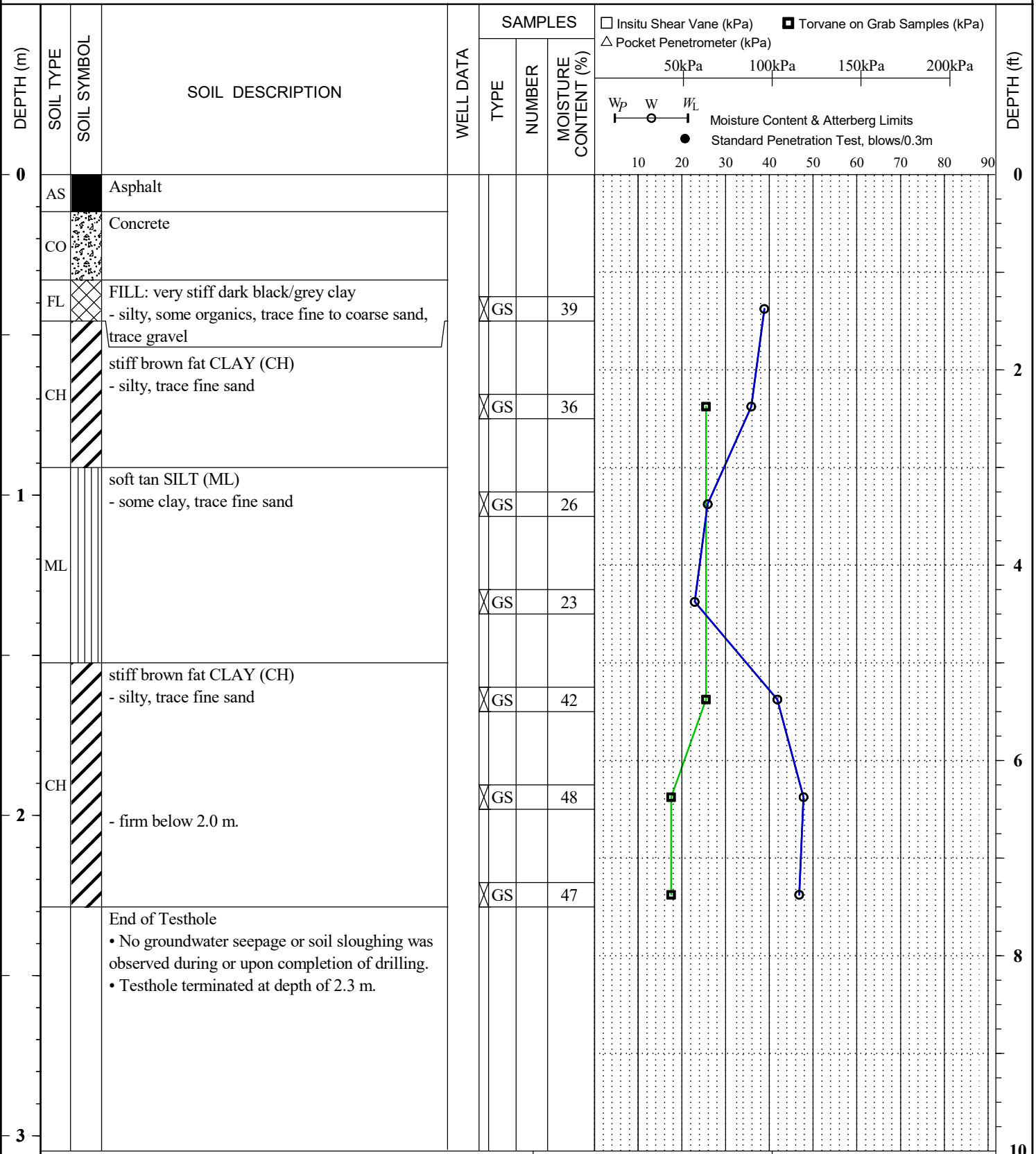
TH06 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5524990
 LOCATION Corydon Ave from Waterloo St to Stafford St ELEVATION 232.471 m EASTING 631003
 DRILLING DATE July 22, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA



TH07 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5524991
 LOCATION Corydon Ave from Waterloo St to Stafford St ELEVATION 232.479 m EASTING 631121
 DRILLING DATE July 23, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA



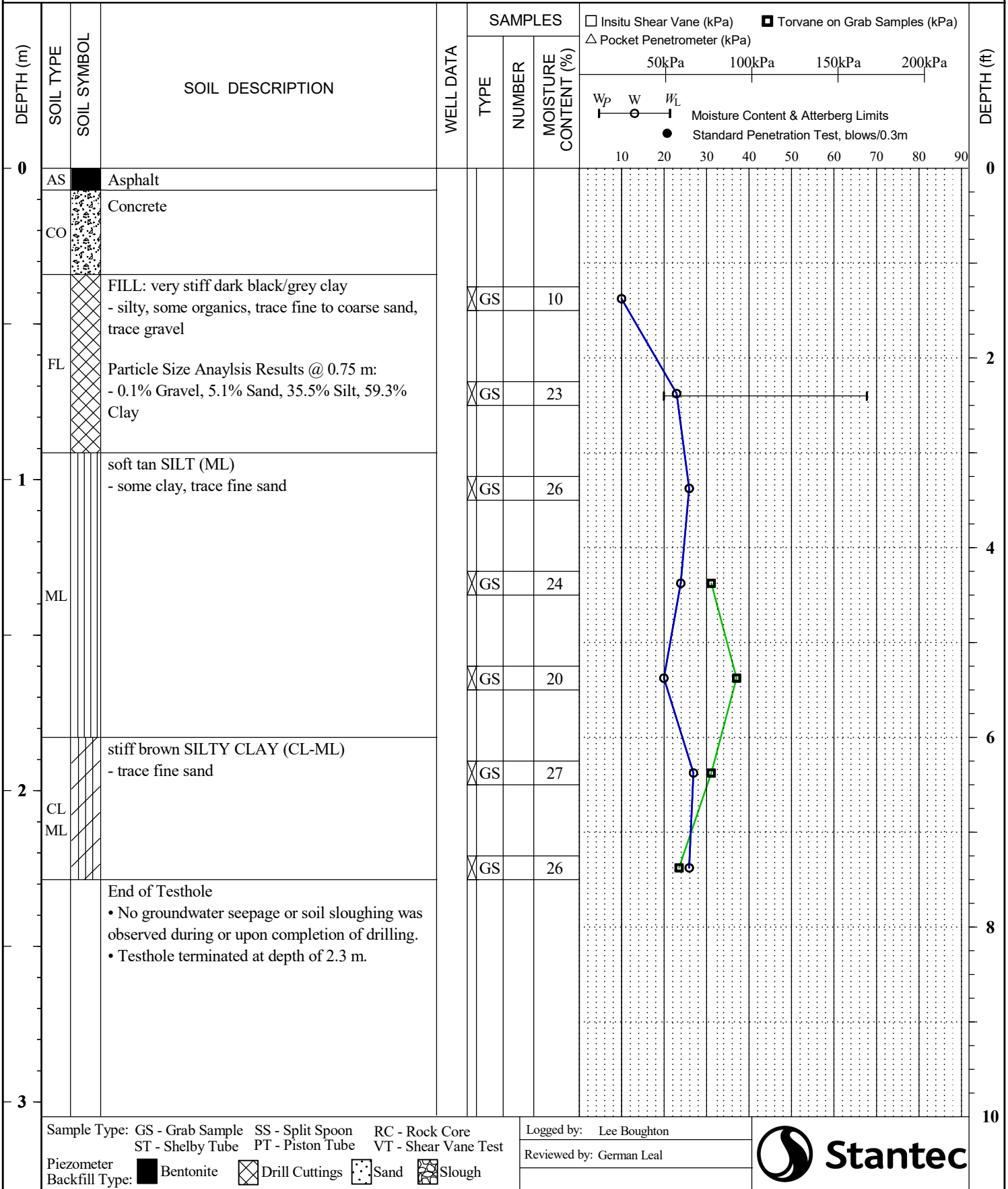
Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough

Logged by: Lee Boughton
 Reviewed by: German Leal



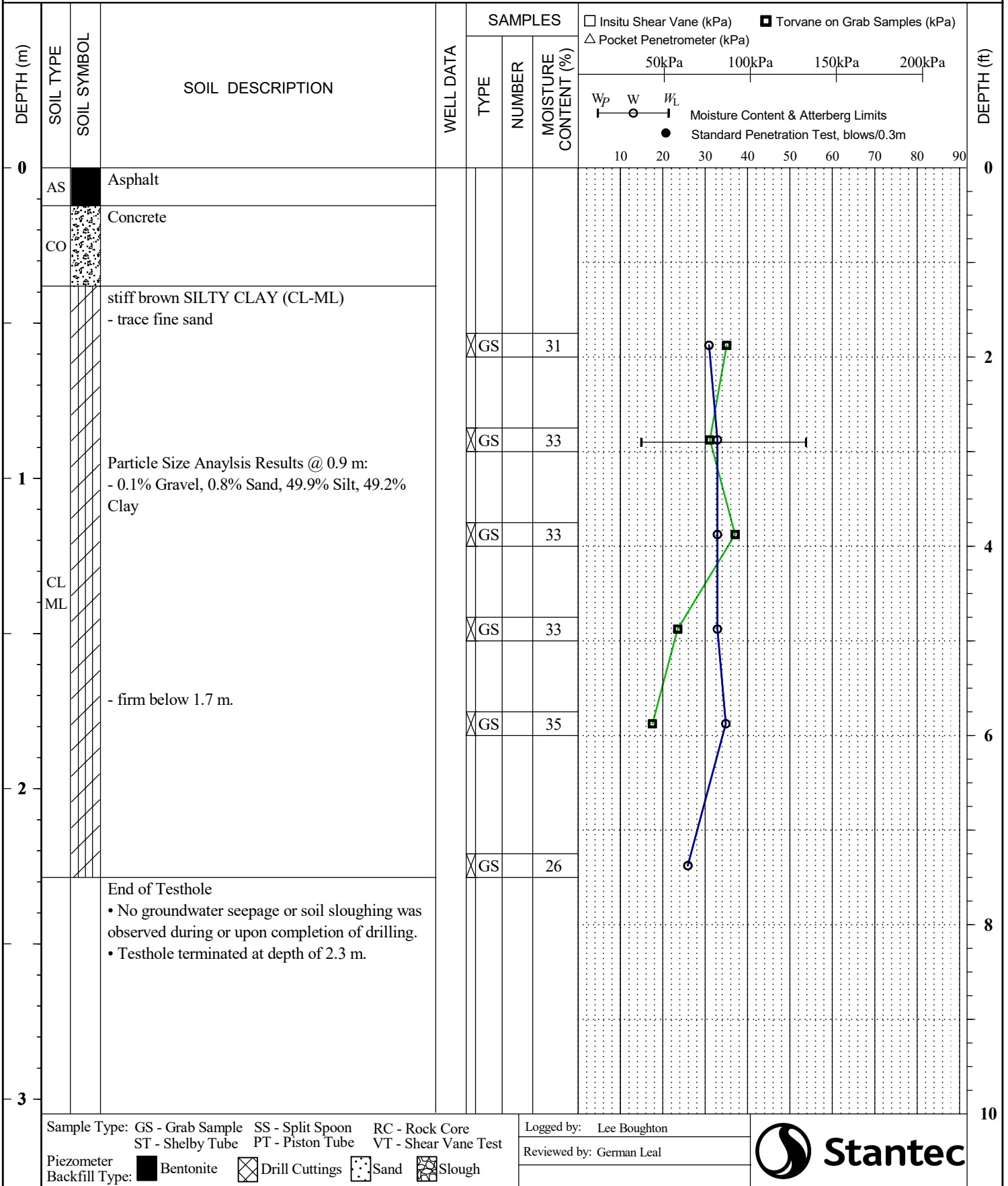
TH08 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5525007
 LOCATION Corydon Ave from Waterloo St to Stafford St ELEVATION 232.301 m EASTING 631196
 DRILLING DATE July 23, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA



TH09 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5525078
 LOCATION Corydon Ave from Waterloo St to Stafford St ELEVATION 232.109 m EASTING 631254
 DRILLING DATE July 25, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA



TH10 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5525149
 LOCATION Corydon Ave from Waterloo St to Stafford St ELEVATION 232.037 m EASTING 631330
 DRILLING DATE July 23, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA

DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES		Moisture Content & Atterberg Limits				DEPTH (ft)	
				TYPE	NUMBER	MOISTURE CONTENT (%)	TYPE	NUMBER	W _p	W	W _L	STANDARD PENETRATION TEST (blows/0.3m)		
0	AS		Asphalt											0
	CO		Concrete											
	FL		FILL: very stiff dark black/grey clay - silty, some organics, trace fine to coarse sand, trace gravel											
	CL ML		stiff brown SILTY CLAY (CL-ML) - trace fine sand	X	GS	30								2
	ML		soft tan SILT (ML) - some clay, trace fine sand	X	GS	25								4
	ML		soft tan SILT (ML) - some clay, trace fine sand	X	GS	30								4
	CH		stiff brown fat CLAY (CH) - silty, trace fine sand	X	GS	23								6
	CH		stiff brown fat CLAY (CH) - silty, trace fine sand	X	GS	39								6
			End of Testhole • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at depth of 2.3 m.	X	GS	45								8
3														10

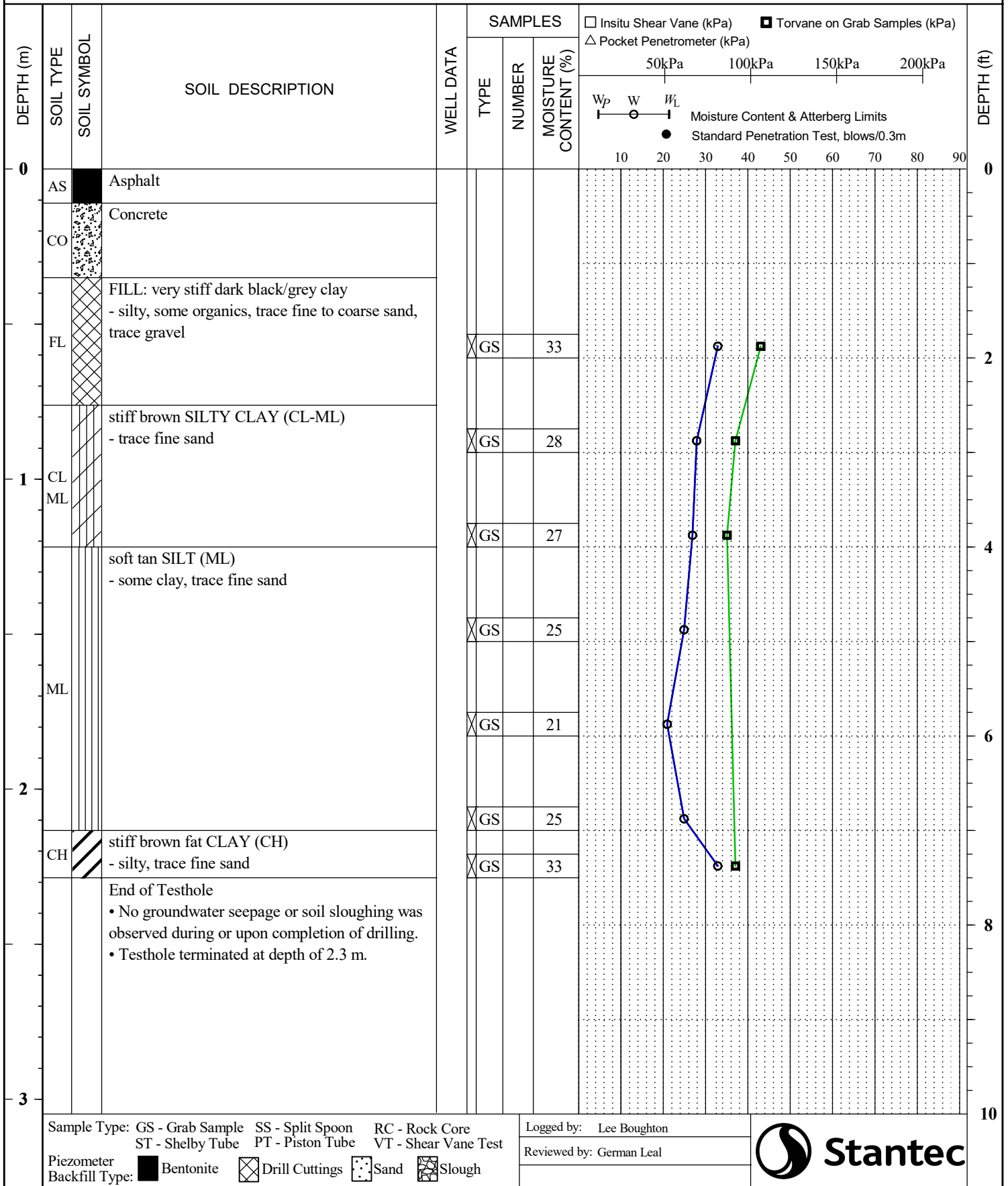
Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough

Logged by: Lee Boughton
 Reviewed by: German Leal



TH11 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5525202
 LOCATION Corydon Ave from Waterloo St to Stafford St ELEVATION 232.238 m EASTING 631411
 DRILLING DATE July 25, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA



Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: ■ Bentonite ■ Drill Cuttings ■ Sand ■ Slough

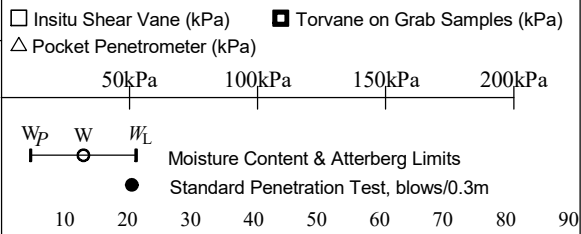
Logged by: Lee Boughton
 Reviewed by: German Leal



TH12 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5525239
 LOCATION Corydon Ave from Waterloo St to Stafford St ELEVATION 232.015 m EASTING 631487
 DRILLING DATE July 23, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA

DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLES			<input type="checkbox"/> Insitu Shear Vane (kPa) <input checked="" type="checkbox"/> Torvane on Grab Samples (kPa) <input type="checkbox"/> Pocket Penetrometer (kPa)				DEPTH (ft)
				WELL DATA	TYPE	NUMBER	MOISTURE CONTENT (%)	50kPa	100kPa	150kPa	
0	AS		Asphalt								0
	CO		Concrete								
	FL		FILL: very stiff dark black/grey clay - silty, some organics, trace fine to coarse sand, trace gravel	X	GS	34					2
				X	GS	35					
1	ML		soft tan SILT (ML) - some clay, trace fine sand	X	GS	20					4
				X	GS	21					
				X	GS	23					
2	CL ML		stiff brown SILTY CLAY (CL-ML) - trace fine sand	X	GS	30					6
				X	GS	28					
3			End of Testhole • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at depth of 2.3 m.								8



