

# **APPENDIX 'G'**

# **GEOTECHNICAL REPORT**

CITY OF WINNIPEG

# 2017 LOCAL STREET RENEWALS PACKAGE 17-R-06

GEOTECHNICAL REPORT

APRIL 2017





# 2017 LOCAL STREET RENWALS PACKAGE 17-R-06

## GEOTECHNICAL REPORT

**City of Winnipeg**

### **GEOTECHNICAL REPORT**

Project: 17M-00410-00  
Date: April 2017

—  
**WSP Canada Inc.**  
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Winnipeg, MB R3T 6B8

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# REVISION HISTORY

VERSION	DATE	DESCRIPTION
1	APRIL 13, 2017	Issued for Tender

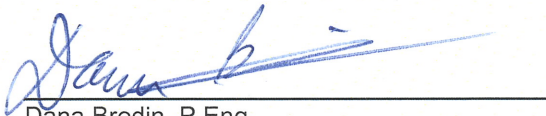


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# SIGNATURES

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PREPARED BY



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Geotechnical / Civil Engineer

REVIEWED BY



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Senior Geotechnical Engineer







# TABLE OF CONTENTS

1	INTRODUCTION.....	1
2	SUB-SURFACE INVESTIGATION AND TESTING .....	1
3	CLOSURE.....	1

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## APPENDICES

APPENDIX A	TEST HOLE LOCATIONS
APPENDIX B	TEST HOLE LOGS
APPENDIX C	MATERIAL TEST RESULTS
APPENDIX D	PAVEMENT CORE PHOTOS



# 1 INTRODUCTION

A geotechnical investigation was conducted by WSP Canada Inc. for the proposed 2017 Local Street Renewals Package 17-R-06 in Winnipeg, Manitoba. Five streets were cored and drilled including Aikins Street from Carruthers Avenue to McAdam Avenue, Aikins Street from Redwood Avenue to Mountain Avenue, Hartford Avenue from McGregor Street to CPR Winnipeg Beach, Leamen Crescent from Pipeline Road to Doubleday Drive, and Powers Street from Smithfield Avenue to Enniskillen Avenue. One street, Alisp Drive from Tallman Street to Lucas Avenue was only cored. The purpose of this investigation was to assess the general subsurface conditions with respect to identifying the existing pavement structure and the underlying soil profile.

# 2 SUB-SURFACE INVESTIGATION AND TESTING

The field investigation was undertaken on March 22, 2017 and was completed on March 24, 2017. A total of 21 test holes and 26 cores were completed by Maple Leaf Drilling. The test holes were drilled to a depth of 3.05 m below the road surface using a truck-mounted CME 55 rig equipped with a 125 mm auger. The pavement was cored using a 150 mm diameter coring press. All test holes were backfilled with auger cuttings and bentonite and capped with cold mix asphalt after the completion of the drilling. Test hole locations are noted on the test hole logs and are shown on the maps included in Appendix A.

The soils encountered were visually classified to the full extent of the test hole. Representative soil samples were recovered at regular intervals, every 0.3 m to 2.1 m as well as one sample at 3.0 m. All of the soil samples were tested for their moisture contents and selected soil samples (one per street) were submitted for grain size analysis. The pavement cores were measured for their thickness and each core was photographed, if intact. Any groundwater seepage and sloughing encountered in the test holes were noted.

Detailed descriptions of the soil profiles for each test hole are included on the logs in Appendix B. The material test results are included in Appendix C. The photos of the pavement cores are included in Appendix D.

# 3 CLOSURE

The findings and recommendations provided in this report were prepared by WSP Canada Inc. (the Consultant) in accordance with generally accepted professional engineering principles and practices. The recommendations are based on the results of field and laboratory investigations and are reflective only of the actual test hole(s) and/or excavation(s) examined. If conditions encountered during construction appear to be different than those shown by the test hole(s) and/or excavation(s) at this site, the Consultant should be notified immediately in order that the recommendations can be reviewed and modified as necessary to address actual site conditions.

This report is limited in scope to only those items that are specifically referenced in this report. There may be existing conditions that were not recorded in this report. Such conditions were not apparent to the

Consultant due to the limitations imposed by the scope of work. The Consultant, therefore, accepts no liability for any costs incurred by the Client for subsequent discovery, manifestation or rectification of such conditions.

This report is intended solely for the Client named as a general indication of the visible or reported physical condition of the items addressed in the report at the time of the geotechnical investigation. The material in this report reflects the Consultant's best judgment in light of the information available to it at the time of preparation.

This report and the information and data contained herein are to be treated as confidential and may be used only by the Client and its officers and employees in relation to the specific project that it was prepared for. Any use a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. The Consultant accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The report has been written to be read in its entirety, do not use any part of this report as a separate entity.

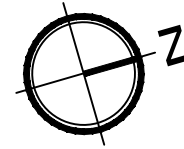
All files, notes, source data, test results and master files are retained by the Consultant and remain the property of the Consultant.

# Appendix A

TEST HOLE LOCATIONS



Feb 10, 2017 - 9:45am  
P:\2017\17M-00183-00 - 2017 Local Streets Renewals 17-R-06\MMM Drawings\Sketches\17M-00183-00-SK-01 Aikins Street 1 Test Hole Locations 2017.02.08.dwg -tab:LAYOUT



**N.I.C.**

**METRIC**

WHOLE NUMBERS INDICATE MILLIMETRES  
DECIMALIZED NUMBERS INDICATE METRES

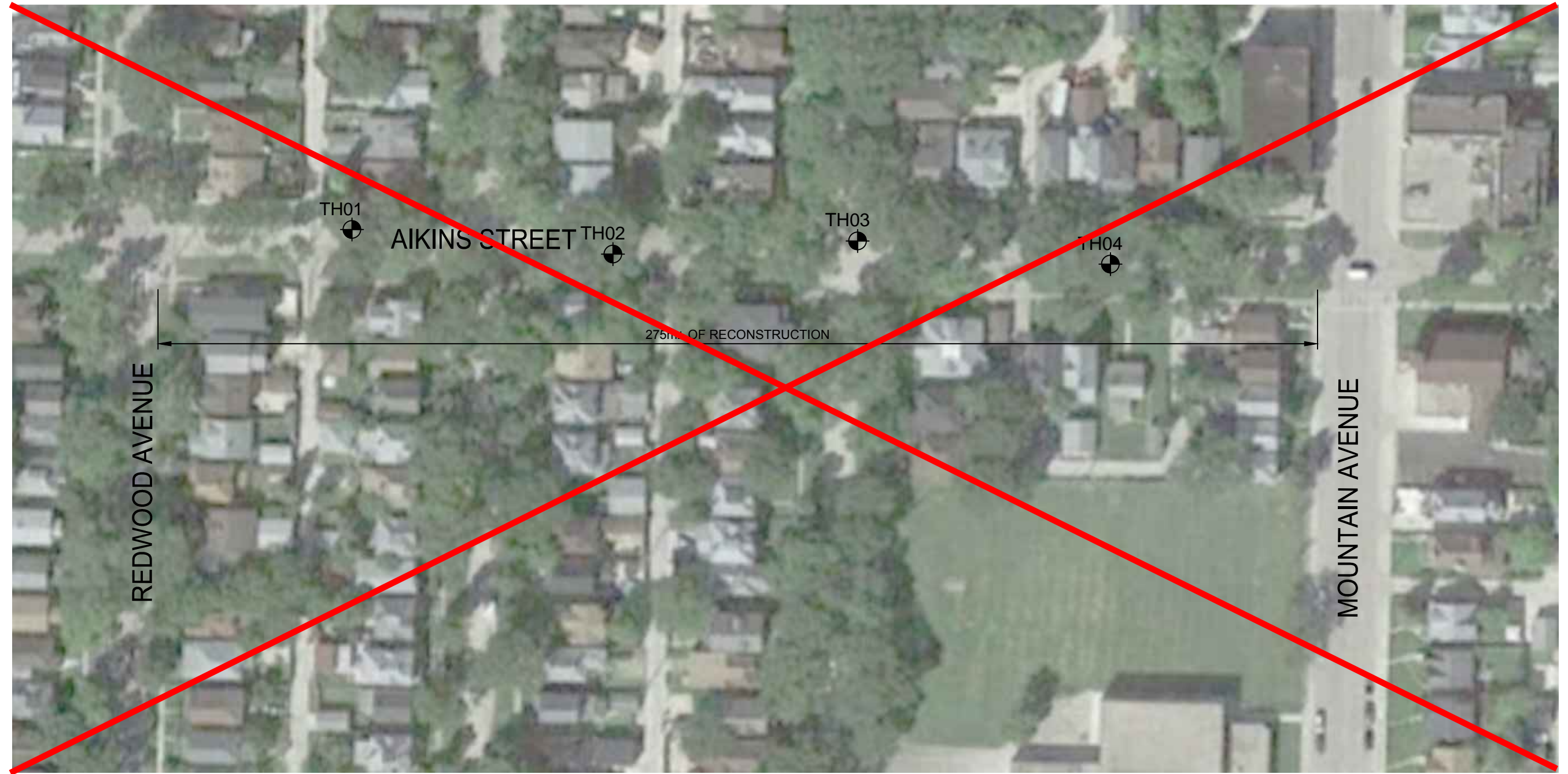
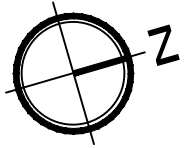
NOTE:  
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2017 LOCAL RENEWAL PROGRAM		
AIKINS STREET - McADAM AVENUE TO CARRUTHERS AVENUE TEST HOLE LOCATIONS		
SCALE: NTS	DATE: 08-FEB-2017	DWG. No. 17M-00183-00-SK-01





**N.I.C.**

**METRIC**

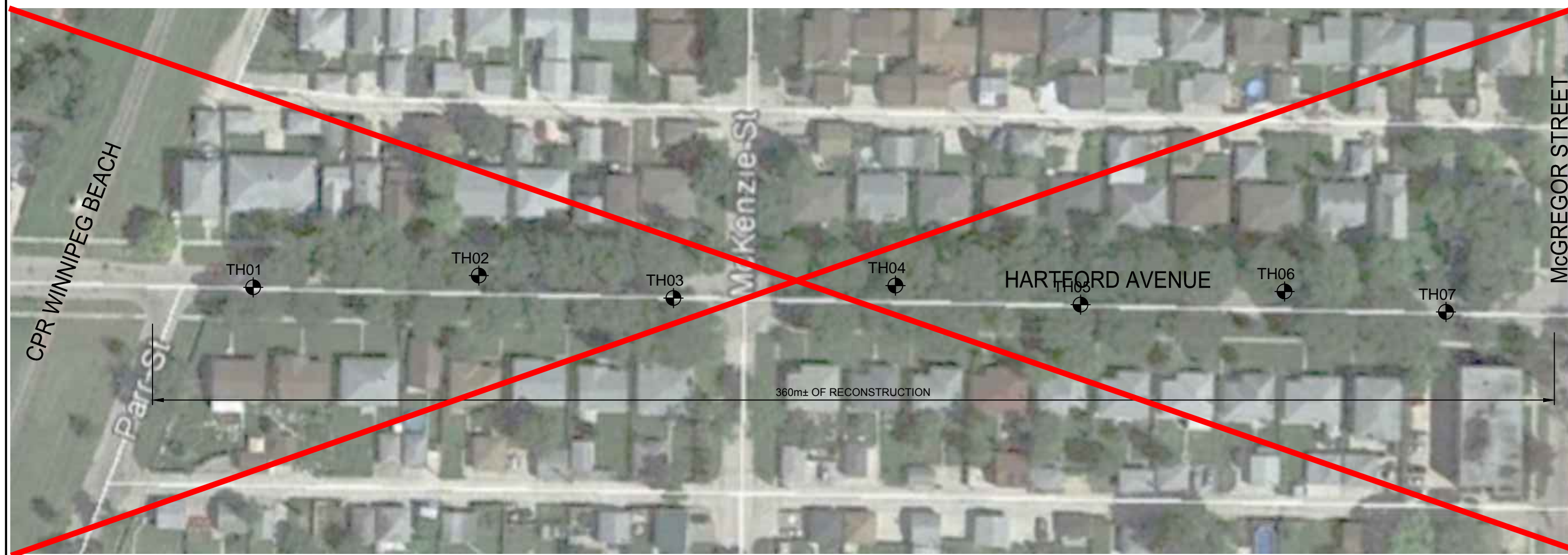
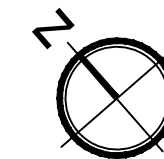
WHOLE NUMBERS INDICATE MILLIMETRES  
DECIMALIZED NUMBERS INDICATE METRES

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2017 LOCAL RENEWAL PROGRAM		
AIKINS STREET - REDWOOD AVENUE TO MOUNTAIN AVENUE		
TEST HOLE LOCATIONS		
SCALE: NTS	DATE: 08-FEB-2017	DWG. No. 17M-00183-00-SK-02

