

APPENDIX 'A'

GEOTECHNICAL REPORT



Quality Engineering | Valued Relationships

Stantec Consulting Ltd.

**Pembina Highway Overpass at Abinojii
Mikanah Rehabilitation RFP 975-2024**

Prepared for:

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500-311 Portage Ave
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R3B 2B9

Project Number: 1000-240-02

Date: February 19, 2025



Quality Engineering | Valued Relationships

February 19, 2025

Our File No. 1000-240-02

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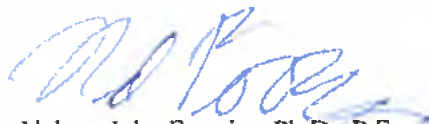
RE: Pembina Highway Overpass at Abinojii Mikanah Rehabilitation RFP 975-2024

TREK Geotechnical Inc. is pleased to submit our Final Report for the road investigation for Pembina Highway Overpass at Abinojii Mikanah Rehabilitation.

Please contact the undersigned should you have any questions.

Sincerely,

TREK Geotechnical Inc.
Per:



Nelson John Ferreira, Ph.D., P.Eng.
Senior Geotechnical Engineer

Encl.

Revision History

Revision No.	Author	Issue Date	Description
1	TG	February 19, 2025	Final Report

Authorization Signatures

Prepared By:



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Intermediate Technician



Reviewed By:

Nelson John Ferreira, Ph.D., P.Eng.
Senior Geotechnical Engineer



**ENGINEERS
GEOSCIENTISTS
MANITOBA**
Certificate of Authorization
TREK GEOTECHNICAL INC.
No. 4877

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1.0 Introduction

This report summarizes the results of the road investigation completed for the Pembina Highway Overpass at Abinojii Mikanah Rehabilitation and Related Works. The investigation was carried out along Pembina Highway and Pembina Highway Overpass ramps. Information collected describes the asphalt and concrete pavement structure. The investigation was carried out in accordance with the City of Winnipeg RFP No. 975-2024.

2.0 Road Investigation

The investigation included coring of pavement at 29 locations on Pembina Highway between Plaza Drive and Chancellor Drive. The investigation locations are shown on Figures 01 to 02 (attached) and the table below summarizes the investigation program per street.

Table 1 – Road Investigation Program

Pembina Highway Overpass at Abinojii Mikanah Rehabilitation	# of Locations	Investigation
Pembina Highway & Overpass Ramps – Plaza Drive to Chancellor Drive	29	29 Cores – 15 Compressive Strength

The road investigation was conducted between January 27, 2025 to January 31, 2025. The pavement structure (asphalt/concrete) was cored by Tyler Green of TREK Geotechnical Inc. (TREK) using a portable coring press equipped with a hollow 150mm diameter diamond core drill bits. Core samples were also retrieved and logged at TREK's material testing laboratory. A summary table of the concrete pavement cores, compressive strength of pavement cores and photographs of the cores are included in Appendix A.

Core logs noted on the summary tables are based on UTM coordinates obtained using a hand-held GPS, their location relative to the nearest address or intersection and measured distance from the edge of pavement, or other permanent features.

Fifteen concrete cores were selected for concrete compressive strength breaks and the length to diameter ratio was between 1.21 and 1.61 for all cores collected. The core compressive strength tests were tested in accordance with CSA A23.2-14C – wet condition. The measured compressive strengths were also corrected based on an adapted ACI 214.4R-03 Standard to estimate the in-place concrete strengths. The table below summarizes the compressive strength results while the compressive strength testing details and the correction factor methodology are included in Appendix A.

