

APPENDIX 'A'

GEOTECHNICAL REPORT

July 9, 2021

KGS Group
865 Waverley Street
Winnipeg, Manitoba R3T 5P4

Attention: Mr. Craig Rowbotham
Municipal Assistant Department Head

**Re: 2022 Keewatin Street Northbound Renewal – Winnipeg, Manitoba
Report of Geotechnical Testing Results**

Dear Mr. Rowbotham

This letter summarizes KGS Group's geotechnical testing of portions of Keewatin Street in Winnipeg, Manitoba, required as part of the 2022 Keewatin Street Renewal Project.

1.0 INTRODUCTION

KGS Group was retained to complete an investigation of the existing pavement as part of 2022 Keewatin Street Renewal Program in the northbound lanes between Inkster Boulevard and Adsum Drive. This report details the results of the pavement investigation completed by KGS Group on June 17 and 18, 2021.

1.1 Scope of Services

The scope of this assignment included the following:

- **Utility Clearances** – Prior to undertaking the coring activities, KGS Group obtained underground utility clearances.
- **Traffic Control** – KGS Group arranged for traffic protection during the pavement investigation in accordance with the 2021 City of Winnipeg Manual for Temporary Traffic Control.

- **Pavement Investigation** – A investigation consisting of five (5) cores in the northbound lanes to determine the existing pavement structure in accordance with City of Winnipeg geotechnical requirements for public works rehabilitation projects.
- **Laboratory Testing** – Compressive strength was determined for three (3) cores of the concrete pavement.

2.0 PAVEMENT INVESTIGATION

2.1 Coring and Sampling

Coring and sampling were completed at five (5) locations in the northbound lanes of Keewatin Street on June 17 and 18, 2021. Approximate 150 mm diameter cores were obtained of the existing pavement measured to range from 178 to up to 286 mm (7 to 11 ¼ in) in length. Upon completion of coring, KGS investigated the base below the pavement structure using a 130 mm diameter hand auger.

The approximate locations of the core holes are shown on Figure 1 and the handheld UTM coordinates (Zone 14) for the core holes are listed in Table 1.

2.2 Laboratory Testing

Laboratory tests were completed on select core samples to determine compressive strength of the concrete, in general accordance with CSA A23.1-14C. Testing was completed in a Winnipeg, Manitoba laboratory certified by the Canadian Council of Independent Laboratories (CCiL). The laboratory test results are summarized in Table 2.

FIGURE 1: CORE HOLE LOCATIONS



TABLE 1: LOCATION DESCRIPTION & COORDINATES

Core ID	Location	Approximate UTM Coordinates ¹	
		Northing (m)	Easting (m)
Core-01A	Sta. 0+091, 1.7 m from curb (curb lane)	5,534,224	629,500
Core-02	Sta. 0+235, 1.6 m from curb (curb lane)	5,534,369	629,495
Core-03	Sta. 0+500, 0.8 m from curb (median lane)	5,534,635	629,478
Core-04	Sta 0+767, 1.4 m from curb (curb lane)	5,534,893	629,478
Core-05	Sta. 1+046, 5.5 m from curb (median lane)	5,535,178	629,466

Note 1: Core hole locations were recorded in the field using a handheld GPS unit with an accuracy of ±5 m.

3.0 INVESTIGATION RESULTS

3.1 Pavement Structure

The pavement structure type and thicknesses are summarized in Table 2. A photo log is also included in Appendix A of the recovered cores.

TABLE 2: PAVEMENT STRUCTURE SUMMARY

Core ID	Asphalt Thickness (mm)	Concrete Thickness (mm)	Rebar Depth Below Grade (mm)	Corrected Concrete Compressive Strength (MPa) ²
Core-01A	89	197	none observed	28.9
Core-02	-	178	70	not tested
Core-03	-	208	none observed	49.2
Core-04 ¹	38	184	114	not testable due to crack
Core-05	-	197	none observed	41.7

Note 1: Core was cracked at the concrete/asphalt interface and again at a depth of 114 mm below the surface.

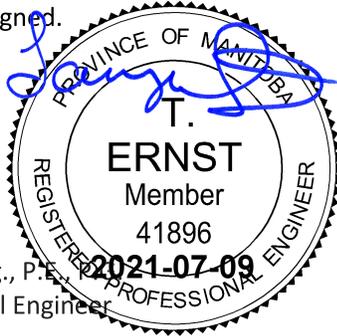
Note 2: See Appendix B for the lab testing report.

An attempt was made to investigate the granular base below the pavement structure at each location. Test holes were advanced to depths of up to 150 mm using the hand augers before refusal was encountered on larger granular particles. The granular base was visually identified to be 20 mm crushed limestone.

4.0 CLOSURE

Should you have any questions regarding the enclosed information or require additional information, please contact the undersigned.

Prepared By:



Taunya Ernst, P.Eng., P.E.
Senior Geotechnical Engineer

Approved By:

David Anderson, P.Eng.
Senior Geotechnical Engineer

NB/jkb

Attached

Cc: Giles Smalley – KGS Group

STATEMENT OF LIMITATIONS AND CONDITIONS

Limitations

This report has been prepared for KGS Group in accordance with the agreement between KGS Group's Geotechnical and Municipal departments (the "Agreement"). This report represents KGS Group's professional judgment and exercising due care consistent with the preparation of similar reports. The information, data, recommendations and conclusions in this report are subject to the constraints and limitations in the Agreement and the qualifications in this report. This report must be read as a whole, and sections or parts should not be read out of context.