Feb 10, 2017 - 10:01am  
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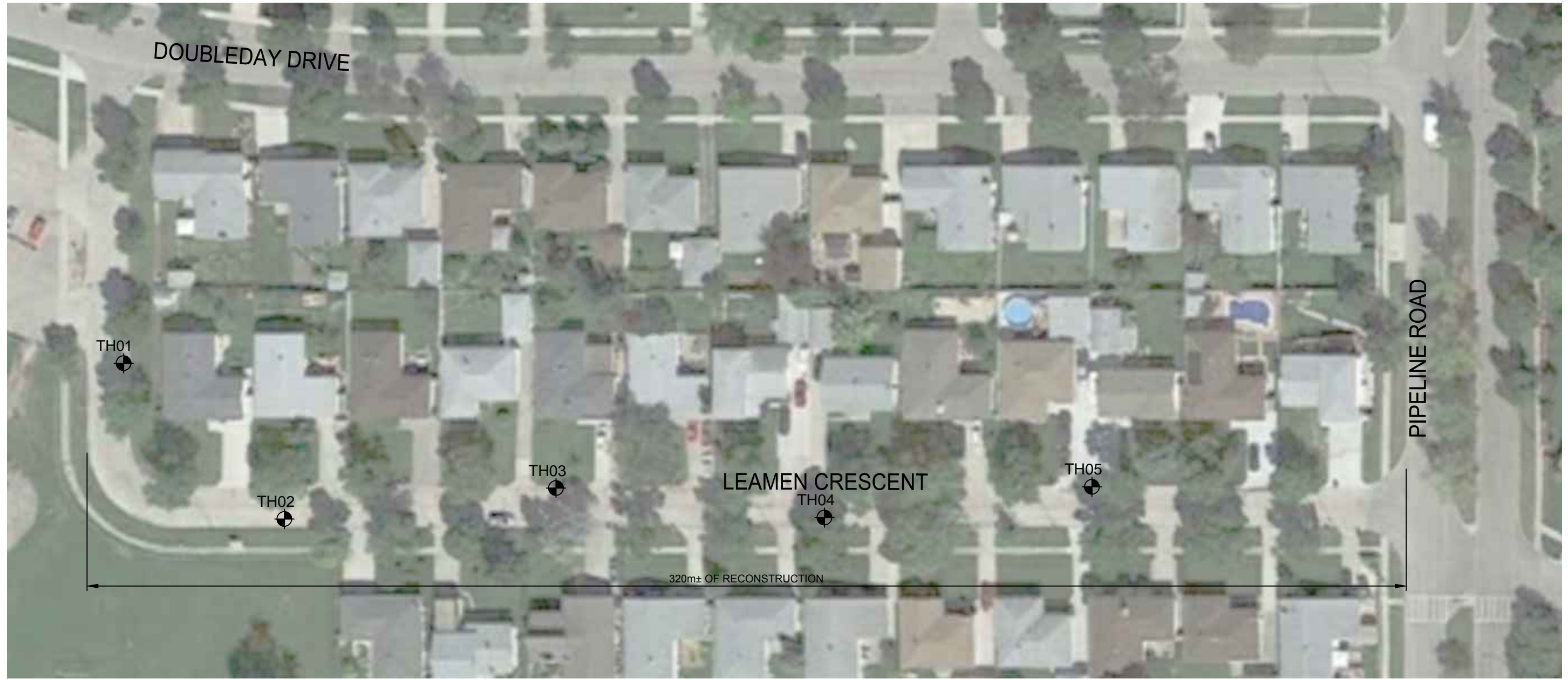
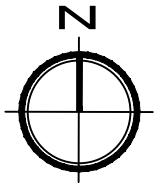
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2017 LOCAL RENEWAL PROGRAM		
HARTFORD AVENUE - McGREGOR STREET TO CPR WINNIPEG BEACH		
TEST HOLE LOCATIONS		
SCALE: NTS	DATE: 08-FEB-2017	DWG. No. 17M-00183-00-SK-03

**METRIC**

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### METRIC

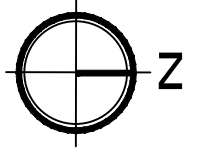
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2017 LOCAL RENEWAL PROGRAM LEAMEN CRESCENT - DOUBLEDAY DRIVE TO PIPELINE ROAD TEST HOLE LOCATIONS		
SCALE: NTS	DATE: 08-FEB-2017	DWG. No. 17M-00183-00-SK-04



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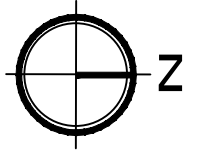
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WHOLE NUMBERS INDICATE MILLIMETRES  
 DECIMALIZED NUMBERS INDICATE METRES



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<b>2017 LOCAL RENEWAL PROGRAM</b>		
<b>POWERS STREET - SMITHFIELD AVENUE TO ENNISKILLEN AVENUE</b>		
<b>TEST HOLE LOCATIONS</b>		
SCALE: NTS	DATE: 08-FEB-2017	DWG. No. 17M-00183-00-SK-05



**METRIC**

WHOLE NUMBERS INDICATE MILLIMETRES  
 DECIMALIZED NUMBERS INDICATE METRES

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<b>2017 LOCAL RENEWAL PROGRAM</b>		
<b>ALISP DRIVE - TALLMAN STREET TO LUCAS AVENUE</b>		
<b>TEST HOLE LOCATIONS</b>		
SCALE: NTS	DATE: 08-FEB-2017	DWG. No. 17M-00183-00-SK-06

# Appendix B

TEST HOLE LOGS





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TH01

PAGE 1 OF 1

CLIENT City of Winnipeg  
 PROJECT NUMBER 17M-00410-00  
 DATE STARTED 3/22/17 COMPLETED 3/22/17  
 DRILLING CONTRACTOR Maple Leaf Drilling  
 DRILLING METHOD Continuous Auger  
 LOGGED BY Dana Breton CHECKED BY Silvestre Urbano  
 NOTES \_\_\_\_\_

PROJECT NAME 2017 Street Renewals - 17-R-06  
 PROJECT LOCATION Aikins St btw. Redwood Av & Mountain Av  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

GENERAL BH PLOTS - WSP 17M-00410 - AIKINS-REDWOOD.GPJ GINT STD CANADA.GDT 4/11/17

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.1		CONCRETE - 180 mm layer, intact							
0.1 - 0.4		GRANULAR FILL - 200 mm layer	MC = 27%			27			
0.4 - 1.0		CLAY FILL - Brown - Trace of fine gravel - Frost to 1.05 m	MC = 29%			29			
1.0 - 1.4		SILT - Tan-brown, soft, moist	MC = 38%			38			
1.4 - 1.8			MC = 21%			21			
1.8 - 2.1			MC = 21%			21			
2.1 - 2.3		CLAY - Brown, stiff - SILTY from 2.15 m to 2.3 m - Trace of silt inclusions below 2.3 m	MC = 23%			23			
2.3 - 2.9		- Test hole dry after completion, no seepage or sloughing noted	MC = 41%			41			
2.9 - 3.0			MC = 48%			48			

N.I.C.

Bottom of hole at 3.05 m.





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TH02

PAGE 1 OF 1

CLIENT City of Winnipeg  
 PROJECT NUMBER 17M-00410-00  
 DATE STARTED 3/22/17 COMPLETED 3/22/17  
 DRILLING CONTRACTOR Maple Leaf Drilling  
 DRILLING METHOD Continuous Auger  
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano  
 NOTES \_\_\_\_\_

PROJECT NAME 2017 Street Renewals - 17-R-06  
 PROJECT LOCATION Aikins St btw. Redwood Av & Mountain Av  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kg)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.1		ASPHALT - 30 mm layer							
0.1 - 0.4		CONCRETE - 120 mm layer, intact							
0.4 - 0.5		GRANULAR FILL - 300 mm layer	MC = 15%			15			
0.5 - 1.35		SILT - Tan-brown - Frost to 1.2 m - CLAYEY from 1.35 m to 1.5 m, brown - Soft, moist below 1.5 m	MC = 26%			26			
1.35 - 1.5			MC = 32%			32			
1.5 - 1.8			MC = 23%			23			
1.8 - 2.0			MC = 36%			36			
2.0 - 2.2		CLAY - Brown, stiff, cohesive	MC = 23%			23			
2.2 - 2.5		- Test hole dry after completion, no seepage or sloughing noted	MC = 32%			32			
2.5 - 3.0									
3.0 - 3.05			MC = 44%			44			

N.I.C.

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP 17M-00410 - AIKINS-REDWOOD.GPJ GINT STD CANADA.GDT 4/11/17



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TH03

PAGE 1 OF 1

CLIENT City of Winnipeg  
 PROJECT NUMBER 17M-00410-00  
 DATE STARTED 3/22/17 COMPLETED 3/22/17  
 DRILLING CONTRACTOR Maple Leaf Drilling  
 DRILLING METHOD Continuous Auger  
 LOGGED BY Dana Breidin CHECKED BY Silvestre Urbano  
 NOTES \_\_\_\_\_

PROJECT NAME 2017 Street Renewals - 17-R-06  
 PROJECT LOCATION Aikins St btw. Redwood Av & Mountain Av  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.1		ASPHALT - 30 mm layer							
0.1 - 0.2		CONCRETE - 70 mm layer, deteriorated							
0.2 - 0.5		GRANULAR FILL - 250 mm layer	MC = 7%			7			
0.5 - 1.5		SILT - Tan-brown - Frost to 1.2 m - Soft, moist below 1.2 m	MC = 21%			21			
1.5 - 1.8			MC = 24%			24			
1.8 - 2.0			MC = 24%			24			
2.0 - 2.4		CLAY - Brown, stiff - SILTY at 2.4 m - Soft below 2.4 m	MC = 24%			24			
2.4 - 2.7		- Test hole dry after completion, no seepage or sloughing noted	MC = 40%			40			
2.7 - 3.0			MC = 47%			47			
3.0 - 3.05			MC = 49%			49			

N.I.C.

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP 17M-00410 - AIKINS-REDWOOD.GPJ GINT STD CANADA.GDT 4/11/17



WSP Canada Inc.  
 1600 Buffalo Place  
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CLIENT City of Winnipeg  
 PROJECT NUMBER 17M-00410-00  
 DATE STARTED 3/22/17 COMPLETED 3/22/17  
 DRILLING CONTRACTOR Maple Leaf Drilling  
 DRILLING METHOD Continuous Auger  
 LOGGED BY Dana Breun CHECKED BY Silvestre Urbano  
 NOTES \_\_\_\_\_

PROJECT NAME 2017 Street Renewals - 17-R-06  
 PROJECT LOCATION Aikins St btw. Redwood Av & Mountain Av  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kN)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.3		ASPHALT - 30 mm layer							
0.3 - 0.4		CONCRETE - 70 mm layer, deteriorated							
0.4 - 0.5		GRANULAR FILL - 200 mm layer	MC = 6%			6			
0.5 - 1.5		SILT - Tan-brown - Frost to 1.2 m - Soft, moist below 1.2 m	MC = 5%			5			
1.5 - 1.8		CLAY - Brown, stiff	MC = 26%			26			
1.8 - 2.0		- SILTY from 2.4 m to 2.55 m	MC = 25%			25			
2.0 - 2.4		- Trace of silt inclusions below 2.55 m	MC = 24%			24			
2.4 - 2.55		- Test hole dry after completion, no seepage or sloughing noted	MC = 41%			41			
2.55 - 2.8			MC = 44%			44			
2.8 - 3.0			MC = 49%			49			
3.0 - 3.05									

N.I.C.

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP 17M-00410 - AIKINS-REDWOOD.GPJ GINT STD CANADA.GDT 4/11/17



WSP Canada Inc.  
 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
 Telephone: (204)-477-6650

**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-00410-00  
**DATE STARTED** 3/22/17 **COMPLETED** 3/22/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Brechin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-06  
**PROJECT LOCATION** Aikins St btw. Carruthers Av & McAdam Av  
**GROUND ELEVATION** \_\_\_\_\_ **HOLE SIZE** 125 mm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
		CONCRETE - 170 mm layer, intact							
0.5		CLAY FILL - Grey-black mixed above 0.6 m - Brown below 0.6 m - Frost to 1.2 m - SILTY below 1.2 m, mixed	MC = 27%			27			
1.0		- Stopped drilling at 2.15 m, suspected unmarked utility - Test hole dry after completion	MC = 39%			39			
1.5			MC = 38%			38			
2.0			MC = 38%			38			
			MC = 39%			39			
			MC = 30%			30			

Bottom of hole at 2.15 m.  
**N.I.C.**

GENERAL BH PLOTS - WSP 17M-00410 - AIKINS-MCADAM.GPJ GINT STD CANADA GDT 4/11/17



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CLIENT City of Winnipeg  
 PROJECT NUMBER 17M-00410-00  
 DATE STARTED 3/22/17 COMPLETED 3/22/07  
 DRILLING CONTRACTOR Maple Leaf Drilling  
 DRILLING METHOD Continuous Auger  
 LOGGED BY Dana Breton CHECKED BY Silvestre Urbano  
 NOTES \_\_\_\_\_

PROJECT NAME 2017 Street Renewals - 17-R-06  
 PROJECT LOCATION Aikins St btw. Carruthers Av & McAdam Av  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

GENERAL BH PLOTS - WSP 17M-00410 - AIKINS-MCADAM.GPJ GINT STD CANADA GDT 4/11/17

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kN)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.1		CONCRETE - 170 mm layer, intact							
0.1 - 0.4		CLAY FILL - Brown-black mixed above 0.6 m	MC = 33%			33			
0.4 - 0.8		CLAY - Brown - Frost to 1.2 m	MC = 38%			38			
0.8 - 1.2		CLAY - Brown - Frost to 1.2 m	MC = 35%			35			
1.2 - 1.6		SILT - Tan-brown, soft, moist	MC = 36%			36			
1.6 - 2.0		SILT - Tan-brown, soft, moist	MC = 21%			21			
2.0 - 2.4		SILT - Tan-brown, soft, moist	MC = 24%			24			
2.4 - 2.55		CLAY - Brown, stiff, fissured - SILTY from 2.4 m to 2.55 m	MC = 25%			25			
2.55 - 3.05		CLAY - Brown, stiff, fissured - SILTY from 2.4 m to 2.55 m - Test hole dry after completion, no seepage or sloughing noted	MC = 51%			51			

N.I.C.

