APPENDIX 'A' GEOTECHNICAL REPORT

APPENDIX 'A' - GEOTECHNICAL REPORT

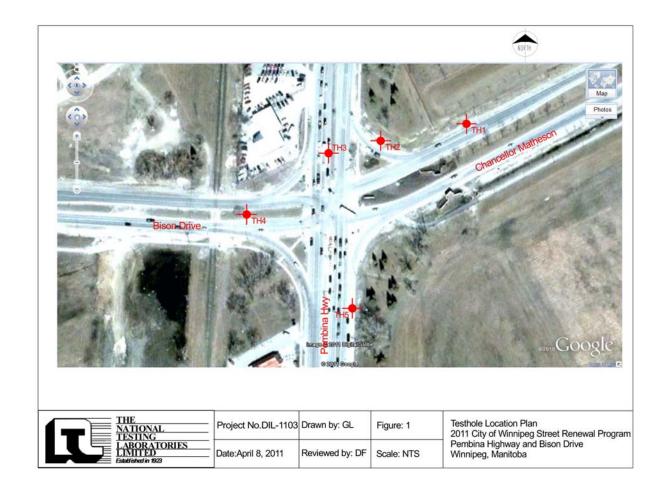
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The geotechnical report is provided to aid in the Contractor's evaluation of the existing pavement structure and/or soil conditions. The information presented is considered accurate at the locations shown on the Drawings and at the time of drilling.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

Geotechnical Report for Bison Drive and Pembina Highway (April 2011)

Test Hole Locations

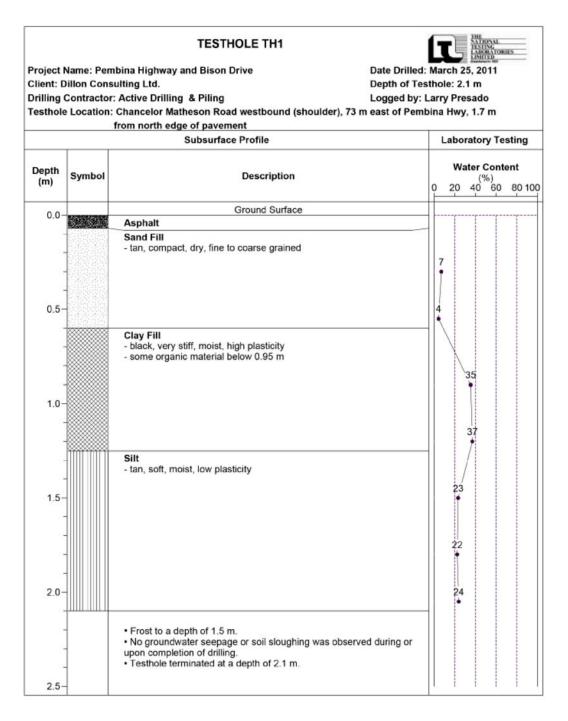


Summary of Core Samples

PEMBINA HIGHWAY AND BISON DRIVE GEOTECHNICAL INVESTIGATION

		Pavement Surface Pavement Structure			Particle Size Analysis				Atterberg Limits						
Testhole ID	Testhole Location	Туре	Thickness (mm)	Туре	Thickness (mm)	Sample Description	Sample Depth (m)	Moisture Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH1	Chancelor Matheson Road westbound (shoulder) 73 m east of Pembina Highway 1.7 m from north edge of pavement	Asphalt	70	Sand	550	-	-	-		-	-	-	-		-
TH2	Yield from Chancelor Matheson Road westbound to Pembina Highway northbound (shoulder) 26 m from Chancellor Matheson Road 2 m from north edge of pavement	-		Sand	600	-									
	Pembina Highway southbound turning lane on to Chancellor Matheson Road eastbound 18 m north of Pembina Highway 1.5 m west from the medan curb	Asphalt/Concrete	170/215	Crushed Limestone	225	Silty Clay	0.9	29	1.7	6.3	34.3	57.7	58	18	40
	Bison Drive median 43 m west of Pembina Highway 1.5 m south from the median curb of westbound Bison Drive			-									-		-
TH5	Pembina Highway northbound turning lane on to Chancelor Matheson Road eastbound 43 m south of Chancellor Matheson Road 2 m west of curb	Asphalt/Concrete	75/175	Sand	1300	Sand	0.6	9	18.5	69.4	8.2	3.9		non plas	tic