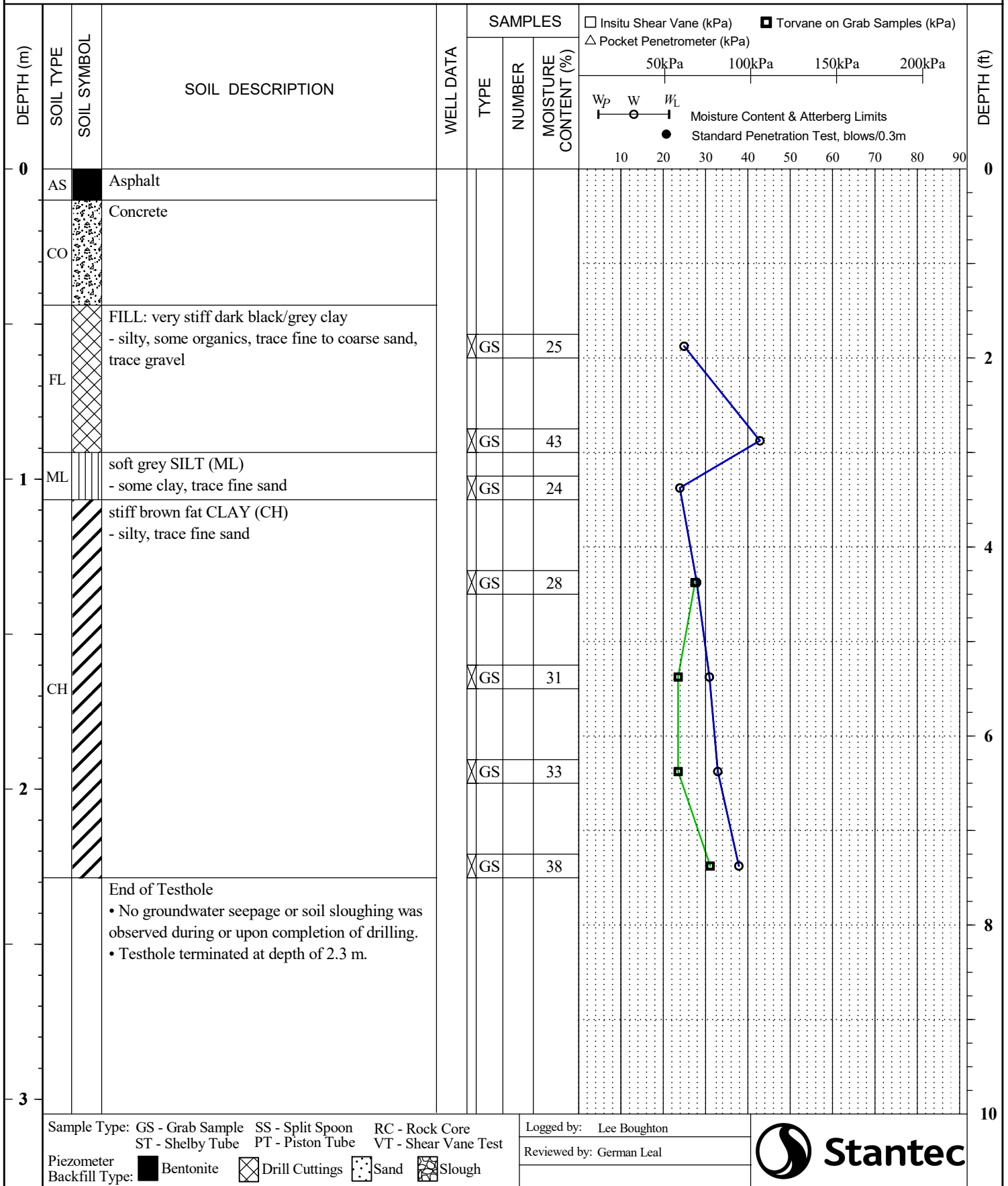
Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough

Logged by: Lee Boughton
 Reviewed by: German Leal



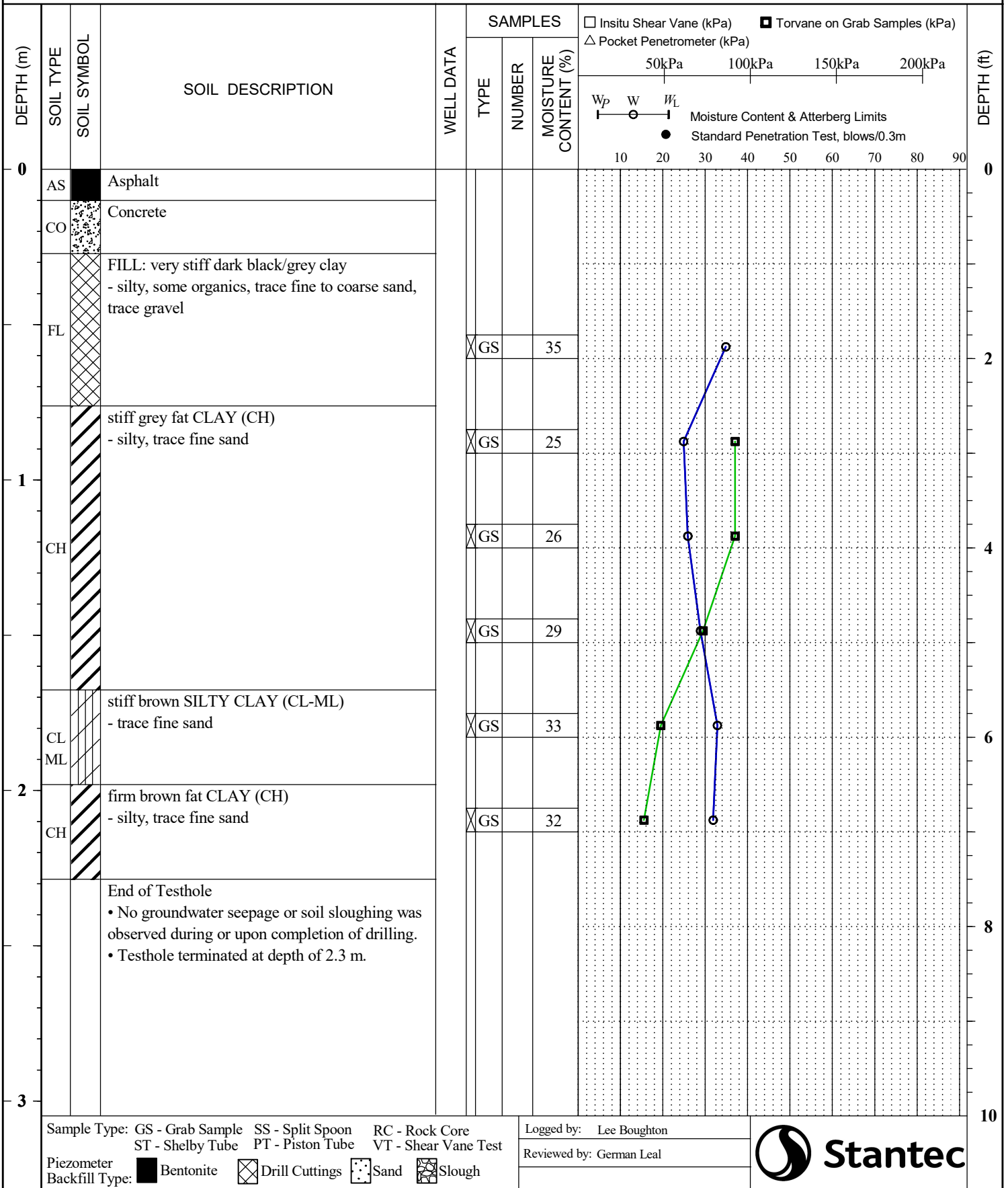
TH13 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5525292
 LOCATION Corydon Ave from Waterloo St to Stafford St ELEVATION 231.963 m EASTING 631576
 DRILLING DATE July 25, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA



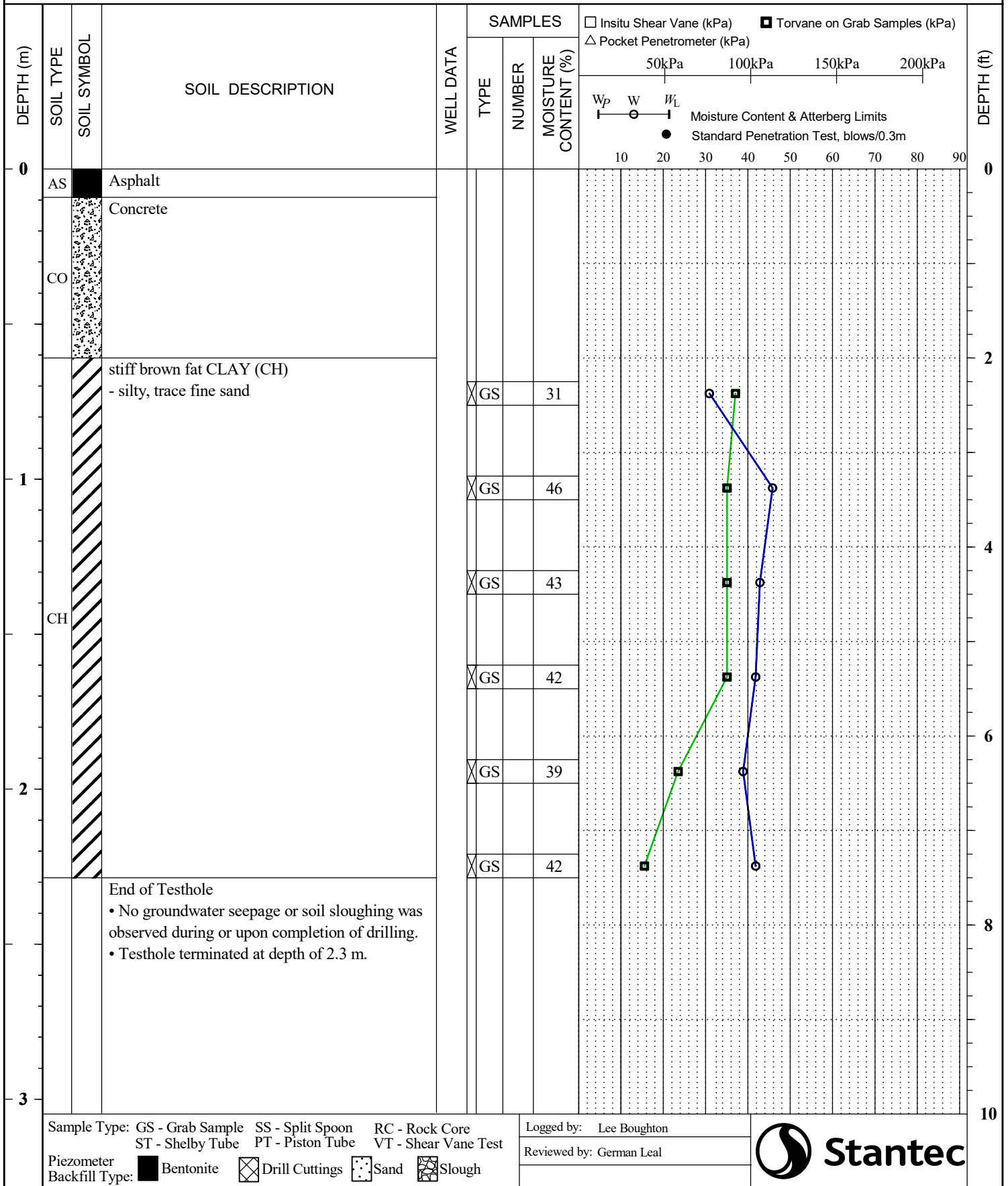
TH14 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5525322
 LOCATION Corydon Ave from Waterloo St to Stafford St ELEVATION 232.278 m EASTING 631639
 DRILLING DATE July 24, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA



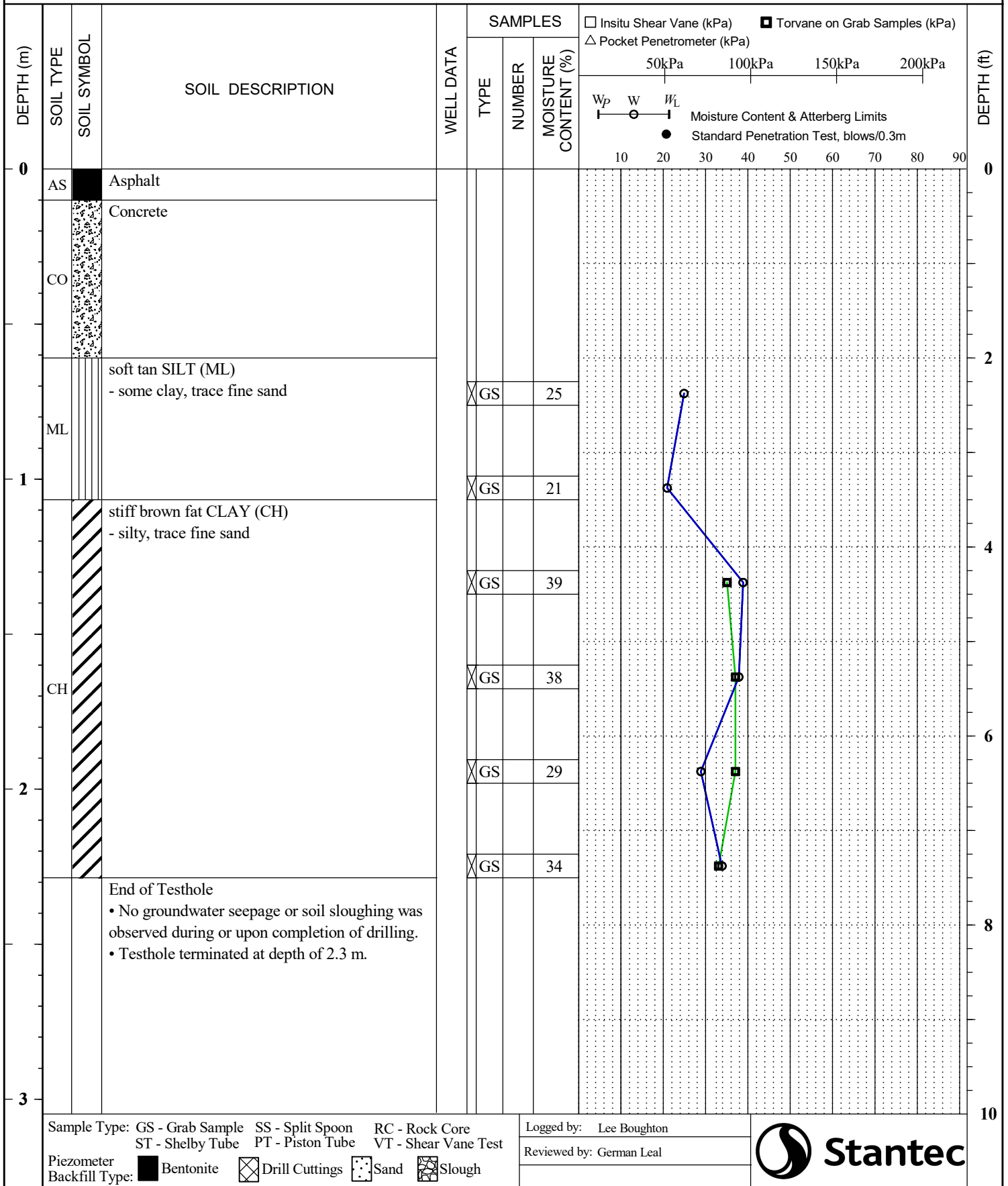
TH15 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5525397
 LOCATION Corydon Ave from Waterloo St to Stafford St ELEVATION 232.243 m EASTING 631768
 DRILLING DATE July 25, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA



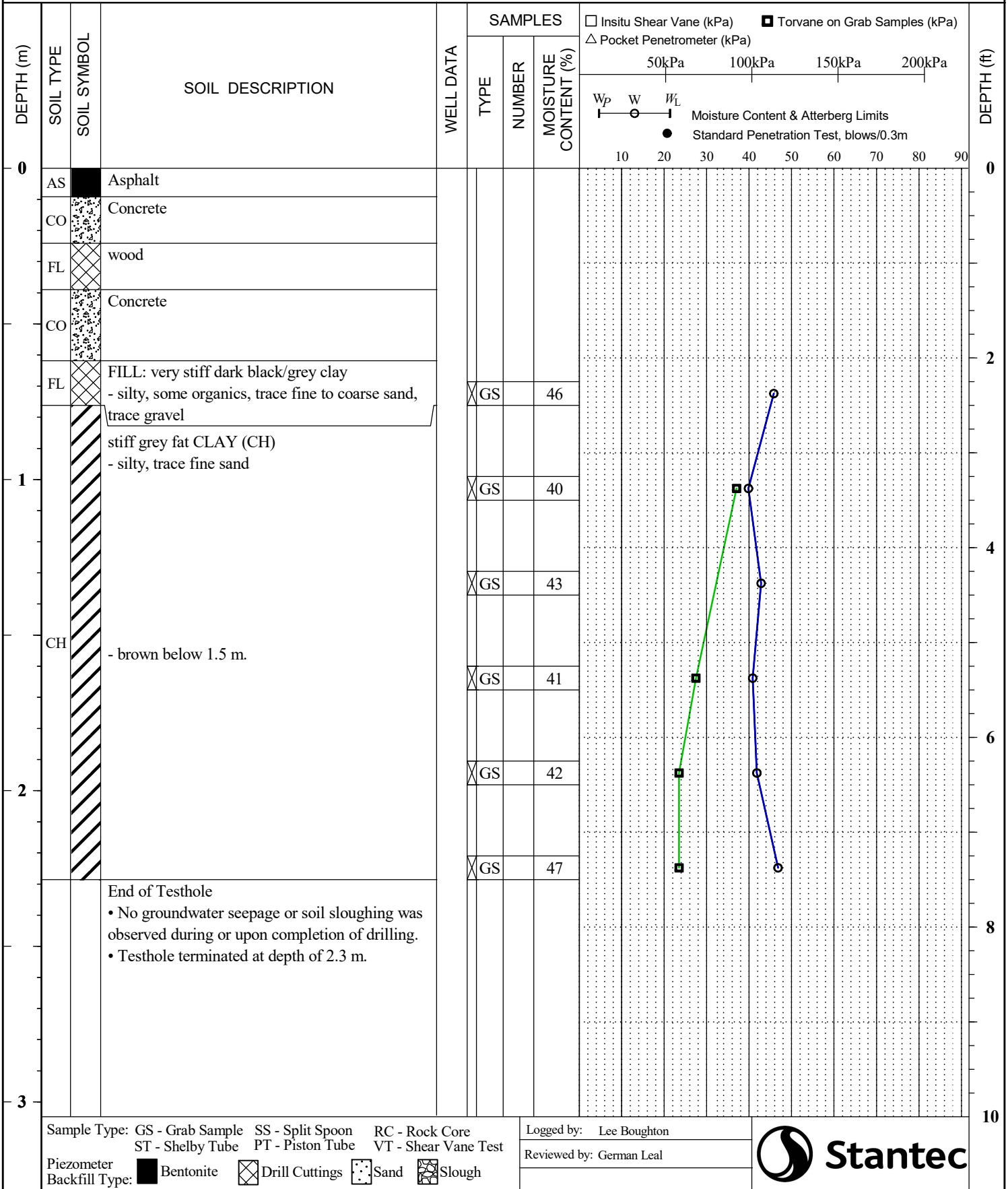
TH16 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5525487
 LOCATION Corydon Ave from Waterloo St to Stafford St ELEVATION 232.489 m EASTING 631934
 DRILLING DATE July 24, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA



TH17 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5525533
 LOCATION Corydon Ave from Waterloo St to Stafford St ELEVATION 232.383 m EASTING 632026
 DRILLING DATE July 24, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA



TH18 TESTHOLE RECORD

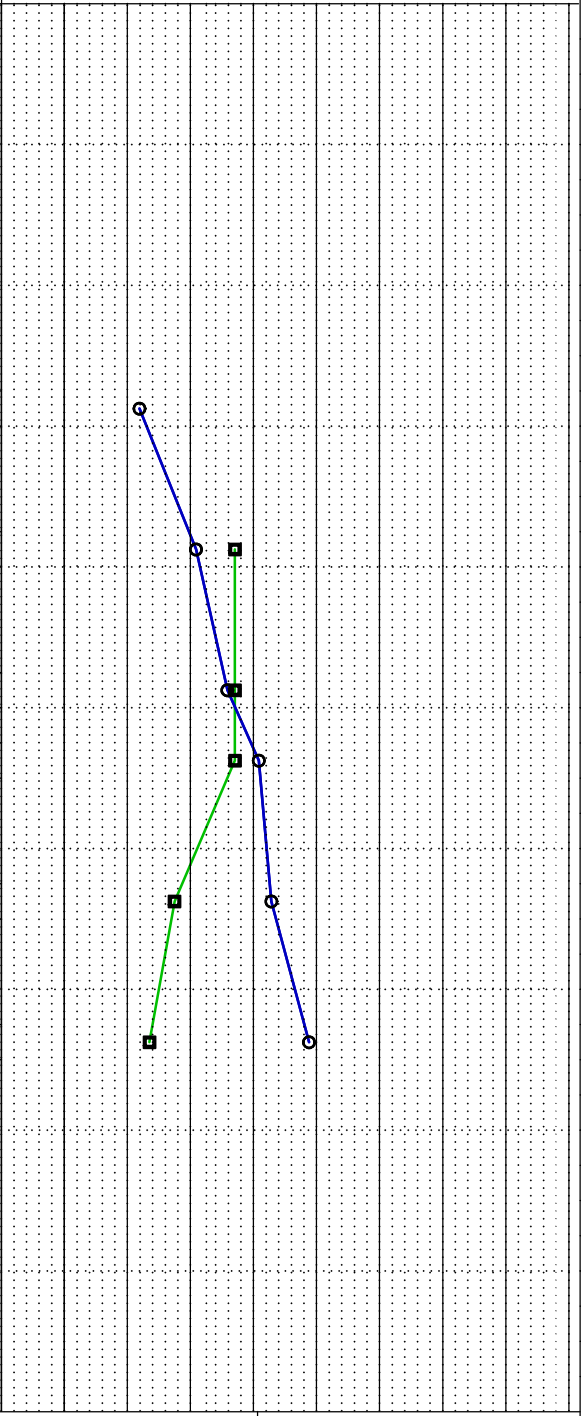
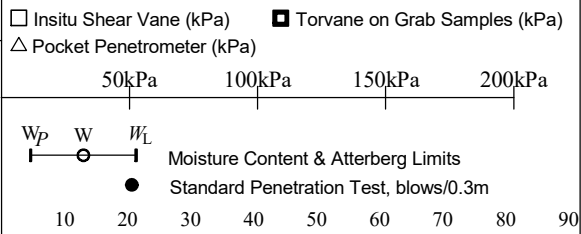
CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5525570
 LOCATION Corydon Ave from Waterloo St to Stafford St ELEVATION 232.247 m EASTING 632086
 DRILLING DATE July 24, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA

DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES		DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	TYPE	NUMBER	
0	AS		Asphalt						0
	CO		Concrete						
	FL		wood						
	CO		Concrete						
	ML		soft tan SILT (ML) - some clay, trace fine sand						2
1	CH		stiff brown fat CLAY (CH) - silty, trace fine sand	X	GS	22			4
				X	GS	31			4
				X	GS	36			6
				X	GS	41			6
2				X	GS	43			6
				X	GS	49			8
3			End of Testhole • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at depth of 2.3 m.						8

Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough

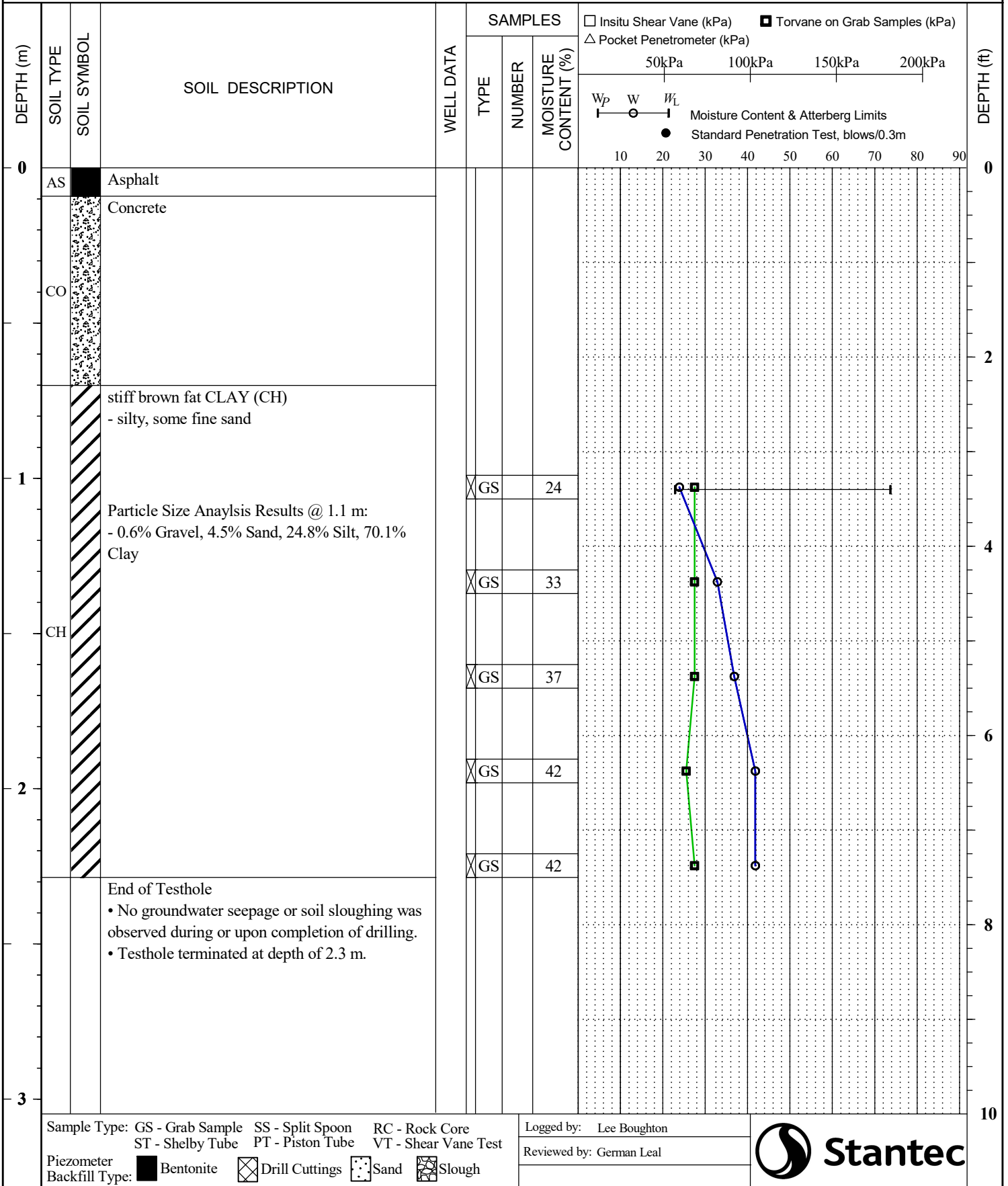
Logged by: Lee Boughton
 Reviewed by: German Leal

Stantec



TH19 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5525539
 LOCATION Stafford St from Corydon Ave to Grant Ave ELEVATION 232.273 m EASTING 632146
 DRILLING DATE July 26, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA



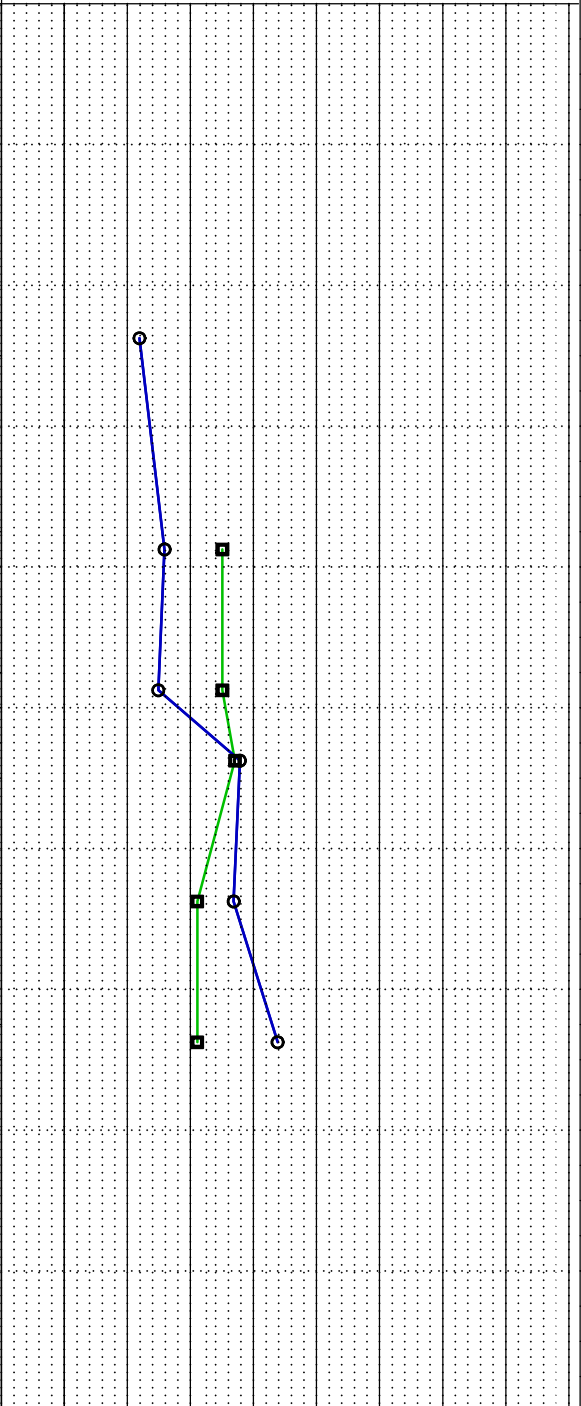
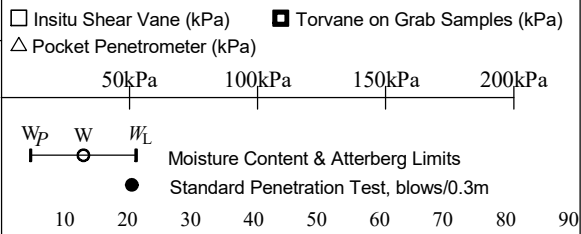
TH20 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5525450
 LOCATION Stafford St from Corydon Ave to Grant Ave ELEVATION 232.217 m EASTING 632195
 DRILLING DATE July 26, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA

DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	WELL DATA			SAMPLES		DEPTH (ft)
				TYPE	NUMBER	MOISTURE CONTENT (%)	MOISTURE CONTENT (%)	MOISTURE CONTENT (%)	
0	AS		Asphalt						0
	CO		Concrete						
	FL		FILL: very stiff dark black/grey clay - silty, some organics, trace fine to coarse sand, trace gravel	X	GS	22			2
1	CH		stiff brown fat CLAY (CH) - silty, trace fine sand	X	GS	26			4
				X	GS	25			
				X	GS	38			
2				X	GS	37			6
				X	GS	44			
3			End of Testhole • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at depth of 2.3 m.						8

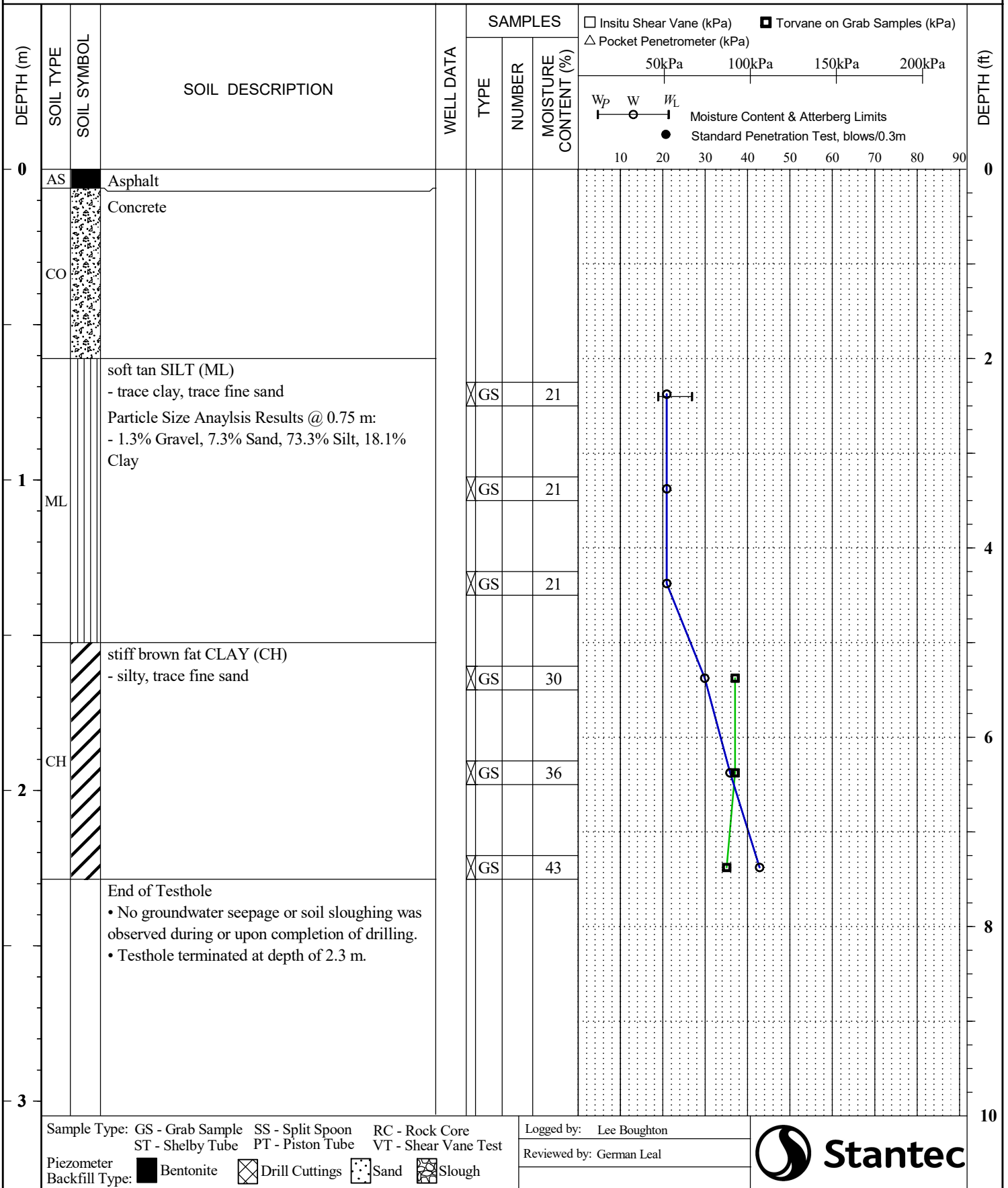
Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough

Logged by: Lee Boughton
 Reviewed by: German Leal



TH21 TESTHOLE RECORD

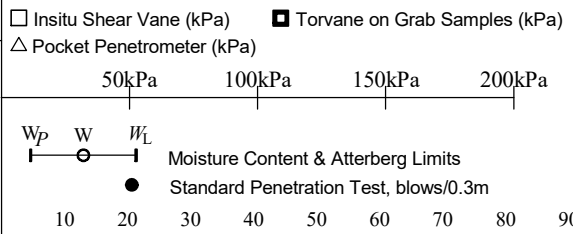
CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5525367
 LOCATION Stafford St from Corydon Ave to Grant Ave ELEVATION 232.307 m EASTING 632239
 DRILLING DATE July 26, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA



TH22 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5525304
 LOCATION Stafford St from Corydon Ave to Grant Ave ELEVATION 232.37 m EASTING 632279
 DRILLING DATE July 26, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA

DEPTH (m)	SOIL TYPE	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)	Moisture Content & Atterberg Limits		
0	AS		Asphalt									0
	CO		Concrete									
1	FL		FILL: very stiff dark black/grey clay - silty, some organics, trace fine to coarse sand, trace gravel Particle Size Analysis Results @ 0.9 m: - 0.0% Gravel, 3.2% Sand, 29.2% Silt, 67.6% Clay	X GS	29							2
				X GS	29							4
	ML		soft tan SILT (ML) - trace clay, trace fine sand	X GS	26							6
2				X GS	27							
	CH		stiff brown fat CLAY (CH) - silty, trace fine sand	X GS	22							
				X GS	40							
3			End of Testhole • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at depth of 2.3 m.									8
												10