Table 1: Concrete Core Compressive Strength Results

Core ID	Uncorrected Compressive Strength (MPa)	Corrected Compressive Strength (MPa)
PC-02	72.00	80.06
PC-05	68.06	75.76
PC-07	75.65	82.05
PC-09	71.85	79.87
PC-11	51.52	56.97
PC-14	68.78	76.64
PC-15	64.47	71.82
PC-17	59.93	66.26
PC-18	61.74	68.73
PC-19	45.39	49.45
PC-20	61.17	67.68
PC-23	47.10	52.10
PC-24	65.48	73.14
PC-26	45.41	48.38
PC-28	69.41	83.98

3.0 Closure

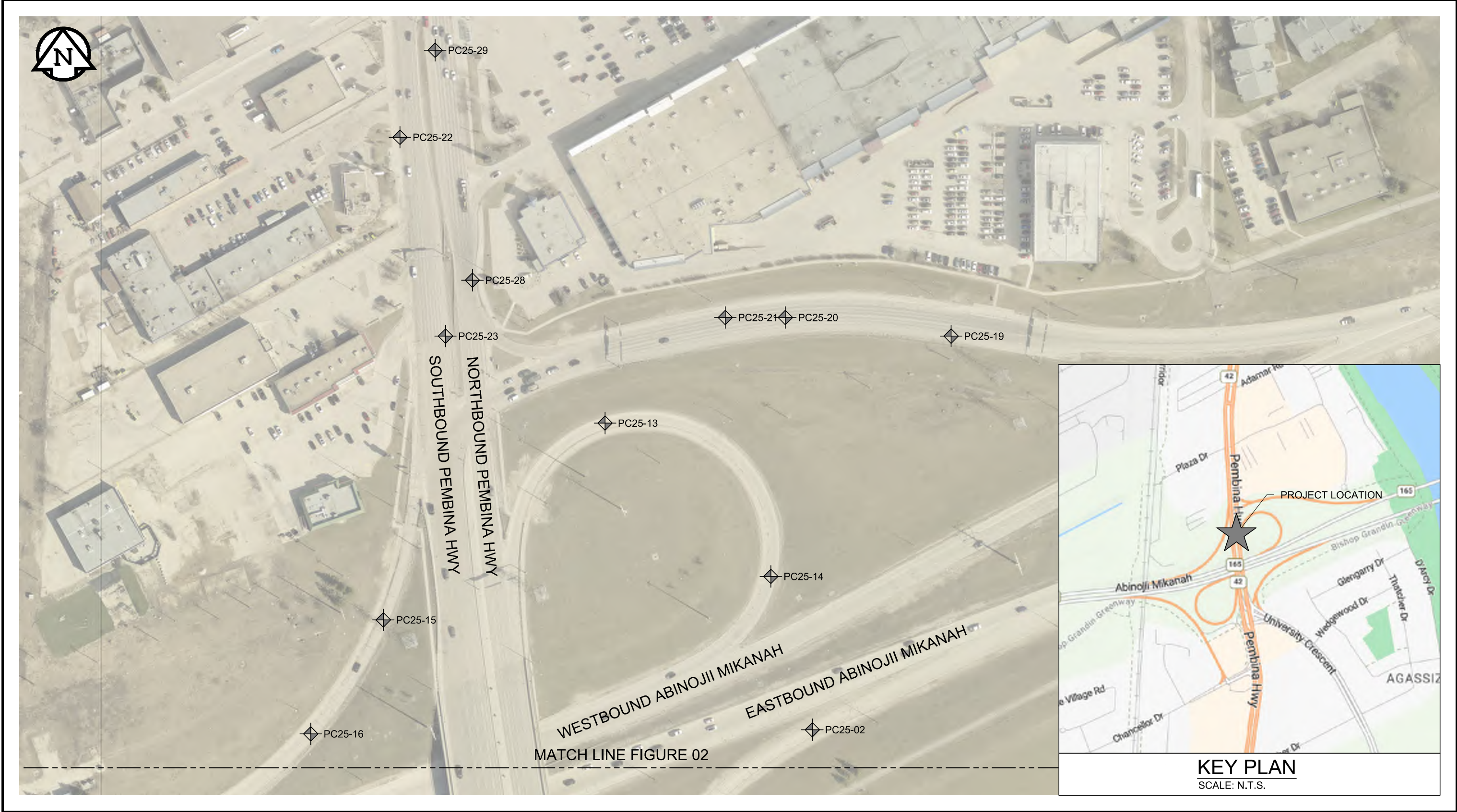
The information provided in this report is in accordance with current engineering principles and practices (Standard of Practice). The findings of this report were based on information provided (field investigation).