Test Hole Log for TH1-



Test Hole Log for TH2-

2.5

TESTHOLE TH2 Project Name: Pembina Highway and Bison Drive Date Drilled: March 25, 2011 Client: Dillon Consulting Ltd. Depth of Testhole: 2.1 m **Drilling Contractor: Active Drilling & Piling** Logged by: Larry Presado Testhole Location: Yield from Chancelor Matheson Road westbound, to Pembina Highway northbound (shoulder), 26 m from Chancellor Matheson Road, 2 m from north edge of pavement Subsurface Profile **Laboratory Testing Water Content** Depth Symbol Description (%) 40 60 80 100 (m) Ground Surface Sand Fill tan, compact, dry, fine to coarse grained some organic material 26 0.5 Clay Fill - black, very stiff, moist, high plasticity - some organic material - grey below 0.9 m 1.0 35 - brown, firm, moist, medium plasticity 31 - tan, soft, moist, low plasticity 2.0 · Frost to a depth of 1.5 m. No groundwater seepage or soil sloughing was observed during or upon completion of drilling. Testhole terminated at a depth of 2.1 m.

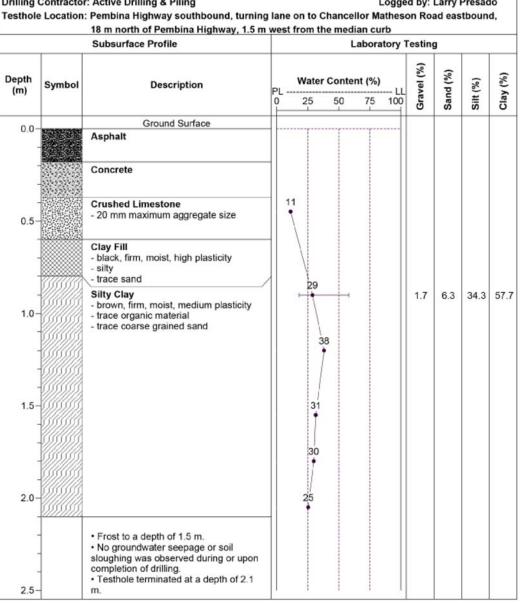
Test Hole Log for TH3-

TESTHOLE TH3

Project Name: Pembina Highway and Bison Drive Client: Dillon Consulting Ltd.

Drilling Contractor: Active Drilling & Piling

Date Drilled: March 25, 2011 Depth of Testhole: 2.1 m Logged by: Larry Presado



Test Hole Log for TH4-

2.5

TESTHOLE TH4 Project Name: Pembina Highway and Bison Drive Date Drilled: March 25, 2011 Client: Dillon Consulting Ltd. Depth of Testhole: 2.1 m **Drilling Contractor: Active Drilling & Piling** Logged by: Larry Presado Testhole Location: Bison Drive median, 43 m west of Pembina Highway, 1.5 m south from the median curb of westbound Bison Drive Subsurface Profile **Laboratory Testing Water Content** Depth Symbol Description (%) 40 60 80 100 (m) Ground Surface Topsoil Clay Fill - black, firm, moist, high plasticity - some sand and fine gravel below 1.5 m - some organic material below 1.8 m 21 0.5 1.0 26 1.5 2.0 29 · Frost to a depth of 1.5 m. No groundwater seepage or soil sloughing was observed during or upon completion of drilling. Testhole terminated at a depth of 2.1 m.

Test Hole Log for TH5-

TESTHOLE TH5

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Project Name: Pembina Highway and Bison Drive

Client: Dillon Consulting Ltd.