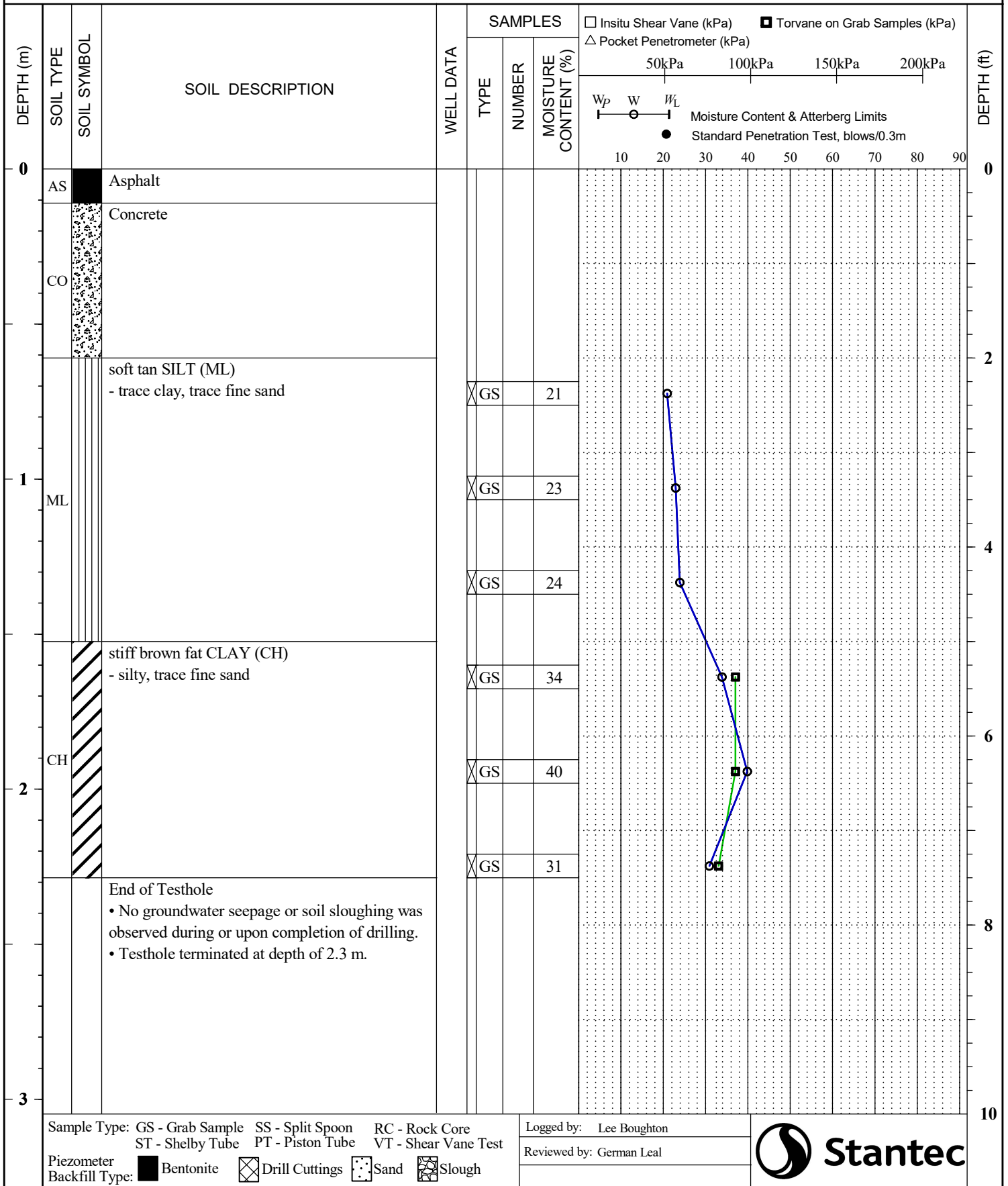
Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Backfill Type: Bentonite Drill Cuttings Sand Slough

Logged by: Lee Boughton
 Reviewed by: German Leal



TH23 TESTHOLE RECORD

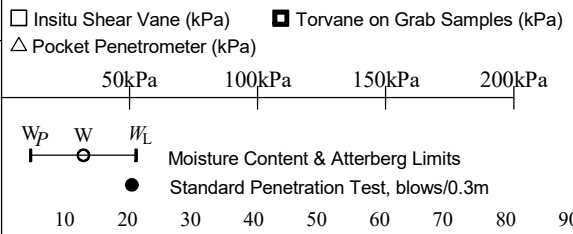
CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5525213
 LOCATION Stafford St from Corydon Ave to Grant Ave ELEVATION 232.161 m EASTING 632324
 DRILLING DATE July 26, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA



TH24 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5525095
 LOCATION Stafford St from Corydon Ave to Grant Ave ELEVATION 232.212 m EASTING 632394
 DRILLING DATE July 26, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA

DEPTH (m)	SOIL TYPE	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)	Moisture Content & Atterberg Limits		
0	AS		Asphalt									0
	CO		Concrete									2
	FL		FILL: very stiff dark black/grey clay - silty, some organics, trace fine to coarse sand, trace gravel	X	GS	28						
1	ML		soft tan SILT (ML) - trace clay, trace fine sand	X	GS	23						4
				X	GS	21						
2	CH		stiff brown fat CLAY (CH) - silty, trace fine sand	X	GS	39						6
				X	GS	37						
			End of Testhole • No groundwater seepage or soil sloughing was observed during or upon completion of drilling. • Testhole terminated at depth of 2.3 m.									8
3												10



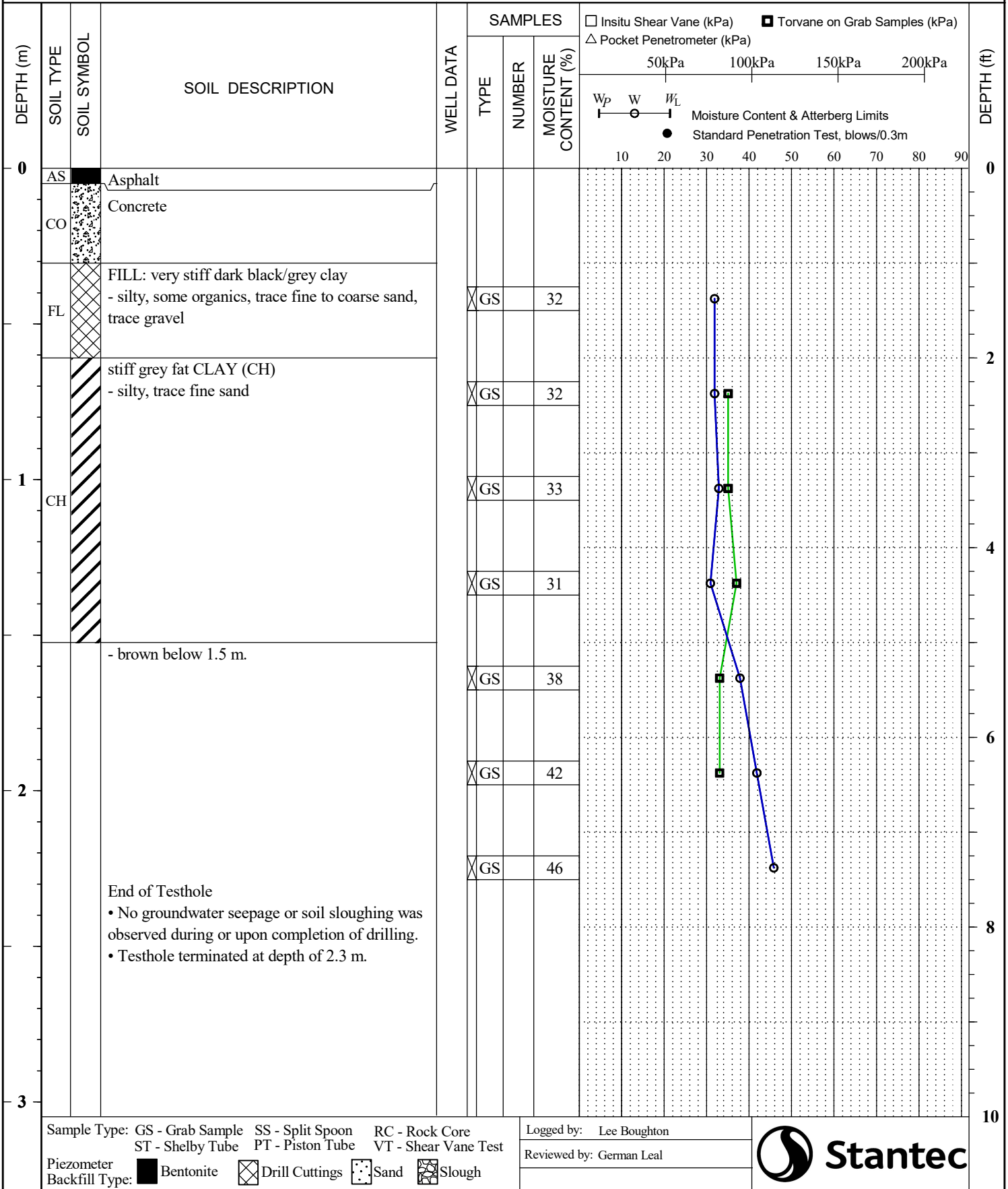
Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core
 ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test
 Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough

Logged by: Lee Boughton
 Reviewed by: German Leal



TH25 TESTHOLE RECORD

CLIENT City of Winnipeg, Public Works Department PROJECT No. 113708020
 PROJECT CoW Stafford and Corydon Pavement Renewal DATUM Geodetic NORTHING 5525018
 LOCATION Stafford St from Corydon Ave to Grant Ave ELEVATION 232.215 m EASTING 632437
 DRILLING DATE July 26, 2019 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA





Atterberg Limits
 ASTM D4318
 Method A- Multi-Point

Client: Stantec Consulting Ltd.
 Project Name: C.O.W. Pavement Renewal
 Project No: 113708020
 Date Received: July 23, 2019
 Date Tested: August 2, 2019
 Tested By: Nesfor Abarca, C.Tech.

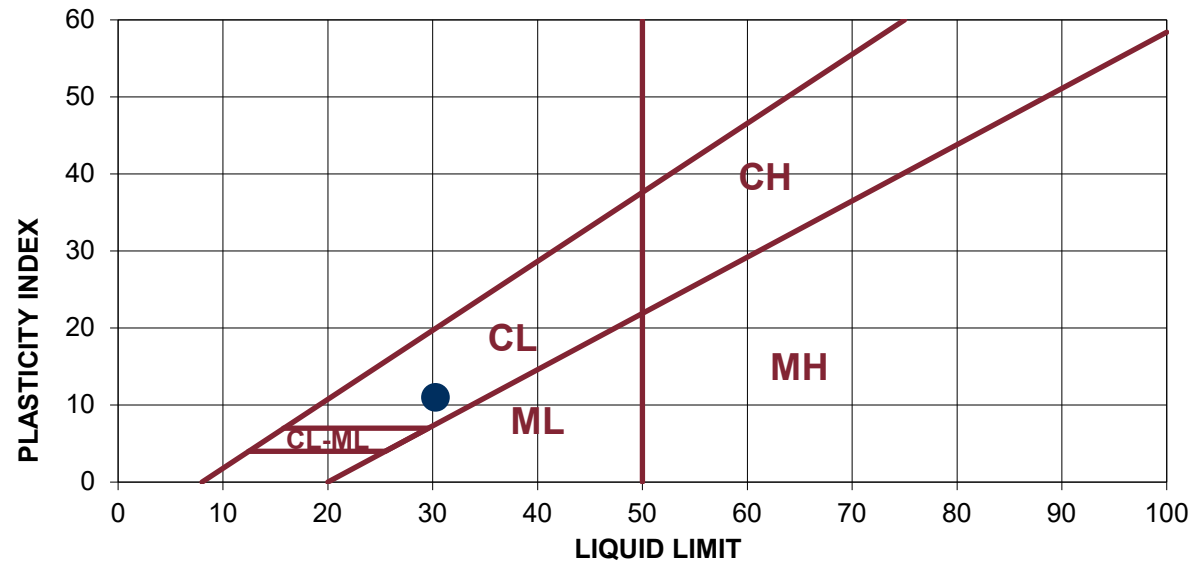
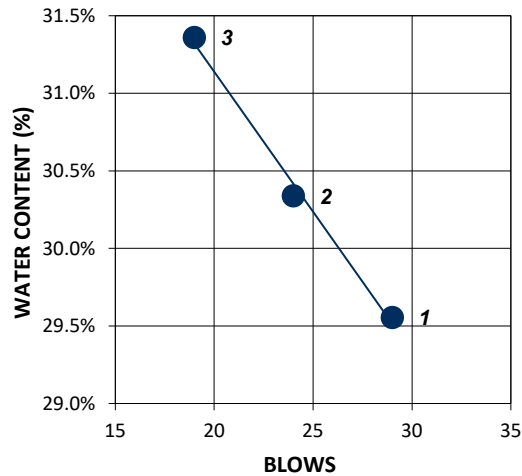
LABORATORY
 199 Henlow Bay

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

Sample : TH05 @ 3'

LIQUID LIMIT				PLASTIC LIMIT		
Trial	1	2	3	Trial	1	2
No. of Blows	29	24	19	Tare No.	317	320
Tare No.	160	194	283	Wt. Sa. (wet+tare)(g)	39.13	38.96
Wt. Sa. (wet+tare)(g)	38	40	46	Wt. Sa. (dry+tare)(g)	36.09	35.95
Wt. Sa. (dry+tare)(g)	34	35	40	Wt. Tare (g)	19.93	19.94
Wt. Tare (g)	19	18	20	Wt. Dry Soil (g)	16.2	16.0
Wt. Dry Soil (g)	14.6	17.1	19.6	Wt. Water (g)	3.0	3.0
Wt. Water (g)	4.3	5.2	6.1	Water Content (%)	18.8%	18.8%
Water Content (%)	29.6%	30.3%	31.4%			

RESULTS	
LL	30
PL	19
PI	11
Natural MC (%)	
24.0%	



Reviewed By: German Leal, P. Eng.

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. STANTEC is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of STANTEC.



Atterberg Limits
 ASTM D4318
 Method A- Multi-Point

Client: Stantec Consulting Ltd.
 Project Name: C.O.W. Pavement Renewal
 Project No: 113708020
 Date Received: July 23, 2019
 Date Tested: August 2, 2019
 Tested By: Nesfor Abarca, C.Tech.

LABORATORY

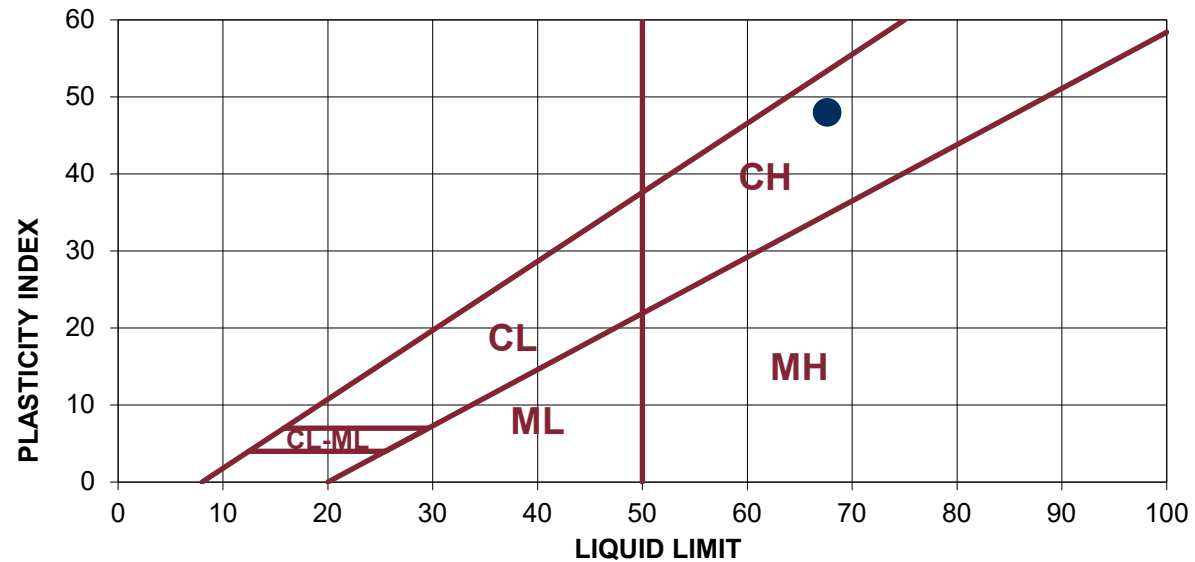
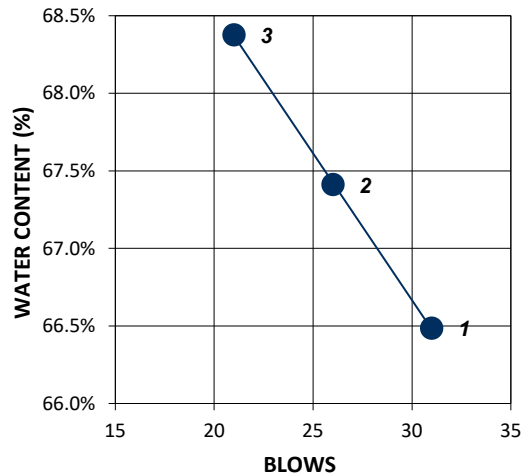
199 Henlow Bay

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

Sample : TH08 @ 2.5'

LIQUID LIMIT				PLASTIC LIMIT		
Trial	1	2	3	Trial	1	2
No. of Blows	31	26	21	Tare No.	297	310
Tare No.	187	250	254	Wt. Sa. (wet+tare)(g)	34.33	34.36
Wt. Sa. (wet+tare)(g)	41	44	41	Wt. Sa. (dry+tare)(g)	32.07	31.99
Wt. Sa. (dry+tare)(g)	32	34	32	Wt. Tare (g)	20.55	19.95
Wt. Tare (g)	19	21	19	Wt. Dry Soil (g)	11.5	12.0
Wt. Dry Soil (g)	12.8	13.9	13.1	Wt. Water (g)	2.3	2.4
Wt. Water (g)	8.5	9.4	8.9	Water Content (%)	19.6%	19.7%
Water Content (%)	66.5%	67.4%	68.4%			

RESULTS	
LL	68
PL	20
PI	48
Natural MC (%)	
29.9%	



Reviewed By: German Leal, P. Eng.

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Atterberg Limits
 ASTM D4318
 Method A- Multi-Point

Client: Stantec Consulting Ltd.
 Project Name: C.O.W. Pavement Renewal
 Project No: 113708020
 Date Received: July 23, 2019
 Date Tested: August 1, 2019
 Tested By: Nesfor Abarca, C.Tech.