All information provided in this report is subject to our standard terms and conditions for engineering services, a copy of which is provided to each of our clients with the original scope of work, or a mutually executed standard engineering services agreement. If these conditions are not attached, and you are not already in possession of such terms and conditions, contact our office and you will be promptly provided with a copy.

This report has been prepared by TREK Geotechnical Inc. (the Consultant) for the exclusive use of Stantec Consulting Ltd. (the Client) and their agents for the work product presented in the report. Any findings or recommendations provided in this report are not to be used or relied upon by any third parties, except as agreed to in writing by the Client and Consultant prior to use.

Figures

Z:\Projects\1000 Soils Lab\1000 Lab Projects\1000-240 Stantec\1000-240-02 975-2024 Pembina Overpass Coring\3 Survey and Dwg\3.4 CAD\3.4.3 Working Folder\Figs 01 & 02 2025-02-13 Pembina Overpass 0_A_1000-240-02.dwg, 2025-02-13 6:54:03 AM



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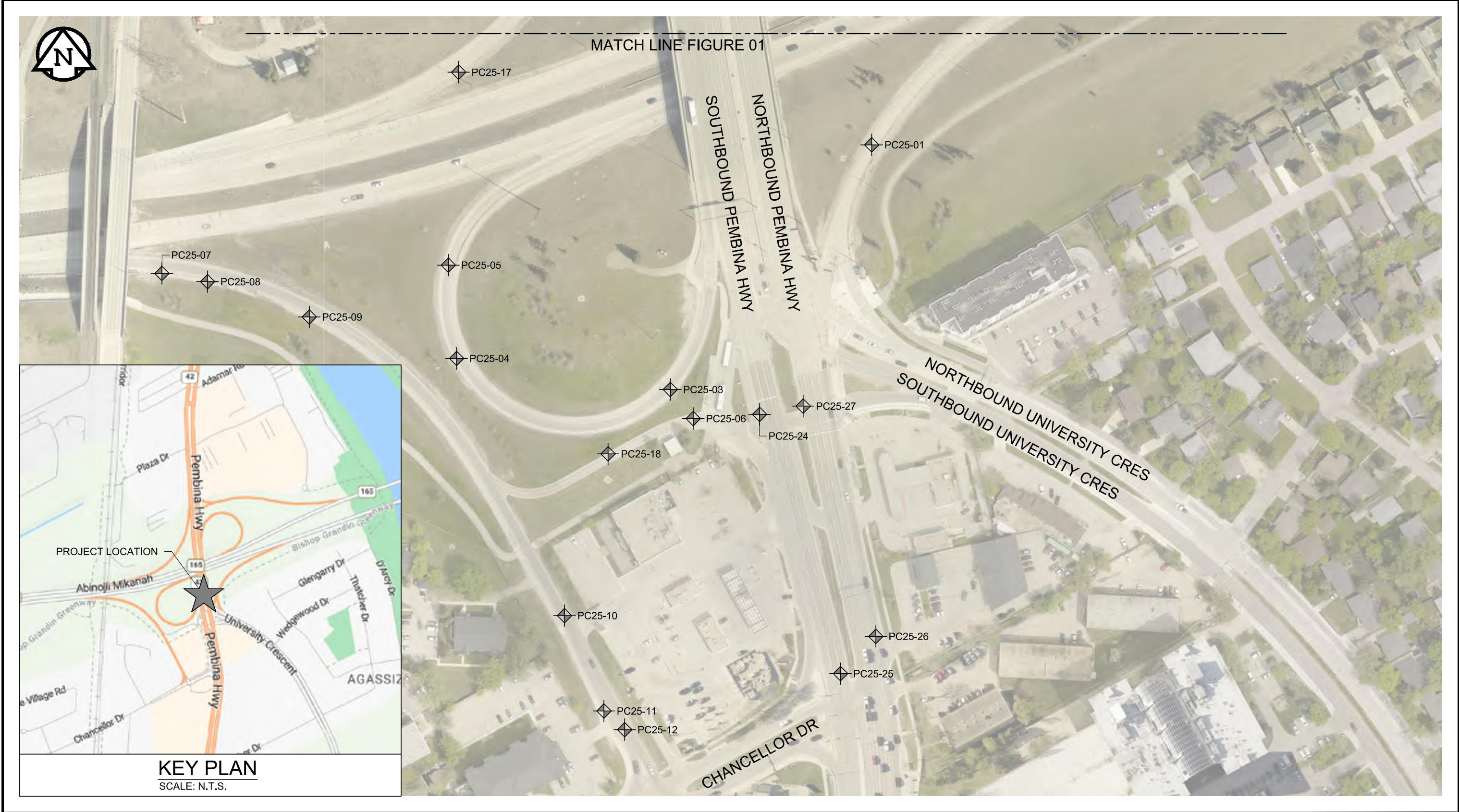