Depth of Testhole: 2.1 m Logged by: Larry Presado

		Subsurface Profile	Laboratory Testing											
epth (m)	Symbol	Description	PL	Wat 25	er Conte	nt (%)	LL 100	Gravel (%)	Sand (%)	Silt (%)	Clay (%)			
			۱Ľ			, ĭ	100	ō	ű	S	Ö			
0.0	S255/255	Ground Surface		r-										
10	DESCRIPTION	Asphalt	-11			1								
(0)		Concrete	.		1									
8	-	Sand Fill - tan, compact, moist, fine to coarse grained	1	'	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0									
0.5			9					18.5	69.4	8.2	3.9			
10														
15				1										
1.0-														
10			.	14	8 8 9									
29				•										
35			,	2										
1.5-			_ '		1									
19	-	Clay - black, stiff, moist, high plasticity			42	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1								
2.0-					39									
11	-	Frost to a depth of 1.5 m No groundwater seepage or soil sloughing was observed during or upon completion of drilling												
177	1	Testhole terminated at a depth of 2.1												
2.5-	-	m	1	1	1	4	- 1							

Pavement Core Photos





Core sample from Testhole TH1



Core sample from Testhole TH3

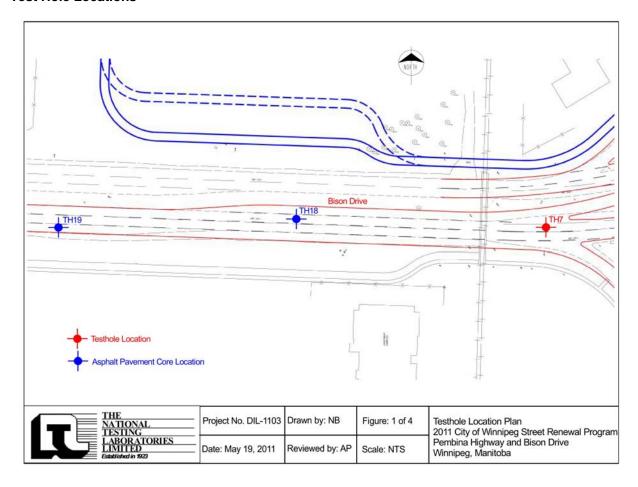


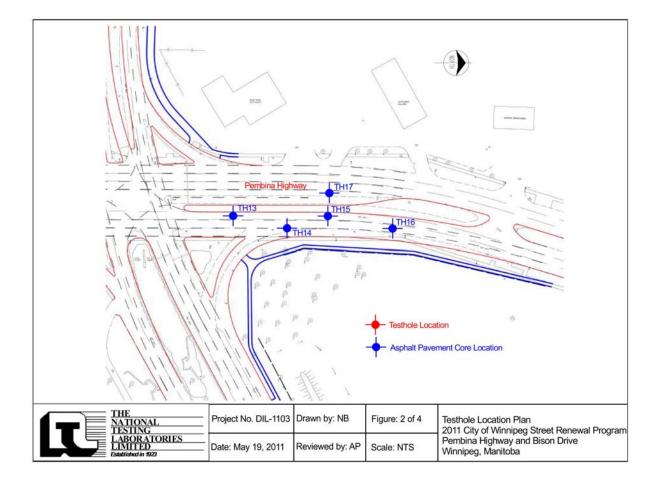


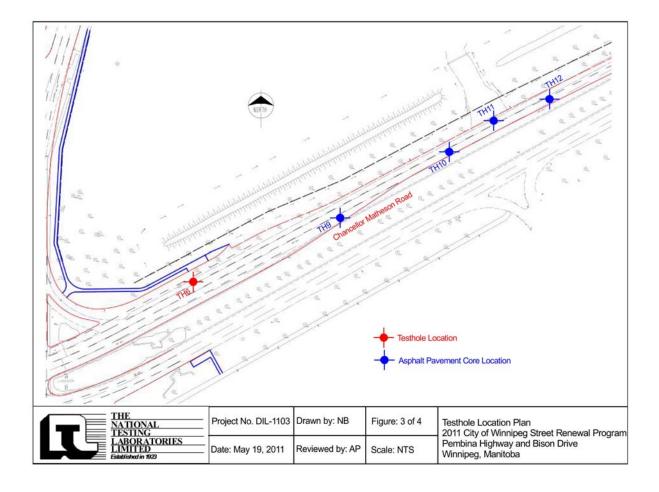
Core sample from Testhole TH5

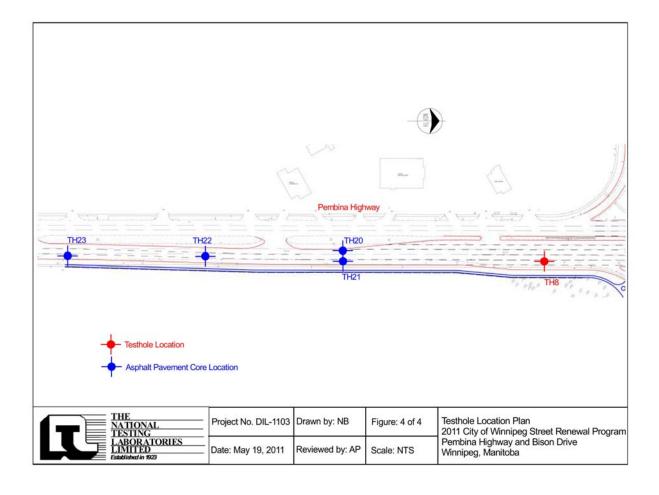
Geotechnical Report for Bison Drive and Pembina Highway (May 2011)

Test Hole Locations









Summary of Core Samples

PEMBINA HIGHWAY AND BISON DRIVE GEOTECHNICAL INVESTIGATION

		Pavement Surface		Paveme	nt Structure		Sample	Moisture	Particle Size Analysis				Atterberg Limits		
Testhole ID	Testhole Location	Туре	Thickness (mm)	Туре	Thickness (mm)	Sample Description	Depth (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH6	Chancellor Matheson Road westbound, 90 m east of Pembina Highway, 2 m south of shoulder edge	Asphalt/Concrete	95/210	Clay Fill		-		-		-		-	-	-	
TH7	Bison Drive eastbound, 40 m west of Pembina Highway, 2 m south of median lane curb	Asphalt/Concrete	70/205	Clay Fill	-	Clay Fill	0.9 m	30.38	1.0	8.8	18.6	71.6	76	20	56
TH8	Pembina Highway northbound, 52 m south of Chancellor Matheson Road, 6 m west of outside lane curb	Asphalt/Concrete	70/235	Sand Fill	-	-	-	-		-	-	-	-	-	-