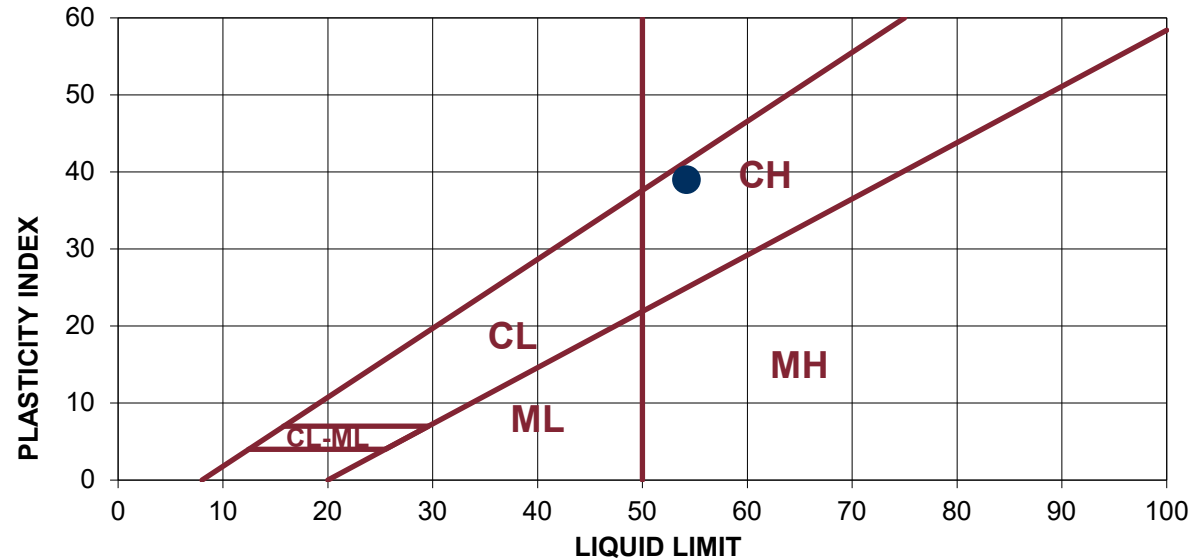
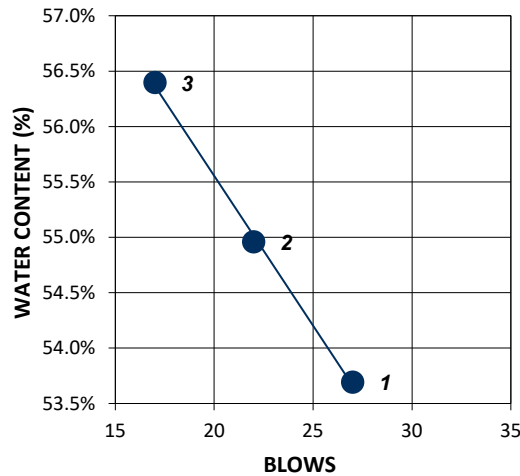
LABORATORY
 199 Henlow Bay

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

Sample : TH09 @ 3'

LIQUID LIMIT				PLASTIC LIMIT		
Trial	1	2	3	Trial	1	2
No. of Blows	27	22	17	Tare No.	292	314
Tare No.	174	256	268	Wt. Sa. (wet+tare)(g)	30.68	31.31
Wt. Sa. (wet+tare)(g)	42	42	40	Wt. Sa. (dry+tare)(g)	29.32	29.84
Wt. Sa. (dry+tare)(g)	34	34	33	Wt. Tare (g)	20.36	20.29
Wt. Tare (g)	19	20	20	Wt. Dry Soil (g)	9.0	9.6
Wt. Dry Soil (g)	15.3	13.7	13.0	Wt. Water (g)	1.4	1.5
Wt. Water (g)	8.2	7.5	7.3	Water Content (%)	15.2%	15.4%
Water Content (%)	53.7%	55.0%	56.4%			

RESULTS	
LL	54
PL	15
PI	39
Natural MC (%)	
33.4%	



Reviewed By: German Leal, P. Eng.

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Atterberg Limits
 ASTM D4318
 Method A- Multi-Point

Client: Stantec Consulting Ltd.
 Project Name: C.O.W. Pavement Renewal
 Project No: 113708020
 Date Received: July 23, 2019
 Date Tested: August 1, 2019
 Tested By: Nesfor Abarca, C.Tech.

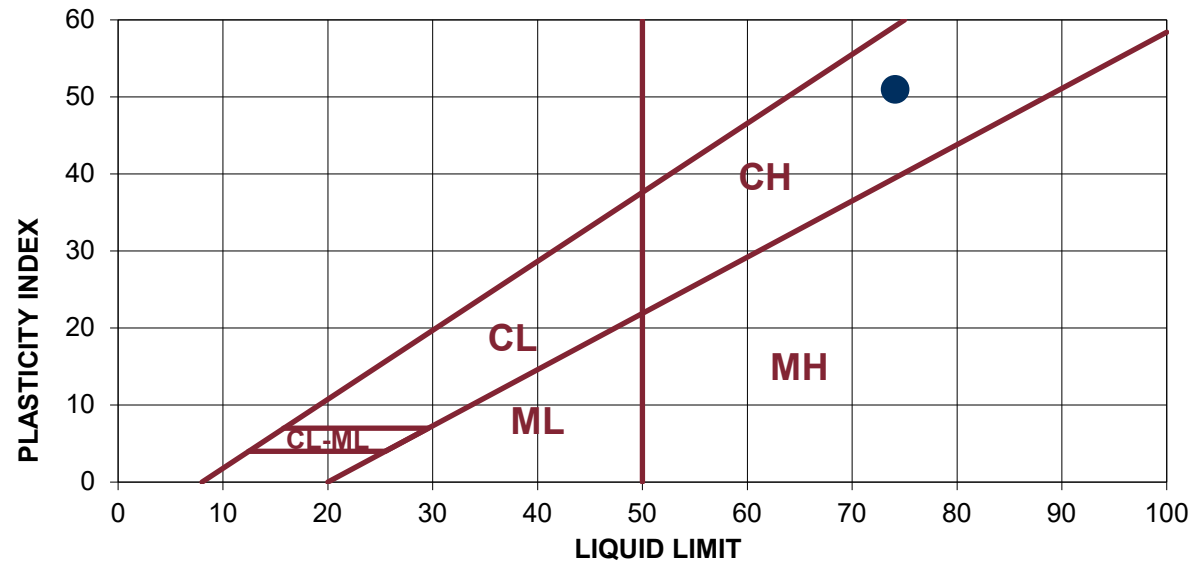
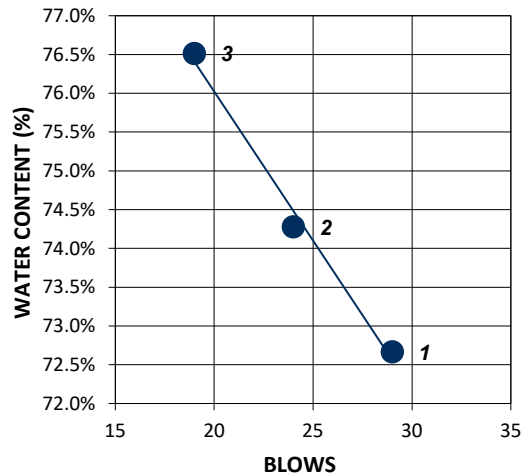
LABORATORY
 199 Henlow Bay

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

Sample : TH19 @ 3.5'

LIQUID LIMIT				PLASTIC LIMIT		
Trial	1	2	3	Trial	1	2
No. of Blows	29	24	19	Tare No.	208	295
Tare No.	132	147	185	Wt. Sa. (wet+tare)(g)	29.66	29.68
Wt. Sa. (wet+tare)(g)	39	41	42	Wt. Sa. (dry+tare)(g)	27.70	27.94
Wt. Sa. (dry+tare)(g)	31	32	32	Wt. Tare (g)	19.13	20.35
Wt. Tare (g)	19	20	19	Wt. Dry Soil (g)	8.6	7.6
Wt. Dry Soil (g)	11.8	12.4	13.2	Wt. Water (g)	2.0	1.7
Wt. Water (g)	8.6	9.2	10.1	Water Content (%)	22.9%	22.9%
Water Content (%)	72.7%	74.3%	76.5%			

RESULTS	
LL	74
PL	23
PI	51
Natural MC (%)	
24.3%	



Reviewed By: German Leal, P. Eng.

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. STANTEC is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of STANTEC.



Atterberg Limits
 ASTM D4318
 Method A- Multi-Point

Client: Stantec Consulting Ltd.
 Project Name: C.O.W. Pavement Renewal
 Project No: 113708020
 Date Received: July 23, 2019
 Date Tested: August 1, 2019
 Tested By: Nesfor Abarca, C.Tech.

LABORATORY

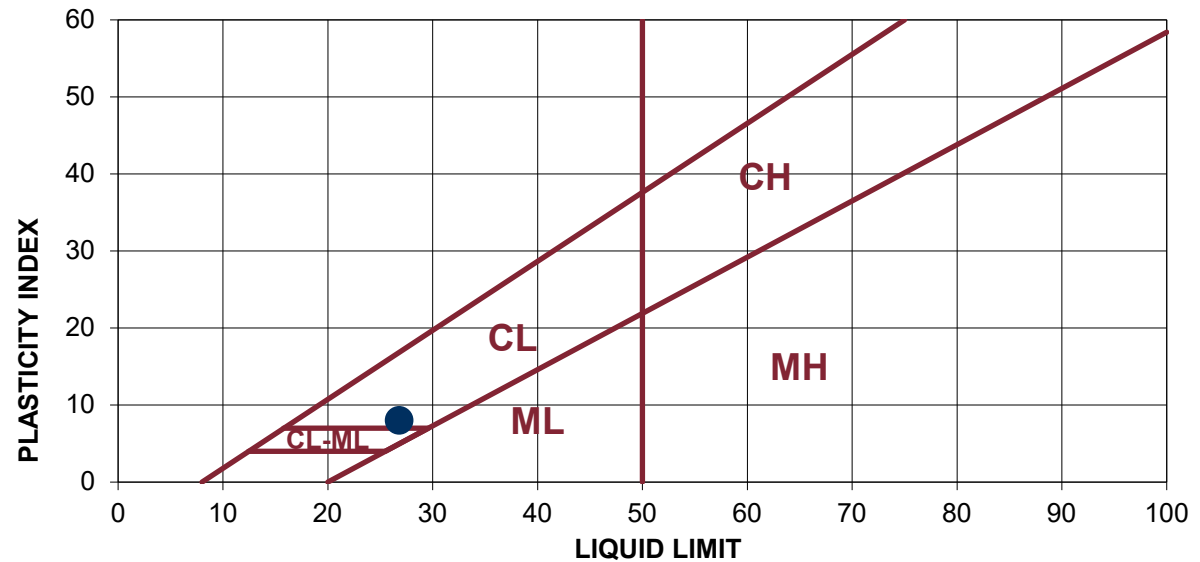
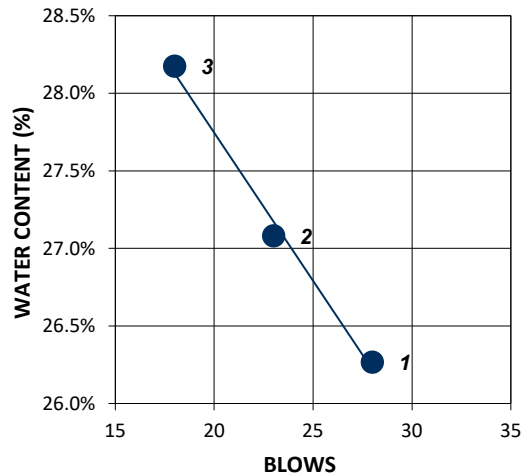
199 Henlow Bay

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

Sample : TH21 @ 2.5'

LIQUID LIMIT				PLASTIC LIMIT		
Trial	1	2	3	Trial	1	2
No. of Blows	28	23	18	Tare No.	280	285
Tare No.	154	188	266	Wt. Sa. (wet+tare)(g)	39.88	45.03
Wt. Sa. (wet+tare)(g)	40	44	48	Wt. Sa. (dry+tare)(g)	36.64	41.14
Wt. Sa. (dry+tare)(g)	35	39	42	Wt. Tare (g)	19.64	20.63
Wt. Tare (g)	19	19	20	Wt. Dry Soil (g)	17.0	20.5
Wt. Dry Soil (g)	16.6	19.7	21.6	Wt. Water (g)	3.2	3.9
Wt. Water (g)	4.4	5.3	6.1	Water Content (%)	19.1%	19.0%
Water Content (%)	26.3%	27.1%	28.2%			

RESULTS	
LL	27
PL	19
PI	8
Natural MC (%)	
20.6%	



Reviewed By: German Leal, P. Eng.

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Atterberg Limits
 ASTM D4318
 Method A- Multi-Point

Client: Stantec Consulting Ltd.
 Project Name: C.O.W. Pavement Renewal
 Project No: 113708020
 Date Received: July 23, 2019
 Date Tested: August 1, 2019
 Tested By: Nesfor Abarca, C.Tech.

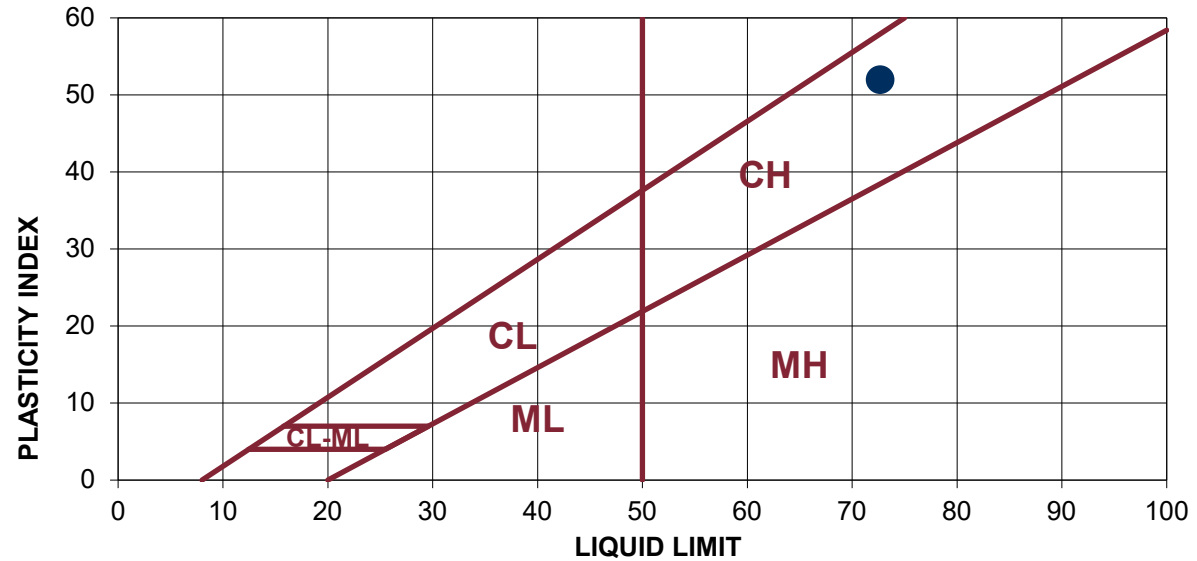
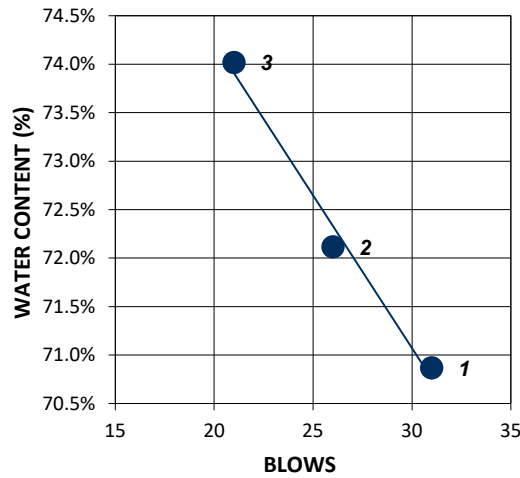
LABORATORY
 199 Henlow Bay

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

Sample : TH22 @ 3'

LIQUID LIMIT				PLASTIC LIMIT		
Trial	1	2	3	Trial	1	2
No. of Blows	31	26	21	Tare No.	270	271
Tare No.	135	145	243	Wt. Sa. (wet+tare)(g)	28.57	31.24
Wt. Sa. (wet+tare)(g)	37	37	40	Wt. Sa. (dry+tare)(g)	27.17	29.24
Wt. Sa. (dry+tare)(g)	30	29	32	Wt. Tare (g)	20.56	19.91
Wt. Tare (g)	19	18	21	Wt. Dry Soil (g)	6.6	9.3
Wt. Dry Soil (g)	10.4	11.3	10.9	Wt. Water (g)	1.4	2.0
Wt. Water (g)	7.4	8.1	8.1	Water Content (%)	21.2%	21.4%
Water Content (%)	70.9%	72.1%	74.0%			

RESULTS	
LL	73
PL	21
PI	52
Natural MC (%)	
28.9%	



Reviewed By: German Leal, P. Eng.