Figure 02
Pavement Core Location Plan

Appendix A

Summary Table, Core Compressive Strength and Pavement Core Photos

Pembina Highway Overpass – Plaza Drive to Chancellor Drive



Pembina Highway Overpass at Abinonji Mikanah Rehabilitation and Related Works

975-2024 Pembina Overpass Coring

Pavement Core No.	Pavement Core Location	Pavement Surface		Pavement Structure Material		Corrected Compressive Strength (Mpa)
		Type	Thickness (mm)	Type	Thickness (mm)	
PC25-01	UTM : 5520143 m N, 632973 m E; Located on Pembina Overpass, Northbound Pembina Highway to Eastbound Abinonji Mikanah, 1.9 m North of South curb (Joint, Core #20)	Asphalt	0	Concrete	235	
PC25-02	UTM : 5520215 m N, 633052 m E; Located on Pembina Overpass, Northbound Pembina Highway to Eastbound Abinonji Mikanah, 2.9 m North of South curb (Compressive Strength, Core #21)	Asphalt	0	Concrete	235	80.06
PC25-03	UTM : 5520025 m N, 632876 m E; Located on Pembina Overpass, Southbound Pembina Highway to Eastbound Abinonji Mikanah, 1.5 m South of North (Joint, Core #09)	Asphalt	90	Concrete	200	
PC25-04	UTM : 5520040 m N, 632773 m E; Located on Pembina Overpass, Southbound Pembina Highway to Eastbound Abinonji Mikanah, 2.0 m South of North (Joint, Core #10)	Asphalt	75	Concrete	240	
PC25-05	UTM : 5520085 m N, 632769 m E; Located on Pembina Overpass, Southbound Pembina Highway to Eastbound Abinonji Mikanah, 2.3 m South of North (Compressive Strength, Core #11)	Asphalt	85	Concrete	225	75.76
PC25-06	UTM : 5520011 m N, 632887 m E; Located on Pembina Overpass, Bus Access Road, 1.4 m North of South curb (Joint, Core #07)	Asphalt	0	Concrete	230	
PC25-07	UTM : 5520081 m N, 632769 m E; Located on Pembina Overpass, Eastbound Abinonji Mikanah to Chancellor Drive, 3.4 m South of North shoulder (Compressive Strength, Core #06)	Asphalt	75	Concrete	200	82.05
PC25-08	UTM : 5520077 m N, 632653 m E; Located on Pembina Overpass, Eastbound Abinonji Mikanah to Chancellor Drive, 3.1 m South of North shoulder (Joint, Core #05)	Asphalt	75	Concrete	225	
PC25-09	UTM : 5520060 m N, 632702 m E; Located on Pembina Overpass, Eastbound Abinonji Mikanah to Chancellor Drive, 2.6 m South of North shoulder (Compressive Strength, Core #04)	Asphalt	35	Concrete	230	79.87
PC25-10	UTM : 5519916 m N, 632825 m E; Located on Pembina Overpass, Eastbound Abinonji Mikanah to Chancellor Drive, 2.6 m West of East curb (Joint, Core #03)	Asphalt	50	Concrete	200	
PC25-11	UTM : 5519870 m N, 632844 m E; Located on Pembina Overpass, Eastbound Abinonji Mikanah to Chancellor Drive, 2.0 m West of East curb (Compressive Strength, Core #02)	Asphalt	55	Concrete	225	56.97
PC25-12	UTM : 5519861 m N, 632854 m E; Located on Pembina Overpass, Eastbound Abinonji Mikanah to Chancellor Drive, 2.0 m East of West curb (Joint, Core #01)	Asphalt	110	Concrete	175	
PC25-13	UTM : 5520363 m N, 632952 m E; Located on Pembina Overpass, Northbound Pembina to Westbound Abinonji Mikanah, 2.5 m North of South curb (Joint, Core #18)	Asphalt	0	Concrete	200	
PC25-14	UTM : 5520289 m N, 633032 m E; Located on Pembina Overpass, Northbound Pembina Highway to Westbound Abinonji Mikanah, 2.1 m North of South curb (Compressive Strength, Core #19)	Asphalt	0	Concrete	230	76.64
PC25-15	UTM : 5520268 m N, 632845 m E; Located on Pembina Overpass, Southbound Pembina Highway to Westbound Abinonji Mikanah, 2.0 m West of East curb (Compressive Strength, Core #14)	Asphalt	40	Concrete	230	71.82