TH9	Chancellor Matheson Road westbound, 180 m east of Pembina Highway, 2 m north of median lane curb	Asphalt	110	-	-	-	-	-		-		-	-	-	
TH10	Chancellor Matheson Road westbound, 250 m east of Pembina Highway, 2 m north of median lane curb	Asphalt	120	-	-	-		-		-	-	-	-	-	
TH11	Chancellor Matheson Road westbound, 280 m east of Pembina Highway, 1 m north of shoulder edge	Asphalt	95	-	-	-	-	-		-	-	-	-	-	
TH12	Chancellor Matheson Road westbound, 310 m east of Pembina Highway, 2 m north of median lane curb	Asphalt	95		-	-		-		-		-	-	-	
TH13	Pembina Highway northbound, 30 m north of Chancellor Matheson Road, 2 m east of median lane curb	Asphalt	80	-	-	-	-	-	-	-	-	-	-	-	-
TH14	Pembina Highway northbound, 50 m north of Chancellor Matheson Road, 6 m west of outside lane curb	Asphalt	85	-	-	-	-	-	-	-	-	-	-	-	-
TH15	Pembina Highway northbound, 75 m north of Chancellor Matheson Road, 2 m east of median lane curb	Asphalt	80	-	-	-	-	-	-	-	-	-	-	-	-
TH16	Pembina Highway northbound, 100 m north of Chancellor Matheson Road, 5 m west of outside lane curb	Asphalt	70	-	-	-	-	-	-	-	-	-	-	-	
TH17	Pembina Highway southbound, 75 m north of Chancellor Matheson Road, 6 m west of median lane curb	Asphalt	125	-	-	-	-	-		-	-	-	-	-	
TH18	Bison Drive eastbound, 80 m west of Canadian National Railway railroad track, 6 m south of median lane curb	Asphalt	60	-	-	-	-	-	-	-	-	-	-	-	
TH19	Bison Drive eastbound, 170 m west of Canadian National Railway railroad track, 1 m from north edge of pavement	Asphalt	100	-	-	-		-	-	-	-	-	-	-	
TH20	Pembina Highway northbound, 232 m south of Chancellor Matheson Road, 2 m east of median lane curb	Asphalt	45	-	-	-	-	-	-	-	-	-	-	-	-
TH21	Pembina Highway northbound, 232 m south of Chancellor Matheson Road, 5 m west of outside lane curb	Asphalt	60	-	-	-		-		-	-	-	-	-	
TH22	Pembina Highway northbound, 301 m south of Chancellor Matheson Road, 6 m west of outside lane curb	Asphalt	75	-		-		-		-	-	-	-	-	
TH23	Pembina Highway northbound, 401 m south of Chancellor Matheson Road, 5 m west of outside lane curb	Asphalt	60	-			-	-	-	-	-	-		-	-

Note: Testholes TH9 to TH23 were cored only through asphalt to top of concrete.