Bottom of hole at 3.05 m.



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**TH01 (TH7)**

PAGE 1 OF 1

**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-00410-00  
**DATE STARTED** 3/22/17 **COMPLETED** 3/22/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-06  
**PROJECT LOCATION** Powers St btw. Smithfield Av & Enniskillen Av  
**GROUND ELEVATION** \_\_\_\_\_ **HOLE SIZE** 125 mm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

GENERAL BH PLOTS - WSP 17M-00410 - POWERS-SMITHFIELD.GPJ GINT STD CANADA.GDT 4/11/17

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.15		CONCRETE - 150 mm layer, intact							
0.15 - 0.3		GRANULAR FILL - 150 mm layer							
0.3 - 1.5		CLAY FILL - Grey - Frost to 1.2 m	MC = 17%			17			
1.5 - 2.0		CLAY - Brown, SILTY	MC = 41%			41			
2.0 - 2.7		SILT - Grey, soft, wet, clayey - Sloughing encountered at 2.7 m after completion	MC = 40%			40			
2.7 - 3.0			MC = 34%			34			
3.0 - 3.05			MC = 32%			32			
3.05 - 3.05			MC = 34%			34			
3.05 - 3.05			MC = 32%			32			
3.05 - 3.05			MC = 39%			39			

Bottom of hole at 3.05 m.



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 Telephone: (204)-477-6650

CLIENT City of Winnipeg  
 PROJECT NUMBER 17M-00410-00  
 DATE STARTED 3/22/17 COMPLETED 3/22/17  
 DRILLING CONTRACTOR Maple Leaf Drilling  
 DRILLING METHOD Continuous Auger  
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano  
 NOTES \_\_\_\_\_

PROJECT NAME 2017 Street Renewals - 17-R-06  
 PROJECT LOCATION Powers St btw. Smithfield Av & Enniskillen Av  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

GENERAL BH PLOTS - WSP 17M-00410 - POWERS-SMITHFIELD.GPJ GINT STD CANADA.GDT 4/11/17

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
		CONCRETE - 150 mm layer, intact							
		GRANULAR FILL - 150 mm layer							
0.5		CLAY FILL - Grey - Frost to 1.35 m - SILTY below 1.5 m - Trace of peat moss at 2.25 m	MC = 19%			19			
1.0			MC = 32%			32			
1.5			MC = 35%			35			
2.0			MC = 39%			39			
2.5			MC = 33%			33			
3.0		CLAY - Brown, stiff	MC = 51%			51			
		SILT - Grey, soft, wet, clayey - Test hole dry after completion, no seepage or sloughing noted	MC = 45%			45			
			MC = 50%			50			

Bottom of hole at 3.05 m.



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**TH03 (TH9)**

PAGE 1 OF 1

**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-00410-00  
**DATE STARTED** 3/22/17 **COMPLETED** 3/22/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-06  
**PROJECT LOCATION** Powers St btw. Smithfield Av & Enniskillen Av  
**GROUND ELEVATION** \_\_\_\_\_ **HOLE SIZE** 125 mm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

GENERAL BH PLOTS - WSP 17M-00410 - POWERS-SMITHFIELD.GPJ GINT STD CANADA.GDT 4/11/17

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.15		CONCRETE - 150 mm layer, intact							
0.15 - 0.3		GRANULAR FILL - 150 mm layer							
0.3 - 1.65		CLAY FILL - Grey-brown, mixed - Frost to 1.2 m - SILTY below 1.2 m, soft - Trace of peat moss at 1.65 m	MC = 22%			22			
			MC = 38%			38			
			MC = 40%			40			
			MC = 30%			30			
			MC = 31%			31			
1.65 - 2.1		CLAY - Brown, stiff	MC = 38%			38			
2.1 - 3.05		SILT - Grey, soft, wet, clayey - Test hole dry after completion, no seepage or sloughing noted	MC = 34%			34			
			MC = 37%			37			
Bottom of hole at 3.05 m.									





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CLIENT City of Winnipeg  
 PROJECT NUMBER 17M-00410-00  
 DATE STARTED 3/23/17 COMPLETED 3/23/17  
 DRILLING CONTRACTOR Maple Leaf Drilling  
 DRILLING METHOD Continuous Auger  
 LOGGED BY Dana Breton CHECKED BY Silvestre Urbano  
 NOTES \_\_\_\_\_

PROJECT NAME 2017 Street Renewals - 17-R-06  
 PROJECT LOCATION Hartford St btw. McGregor Av & CFR Wpg Beach  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

GENERAL BH PLOTS - WSP 17M-00410 - HARTFORD-MCGREGOR.GPJ GINT STD CANADA.GDT 4/13/17

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.05		ASPHALT - 40 mm layer							
0.05 - 0.15		CONCRETE - 150 mm layer, intact							
0.15 - 0.6		CLAY FILL - Black-brown mixed above 0.6 m - Trace of fine gravel	MC = 20%			20			
0.6 - 1.0		CLAY - Brown - Frost to 1.2 m	MC = 30%				30		
1.0 - 1.2			MC = 33%					33	
1.2 - 1.5		SILT - Tan-brown, soft, moist	MC = 39%						39
1.5 - 2.0		CLAY - Brown, stiff - Trace of silt lenses below 2.0 m - Soft below 2.7 m	MC = 22%			22			
2.0 - 2.5			MC = 41%						41
2.5 - 3.0		- Test hole dry after completion, no seepage or sloughing noted	MC = 30%						30
3.0 - 3.05			MC = 47%						47

N.I.C.

Bottom of hole at 3.05 m.



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**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-00410-00  
**DATE STARTED** 3/23/17 **COMPLETED** 3/23/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Brechin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-06  
**PROJECT LOCATION** Hartford St btw. McGregor Av & CP, Wpg Beach  
**GROUND ELEVATION** \_\_\_\_\_ **HOLE SIZE** 125 mm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

GENERAL BH PLOTS - WSP 17M-00410 - HARTFORD-MCGREGOR.GPJ GINT STD CANADA.GDT 4/13/17

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.05		ASPHALT - 40 mm layer							
0.05 - 0.1		CONCRETE - 140 mm layer, intact							
0.1 - 2.7		CLAY - Brown - Frost to 1.2 m - Stiff below 1.2 m - Trace of silt inclusions	MC = 34%			34			
			MC = 31%			31			
			MC = 30%			30			
			MC = 31%			31			
			MC = 30%			30			
			MC = 35%			35			
			MC = 28%			28			
2.7 - 3.0		SILT - Tan-brown, soft, moist							
3.0 - 3.05		CLAY - Brown, trace oxidation - Test hole dry after completion, no seepage or sloughing noted	MC = 25%			25			

N.I.C.

Bottom of hole at 3.05 m.



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**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-00410-00  
**DATE STARTED** 3/23/17 **COMPLETED** 3/23/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Brechin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-06  
**PROJECT LOCATION** Hartford St btw. McGregor Av & CFR Wpg Beach  
**GROUND ELEVATION** \_\_\_\_\_ **HOLE SIZE** 125 mm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

GENERAL BH PLOTS - WSP 17M-00410 - HARTFORD-MCGREGOR.GPJ GINT STD CANADA.GDT 4/13/17

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.05		ASPHALT - 30 mm layer							
0.05 - 0.15		CONCRETE - 140 mm layer, intact							
0.15 - 0.25		GRANULAR FILL - 130 mm layer	MC = 19%			19			
0.25 - 0.5		CLAY FILL - Black - Trace of gravel	MC = 23%			23			
0.5 - 1.0		CLAY - Brown, stratified with silt - SILTY from 0.6 m to 1.2 m - Frost to 1.2 m - Stiff below 1.2 m - SILTY from 2.1 m to 2.25 m	MC = 26%			26			
1.0 - 1.5		- Test hole dry after completion, no seepage or sloughing noted	MC = 23%			23			
1.5 - 2.0			MC = 25%			25			
2.0 - 2.5			MC = 43%			43			
2.5 - 3.0			MC = 46%			46			
3.0 - 3.05			MC = 47%			47			

N.I.C.

Bottom of hole at 3.05 m.



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**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-00410-00  
**DATE STARTED** 3/23/17 **COMPLETED** 3/23/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Breton **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-06  
**PROJECT LOCATION** Hartford St btw. McGregor Av & CFR Wpg Beach  
**GROUND ELEVATION** \_\_\_\_\_ **HOLE SIZE** 125 mm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

GENERAL BH PLOTS - WSP 17M-00410 - HARTFORD-MCGREGOR.GPJ GINT STD CANADA.GDT 4/13/17

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.1		ASPHALT - 30 mm layer							
0.1 - 0.3		CONCRETE - 150 mm layer, intact							
0.3 - 0.7		CLAY FILL - Black-grey mixed - Trace of gravel	MC = 18%			18			
0.7 - 1.0		SILT - Tan-brown - Frost to 1.2 m - Soft, moist below 1.2 m	MC = 31%			31			
1.0 - 1.3			MC = 22%			22			
1.3 - 1.5			MC = 23%			23			
1.5 - 1.65		CLAY - Brown, stiff - Silt lens at 1.65 m	MC = 21%			21			
1.65 - 2.0		- SILTY from 2.7 m to 2.85 m, soft	MC = 40%			40			
2.0 - 2.4		- Test hole dry after completion, no seepage or sloughing noted	MC = 44%			44			
2.4 - 3.05			MC = 43%			43			

N.I.C.

Bottom of hole at 3.05 m.



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**TH05 (TH12)**

PAGE 1 OF 1

**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-00410-00  
**DATE STARTED** 3/23/17 **COMPLETED** 3/23/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Brechin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-06  
**PROJECT LOCATION** Hartford St btw. McGregor Av & CFR Wpg Beach  
**GROUND ELEVATION** \_\_\_\_\_ **HOLE SIZE** 125 mm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

GENERAL BH PLOTS - WSP 17M-00410 - HARTFORD-MCGREGOR.GPJ GINT STD CANADA.GDT 4/13/17

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.1		ASPHALT - 30 mm layer							
0.1 - 0.3		CONCRETE - 130 mm layer, intact							
0.3 - 0.75		CLAY FILL - Black-brown mixed - Trace of gravel - SILTY below 0.75 m	MC = 14%			14			
0.75 - 1.0		SILT - Tan-brown - Frost to 1.35 m - Soft, moist below 1.35 m	MC = 30%			30			
1.0 - 1.35		SILT - Tan-brown - Frost to 1.35 m - Soft, moist below 1.35 m	MC = 29%			29			
1.35 - 1.5		SILT - Tan-brown - Frost to 1.35 m - Soft, moist below 1.35 m	MC = 20%			20			
1.5 - 2.0		CLAY - Brown, stiff - Trace of silt inclusions - SILTY from 2.7 m to 2.85, soft	MC = 21%			21			
2.0 - 2.7		CLAY - Brown, stiff - Trace of silt inclusions - SILTY from 2.7 m to 2.85, soft	MC = 38%			38			
2.7 - 2.85		CLAY - Brown, stiff - Trace of silt inclusions - SILTY from 2.7 m to 2.85, soft	MC = 38%			38			
2.85 - 3.05		CLAY - Brown, stiff - Trace of silt inclusions - SILTY from 2.7 m to 2.85, soft	MC = 52%			52			

N.I.C.

Bottom of hole at 3.05 m.



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CLIENT City of Winnipeg  
 PROJECT NUMBER 17M-00410-00  
 DATE STARTED 3/23/17 COMPLETED 3/23/17  
 DRILLING CONTRACTOR Maple Leaf Drilling  
 DRILLING METHOD Continuous Auger  
 LOGGED BY Dana Brechin CHECKED BY Silvestre Urbano  
 NOTES \_\_\_\_\_

PROJECT NAME 2017 Street Renewals - 17-R-06  
 PROJECT LOCATION Hartford St btw. McGregor Av & CFR Wpg Beach  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

GENERAL BH PLOTS - WSP 17M-00410 - HARTFORD-MCGREGOR.GPJ GINT STD CANADA.GDT 4/13/17

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.1		ASPHALT - 30 mm layer							
0.1 - 0.2		CONCRETE - 200 mm layer, intact							
0.2 - 0.5		CLAY FILL - Black-grey mixed	MC = 25%			25			
0.5 - 1.0		SILT - Tan-brown - Frost to 1.2 m	MC = 20%			20			
1.0 - 1.5			MC = 22%			22			
1.5 - 2.0		CLAY - Brown, stiff - Trace of silt inclusions	MC = 28%			28			
2.0 - 2.5		- SILTY from 2.25 m to 2.4 m, soft	MC = 29%			29			
2.5 - 3.0		- Test hole dry after completion, no seepage or sloughing noted	MC = 40%			40			
3.0 - 3.5			MC = 37%			37			
3.5 - 3.8			MC = 49%			49			

N.I.C.

Bottom of hole at 3.05 m.