Pembina Highway Overpass at Abinooji Mikanah Rehabilitation and Related Works

975-2024 Pembina Overpass Coring

Pavement Core No.	Pavement Core Location	Pavement Surface		Pavement Structure Material		Corrected Compressive Strength (Mpa)
		Type	Thickness (mm)	Type	Thickness (mm)	
PC25-16	UTM : 5520213 m N, 632810 m E; Located on Pembina Overpass, Southbound Pembina Highway to Westbound Abinooji Mikanah, 1.8 m West of East curb (Joint, Core #13)	Asphalt	40	Concrete	260	
PC25-17	UTM : 5520178 m N, 632774 m E; Located on Pembina Overpass, Southbound Pembina Highway to Westbound Abinooji Mikanah, 2.0 m West of East curb (Compressive Strength, Core #12)	Asphalt	25	Concrete	225	66.26
PC25-18	UTM : 5519994 m N, 632846 m E; Located on Pembina Overpass, Bus Access Road, 2.0 m South of North curb (Joint, Core #08)	Asphalt	0	Concrete	230	68.73
PC25-19	UTM : 5519861 m N, 632854 m E; Located on Pembina Overpass, Westbound Abinooji Mikanah to Pembina Highway, 2.3 m North of South curb (Compressive Strength, Core #17)	Asphalt	90	Concrete	210	49.45
PC25-20	UTM : 5520414 m N, 633039 m E; Located on Pembina Overpass, Westbound Abinooji Mikanah to Pembina Highway, 4.5 m South of North curb (Compressive Strength, Core #16)	Asphalt	90	Concrete	210	67.68
PC25-21	UTM : 5520414 m N, 633010 m E; Located on Pembina Overpass, Westbound Abinooji Mikanah to Pembina Highway, 1.7 m North of South curb (Joint, Core #17)	Asphalt	40	Concrete	220	
PC25-22	UTM : 5520501 m N, 632853 m E; Located at #1875 Pembina Highway, Southbound Curb Lane, 1.9 m East of West curb (Joint, Core #29)	Asphalt	70	Concrete	210	
PC25-23	UTM : 5520405 m N, 632875 m E; Located at #1921 Pembina Highway, Southbound Median Lane, 2.0 m West of East curb (Compressive Strength, Core #28)	Asphalt	65	Concrete	225	52.10
PC25-24	UTM : 5520013 m N, 632919 m E; Located at Pembina Highway Bus Stop #60138, Southbound Curb Lane, 2.0 m East of West curb (Compressive Strength, Core #27)	Asphalt	115	Concrete	240	73.14
PC25-25	UTM : 5519888 m N, 632958 m E; Located at #2027 Pembina Highway, Southbound Median Lane, 1.7 m West of East curb (Joint, Core #26)	Asphalt	110	Concrete	200	
PC25-26	UTM : 5519906 m N, 632975 m E; Located at #2028 Pembina Highway, Northbound Curb Lane, 2.0 m East of West curb (Compressive Strength, Core #22)	Asphalt	70	Concrete	190	48.38
PC25-27	UTM : 5520017 m N, 632940 m E; Located at Pembina Highway 10 m North of bus access road, Northbound Median Lane, 2.0 m East of West curb (Joint, Core #23)	Asphalt	180	Concrete	190	
PC25-28	UTM : 5520432 m N, 632888 m E; Located at #1890 Pembina Highway, Northbound Curb Lane, 1.4 m West of East curb (Compressive Strength, Core #24)	Asphalt	170	Concrete	190	83.98
PC25-29	UTM : 5520543 m N, 632870 m E; Located at Pembina Highway 20 m South of Plaza Drive, Northbound Median Lane, 4.0 m East of West curb (Joint, Core #22)	Asphalt	90	Concrete	200	