This report is based on information made available to KGS Group by KGS Group. Unless stated otherwise, KGS Group has not verified the accuracy, completeness or validity of such information, makes no representation regarding its accuracy and hereby disclaims any liability in connection therewith. KGS Group shall not be responsible for conditions/issues it was not authorized or able to investigate or which were beyond the scope of its work. The information and conclusions provided in this report apply only as they existed at the time of KGS Group's work.

Third Party Use of Report

Any use a third party makes of this report or any reliance on or decisions made based on it, are the responsibility of such third parties. KGS Group accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions undertaken based on this report.

Geotechnical Investigation Statement of Limitations

The geotechnical investigation findings and recommendations of this report were prepared in accordance with generally accepted professional engineering principles and practice. The findings and recommendations are based on the results of field and laboratory investigations, combined with an interpolation of soil and groundwater conditions found at and within the depth of the test holes drilled by KGS Group at the site at the time of drilling. If conditions encountered during construction appear to be different from those shown by the test holes drilled by KGS Group or if the assumptions stated herein are not in keeping with the design, KGS Group should be notified in order that the recommendations can be reviewed and modified if necessary.

APPENDIX A

Photo Log



Photo 1: Core-01A (89 mm AC, 197 mm PCC)



Photo 2: Core-02 (178 mm PCC)

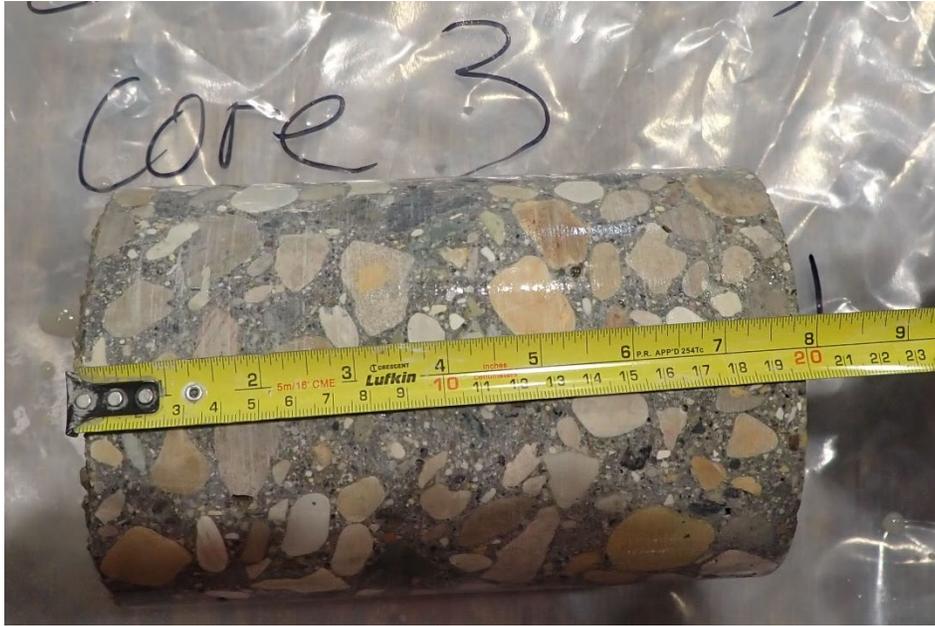


Photo 3: Core-03 (208 PCC)



Photo 4: Core-04 (38 mm AC, 184 PCC)



Photo 5: Core-05 (197 PCC)

APPENDIX B

Concrete Compressive Strength Results



Stantec Consulting Ltd.
199 Henlow Bay, Winnipeg MB R3Y 1G4

June 28, 2021
File: 123315547

Attention: Mr. Nolan Bray
KGS Group Inc.
3rd Floor – 865 Waverley Street
Winnipeg, MB R3T 5P4

Good day Nolan,

Reference: 2022 Keewatin Road Renewal (21-0535-013, 1000.02) – Core Testing

On June 23, 2021, three (3) concrete core samples were submitted to our laboratory for analysis. It was requested that the core samples be tested to determine the compressive strength of the concrete for the above noted project.

The concrete core samples were tested for compressive strength in accordance with *CSA A23.1-14C; Obtaining and Testing Drilled Cores for Compressive Strength*. Prior to testing, the core samples were conditioned in water at room temperature for 48 hours. The compressive strength results ranged from 28.9 to 49.2 MPa with an average of 39.9 MPa and are summarized in the attached Table 1.

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

Regards,

Stantec Consulting Ltd.

Jason Thompson C.E.T.
Principal - Manager, Materials Testing Services

Phone: 204 928 4004
Mobile: 204 981 8445
jason.thompson@stantec.com

Attachment: Table 1 – Compressive Strength Test Data

Reference: 2022 Keewatin Road Renewal (21-0535-013, 1000.02) – Core Testing

Table 1 - Compressive Strength Test Data

Test No.	Client Identification	Diameter (mm)	Length (mm)	L/D Ratio	Correction Factor	Peak Load (kN)	Compressive Strength (MPa)		
							Measured	Corrected	
1	Core-01a	131	198	1.01	0.872	446.4	33.1	28.9	
2	Core-03	131	208	1.06	0.884	750.3	55.7	49.2	
3	Core-05	131	155	0.77	0.785	715.2	53.1	41.7	
Average								39.9	

Notes:

1. The core sample represented by test no. 3 (Core-05) was trimmed prior to testing to avoid the reinforcing steel present.