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**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-00410-00  
**DATE STARTED** 3/23/17 **COMPLETED** 3/23/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Breton **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-06  
**PROJECT LOCATION** Hartford St btw. McGregor Av & CFR Wpg Beach  
**GROUND ELEVATION** \_\_\_\_\_ **HOLE SIZE** 125 mm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

GENERAL BH PLOTS - WSP 17M-00410 - HARTFORD-MCGREGOR.GPJ GINT STD CANADA.GDT 4/13/17

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.1		ASPHALT - 20 mm layer							
0.1 - 0.2		CONCRETE - 140 mm layer, intact							
0.2 - 0.5		CLAY FILL - Black-grey mixed	MC = 18%			18			
0.5 - 1.5		SILT - Tan-brown - Frost to 1.35 m - Soft, moist below 1.35 m	MC = 21%			21			
1.5 - 1.8			MC = 22%			22			
1.8 - 2.0			MC = 21%			21			
2.0 - 2.5		CLAY - Brown, stiff, cohesive - SILTY from 2.55 m to 2.7 m  - Test hole dry after completion, no seepage or sloughing noted	MC = 21%			21			
2.5 - 2.8			MC = 38%			38			
2.8 - 3.0			MC = 44%			44			
3.0 - 3.05			MC = 48%			48			

N.I.C.

Bottom of hole at 3.05 m.



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**TH01 (TH20)**

PAGE 1 OF 1

**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-00410-00  
**DATE STARTED** 3/24/17 **COMPLETED** 3/24/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-06  
**PROJECT LOCATION** Leamen Cres btw. Doubleday Dr  
**GROUND ELEVATION** \_\_\_\_\_ **HOLE SIZE** 125 mm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

GENERAL BH PLOTS - WSP 17M-00410 - LEAMEN GP.1 GINT STD CANADA.GDT 4/11/17

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
		CONCRETE - 150 mm layer, intact							
0.5		CLAY -Brown	MC = 29%			29			
1.0		CLAY -Brown	MC = 29%			29			
1.5		SILT - Tan-brown - Frost to 1.2 m - Soft, moist below 1.2 m	MC = 31%			31			
2.0		SILT - Tan-brown - Frost to 1.2 m - Soft, moist below 1.2 m	MC = 24%			24			
2.5		SILT - Tan-brown - Frost to 1.2 m - Soft, moist below 1.2 m	MC = 23%			23			
3.0		CLAY - Brown, stiff, stratified with silt - SILTY from 2.4 m to 2.7 m  - Test hole dry after completion, no seepage or sloughing noted	MC = 37%			37			
3.0		CLAY - Brown, stiff, stratified with silt - SILTY from 2.4 m to 2.7 m  - Test hole dry after completion, no seepage or sloughing noted	MC = 31%			31			
3.0		CLAY - Brown, stiff, stratified with silt - SILTY from 2.4 m to 2.7 m  - Test hole dry after completion, no seepage or sloughing noted	MC = 37%			37			

Bottom of hole at 3.05 m.





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**TH02 (TH21)**

PAGE 1 OF 1

**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-00410-00  
**DATE STARTED** 3/24/17 **COMPLETED** 3/24/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-06  
**PROJECT LOCATION** Leamen Cres btw. Doubleday Dr  
**GROUND ELEVATION** \_\_\_\_\_ **HOLE SIZE** 125 mm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.15		CONCRETE - 160 mm layer, intact							
0.15 - 1.1		CLAY FILL - Mixed black and brown	MC = 31%			31			
0.5			MC = 30%			30			
1.0			MC = 25%			25			
1.1 - 1.8		SILT - Tan-brown - Frost to 1.2 m - Soft, moist to wet below 1.2 m	MC = 16%			16			
1.5			MC = 18%			18			
1.8 - 2.25		CLAY - Brown, stiff, stratified with silt - SILTY from 2.25 m to 2.7 m, soft	MC = 41%			41			
2.0			MC = 40%			40			
2.5									
3.0			MC = 35%			35			
Bottom of hole at 3.05 m.									

GENERAL BH PLOTS - WSP 17M-00410 - LEAMEN GP.J GINT STD CANADA.GDT 4/11/17



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**TH03 (TH19)**

PAGE 1 OF 1

**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-00410-00  
**DATE STARTED** 3/23/17 **COMPLETED** 3/23/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-06  
**PROJECT LOCATION** Leamen Cres btw. Doubleday Dr  
**GROUND ELEVATION** \_\_\_\_\_ **HOLE SIZE** 125 mm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.16		CONCRETE - 160 mm layer, intact							
0.16 - 0.31		GRANULAR FILL - 150 mm layer							
0.31 - 0.50		CLAY FILL - Black-brown mixed	MC = 21%			21			
0.50 - 0.75		SILT - Tan-brown	MC = 24%			24			
0.75 - 1.00		SILT - Tan-brown	MC = 23%			23			
1.00 - 1.50		CLAY - Brown, stratified with silt - Frost to 1.5 m - Stiff below 1.5 m	MC = 30%			30			
1.50 - 2.25		CLAY - Brown, stratified with silt - Frost to 1.5 m - Stiff below 1.5 m - SILTY from 2.25 m to 2.4 m	MC = 33%			33			
2.25 - 2.40		CLAY - Brown, stratified with silt - Frost to 1.5 m - Stiff below 1.5 m - SILTY from 2.25 m to 2.4 m	MC = 50%			50			
2.40 - 2.75		CLAY - Brown, stratified with silt - Frost to 1.5 m - Stiff below 1.5 m - Soft below 2.4 m	MC = 52%			52			
2.75 - 3.05		CLAY - Brown, stratified with silt - Frost to 1.5 m - Stiff below 1.5 m - Soft below 2.4 m	MC = 53%			53			

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP 17M-00410 - LEAMEN GP.J GINT STD CANADA.GDT 4/11/17



WSP Canada Inc.  
 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
 Telephone: (204)-477-6650

**TH04 (TH18)**

PAGE 1 OF 1

**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-00410-00  
**DATE STARTED** 3/23/07 **COMPLETED** 3/23/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-06  
**PROJECT LOCATION** Leamen Cres btw. Doubleday Dr  
**GROUND ELEVATION** \_\_\_\_\_ **HOLE SIZE** 125 mm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.17		CONCRETE - 170 mm layer, intact							
0.17 - 1.0		CLAY FILL - Brown - Trace fine gravel	MC = 29%			29			
1.0 - 1.5		CLAY - Brown, stratified with silt - Frost to 1.5 m - Stiff below 1.5 m - SILTY from 1.95 m to 2.1 m - Soft below 2.1 m	MC = 25%			25			
1.5 - 2.1		- Test hole dry after completion, no seepage or sloughing noted	MC = 27%			27			
2.1 - 2.5			MC = 32%			32			
2.5 - 3.0			MC = 49%			49			
3.0 - 3.05			MC = 50%			50			
3.05 - 3.05			MC = 54%			54			

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP 17M-00410 - LEAMEN GP.J GINT STD CANADA.GDT 4/11/17



WSP Canada Inc.  
 1600 Buffalo Place  
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**TH05 (TH17)**

PAGE 1 OF 1

**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-00410-00  
**DATE STARTED** 3/23/17 **COMPLETED** 3/23/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-06  
**PROJECT LOCATION** Leamen Cres btw. Doubleday Dr  
**GROUND ELEVATION** \_\_\_\_\_ **HOLE SIZE** 125 mm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.15		CONCRETE - 140 mm layer, intact							
0.15 - 0.5		CLAY FILL - Brown - Trace of fine gravel	MC = 30%			30			
0.5 - 1.5		SILT - Tan-brown - Frost to 1.5 m	MC = 32%			32			
1.5 - 1.7			MC = 22%			22			
1.7 - 1.9			MC = 21%			21			
1.9 - 2.0			MC = 20%			20			
2.0 - 2.25		CLAY - Brown, stiff, stratified with silt	MC = 41%			41			
2.25 - 2.4		- SILTY from 2.25 m to 2.4 m	MC = 46%			46			
2.4 - 3.0		- Soft below 2.4 m  - Test hole dry after completion, no seepage or sloughing noted	MC = 46%			46			

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP 17M-00410 - LEAMEN GP.J GINT STD CANADA.GDT 4/11/17



# Appendix C

**MATERIAL TESTING RESULTS**



**MOISTURE CONTENT OF SOIL (ASTM D2216)**

CLIENT: WSP	TEST NO: 1	PROJECT NO: 103-1705
PROJECT: 17M-006	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 30-Mar-2017	TESTED BY: Irvin Araquil
TEST LOCATION: Aikins, Redwood		

Description	TH 2	TH 2	TH 2	TH 2	TH 2
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	161.50	163.60	156.40	358.10	154.10
Wt Dry Sample + Tare	141.30	130.50	119.80	293.40	114.10
Wt Water	20.20	33.10	36.60	64.70	40.00
Wt Tare	4.60	4.20	4.40	13.70	4.30
Wt Dry Sample	136.70	126.30	115.40	279.70	109.80
<b>Moisture Content (%)</b>	<b>14.8</b>	<b>26.2</b>	<b>31.7</b>	<b>23.1</b>	<b>36.4</b>

Description	TH 2	TH 2	TH 2		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	175.80	179.70	163.30		
Wt Dry Sample + Tare	144.30	137.20	114.70		
Wt Water	31.50	42.50	48.60		
Wt Tare	4.30	4.30	4.30		
Wt Dry Sample	140.00	132.90	110.40		
<b>Moisture Content (%)</b>	<b>22.5</b>	<b>32.0</b>	<b>44.0</b>		

Description	TH 1	TH 1	TH 1	TH 1	TH 1
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	156.70	171.20	162.10	208.30	174.00
Wt Dry Sample + Tare	124.10	133.30	118.40	173.50	144.10
Wt Water	32.60	37.90	43.70	34.80	29.90
Wt Tare	4.40	4.60	4.20	4.30	4.30
Wt Dry Sample	119.70	128.70	114.20	169.20	139.80
<b>Moisture Content (%)</b>	<b>27.2</b>	<b>29.4</b>	<b>38.3</b>	<b>20.6</b>	<b>21.4</b>

Description	TH 1	TH 1	TH 1		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	174.50	150.90	162.10		
Wt Dry Sample + Tare	142.40	108.50	110.90		
Wt Water	32.10	41.40	51.20		
Wt Tare	4.70	4.30	4.20		
Wt Dry Sample	137.70	104.20	106.70		
<b>Moisture Content (%)</b>	<b>23.3</b>	<b>40.7</b>	<b>48.0</b>		

**N.I.C.**



**MOISTURE CONTENT OF SOIL (ASTM D2216)**

CLIENT: WSP	TEST NO: 1	PROJECT NO: 103-1705
PROJECT: 17M-006	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 30-Mar-2017	TESTED BY: Irwin Araquil
TEST LOCATION: Aikins, Redwood		

Description	TH 3	TH 3	TH 3	TH 3	TH 3
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	185.50	192.70	198.10	185.40	173.80
Wt Dry Sample + Tare	173.40	159.50	161.20	151.30	140.50
Wt Water	12.10	33.20	36.90	35.10	33.30
Wt Tare	4.20	4.20	4.30	4.30	4.20
Wt Dry Sample	169.20	155.30	156.90	147.00	136.30
<b>Moisture Content (%)</b>	<b>7.2</b>	<b>21.4</b>	<b>23.5</b>	<b>23.9</b>	<b>24.4</b>

Description	TH 3	TH 3	TH 3		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	177.50	152.10	166.70		
Wt Dry Sample + Tare	128.10	104.70	113.70		
Wt Water	49.40	47.40	53.00		
Wt Tare	4.50	4.20	4.60		
Wt Dry Sample	123.60	100.50	109.10		
<b>Moisture Content (%)</b>	<b>40.0</b>	<b>47.2</b>	<b>48.6</b>		

Description	TH 4	TH 4	TH 4	TH 4	TH 4
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	179.50	161.00	155.00	155.10	152.90
Wt Dry Sample + Tare	169.10	154.00	122.10	125.10	124.20
Wt Water	10.40	7.00	30.90	30.00	28.70
Wt Tare	4.50	4.50	4.50	4.30	4.80
Wt Dry Sample	164.60	149.50	117.60	120.80	119.40
<b>Moisture Content (%)</b>	<b>6.3</b>	<b>4.7</b>	<b>26.3</b>	<b>24.8</b>	<b>24.0</b>

Description	TH 4	TH 4	TH 4		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	168.00	148.70	162.40		
Wt Dry Sample + Tare	120.10	104.50	110.20		
Wt Water	47.90	44.20	52.20		
Wt Tare	4.20	4.40	4.60		
Wt Dry Sample	115.90	100.10	105.60		
<b>Moisture Content (%)</b>	<b>41.3</b>	<b>44.2</b>	<b>49.4</b>		

**N.I.C.**

**MOISTURE CONTENT OF SOIL (ASTM D2216)**

CLIENT: WSP	TEST NO: 2	PROJECT NO: 103-1705
PROJECT: 17M-006	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 30-Mar-2017	TESTED BY: Irwin Araquil
TEST LOCATION: Aikins, McAdam		

Description	TH 5	TH 5	TH 5	TH 5	TH 5
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	158.70	151.30	323.70	162.50	164.60
Wt Dry Sample + Tare	120.30	111.20	243.50	121.00	136.40
Wt Water	38.40	40.10	80.20	41.50	28.20
Wt Tare	4.10	4.40	13.70	4.20	4.40
Wt Dry Sample	115.90	106.80	229.80	116.80	132.00
<b>Moisture Content (%)</b>	<b>33.1</b>	<b>37.5</b>	<b>34.9</b>	<b>35.5</b>	<b>21.4</b>