Photo 1: Pavement Core Sample at PC25-01



Photo 2: Pavement Core Sample at PC25-02



Photo 3: Pavement Core Sample at PC25-03



Photo 4: Pavement Core Sample at PC25-04



Photo 5: Pavement Core Sample at PC25-05



Photo 6: Pavement Core Sample at PC25-06



Photo 7: Pavement Core Sample at PC25-07



Photo 8: Pavement Core Sample at PC25-08



Photo 9: Pavement Core Sample at PC25-09



Photo 10: Pavement Core Sample at PC25-10



Photo 11: Pavement Core Sample at PC25-11



Photo 12: Pavement Core Sample at PC25-12



Photo 13: Pavement Core Sample at PC25-13



Photo 14: Pavement Core Sample at PC25-14



Photo 15: Pavement Core Sample at PC25-15



Photo 16: Pavement Core Sample at PC25-16



Photo 17: Pavement Core Sample at PC25-17



Photo 18: Pavement Core Sample at PC25-18



Photo 19: Pavement Core Sample at PC25-19

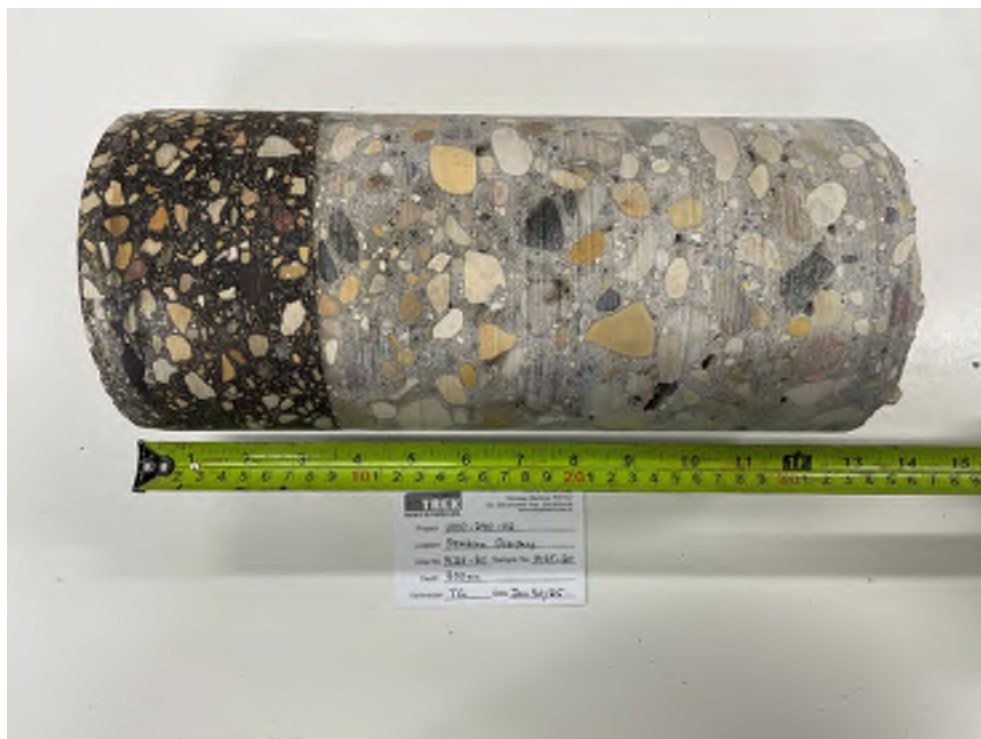


Photo 20: Pavement Core Sample at PC25-20



Photo 21: Pavement Core Sample at PC25-21



Photo 22: Pavement Core Sample at PC25-22



Photo 23: Pavement Core Sample at PC25-23



Photo 24: Pavement Core Sample at PC25-24



Photo 25: Pavement Core Sample at PC25-25

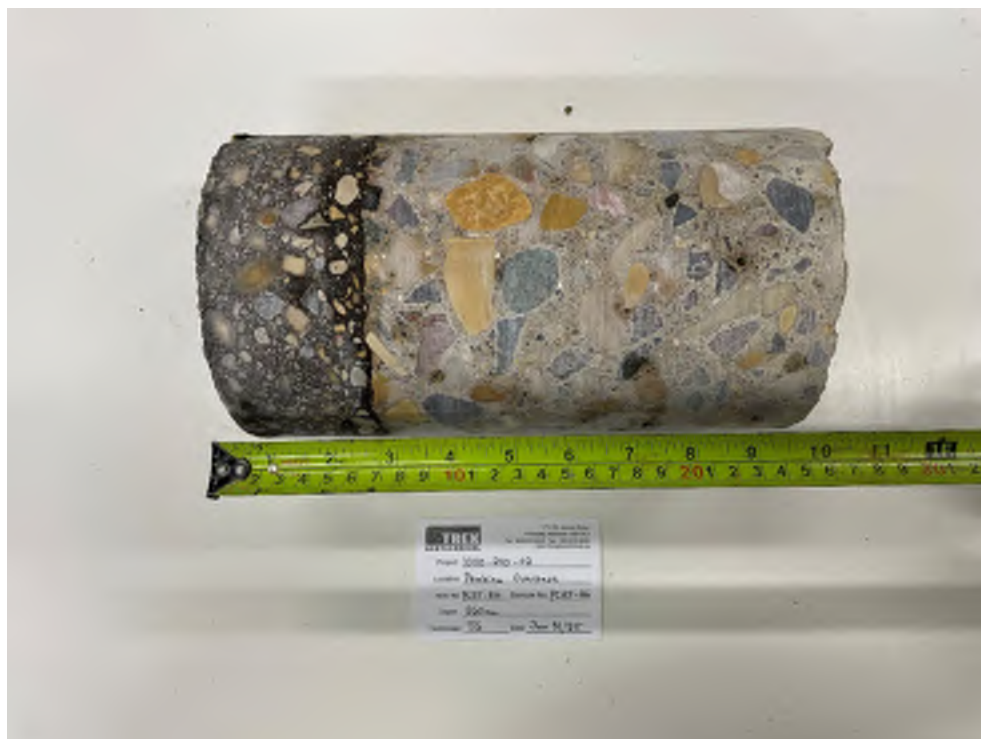


Photo 26: Pavement Core Sample at PC25-26



Photo 27: Pavement Core Sample at PC25-27



Photo 28: Pavement Core Sample at PC25-28



Photo 29: Pavement Core Sample at PC25-29

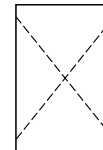
Project No. 1000-240-02
Project 975-2024 Pembina Overpass
Client Stantec Consulting Ltd.