THE NATIONAL TESTING LABORATORIES LIMITED

Date Drilled: May 10, 2011

Test Hole Log for TH6

TESTHOLE TH6

Project Name: Pembina Highway and Bison Drive

	L	Laboratory Testing						
Depth (m)	Symbol	Description	0	Water Content (%) 20 40 60 80 1				
		Ground Surface	-	ted the second the				
0.0		Asphalt	1:::::					
		Concrete						
0.5		Clay Fill - black, stiff, moist, high plasticity - some organic material - brown below 1.1 m - firm below 1.5 m - some sand and fine gravel		32 1 31				
1.0-				35 • • •				
1.5-				33				
		Clayey Silt -tan, firm, moist, low plasticity		30				
2.0				33				
		 No groundwater seepage or soil sloughing was observed during or upon completion of drilling. Testhole terminated at a depth of 2.1 m. 						

Test Hole Log for TH7

2.5

TESTHOLE TH7 Project Name: Pembina Highway and Bison Drive Date Drilled: May 10, 2011 Client: Dillon Consulting Ltd. Depth of Testhole: 2.1 m **Drilling Contractor: Active Drilling & Piling** Logged by: Larry Presado Testhole Location: Bison Drive eastbound, 40 m west of Pembina Highway, 2 m south of median lane curb **Subsurface Profile Laboratory Testing** Gravel (%) Sand (%) Clay (%) Depth Water Content (%) Silt (%) Symbol Description (m) 25 50 75 100 Ground Surface 0.0 Asphalt Concrete Clay Fill black, stiff, moist, high plasticitysome organic material 33 0.5 - some silt 25 - trace sand and fine gravel - firm below 1.6 m 30 1.0 8.8 18.6 71.6 1.0 29 32 1.5 32 2.0 34 · No groundwater seepage or soil sloughing was observed during or upon completion of drilling. Testhole terminated at a depth of 2.1

Test Hole Log for TH8

2.5

TESTHOLE TH8 Project Name: Pembina Highway and Bison Drive Date Drilled: May 10, 2011 Client: Dillon Consulting Ltd. Depth of Testhole: 2.1 m **Drilling Contractor: Active Drilling & Piling** Logged by: Larry Presado Testhole Location: Pembina Highway northbound, 52 m south of Chancellor Matheson Road, 6 m west of outside lane curb Subsurface Profile **Laboratory Testing** Water Content Depth Symbol Description (%) 40 60 80 100 (m) **Ground Surface** 0.0 Asphalt Concrete Sand Fill - tan, compact, dry, fine to coarse grained 0.5 5 Clay Fill - black, stiff, moist, high plasticity 28 - some organic material - trace sand and fine gravel 1.0 34 29 1.5 Silty Clay 35 - brown, firm, moist, medium plasticity 26 - tan, soft, moist, low plasticity · No groundwater seepage or soil sloughing was observed during or upon completion of drilling.

• Testhole terminated at a depth of 2.1 m.

Pavement Core Photos





Core sample from Testhole TH6



Core sample from Testhole TH8



Core sample from Testhole TH7



Core sample from Testhole TH9





Core sample from Testhole TH10



Core sample from Testhole TH11



Core sample from Testhole TH12



Core sample from Testhole TH13

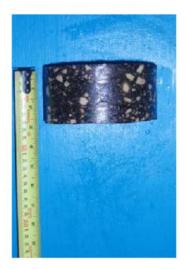




Core sample from Testhole TH14



Core sample from Testhole TH15



Core sample from Testhole TH16



Core sample from Testhole TH17





Core sample from Testhole TH18



Core sample from Testhole TH19



Core sample from Testhole TH20



Core sample from Testhole TH21





Core sample from Testhole TH22



Core sample from Testhole TH23