Description	TH 5	TH 5	TH 5		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	186.10	190.00	153.40		
Wt Dry Sample + Tare	150.90	153.30	102.80		
Wt Water	35.20	36.70	50.60		
Wt Tare	4.30	4.20	4.20		
Wt Dry Sample	146.60	149.10	98.60		
<b>Moisture Content (%)</b>	<b>24.0</b>	<b>24.5</b>	<b>51.3</b>		

Description	TH 6	TH 6	TH 6	TH 6	TH 6
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	151.40	165.60	152.40	166.10	158.50
Wt Dry Sample + Tare	120.00	120.40	112.00	121.30	115.50
Wt Water	31.40	45.20	40.40	44.80	43.00
Wt Tare	4.50	4.40	4.20	4.20	4.30
Wt Dry Sample	155.50	116.00	107.80	117.10	111.20
<b>Moisture Content (%)</b>	<b>27.2</b>	<b>39.0</b>	<b>37.5</b>	<b>38.3</b>	<b>38.7</b>

Description	TH 6				
Depth (ft)	6				
Wt Wet Sample + Tare	153.00				
Wt Dry Sample + Tare	118.70				
Wt Water	34.30				
Wt Tare	4.30				
Wt Dry Sample	114.40				
<b>Moisture Content (%)</b>	<b>30.0</b>				

**N.I.C.**

**MOISTURE CONTENT OF SOIL (ASTM D2216)**

CLIENT: WSP	TEST NO: 3	PROJECT NO: 103-1705
PROJECT: 17M-006	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 30-Mar-2017	TESTED BY: Irvin Araquil
TEST LOCATION: Powers		

Description	TH 7	TH 7	TH 7	TH 7	TH 7
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	170.00	158.20	159.70	189.20	169.70
Wt Dry Sample + Tare	145.80	113.40	115.70	142.50	129.70
Wt Water	24.20	44.80	44.00	46.70	40.00
Wt Tare	4.30	4.20	4.20	4.30	4.20
Wt Dry Sample	141.50	109.20	111.50	138.20	125.50
<b>Moisture Content (%)</b>	<b>17.1</b>	<b>41.0</b>	<b>39.5</b>	<b>33.8</b>	<b>31.9</b>

Description	TH 7	TH 7	TH 7		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	370.20	179.80	142.80		
Wt Dry Sample + Tare	279.30	137.70	103.90		
Wt Water	90.90	42.10	38.90		
Wt Tare	13.50	4.30	4.30		
Wt Dry Sample	265.80	133.40	99.60		
<b>Moisture Content (%)</b>	<b>34.2</b>	<b>31.6</b>	<b>39.1</b>		

Description	TH 8	TH 8	TH 8	TH 8	TH 8
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	144.30	170.20	178.40	159.20	165.40
Wt Dry Sample + Tare	121.70	129.80	133.50	115.50	125.20
Wt Water	22.60	40.40	44.90	43.70	40.20
Wt Tare	4.20	4.30	4.20	4.40	4.40
Wt Dry Sample	117.50	125.50	129.30	111.10	120.80
<b>Moisture Content (%)</b>	<b>19.2</b>	<b>32.2</b>	<b>34.7</b>	<b>39.3</b>	<b>33.3</b>

Description	TH 8	TH 8	TH 8		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	148.10	150.70	165.20		
Wt Dry Sample + Tare	99.40	105.50	111.50		
Wt Water	48.70	45.20	53.70		
Wt Tare	4.20	4.40	4.30		
Wt Dry Sample	95.20	101.10	107.20		
<b>Moisture Content (%)</b>	<b>51.2</b>	<b>44.7</b>	<b>50.1</b>		

**MOISTURE CONTENT OF SOIL (ASTM D2216)**

CLIENT: WSP	TEST NO: 3	PROJECT NO: 103-1705
PROJECT: 17M-006	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 30-Mar-2017	TESTED BY: Irvin Araquil
TEST LOCATION: Powers		

Description	TH 9	TH 9	TH 9	TH 9	TH 9
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	152.30	169.10	154.00	184.80	169.20
Wt Dry Sample + Tare	125.90	124.10	111.50	142.90	129.90
Wt Water	26.40	45.00	42.50	41.90	39.30
Wt Tare	4.30	4.20	4.10	4.10	4.10
Wt Dry Sample	121.60	119.90	107.40	138.80	125.80
<b>Moisture Content (%)</b>	<b>21.7</b>	<b>37.5</b>	<b>39.6</b>	<b>30.2</b>	<b>31.2</b>

Description	TH 9	TH 9	TH 9		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	192.90	165.80	185.60		
Wt Dry Sample + Tare	141.20	124.40	136.20		
Wt Water	51.70	41.40	49.40		
Wt Tare	4.20	4.20	4.20		
Wt Dry Sample	137.00	120.20	132.00		
<b>Moisture Content (%)</b>	<b>37.7</b>	<b>34.4</b>	<b>37.4</b>		

Description					
Depth (ft)					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
<b>Moisture Content (%)</b>					

Description					
Depth (ft)					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
<b>Moisture Content (%)</b>					

**MOISTURE CONTENT OF SOIL (ASTM D2216)**

CLIENT: WSP	TEST NO: 4	PROJECT NO: 103-1705
PROJECT: 17M-006	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 31-Mar-2017	TESTED BY: Irwin Araquil
TEST LOCATION: Hartford		

Description	TH 10	TH 10	TH 10	TH 10	TH 10
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	136.10	170.20	171.90	175.60	166.70
Wt Dry Sample + Tare	115.80	141.50	141.70	146.40	138.90
Wt Water	20.30	28.70	30.20	30.20	27.80
Wt Tare	4.20	4.20	4.20	4.40	4.20
Wt Dry Sample	111.60	137.30	137.50	142.00	134.70
<b>Moisture Content (%)</b>	<b>18.2</b>	<b>20.9</b>	<b>22.0</b>	<b>21.3</b>	<b>20.6</b>

Description	TH 10	TH 10	TH 10		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	142.20	164.00	153.20		
Wt Dry Sample + Tare	104.50	115.10	105.00		
Wt Water	37.70	48.90	48.20		
Wt Tare	4.20	4.30	4.30		
Wt Dry Sample	100.30	110.80	100.70		
<b>Moisture Content (%)</b>	<b>37.6</b>	<b>44.1</b>	<b>47.9</b>		

Description	TH 11	TH 11	TH 11	TH 11	TH 11
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	135.90	159.90	411.00	162.00	186.50
Wt Dry Sample + Tare	109.40	134.30	346.20	127.90	145.90
Wt Water	26.50	25.60	72.80	34.10	40.60
Wt Tare	4.40	4.40	13.10	4.50	4.20
Wt Dry Sample	105.00	129.90	333.10	123.40	141.70
<b>Moisture Content (%)</b>	<b>25.2</b>	<b>19.7</b>	<b>21.9</b>	<b>27.6</b>	<b>28.7</b>

Description	TH 11	TH 11	TH 11		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	137.30	153.20	141.30		
Wt Dry Sample + Tare	99.20	112.90	96.30		
Wt Water	38.10	40.30	45.00		
Wt Tare	4.20	4.20	4.20		
Wt Dry Sample	95.00	108.70	92.10		
<b>Moisture Content (%)</b>	<b>40.1</b>	<b>37.1</b>	<b>49.2</b>		

**N.I.C.**

**MOISTURE CONTENT OF SOIL (ASTM D2216)**

CLIENT: WSP	TEST NO: 4	PROJECT NO: 103-1705
PROJECT: 17M-006	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 31-Mar-2017	TESTED BY: Irwin Araquil
TEST LOCATION: Hartford		

Description	TH 12	TH 12	TH 12	TH 12	TH 12
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	170.60	165.60	167.00	167.70	200.50
Wt Dry Sample + Tare	150.20	127.70	130.80	140.20	166.20
Wt Water	20.40	37.90	36.20	27.50	34.30
Wt Tare	4.20	4.10	4.20	4.20	4.30
Wt Dry Sample	146.00	123.60	126.60	136.00	161.90
<b>Moisture Content (%)</b>	<b>14.0</b>	<b>30.7</b>	<b>28.6</b>	<b>20.2</b>	<b>21.2</b>

Description	TH 12	TH 12	TH 12		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	139.00	130.40	160.00		
Wt Dry Sample + Tare	102.00	95.70	106.40		
Wt Water	37.00	34.70	53.60		
Wt Tare	4.20	4.20	4.20		
Wt Dry Sample	97.80	91.50	102.20		
<b>Moisture Content (%)</b>	<b>37.8</b>	<b>37.5</b>	<b>52.4</b>		

Description	TH 13	TH 13	TH 13	TH 13	TH 13
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	170.50	162.70	163.00	171.40	173.70
Wt Dry Sample + Tare	145.70	125.10	139.20	139.80	144.10
Wt Water	24.80	37.60	29.80	31.60	29.60
Wt Tare	4.20	4.50	4.20	4.20	4.30
Wt Dry Sample	161.50	120.60	135.00	135.60	139.80
<b>Moisture Content (%)</b>	<b>17.5</b>	<b>31.2</b>	<b>22.1</b>	<b>23.3</b>	<b>21.2</b>

Description	TH 13	TH 13	TH 13		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	158.50	165.70	179.10		
Wt Dry Sample + Tare	114.70	116.10	126.20		
Wt Water	43.80	49.60	52.90		
Wt Tare	4.60	4.20	4.20		
Wt Dry Sample	110.10	111.90	122.00		
<b>Moisture Content (%)</b>	<b>39.8</b>	<b>44.3</b>	<b>43.4</b>		

**N.I.C.**

**MOISTURE CONTENT OF SOIL (ASTM D2216)**

CLIENT: WSP	TEST NO: 4	PROJECT NO: 103-1705
PROJECT: 17M-006	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 31-Mar-2017	TESTED BY: Irwin Araquil
TEST LOCATION: Hartford		

Description	TH 14	TH 14	TH 14	TH 14	TH 14
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	151.40	153.40	156.40	173.90	153.00
Wt Dry Sample + Tare	127.60	125.30	124.90	141.90	123.30
Wt Water	23.80	28.10	31.50	32.00	29.70
Wt Tare	4.20	4.20	4.20	4.40	4.20
Wt Dry Sample	123.40	121.10	120.70	137.50	119.10
<b>Moisture Content (%)</b>	<b>19.3</b>	<b>23.2</b>	<b>26.1</b>	<b>23.3</b>	<b>24.9</b>

Description	TH 14	TH 14	TH 14		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	178.30	174.00	163.20		
Wt Dry Sample + Tare	126.30	120.70	112.50		
Wt Water	52.00	53.30	50.70		
Wt Tare	4.20	4.40	4.30		
Wt Dry Sample	122.10	116.30	108.20		
<b>Moisture Content (%)</b>	<b>42.6</b>	<b>45.5</b>	<b>46.9</b>		

Description	TH 15	TH 15	TH 15	TH 15	TH 15
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	145.30	319.10	173.90	159.30	174.00
Wt Dry Sample + Tare	109.20	246.70	133.10	122.80	135.30
Wt Water	36.10	72.40	38.80	36.50	38.70
Wt Tare	4.20	13.10	4.20	4.40	4.20
Wt Dry Sample	105.00	233.60	128.90	118.40	131.10
<b>Moisture Content (%)</b>	<b>34.4</b>	<b>31.0</b>	<b>30.1</b>	<b>30.8</b>	<b>29.5</b>

Description	TH 15	TH 15	TH 15		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	179.90	201.80	188.50		
Wt Dry Sample + Tare	134.60	158.50	151.70		
Wt Water	45.30	43.30	36.80		
Wt Tare	4.30	4.30	4.20		
Wt Dry Sample	130.30	154.20	147.50		
<b>Moisture Content (%)</b>	<b>34.8</b>	<b>28.1</b>	<b>24.9</b>		

**N.I.C.**

**MOISTURE CONTENT OF SOIL (ASTM D2216)**

CLIENT: WSP	TEST NO: 4	PROJECT NO: 103-1705
PROJECT: 17M-006	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 31-Mar-2017	TESTED BY: Irwin Araquil
TEST LOCATION: Hartford		

Description	TH 16	TH 16	TH 16	TH 16	TH 16
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	166.80	155.80	179.20	163.90	165.00
Wt Dry Sample + Tare	139.60	120.70	135.90	119.50	136.60
Wt Water	27.20	35.10	43.30	44.40	28.40
Wt Tare	4.30	4.30	4.30	4.50	4.40
Wt Dry Sample	135.40	116.40	131.60	115.00	132.20
<b>Moisture Content (%)</b>	<b>20.1</b>	<b>30.2</b>	<b>32.9</b>	<b>38.6</b>	<b>21.5</b>

Description	TH 16	TH 16	TH 16		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	171.70	190.30	189.30		
Wt Dry Sample + Tare	123.30	147.30	130.20		
Wt Water	48.40	43.00	59.10		
Wt Tare	4.20	4.20	4.70		
Wt Dry Sample	119.10	143.10	125.50		
<b>Moisture Content (%)</b>	<b>40.6</b>	<b>30.5</b>	<b>47.1</b>		

Description					
Depth (ft)					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
<b>Moisture Content (%)</b>					