Date February 7, 2025
Technician T. Green

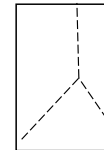
Core Location	Core ID	Date Received	Date of Break	Age at Break	Diam. (mm)	Length (mm)	Moisture Conditioning	Compressive Strength (MPa)		Break Type	Correction Factors*				
								Uncorrected f_{conc}	Corrected* f_c		$F_{l/d}$	F_{dia}	F_{mc}	F_D	F_{reinf}
UTM : 5520215 m N, 633052 m E: (Core 21)	PC-02	2025-01-27	2025-02-07	-	143	220	Soaked 48 h	72.00	80.06	1	0.9817	0.9804	1.0900	1.0600	1.0000
UTM : 5520085 m N, 632769 m E: (Core 11)	PC-05	2025-01-27	2025-02-07	-	144	224	Soaked 48 h	68.06	75.76	1	0.9827	0.9803	1.0900	1.0600	1.0000
UTM : 5520081 m N, 632769 m E: (Core 06)	PC-07	2025-01-28	2025-02-07	-	144	186	Soaked 48 h	75.65	82.05	1	0.9576	0.9803	1.0900	1.0600	1.0000
UTM : 5520060 m N, 632702 m E: (Core 04)	PC-09	2025-01-28	2025-02-07	-	144	221	Soaked 48 h	71.85	79.87	1	0.9814	0.9803	1.0900	1.0600	1.0000
UTM : 5519870 m N, 632844 m E: (Core 02)	PC-11	2025-01-28	2025-02-07	-	144	216	Soaked 48 h	51.52	56.97	1	0.9763	0.9803	1.0900	1.0600	1.0000
UTM : 5520289 m N, 633032 m E: (Core 19)	PC-14	2025-01-29	2025-02-07	-	144	226	Soaked 48 h	68.78	76.64	1	0.9838	0.9803	1.0900	1.0600	1.0000
UTM : 5520268 m N, 632845 m E: (Core 14)	PC-15	2025-01-29	2025-02-07	-	145	228	Soaked 48 h	64.47	71.82	1	0.9837	0.9802	1.0900	1.0600	1.0000
UTM : 5520178 m N, 632774 m E: (Core 12)	PC-17	2025-01-29	2025-02-07	-	145	216	Soaked 48 h	59.93	66.26	1	0.9762	0.9802	1.0900	1.0600	1.0000
UTM : 5519994 m N, 632846 m E: (Core 08)	PC-18	2025-01-29	2025-02-07	-	145	227	Soaked 48 h	61.74	68.73	1	0.9829	0.9802	1.0900	1.0600	1.0000
UTM : 5519861 m N, 632854 m E: (Core 17)	PC-19	2025-01-30	2025-02-07	-	144	198	Soaked 48 h	45.39	49.45	1	0.9619	0.9803	1.0900	1.0600	1.0000
UTM : 5520414 m N, 633039 m E: (Core 16)	PC-20	2025-01-30	2025-02-07	-	145	217	Soaked 48 h	61.17	67.68	1	0.9770	0.9802	1.0900	1.0600	1.0000
UTM : 5520405 m N, 632875 m E: (Core 28)	PC-23	2025-01-30	2025-02-07	-	145	219	Soaked 48 h	47.10	52.10	1	0.9768	0.9802	1.0900	1.0600	1.0000
UTM : 5520013 m N, 632919 m E: (Core 27)	PC-24	2025-01-30	2025-02-07	-	145	233	Soaked 48 h	65.48	73.14	1	0.9863	0.9802	1.0900	1.0600	1.0000
UTM : 5519906 m N, 632975 m E: (Core 22)	PC-26	2025-01-31	2025-02-07	-	145	177	Soaked 48 h	45.41	48.38	1	0.9408	0.9802	1.0900	1.0600	1.0000
UTM : 5520432 m N, 632888 m E: (Core 23)	PC-28	2025-01-31	2025-02-07	-	144	174	Soaked 48 h	69.41	83.98	1	0.9454	0.9803	1.0900	1.0600	1.1300

Comments

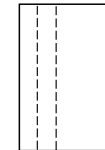
*Correction factors $F_{l/d}$, F_{dia} , F_{mc} , and F_D calculated as per ACI 214.4R-03, and correction factor F_{reinf} calculated as per Khoury et al. (2014): $f_c = f_{conc} F_{l/d} F_{dia} F_{mc} F_D F_{reinf}$



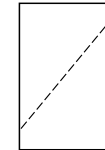
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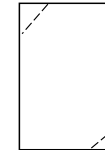
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Type 3



Type 4



Type 5



Type 6

Reviewed by (print): Angela Fidler-Kliewer, C.Tech.

Signature: Angela Fidler-Kliewer