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



ASTM D422 - PARTICLE-SIZE ANALYSIS OF SOILS

TO Lee Boughton
 Stantec Consulting Ltd.
 500-311 Portage Avenue
 Winnipeg, Manitoba R3B 2B9

PROJECT C.O.W. Pavement Renewal

PROJECT NO. 113708020

ATTN: Lee Boughton

REPORT NO. 1

DATE SAMPLED: N/A

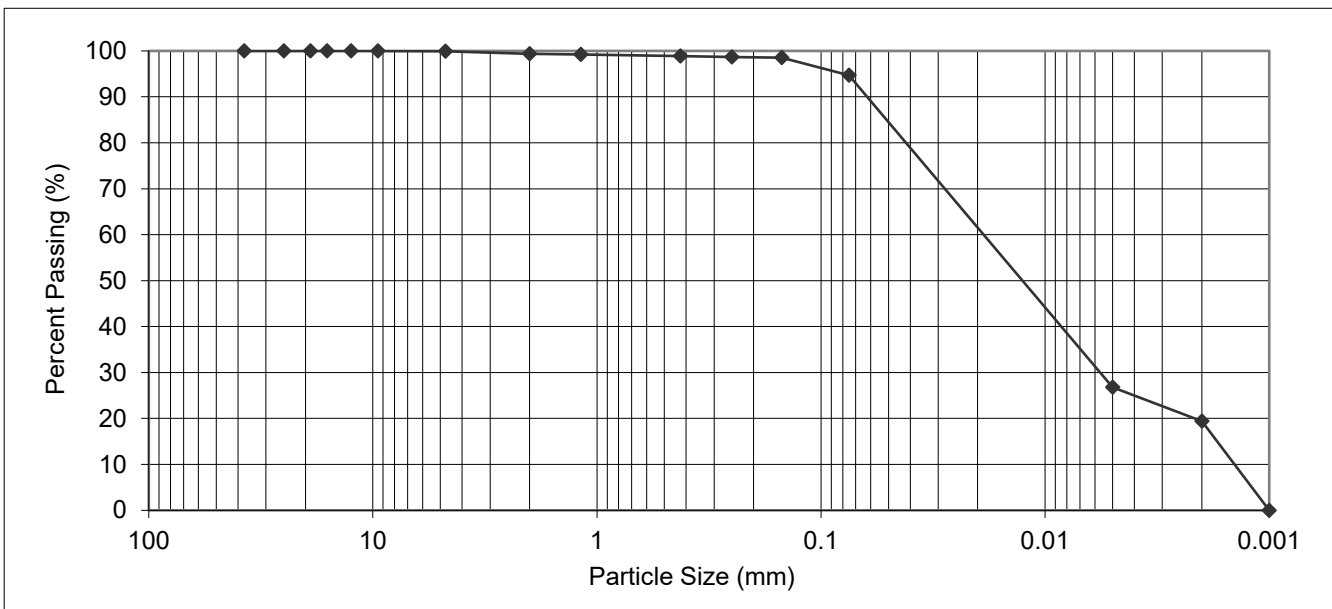
DATE RECEIVED: 2019.Jul.23

DATE TESTED: 2019.Aug.01

SAMPLED BY: Lee Boughton

SAMPLE ID: TH05 @ 3'

TESTED BY: Nestor Abarca, C.Tech.



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	99.4

PARTICLE SIZE		PERCENT PASSING
1.18	mm	99.2
0.425	mm	98.9
0.250	mm	98.7
0.150	mm	98.5
0.075	mm	94.7
0.005	mm	26.8
0.002	mm	19.4
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			
0.1	0.5	0.5	4.2	75.3	19.4	NT*

NT* Sample not tested for colloids

REPORT DATE: 2019.Aug.16

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

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



ASTM D422 - PARTICLE-SIZE ANALYSIS OF SOILS

TO Lee Boughton
 Stantec Consulting Ltd.
 500-311 Portage Avenue
 Winnipeg, Manitoba R3B 2B9

PROJECT C.O.W. Pavement Renewal

PROJECT NO. 113708020

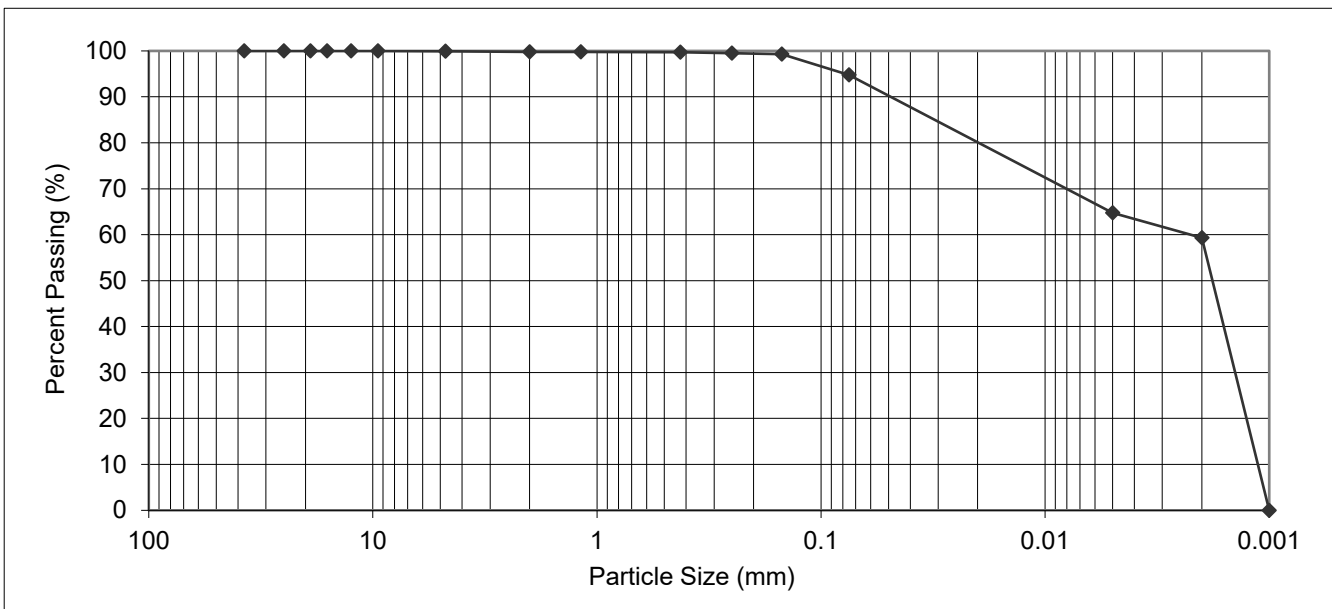
ATTN: Lee Boughton

REPORT NO. 2

DATE SAMPLED: N/A
 SAMPLED BY: Lee Boughton

DATE RECEIVED: 2019.Jul.23
 SAMPLE ID: TH08 @ 2.5'

DATE TESTED: 2019.Aug.01
 TESTED BY: Nestor Abarca, C.Tech.



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	99.8
0.425	mm	99.7
0.250	mm	99.5
0.150	mm	99.3
0.075	mm	94.8
0.005	mm	64.8
0.002	mm	59.3
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			
0.1	0.1	0.1	4.9	35.5	59.3	NT*

NT* Sample not tested for colloids

REPORT DATE: 2019.Aug.16

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

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 199 Henlow Bay, Winnipeg, MB R3Y 1G4
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ASTM D422 - PARTICLE-SIZE ANALYSIS OF SOILS

TO Lee Boughton
 Stantec Consulting Ltd.
 500-311 Portage Avenue
 Winnipeg, Manitoba R3B 2B9

PROJECT C.O.W. Pavement Renewal

PROJECT NO. 113708020

ATTN: Lee Boughton

REPORT NO. 3

DATE SAMPLED: N/A

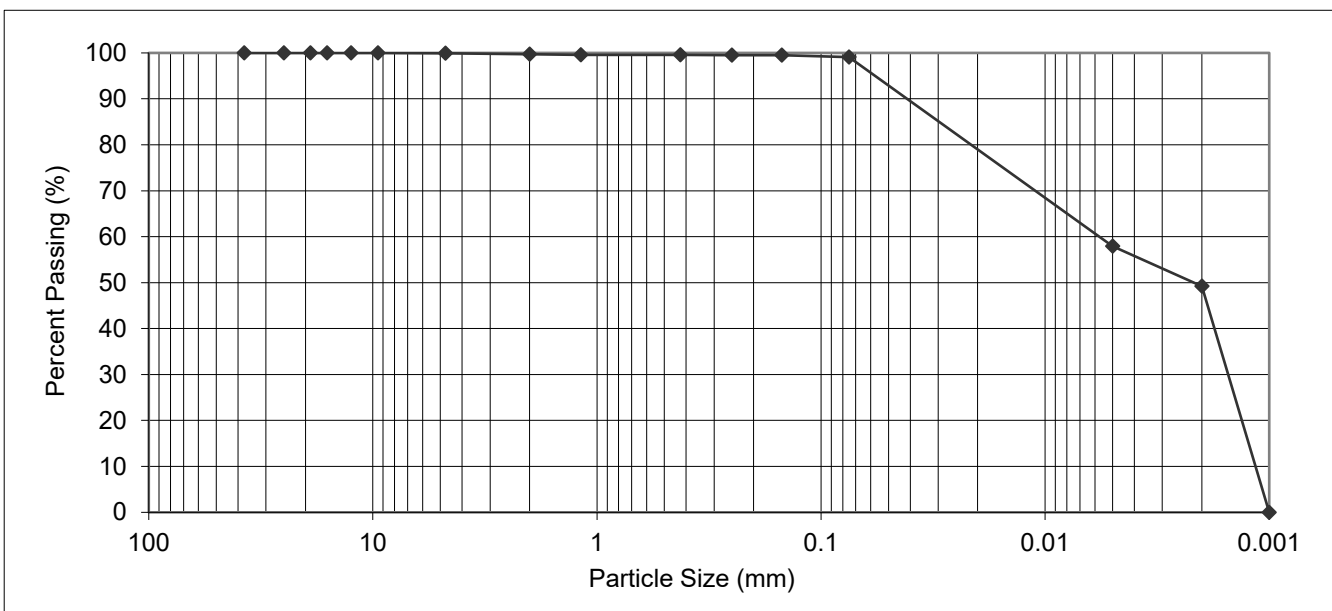
DATE RECEIVED: 2019.Jul.23

DATE TESTED: 2019.Aug.01

SAMPLED BY: Lee Boughton

SAMPLE ID: TH09 @ 3'

TESTED BY: Nestor Abarca, C.Tech.



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

PARTICLE SIZE		PERCENT PASSING
1.18	mm	99.6
0.425	mm	99.6
0.250	mm	99.5
0.150	mm	99.5
0.075	mm	99.1
0.005	mm	57.9
0.002	mm	49.2
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			
0.1	0.2	0.1	0.5	49.9	49.2	NT*

NT* Sample not tested for colloids

REPORT DATE: 2019.Aug.16

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

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ASTM D422 - PARTICLE-SIZE ANALYSIS OF SOILS

TO Lee Boughton
 Stantec Consulting Ltd.
 500-311 Portage Avenue
 Winnipeg, Manitoba R3B 2B9

PROJECT C.O.W. Pavement Renewal

PROJECT NO. 113708020

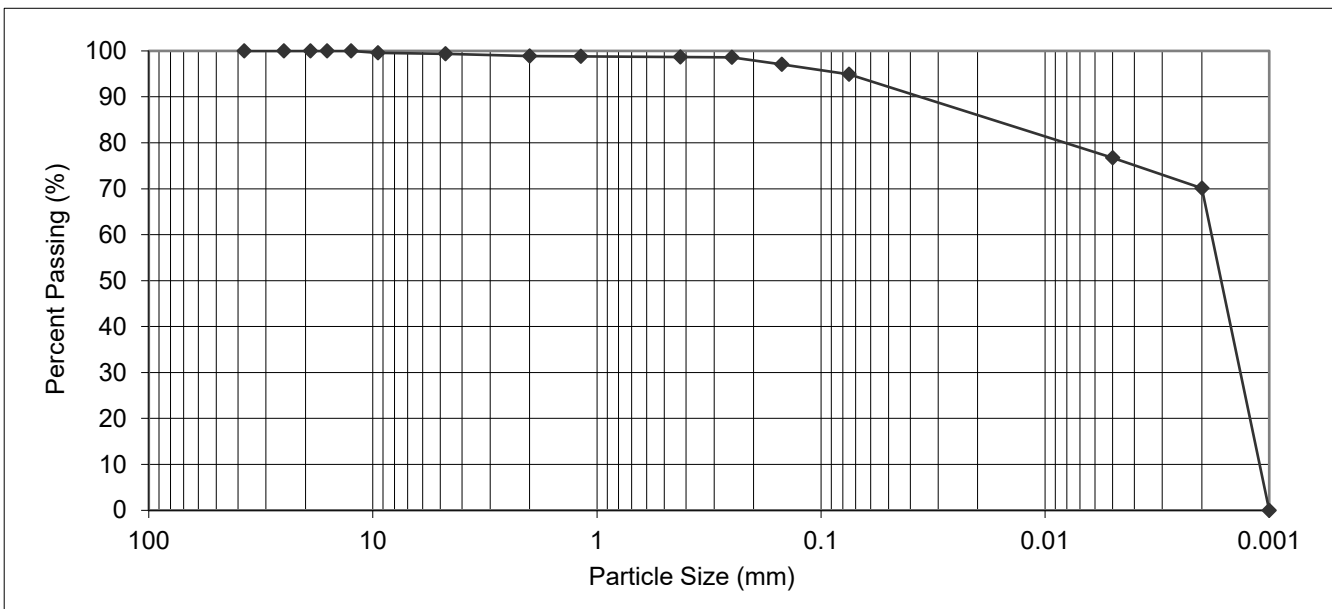
ATTN: Lee Boughton

REPORT NO. 4

DATE SAMPLED: N/A
 SAMPLED BY: Lee Boughton

DATE RECEIVED: 2019.Jul.23
 SAMPLE ID: TH19 @ 3.5'

DATE TESTED: 2019.Aug.01
 TESTED BY: Nestor Abarca, C.Tech.



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	99.4
2.00	mm	98.9

PARTICLE SIZE		PERCENT PASSING
1.18	mm	98.8
0.425	mm	98.7
0.250	mm	98.6
0.150	mm	97.1
0.075	mm	94.9
0.005	mm	76.7
0.002	mm	70.1
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			
0.6	0.5	0.2	3.8	24.8	70.1	NT*

NT* Sample not tested for colloids

REPORT DATE: 2019.Aug.16

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

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ASTM D422 - PARTICLE-SIZE ANALYSIS OF SOILS

TO Lee Boughton
 Stantec Consulting Ltd.
 500-311 Portage Avenue
 Winnipeg, Manitoba R3B 2B9

PROJECT C.O.W. Pavement Renewal

PROJECT NO. 113708020

ATTN: Lee Boughton

REPORT NO. 5

DATE SAMPLED: N/A

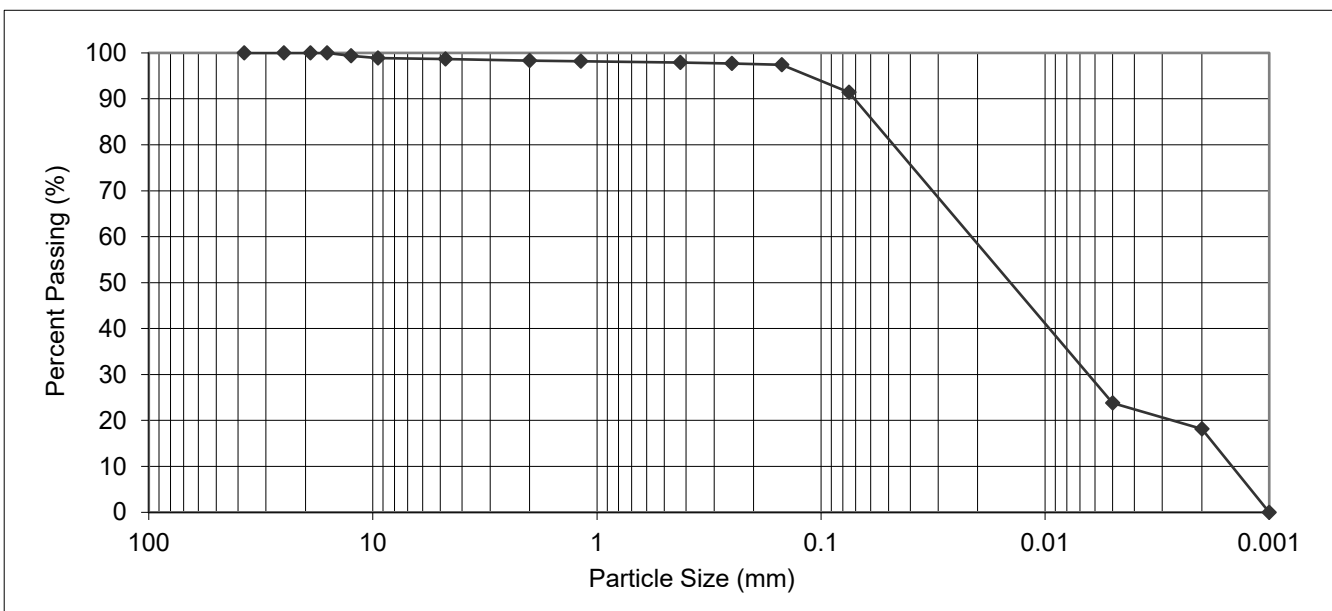
DATE RECEIVED: 2019.Jul.23

DATE TESTED: 2019.Aug.01

SAMPLED BY: Lee Boughton

SAMPLE ID: TH21 @ 2.5'

TESTED BY: Nestor Abarca, C.Tech.



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	99.4
9.50	mm	98.9
4.75	mm	98.7
2.00	mm	98.3

PARTICLE SIZE		PERCENT PASSING
1.18	mm	98.2
0.425	mm	97.9
0.250	mm	97.7
0.150	mm	97.4
0.075	mm	91.4
0.005	mm	23.8
0.002	mm	18.1
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			
1.3	0.4	0.4	6.5	73.3	18.1	NT*

NT* Sample not tested for colloids

REPORT DATE: 2019.Aug.16

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

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



ASTM D422 - PARTICLE-SIZE ANALYSIS OF SOILS

TO Lee Boughton
 Stantec Consulting Ltd.
 500-311 Portage Avenue
 Winnipeg, Manitoba R3B 2B9

PROJECT C.O.W. Pavement Renewal

PROJECT NO. 113708020

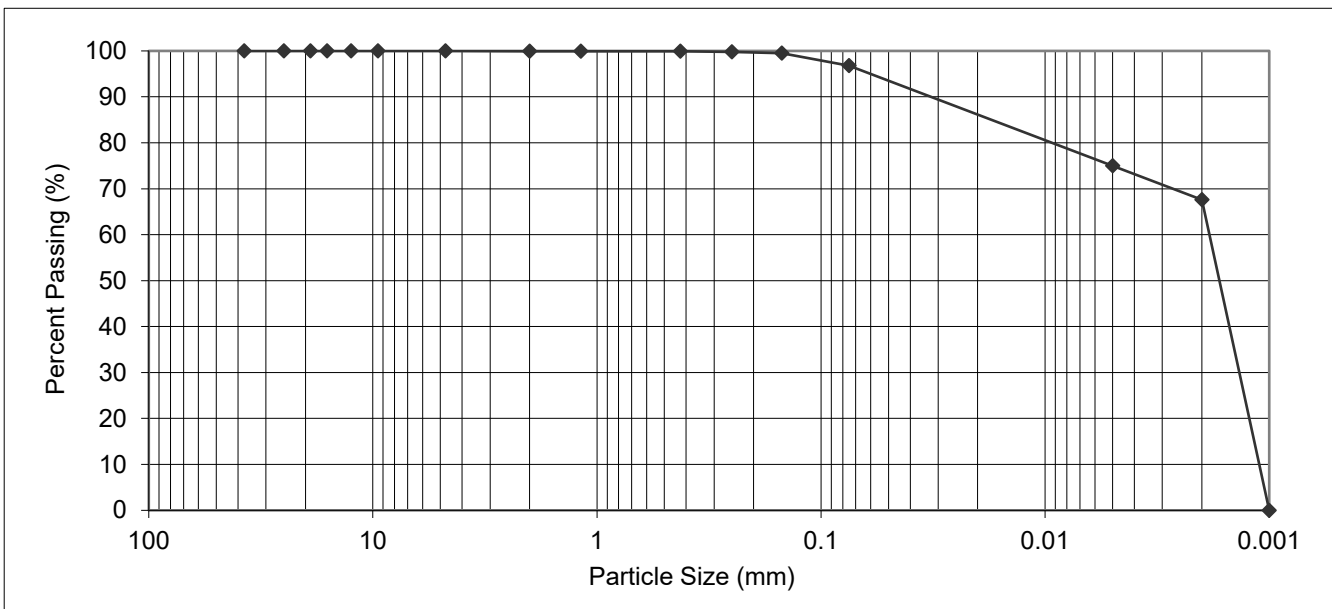
ATTN: Lee Boughton

REPORT NO. 6

DATE SAMPLED: N/A
 SAMPLED BY: Lee Boughton

DATE RECEIVED: 2019.Jul.23
 SAMPLE ID: TH22 @ 3'

DATE TESTED: 2019.Aug.01
 TESTED BY: Nestor Abarca, C.Tech.