Description					
Depth (ft)					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
<b>Moisture Content (%)</b>					

**N.I.C.**



**MOISTURE CONTENT OF SOIL (ASTM D2216)**

CLIENT: WSP	TEST NO: 5	PROJECT NO: 103-1705
PROJECT: 17M-006	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 31-Mar-2017	TESTED BY: Irvin Araquil
TEST LOCATION: Leamen		

Description	TH 17	TH 17	TH 17	TH 17	TH 17
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	136.50	140.90	144.90	168.10	153.90
Wt Dry Sample + Tare	106.20	108.20	119.50	140.00	129.50
Wt Water	30.30	32.70	25.40	28.10	24.40
Wt Tare	4.40	4.30	4.70	4.30	4.30
Wt Dry Sample	101.80	103.90	114.80	135.70	125.20
<b>Moisture Content (%)</b>	<b>29.8</b>	<b>31.5</b>	<b>22.1</b>	<b>20.7</b>	<b>19.5</b>

Description	TH 17	TH 17	TH 17		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	135.80	180.50	159.40		
Wt Dry Sample + Tare	97.80	125.20	110.30		
Wt Water	38.00	55.30	49.10		
Wt Tare	4.30	4.30	4.40		
Wt Dry Sample	93.50	120.90	105.90		
<b>Moisture Content (%)</b>	<b>40.6</b>	<b>45.7</b>	<b>46.4</b>		

Description	TH 18	TH 18	TH 18	TH 18	TH 18
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	158.70	155.60	121.90	245.90	168.10
Wt Dry Sample + Tare	124.10	121.10	98.50	196.30	128.70
Wt Water	34.60	34.50	23.40	49.60	39.40
Wt Tare	4.40	4.30	4.30	13.30	4.10
Wt Dry Sample	119.70	116.80	94.20	183.00	124.60
<b>Moisture Content (%)</b>	<b>28.9</b>	<b>29.5</b>	<b>24.8</b>	<b>27.1</b>	<b>31.6</b>

Description	TH 18	TH 18	TH 18		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	158.30	190.70	156.10		
Wt Dry Sample + Tare	107.70	128.30	102.70		
Wt Water	50.60	62.40	53.40		
Wt Tare	4.20	4.20	4.10		
Wt Dry Sample	103.50	124.10	98.60		
<b>Moisture Content (%)</b>	<b>48.9</b>	<b>50.3</b>	<b>54.2</b>		

### MOISTURE CONTENT OF SOIL (ASTM D2216)

CLIENT: WSP	TEST NO: 5	PROJECT NO: 103-1705
PROJECT: 17M-006	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 31-Mar-2017	TESTED BY: Irvin Araquil
TEST LOCATION: Leamen		

Description	TH 19	TH 19	TH 19	TH 19	TH 19
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	171.00	156.10	136.40	142.80	162.00
Wt Dry Sample + Tare	142.70	126.90	111.50	110.70	123.20
Wt Water	28.30	29.20	24.90	32.10	38.80
Wt Tare	4.70	4.20	4.10	4.50	4.20
Wt Dry Sample	138.00	122.70	107.40	106.20	119.00
<b>Moisture Content (%)</b>	<b>20.5</b>	<b>23.8</b>	<b>23.2</b>	<b>30.2</b>	<b>32.6</b>

Description	TH 19	TH 19	TH 19		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	192.40	152.80	148.00		
Wt Dry Sample + Tare	129.30	102.10	98.10		
Wt Water	63.10	50.70	49.90		
Wt Tare	4.20	4.30	4.40		
Wt Dry Sample	125.10	97.80	93.70		
<b>Moisture Content (%)</b>	<b>50.4</b>	<b>51.8</b>	<b>53.3</b>		

Description	TH 20	TH 20	TH 20	TH 20	TH 20
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	149.30	164.00	139.10	210.90	203.20
Wt Dry Sample + Tare	116.90	128.60	107.00	171.10	166.60
Wt Water	32.40	35.40	32.10	39.80	36.60
Wt Tare	4.30	4.20	4.20	4.30	4.30
Wt Dry Sample	112.60	124.40	102.80	166.80	162.30
<b>Moisture Content (%)</b>	<b>28.8</b>	<b>28.5</b>	<b>31.2</b>	<b>23.9</b>	<b>22.6</b>

Description	TH 20	TH 20	TH 20		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	194.70	163.80	167.10		
Wt Dry Sample + Tare	143.00	126.00	123.20		
Wt Water	51.70	37.80	43.90		
Wt Tare	4.20	4.70	4.30		
Wt Dry Sample	138.80	121.30	118.90		
<b>Moisture Content (%)</b>	<b>37.2</b>	<b>31.2</b>	<b>36.9</b>		

**MOISTURE CONTENT OF SOIL (ASTM D2216)**

CLIENT: WSP	TEST NO: 5	PROJECT NO: 103-1705
PROJECT: 17M-006	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 31-Mar-2017	TESTED BY: Irvin Araquil
TEST LOCATION: Leamen		

Description	TH 21	TH 21	TH 21	TH 21	TH 21
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	128.30	141.40	154.90	159.10	168.30
Wt Dry Sample + Tare	98.90	109.70	125.30	137.70	143.60
Wt Water	29.40	31.70	29.60	21.40	24.70
Wt Tare	4.70	4.50	4.30	4.20	4.30
Wt Dry Sample	94.20	105.20	121.00	133.50	139.30
<b>Moisture Content (%)</b>	<b>31.2</b>	<b>30.1</b>	<b>24.5</b>	<b>16.0</b>	<b>17.7</b>

Description	TH 21	TH 21	TH 21		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	180.70	159.30	176.40		
Wt Dry Sample + Tare	129.40	115.10	131.80		
Wt Water	51.30	44.20	44.60		
Wt Tare	4.30	4.30	4.60		
Wt Dry Sample	125.10	110.80	127.20		
<b>Moisture Content (%)</b>	<b>41.0</b>	<b>39.9</b>	<b>35.1</b>		

Description					
Depth (ft)					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
<b>Moisture Content (%)</b>					

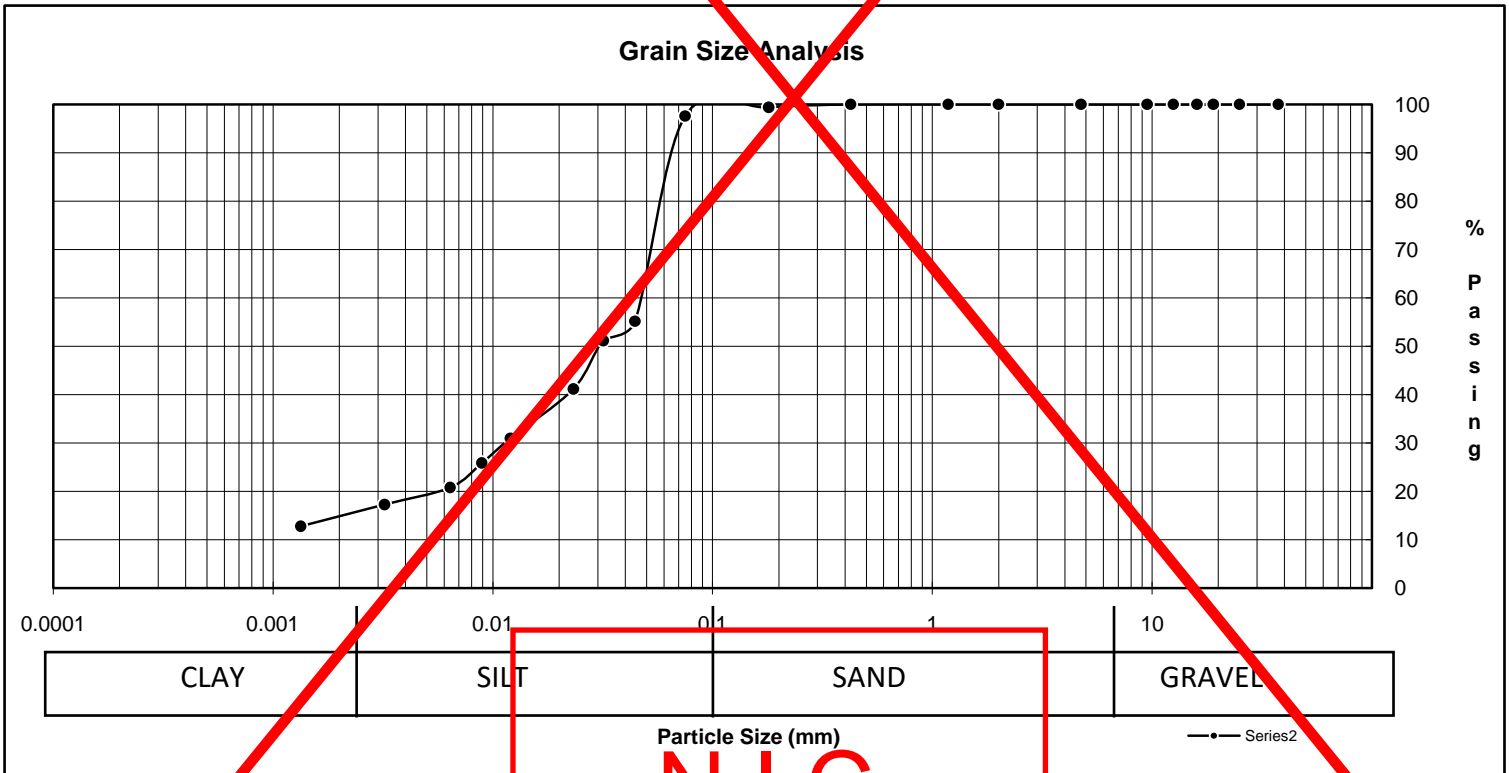
Description					
Depth (ft)					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
<b>Moisture Content (%)</b>					

**PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT**

CLIENT: WSP PROJECT NO. 103-1705  
1600 Buffalo Place  
Winnipeg, MB R3T 6B8  
ATTN: Silvestre Urbano  
PROJECT: 17M-006

Date Sampled:	Unknown	Date Received:	29-Mar-17	Sieve Analysis		Hydrometer Analysis	
Sampled By:	Client	Date Tested:	3-Apr-17	Sieve (mm)	% Passing	Diameter	% Finer
				50.00	100.0		
				37.50	100.0		
				25.00	100.0		
				19.00	100.0		
				16.00	100.0		
				12.50	100.0	0.0444	55.1
				9.50	100.0	0.0318	51.1
				4.75	100.0	0.0233	41.1
				2.00	100.0	0.0120	30.9
				1.18	100.0	0.0089	25.9
				0.425	100.0	0.0064	20.8
				0.180	99.4	0.0032	17.2
				0.075	97.6	0.0013	12.8

**Material Identification**  
B.H./T.H. No. TH2 @ 4'  
Sample No. 8  
Sample Source  
Specific Gravity of Material: 2.65



N.I.C.

SOIL DESCRIPTION	% Composition		D10	D30	D60	Cu	Cc
	Gravel	Sand					
SILT LOAM	2.4	Sand		0.01203		0.07500	
	84.8	Silt				#DIV/0!	
	12.8	Clay				#DIV/0!	

Remarks: Test Method: ASTM D422, D2216, D4318  
Technician: IA/GM

*H. Manalo*

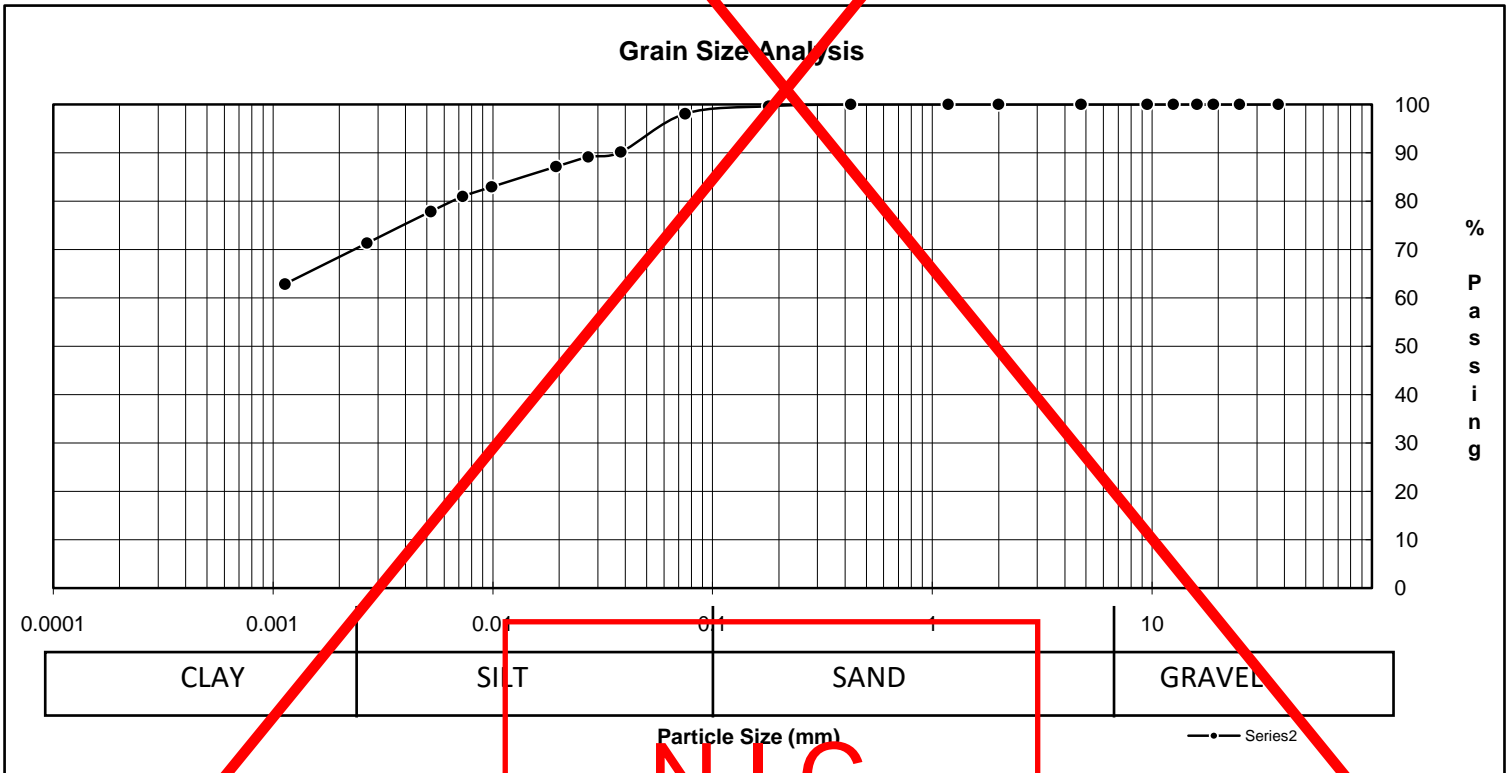
Reviewed by: Hermie Manalo

**PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT**

CLIENT: WSP PROJECT NO. 103-1705  
1600 Buffalo Place  
Winnipeg, MB R3T 6B8  
ATTN: Silvestre Urbano  
PROJECT: 17M-006

Date Sampled:	Unknown	Date Received:	29-Mar-17	Sieve Analysis		Hydrometer Analysis	
Sampled By:	Client	Date Tested:	3-Apr-17	Sieve (mm)	% Passing	Diameter	% Finer
				50.00	100.0		
				37.50	100.0		
				25.00	100.0		
				19.00	100.0		
				16.00	100.0		
				12.50	100.0	0.0382	90.1
				9.50	100.0	0.0272	89.1
				4.75	100.0	0.0194	87.1
				2.00	100.0	0.0099	82.9
				0.75	100.0	0.0073	80.9
				0.425	100.0	0.0052	77.8
				0.180	99.6	0.0027	71.3
				0.075	98.1	0.0011	62.8

**Material Identification**  
B.H./T.H. No. TH5 @ 3'  
Sample No. 9  
Sample Source  
Specific Gravity of Material: 2.65



**N.I.C.**

SOIL DESCRIPTION	% Composition		D10	
	HEAVY CLAY	1.9	Gravel	D30
35.3		Sand	D60	
62.8		Silt	Cu	#DIV/0!
		Clay	Cc	#DIV/0!

Remarks: Test Method: ASTM D422, D2216, D4318  
Technician: IA/GM

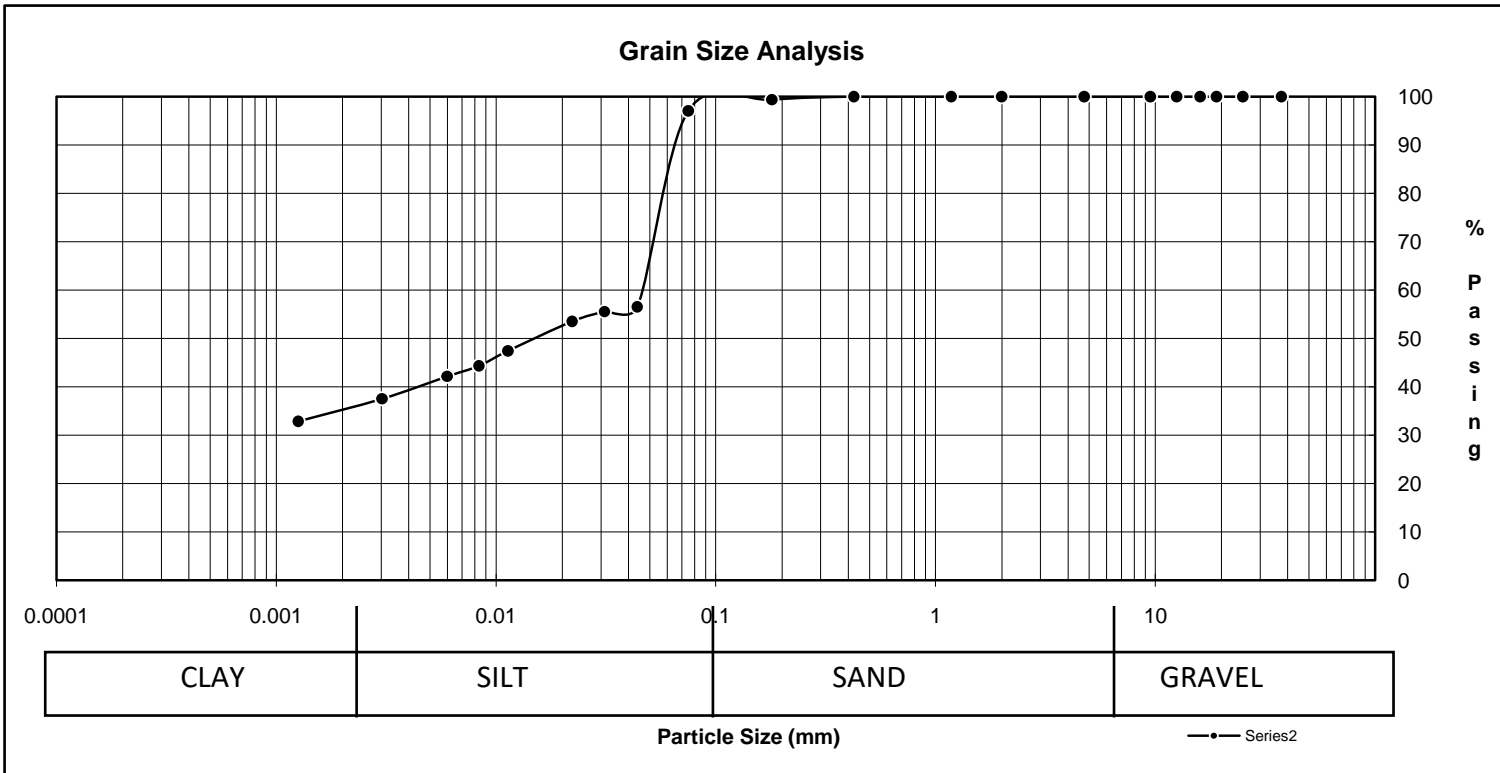
*H. Manalo*

Reviewed by: Hermie Manalo

**PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT**

CLIENT: WSP PROJECT NO. 103-1705  
1600 Buffalo Place  
Winnipeg, MB R3T 6B8  
ATTN: Silvestre Urbano  
PROJECT: 17M-006

Date Sampled:	unknown	Date Received:	29-Mar-17	Sieve Analysis		Hydrometer Analysis	
Sampled By:	Client	Date Tested:	3-Apr-17	Sieve (mm)	% Passing	Diameter	% Finer
<b>Material Identification</b> B.H./T.H. No. TH7 @ 6' Sample No. 10 Sample Source Specific Gravity of Material: 2.65				50.00	100.0		
				37.50	100.0		
				25.00	100.0		
				19.00	100.0		
				16.00	100.0		
				12.50	100.0	0.0439	56.5
				9.50	100.0	0.0312	55.5
				4.75	100.0	0.0222	53.5
				2.00	100.0	0.0113	47.4
				1.18	100.0	0.0084	44.3
0.425	100.0	0.0060	42.1				
0.180	99.4	0.0030	37.5				
0.075	97.1	0.0013	32.9				



SOIL DESCRIPTION	% Composition		D10	
	SILTY CLAY LOAM	2.9	Gravel	D30
64.2		Sand	D60	0.07500
32.9		Silt	Cu	#DIV/0!
		Clay	Cc	#DIV/0!

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: IA/GM

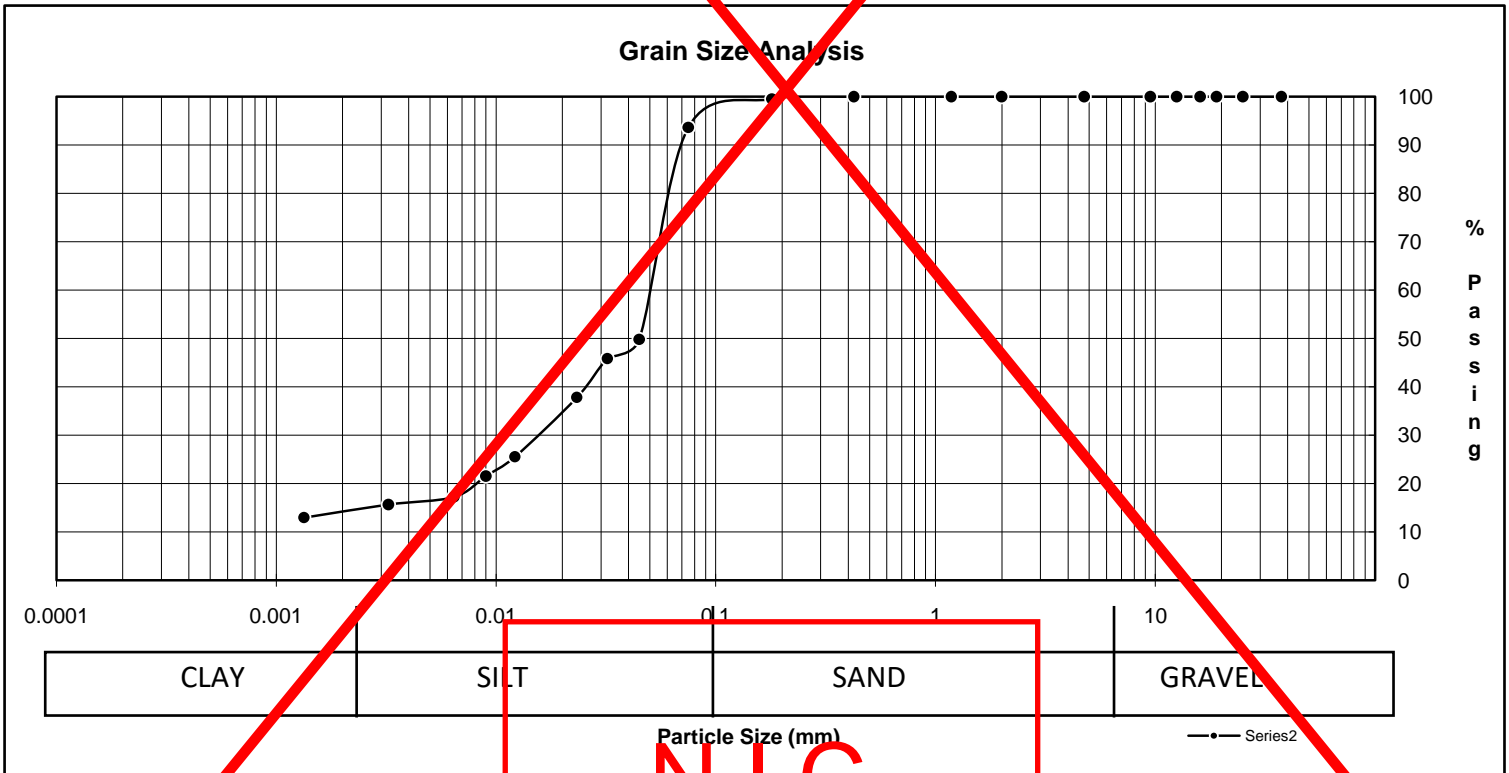
Reviewed by: Hermie Manalo

**PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT**

CLIENT: WSP PROJECT NO. 103-1705  
1600 Buffalo Place  
Winnipeg, MB R3T 6B8  
ATTN: Silvestre Urbano  
PROJECT: 17M-006

Date Sampled:	Unknown	Date Received:	29-Mar-17	Sieve Analysis		Hydrometer Analysis	
Sampled By:	Client	Date Tested:	3-Apr-17	Sieve (mm)	% Passing	Diameter	% Finer
				50.00	100.0		
				37.50	100.0		
				25.00	100.0		
				19.00	100.0		
				16.00	100.0		
				12.50	100.0	0.0448	49.8
				9.50	100.0	0.0321	45.8
				4.75	100.0	0.0233	37.8
				2.00	100.0	0.0122	25.5
				0.75	100.0	0.0090	21.5
				0.425	100.0	0.0064	17.2
				0.180	99.5	0.0032	15.6
				0.075	93.6	0.0013	12.9

**Material Identification**  
B.H./T.H. No. TH11 @ 3'  
Sample No. 11  
Sample Source  
Specific Gravity of Material: 2.65



N.I.C.