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

PARTICLE SIZE		PERCENT PASSING
1.18	mm	99.9
0.425	mm	99.9
0.250	mm	99.8
0.150	mm	99.5
0.075	mm	96.8
0.005	mm	75.0
0.002	mm	67.6
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	0.1	0.0	3.1	29.2	67.6	NT*

NT* Sample not tested for colloids

REPORT DATE: 2019.Aug.16

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

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PROCTOR TEST REPORT

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

CLIENT Stantec Consulting Ltd.
C.C.

ATTN: Lee Boughton

PROJECT Stafford/Taylor/Corydon Pavement Review
City of Winnipeg

PROJECT NO. 113708020

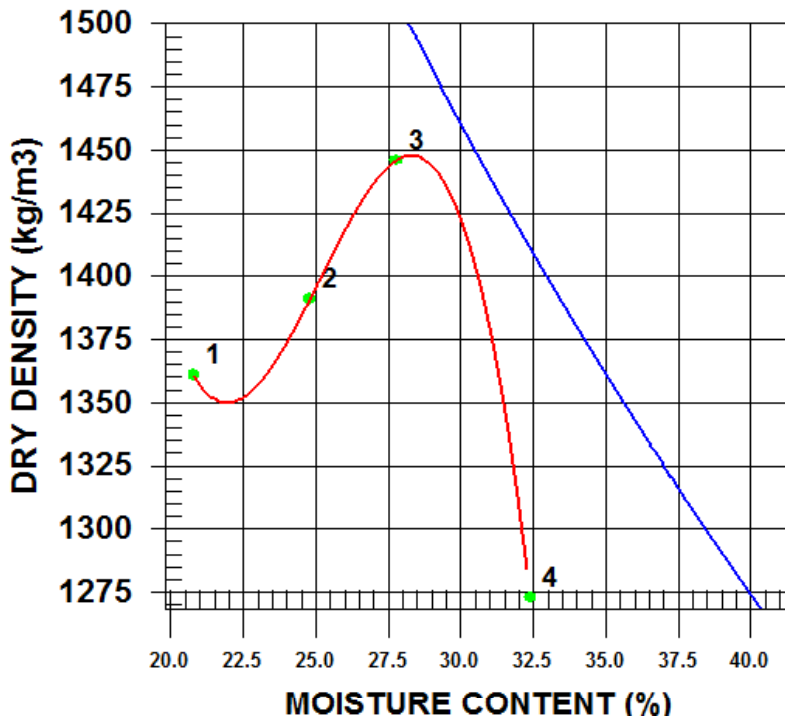
PROCTOR NO. 1 DATE SAMPLED 2019.Jul.26

DATE RECEIVED 2019.Jul.26

DATE TESTED 2019.Aug.03

INSITU MOISTURE 31.8 %
TESTED BY Matthew Moniz
MATERIAL IDENTIFICATION
MATERIAL USE Subgrade
MAX. NOMINAL SIZE
MATERIAL TYPE Clay
SUPPLIER
SOURCE Test Holes

COMPACTION STANDARD Standard Proctor, ASTM D698
COMPACTION PROCEDURE A: 101.6mm Mold, Passing 4.75mm
RAMMER TYPE Manual
PREPARATION Moist
OVERSIZE CORRECTION METHOD None
RETAINED 4.75mm SCREEN



TRIAL NUMBER	WET DENSITY (kg/m ³)	DRY DENSITY (kg/m ³)	MOISTURE CONTENT (%)
1	1644	1361	20.8
2	1736	1391	24.8
3	1848	1446	27.8
4	1685	1273	32.4

	MAXIMUM DRY DENSITY (kg/m ³)	OPTIMUM MOISTURE CONTENT (%)
CALCULATED OVERSIZE CORRECTED	1448	28.5

COMMENTS

Material tested was identified by the client as composite samples of TH03 & TH04.

PROCTOR TEST REPORT

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

CLIENT Stantec Consulting Ltd.
C.C.

ATTN: Lee Boughton

PROJECT Stafford/Taylor/Corydon Pavement Review
City of Winnipeg

PROJECT NO. 113708020

PROCTOR NO. 2

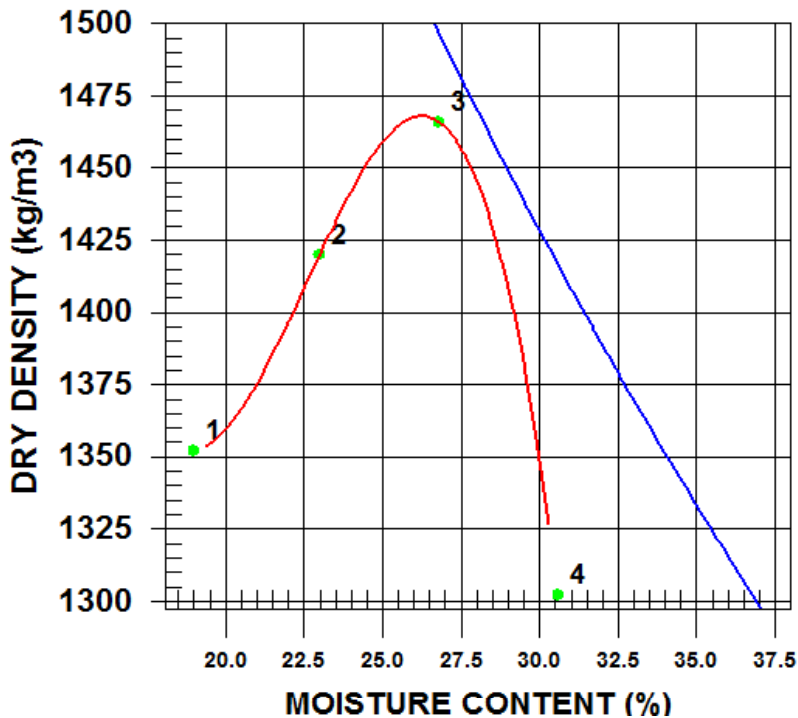
DATE SAMPLED 2019.Jul.26

DATE RECEIVED 2019.Jul.26

DATE TESTED 2019.Aug.03

INSITU MOISTURE 30.3 %
TESTED BY Matthew Moniz
MATERIAL IDENTIFICATION
MATERIAL USE Subgrade
MAX. NOMINAL SIZE
MATERIAL TYPE Clay
SUPPLIER
SOURCE Test Holes

COMPACTION STANDARD Standard Proctor, ASTM D698
COMPACTION PROCEDURE A: 101.6mm Mold, Passing 4.75mm
RAMMER TYPE Manual
PREPARATION Moist
OVERSIZE CORRECTION METHOD None
RETAINED 4.75mm SCREEN



TRIAL NUMBER	WET DENSITY (kg/m ³)	DRY DENSITY (kg/m ³)	MOISTURE CONTENT (%)
1	1609	1352	19.0
2	1747	1420	23.0
3	1859	1466	26.8
4	1700	1302	30.6

	MAXIMUM DRY DENSITY (kg/m ³)	OPTIMUM MOISTURE CONTENT (%)
CALCULATED	1468	26.5
OVERSIZE CORRECTED		

COMMENTS

Material tested was identified by the client as composite samples of TH13 & TH15.

PROCTOR TEST REPORT

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

CLIENT Stantec Consulting Ltd.
C.C.

ATTN: Lee Boughton

PROJECT Stafford/Taylor/Corydon Pavement Review
City of Winnipeg

PROJECT NO. 113708020

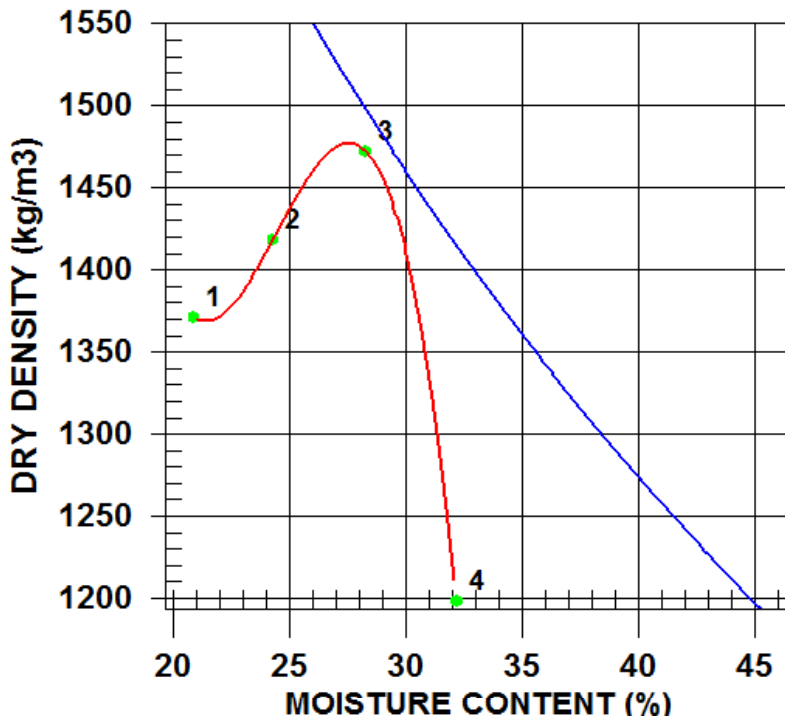
PROCTOR NO. 3 DATE SAMPLED 2019.Jul.26

DATE RECEIVED 2019.Jul.26

DATE TESTED 2019.Aug.03

INSITU MOISTURE 38.0 %
TESTED BY Matthew Moniz
MATERIAL IDENTIFICATION
MATERIAL USE Subgrade
MAX. NOMINAL SIZE
MATERIAL TYPE Clay
SUPPLIER
SOURCE Test Holes

COMPACTION STANDARD Standard Proctor, ASTM D698
COMPACTION PROCEDURE A: 101.6mm Mold, Passing 4.75mm
RAMMER TYPE Manual
PREPARATION Moist
OVERSIZE CORRECTION METHOD None
RETAINED 4.75mm SCREEN



TRIAL NUMBER	WET DENSITY (kg/m ³)	DRY DENSITY (kg/m ³)	MOISTURE CONTENT (%)
1	1657	1371	20.9
2	1762	1418	24.3
3	1888	1472	28.3
4	1584	1198	32.2

	MAXIMUM DRY DENSITY (kg/m ³)	OPTIMUM MOISTURE CONTENT (%)
CALCULATED OVERSIZE CORRECTED	1477	27.5

COMMENTS

Material tested was identified by the client as a composite sample of TH01 to TH04, TH06 & TH07, TH10 to TH15, TH17, TH22 and TH23.

PROCTOR TEST REPORT

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

CLIENT Stantec Consulting Ltd.
C.C.

ATTN: Lee Boughton

PROJECT Stafford/Taylor/Corydon Pavement Review
City of Winnipeg

PROJECT NO. 113708020

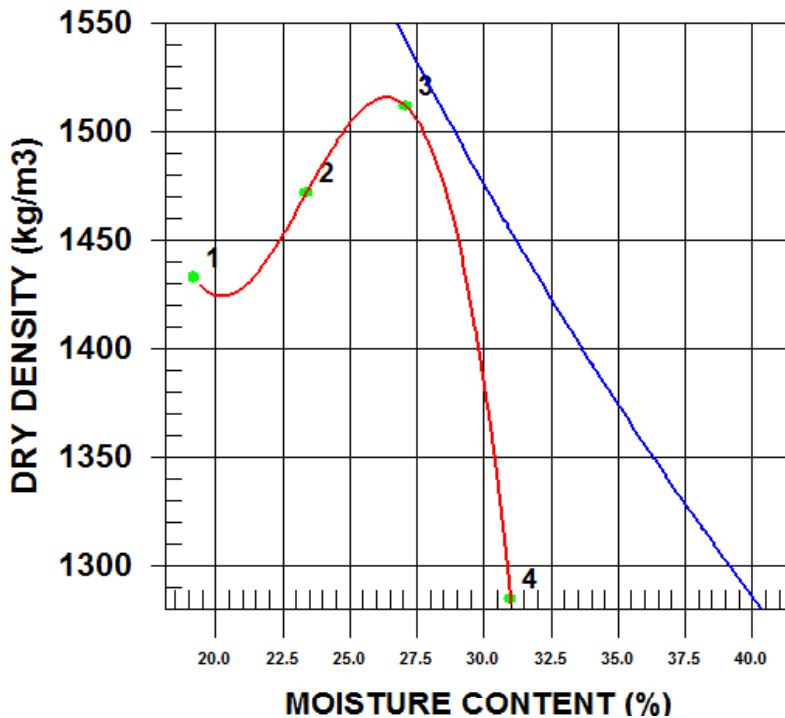
PROCTOR NO. 4 DATE SAMPLED 2019.Jul.26

DATE RECEIVED 2019.Jul.26

DATE TESTED 2019.Aug.03

INSITU MOISTURE 17.6 %
TESTED BY Matthew Moniz
MATERIAL IDENTIFICATION
MATERIAL USE Subgrade
MAX. NOMINAL SIZE
MATERIAL TYPE Clay
SUPPLIER
SOURCE Test Holes

COMPACTION STANDARD Standard Proctor, ASTM D698
COMPACTION PROCEDURE A: 101.6mm Mold, Passing 4.75mm
RAMMER TYPE Manual
PREPARATION Moist
OVERSIZE CORRECTION METHOD None
RETAINED 4.75mm SCREEN



TRIAL NUMBER	WET DENSITY (kg/m ³)	DRY DENSITY (kg/m ³)	MOISTURE CONTENT (%)
1	1708	1433	19.2
2	1817	1472	23.4
3	1922	1512	27.1
4	1683	1285	31.0

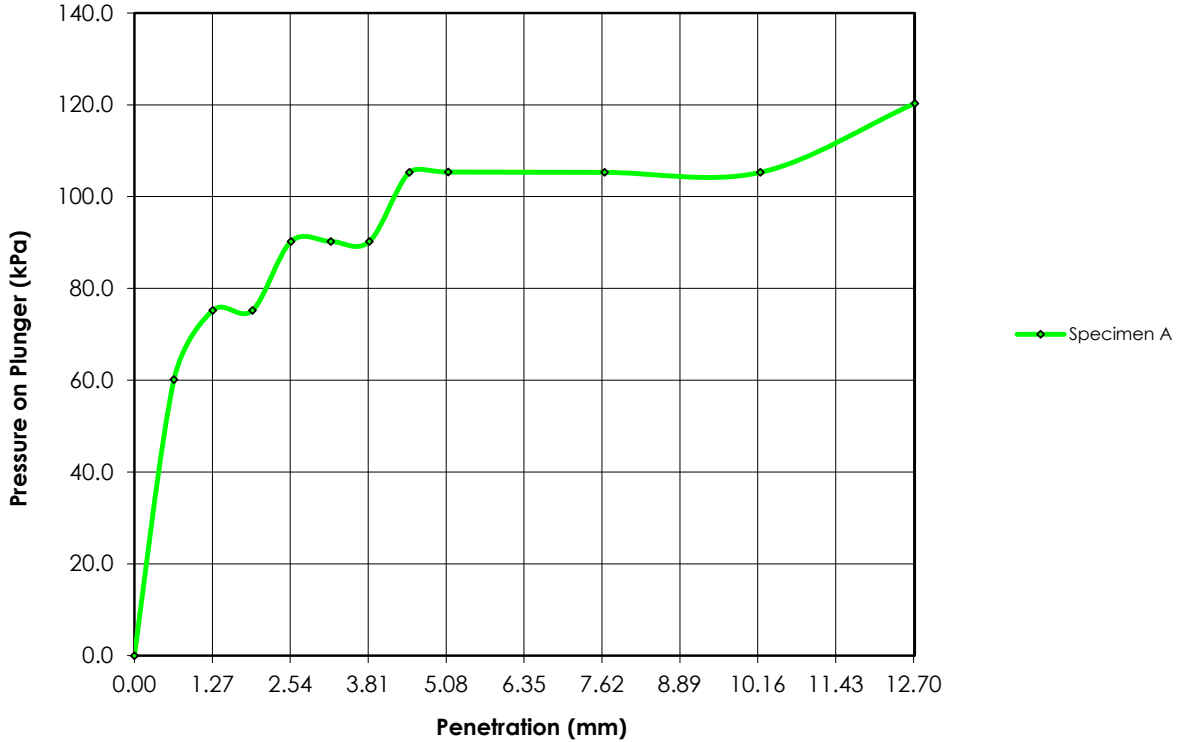
	MAXIMUM DRY DENSITY (kg/m ³)	OPTIMUM MOISTURE CONTENT (%)
CALCULATED OVERSIZE CORRECTED	1516	26.5

COMMENTS

Material tested was identified by the client as composite samples of TH 19 & TH20.



Load Penetration Curve



Reviewed By: B. Sawchyn

Date: 16-Aug-19

Tested By: J. Sorrell

CBR Results					
Results	A	B	C	D	Average
2.54 mm Pen.	1.3				1.3
5.08 mm Pen.	1.0				1.0
Initial Moisture (%)	28.9				28.9
Initial Dry Density (kg/m3)	1377				1377
Final Moisture (%)	36.2				36.2
Final Dry Density (kg/m3)	1370				1370

Project Information			
Project Num	113708020		Swell (%)
Project	Stafford/Taylor/Corydon Pavement	Specimen A	5.52
	Review	Specimen B	-
Date	16-Aug-2019	Specimen C	-
Client	Stantec Consulting Ltd.	Specimen D	-
		Test Variables	
Job Ref.		Liquid Limit:	-
Sample Num.	3082	Plastic Limit:	-
Remarks	Material tested was identified by the client as composite samples of TH03 & TH04.		