SOIL DESCRIPTION	% Composition		D10	D30	D60	Cu	Cc
	Gravel	Sand					
SILT LOAM	6.4	80.7	0.02333	0.07500	#DIV/0!	#DIV/0!	#DIV/0!
	12.9						

Remarks: Test Method: ASTM D422, D2216, D4318  
Technician: IA/GM

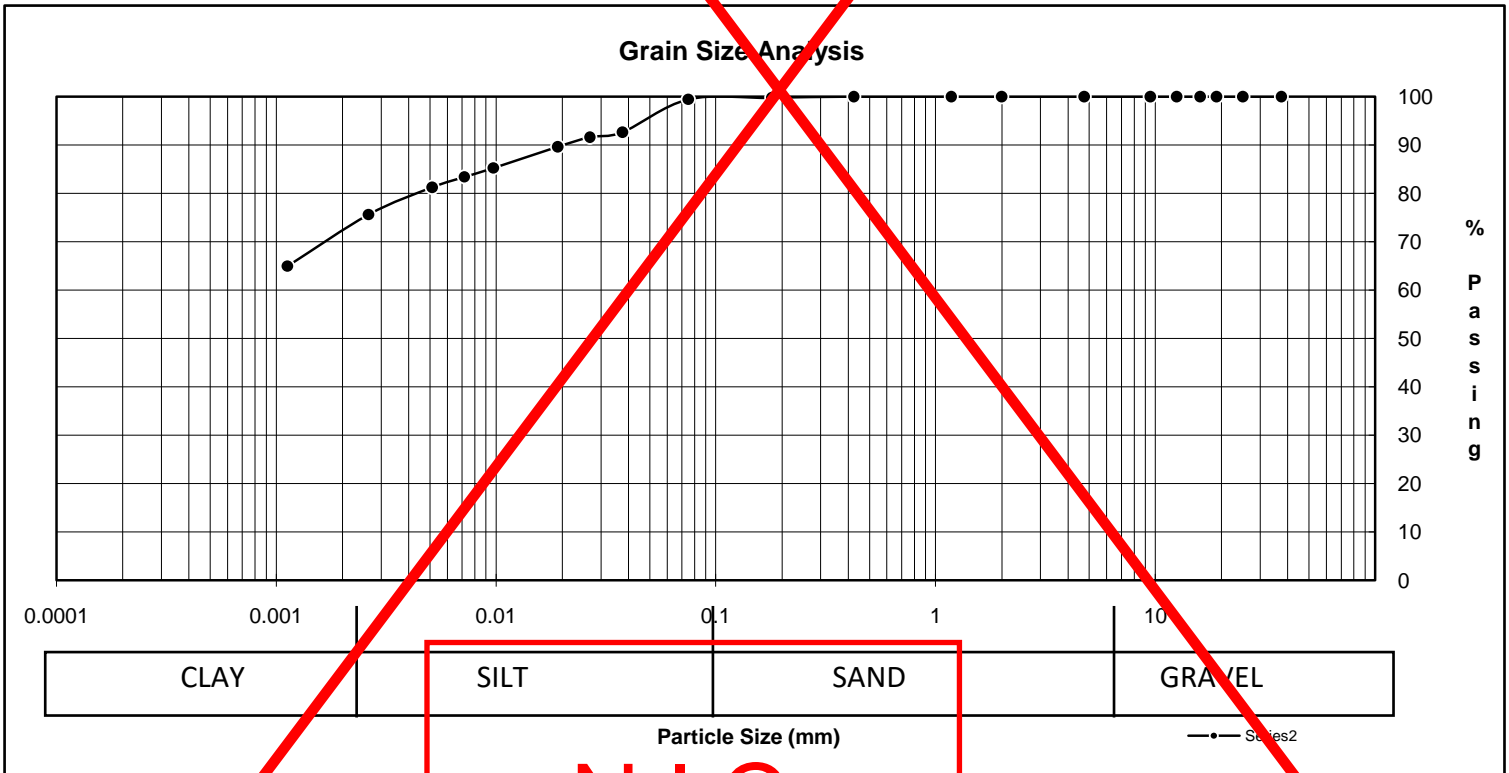
*H. Manalo*

Reviewed by: Hermie Manalo

**PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT**

CLIENT: WSP PROJECT NO. 103-1705  
1600 Buffalo Place  
Winnipeg, MB R3T 6B8  
ATTN: Silvestre Urbano  
PROJECT: 17M-006

Date Sampled:	unknown	Date Received:	29-Mar-17	Sieve Analysis		Hydrometer Analysis	
Sampled By:	Client	Date Tested:	3-Apr-17	Sieve (mm)	% Passing	Diameter	% Finer
<b>Material Identification</b> B.H./T.H. No. TH15 @ 2' Sample No. 12 Sample Source Specific Gravity of Material: 2.65				50.00	100.0		
				37.50	100.0		
				25.00	100.0		
				19.00	100.0		
				16.00	100.0		
				12.50	100.0	0.0376	92.6
				9.50	100.0	0.0268	91.6
				4.75	100.0	0.0191	89.6
				2.00	100.0	0.0097	85.2
				0.85	100.0	0.0072	83.4
0.425	100.0	0.0051	81.2				
0.180	99.8	0.0026	75.6				
0.075	99.5	0.0011	64.9				



**N.I.C.**

SOIL DESCRIPTION	% Composition		D10	D30	D60	Cu	Cc
	Gravel	Sand					
HEAVY CLAY	0.5	34.6					#DIV/0!
		64.9					#DIV/0!

Remarks: Test Method: ASTM D422, D2216, D4318  
Technician: IA/GM

*H. Manalo*

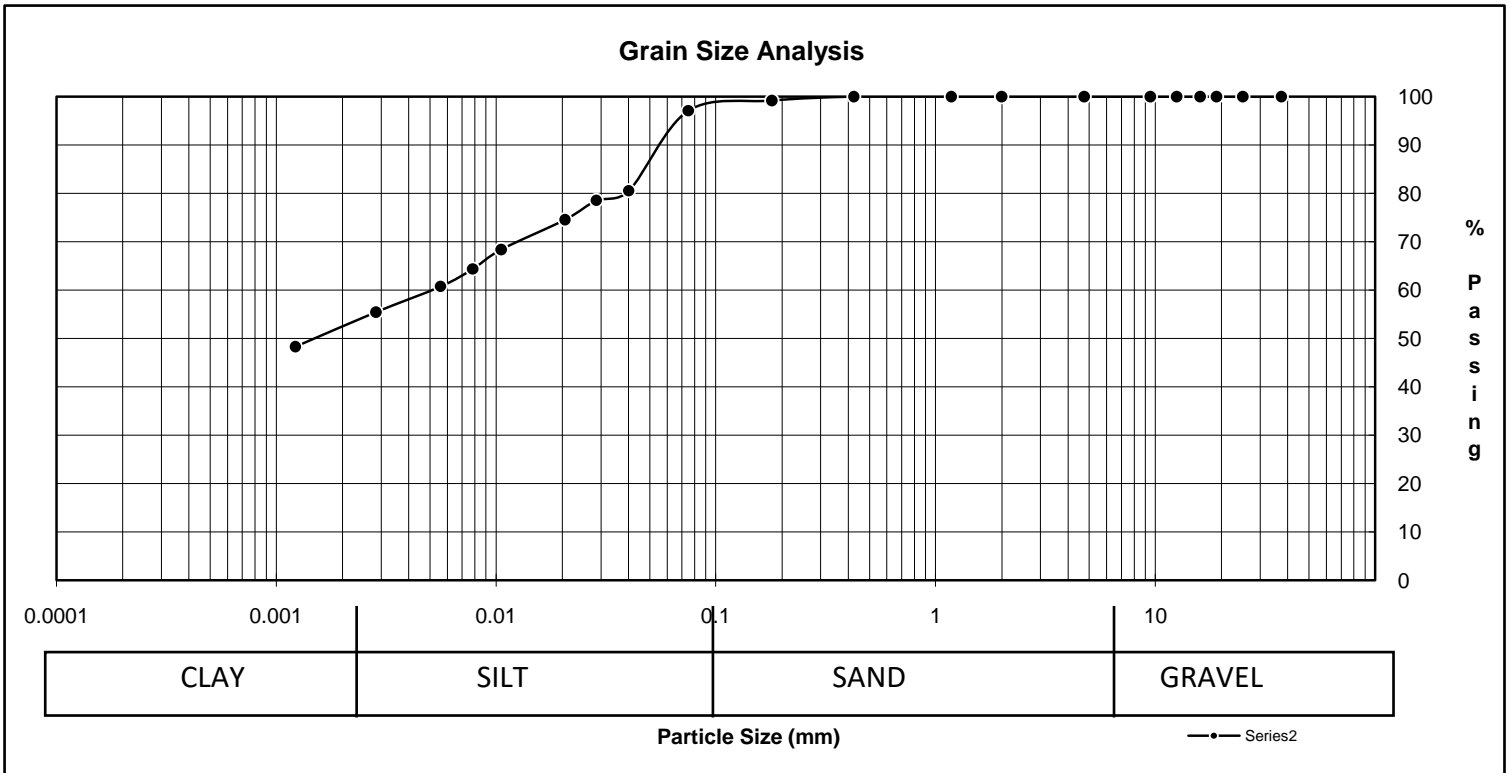
Reviewed by: Hermie Manalo



**PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT**

CLIENT: WSP PROJECT NO. 103-1705  
1600 Buffalo Place  
Winnipeg, MB R3T 6B8  
ATTN: Silvestre Urbano  
PROJECT: 17M-006

Date Sampled:	unknown	Date Received:	29-Mar-17	Sieve Analysis		Hydrometer Analysis	
Sampled By:	Client	Date Tested:	3-Apr-17	Sieve (mm)	% Passing	Diameter	% Finer
<b>Material Identification</b> B.H./T.H. No. <b>TH18 @ 4'</b> Sample No. <b>13</b> Sample Source Specific Gravity of Material: 2.65				50.00	100.0		
				37.50	100.0		
				25.00	100.0		
				19.00	100.0		
				16.00	100.0		
				12.50	100.0	0.0401	80.6
				9.50	100.0	0.0286	78.6
				4.75	100.0	0.0206	74.6
				2.00	100.0	0.0106	68.4
				1.18	100.0	0.0078	64.4
			0.425	100.0	0.0056	60.8	
			0.180	99.2	0.0028	55.4	
			0.075	97.1	0.0012	48.3	



SOIL DESCRIPTION	% Composition		D10	
	SILTY CLAY	2.9	Gravel	D30
48.8		Sand	D60	0.00560
48.3		Silt	Cu	#DIV/0!
		Clay	Cc	#DIV/0!

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: IA/GM

Reviewed by: Hermie Manalo

# Appendix D

PHOTOS OF PAVEMENT CORES



**Wiggins Street from Redwood Avenue to Mountain Avenue (Site #1)**



**TH01 – 180 mm intact**



**TH02 – 150 mm intact, 30 mm asphalt layer not shown**

\*\*\*TH03, TH04, concrete was deteriorated and no intact core could be recovered.

**N.I.C.**

**Hikins Street from Carruthers Avenue to McAdam Avenue (Site #2)**



**TH01 – 170 mm intact**



**TH02 – 170 mm intact**

**N.I.C.**

**Powers Street from Smithfield Avenue to Enniskillen Avenue (Site #3)**



**TH01 – 150 mm intact**



**TH02 – 150 mm intact**



TH03 – 150 mm intact

Hartford Avenue from McGregor Street to CPR Winnipeg Beach (Site #4)



TH01 – 150 mm intact, 40 mm asphalt layer not shown



TH02 – 140 mm intact, 40 mm asphalt layer not shown



TH03 – 140 mm intact, 30 mm asphalt layer not shown

**N.I.C.**





**TH04** – 150 mm intact, 30 mm asphalt layer



**TH05** – 130 mm intact, 30 mm asphalt layer not shown

**N.I.C.**



TH06 – 200 mm intact, 30 mm asphalt layer not shown



TH07 – 140 mm intact, 20 mm asphalt layer

**N.I.C.**

**Leamen Crescent from Pipeline Road to Doubleday Drive (Site #5)**



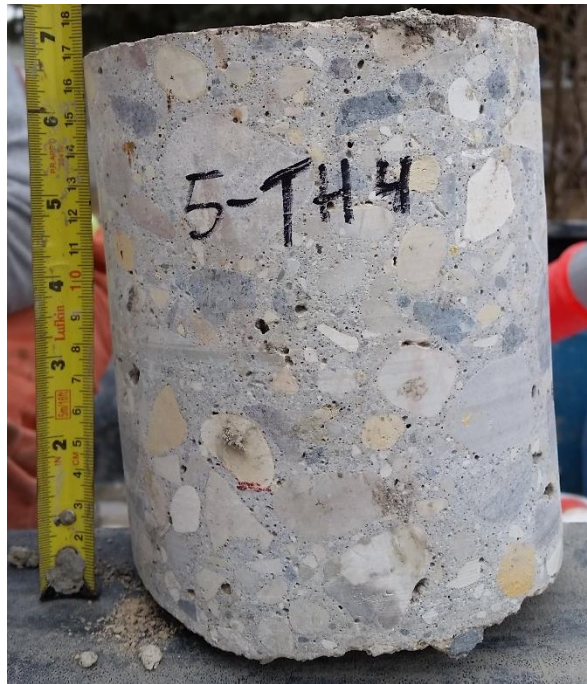
**TH01 – 150 mm intact**



**TH02 – 160 mm intact**



**TH03 – 160 mm intact**



**TH04 – 170 mm intact**



TH05 – 140 mm intact

Alisp Drive from Tallman Street to Lucas Avenue (Site #6)



TH01 – 160 mm intact



**TH02 – 160 mm intact**



**TH03 – 160 mm intact**



**TH04 – 150 mm intact**



**TH05 – 165 mm intact**