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Specimen A Information
CBR Test



Stantec Consulting Ltd.

File Name
lab_113708020_cbr_3082.HSD

Project Information

Project No. 113708020
Project Name: Stafford/Taylor/Corydon Pavement Review
Client: Stantec Consulting Ltd.
Sample Location: -
Sample Description: Clay Subgrade
Remarks: -

Date: 16-Aug-2019

Specimen A Data

Soaked Height (mm): 123.44
Swell (%): 5.52

Liquid Limit: - Max Dry Dens. (kg/m³): 1448
Plastic Limit: - Opt. Moisture (%): 28.5

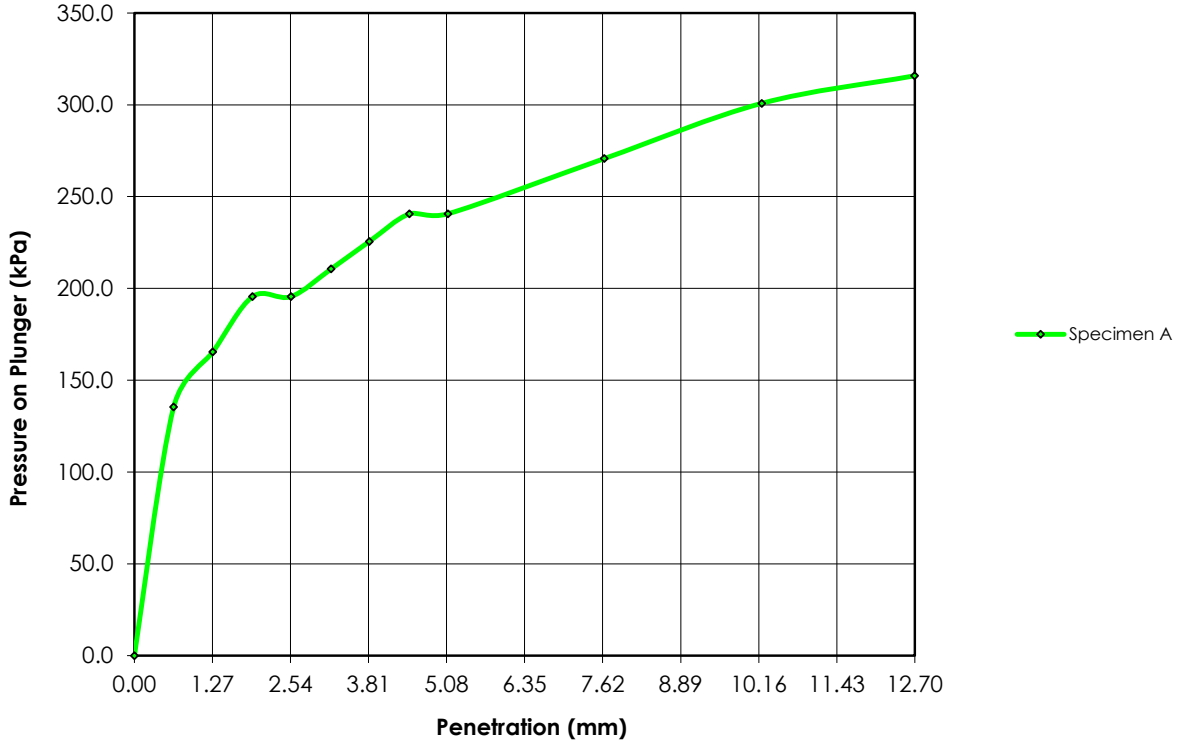
Mold Info	
Height (mm)	117.09
Weight (g)	7229.6
Soil Weight + Mold (g)	11026.6
Soil Weight (g)	3797.0
Mold Volume (cm ³)	2139.3
Dry Density (kg/m ³)	1377

	Moisture Percentage	
	Initial	Avg Final
Moist Soil + tare (g)	170.2	232.8
Dry Soil + tare (g)	132.9	172.7
tare (g)	3.9	4.2
Moisture (%)	28.9	36.2

Specimen A Test Data

Read Number	Load (kN)	Disp. (mm)	Pressure on Plunger (kPa)	Penetration (mm)	CBR
0	0.029	0.213	0.0	0.000	
1	0.146	0.858	60.2	0.646	
2	0.175	1.490	75.2	1.277	
3	0.175	2.135	75.2	1.923	
4	0.204	2.767	90.2	2.554	1.31
5	0.204	3.412	90.2	3.199	
6	0.204	4.044	90.2	3.831	
7	0.233	4.696	105.3	4.484	
8	0.233	5.328	105.3	5.115	1.02
9	0.233	7.875	105.3	7.662	0.80
10	0.233	10.414	105.3	10.201	0.66
11	0.262	12.933	120.3	12.720	0.67

Load Penetration Curve



Reviewed By: B. Sawchyn

Date: 16-Aug-19

Tested By: J. Sorrell

CBR Results					
Results	A	B	C	D	Average
2.54 mm Pen.	2.8				2.8
5.08 mm Pen.	2.3				2.3
Initial Moisture (%)	27.1				27.1
Initial Dry Density (kg/m3)	1513				1513
Final Moisture (%)	30.4				30.4
Final Dry Density (kg/m3)	1503				1503

Project Information			
Project Num	113708020		Swell (%)
Project	Stafford/Taylor/Corydon Pavement	Specimen A	2.50
	Review	Specimen B	-
Date	16-Aug-2019	Specimen C	-
Client	Stantec Consulting Ltd.	Specimen D	-
		Test Variables	
Job Ref.		Liquid Limit:	-
Sample Num.	3088	Plastic Limit:	-
Remarks	Material tested was identified by the client as composite samples of TH13 & TH15.		

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.

Specimen A Information
CBR Test



Stantec Consulting Ltd.

File Name
lab_113708020_cbr_3088.HSD

Project Information

Project No. 113708020
Project Name: Stafford/Taylor/Corydon Pavement Review
Client: Stantec Consulting Ltd.
Sample Location: -
Sample Description: Clay Subgrade
Remarks: -

Date: 16-Aug-2019

Specimen A Data

Soaked Height (mm): 119.38
Swell (%): 2.50

Liquid Limit: - Max Dry Dens. (kg/m³): 1468
Plastic Limit: - Opt. Moisture (%): 26.5

Mold Info	
Height (mm)	116.59
Weight (g)	7158.8
Soil Weight + Mold (g)	11251.4
Soil Weight (g)	4092.6
Mold Volume (cm ³)	2127.2
Dry Density (kg/m ³)	1513

	Moisture Percentage	
	Initial	Avg Final
Moist Soil + tare (g)	164.1	260.4
Dry Soil + tare (g)	130.0	201.0
tare (g)	4.3	4.1
Moisture (%)	27.1	30.4

Specimen A Test Data

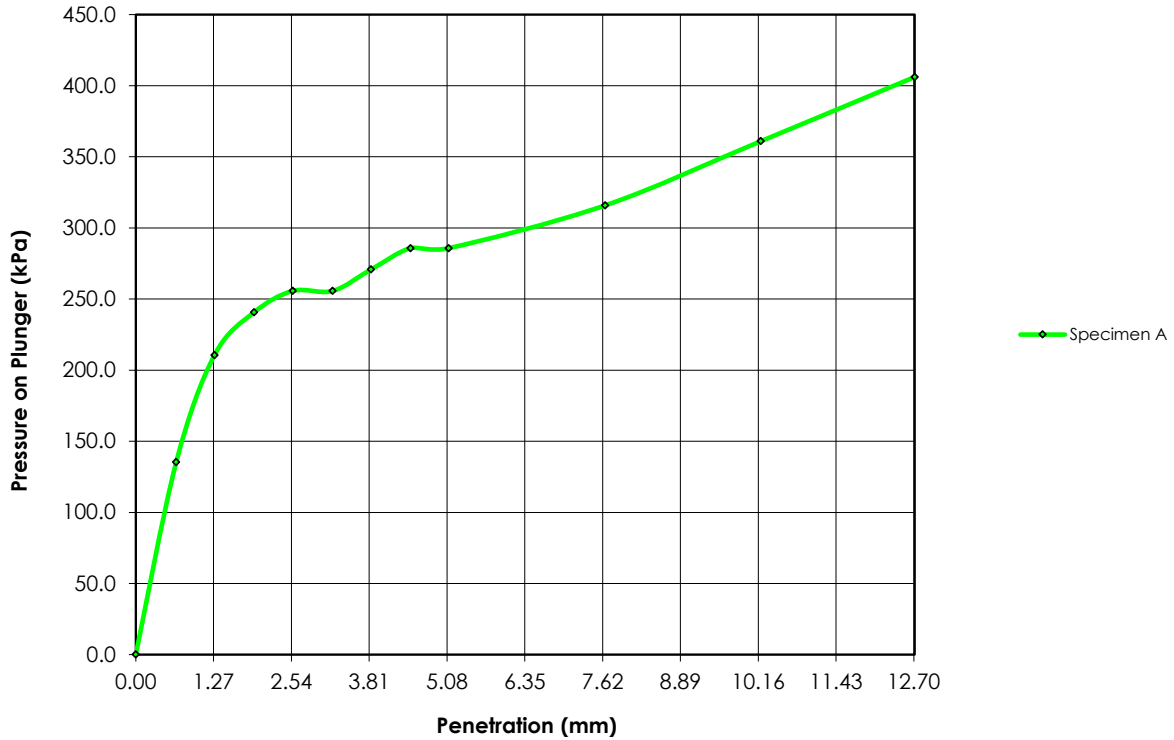
Read Number	Load (kN)	Disp. (mm)	Pressure on Plunger (kPa)	Penetration (mm)	CBR
0	0.029	0.199	0.0	0.000	
1	0.291	0.837	135.4	0.638	
2	0.349	1.476	165.4	1.277	
3	0.408	2.121	195.5	1.923	
4	0.408	2.745	195.5	2.547	2.84
5	0.437	3.398	210.6	3.199	
6	0.466	4.022	225.6	3.824	
7	0.495	4.675	240.6	4.476	
8	0.495	5.299	240.6	5.101	2.33
9	0.553	7.846	270.7	7.648	2.07
10	0.611	10.407	300.8	10.209	1.90
11	0.640	12.897	315.8	12.699	1.76

Reviewed By: B. Sawchyn

Date: 14-Aug-19

Tested By: E. Wahl

Load Penetration Curve



CBR Results

Results	A	B	C	D	Average
2.54 mm Pen.	3.7				3.7
5.08 mm Pen.	2.8				2.8
Initial Moisture (%)	25.8				25.8
Initial Dry Density (kg/m3)	1484				1484
Final Moisture (%)	30.1				30.1
Final Dry Density (kg/m3)	1470				1470

Project Information

Project Number	113708020	Swell (%)	
Project	Stafford/Taylor/Corydon Pavement Review	Specimen A	2.49
Date	13-Aug-19	Specimen B	-
Client	Stantec Consulting Ltd.	Specimen C	-
		Specimen D	-
		Test Variables	
Job Ref.	-	Liquid Limit:	-
Sample Number	3089	Plastic Limit:	-
Remarks	Material tested was identified by the client as composite samples of TH01 to TH04, TH06 & TH07, TH10 to TH15, TH17, TH22 and TH23		

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Specimen A Information

CBR Test

**Stantec Consulting Ltd.**

File Name

lab_113708020_cbr_3089.HSD

Project Information

Project No. 113708020

Date: 13-Aug-19

Project Name: Stafford/Taylor/Corydon Pavement Review

Client: Stantec Consulting Ltd.

Sample Location: -

Sample Description: Clay Subgrade

Remarks: -

Specimen A DataSoaked Height (mm): 119.63
Swell (%): 2.49Liquid Limit: -
Plastic Limit: -Max Dry Dens. (kg/m³): 1477
Opt. Moisture (%): 27.5

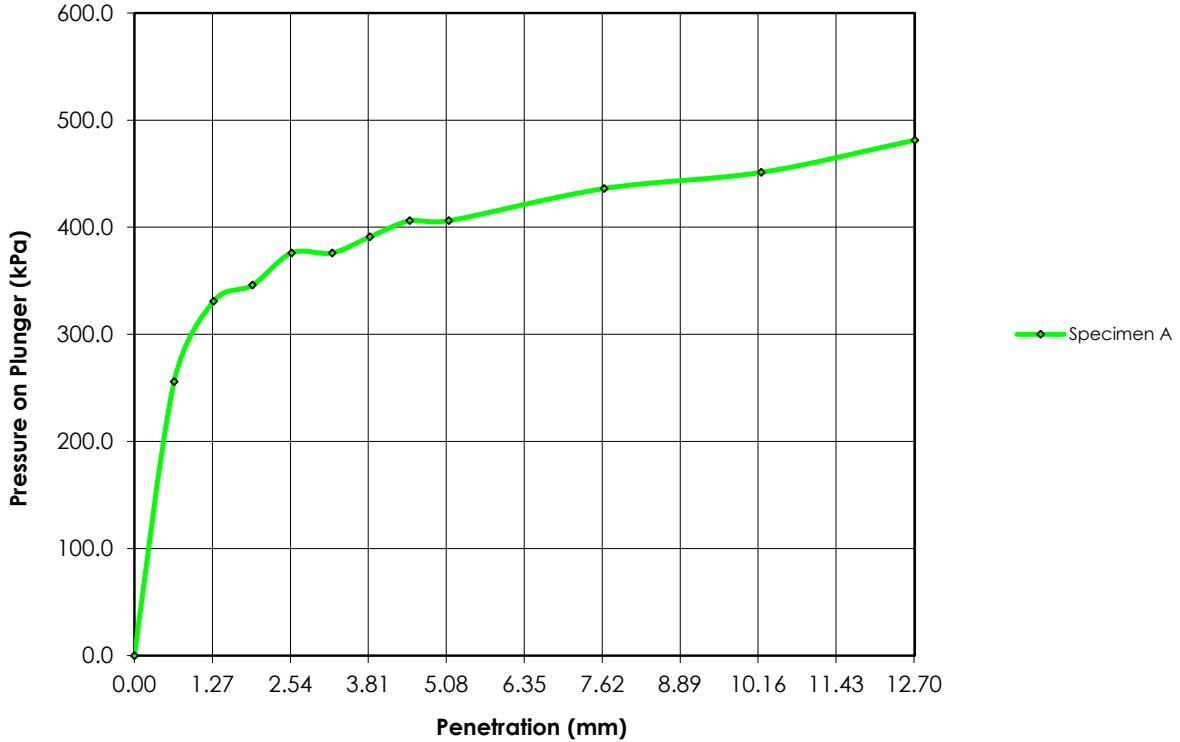
Mold Info	
Height (mm)	116.59
Weight (g)	7227.4
Soil Weight + Mold (g)	11210.3
Soil Weight (g)	3982.9
Mold Volume (cm ³)	2132.3
Dry Density (kg/m ³)	1484

	Moisture Percentage	
	Initial	Avg Final
Moist Soil + tare (g)	130.8	265.4
Dry Soil + tare (g)	104.8	205.2
tare (g)	4.2	4.1
Moisture (%)	25.8	30.1

Specimen A Test Data

Read Number	Load (kN)	Disp. (mm)	Pressure on Plunger (kPa)	Penetration (mm)	CBR
0	0.029	0.298	0.0	0.000	
1	0.291	0.958	135.4	0.660	
2	0.437	1.582	210.6	1.284	
3	0.495	2.228	240.6	1.930	
4	0.524	2.859	255.7	2.561	3.71
5	0.524	3.512	255.7	3.214	
6	0.553	4.136	270.7	3.838	
7	0.582	4.781	285.8	4.484	
8	0.582	5.406	285.8	5.108	2.76
9	0.640	7.960	315.8	7.662	
10	0.728	10.499	361.0	10.201	2.28
11	0.815	13.011	406.1	12.713	2.27

Load Penetration Curve



Reviewed By: B. Sawchyn

Date: 16-Aug-19

Tested By: J. Sorrell

CBR Results

Results	A	B	C	D	Average
2.54 mm Pen.	5.5				5.5
5.08 mm Pen.	3.9				3.9
Initial Moisture (%)	26.8				26.8
Initial Dry Density (kg/m3)	1517				1517
Final Moisture (%)	28.3				28.3
Final Dry Density (kg/m3)	1514				1514

Project Information

Project Num	113708020	Swell (%)	
Project	Stafford/Taylor/Corydon Pavement Review	Specimen A	0.88
Date	16-Aug-19	Specimen B	-
Client	Stantec Consulting Ltd.	Specimen C	-
		Specimen D	-
		Test Variables	
Job Ref.		Liquid Limit:	-
Sample Num.	3090	Plastic Limit:	-
Remarks	Material tested was identified by the client as composite samples of TH19 & TH20.		

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Specimen A Information
CBR Test



Stantec Consulting Ltd.

File Name
lab_113708020_cbr_3090.HSD

Project Information

Project No. 113708020
Project Name: Stafford/Taylor/Corydon Pavement Review
Client: Stantec Consulting Ltd.
Sample Location: -
Sample Description: Clay Subgrade
Remarks: -

Date: 16-Aug-19

Specimen A Data

Soaked Height (mm): 117.35
Swell (%): 0.88

Liquid Limit: -
Plastic Limit: -

Max Dry Dens. (kg/m³): 1516
Opt. Moisture (%): 26.5

Mold Info	
Height (mm)	116.33
Weight (g)	7233.1
Soil Weight + Mold (g)	11321.9
Soil Weight (g)	4088.8
Mold Volume (cm ³)	2125.4
Dry Density (kg/m ³)	1517

	Moisture Percentage	
	Initial	Avg Final
Moist Soil + tare (g)	186.3	300.3
Dry Soil + tare (g)	147.8	234.9
tare (g)	4.2	4.1
Moisture (%)	26.8	28.3

Specimen A Test Data

Read Number	Load (kN)	Disp. (mm)	Pressure on Plunger (kPa)	Penetration (mm)	CBR
0	0.029	0.099	0.0	0.000	
1	0.524	0.745	255.7	0.646	
2	0.670	1.390	330.9	1.291	
3	0.699	2.022	345.9	1.923	
4	0.757	2.660	376.0	2.561	5.45
5	0.757	3.320	376.0	3.221	
6	0.786	3.937	391.0	3.838	
7	0.815	4.583	406.1	4.484	
8	0.815	5.221	406.1	5.122	3.93
9	0.873	7.754	436.2	7.655	3.33
10	0.902	10.308	451.2	10.209	2.85
11	0.961	12.812	481.3	12.713	2.68