APPENDIX ‘A’

GEOTECHNICAL REPORT

H. MANALO CONSULTING LTD.

1402 Notre Dame Avenue, Winnipeg, MB, R3E 3G5
Phone: (204) 697-3854; Cell (204) 997-1355
hermie@hmanalo.ca

2025 Pavement Investigation Program
Residential Streets Package 2
10-2025

Prepared for

AECOM
99 Commerce Drive,
Winnipeg, Canada. R3P 0Y7

AECOM Project Number: 60743827

March 11, 2025

H. MANALO CONSULTING LTD.

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2025 Pavement Investigation Program
Residential Streets Package 1 (10-2025)

HMCL Project Number: 112-2502

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2. Field Work Program 3
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Appendix A – Reconstruction Sites

Alley of Oxford St and Cambridge St (From Corydon Ave to Fleet Ave)

Alley of Garwood Ave and Dudley Ave (From Guelph St to Harrow St)

Alley of Grosvenor Ave and Dorchester Ave (From Guelph St to Harrow St)

Appendix B – Rehabilitation Sites

Beaverbrook St (From Grant Ave to Taylor Ave)

Brooklyn St (From Ness Ave to Portage Ave)

Brooklyn St (From Silver Ave to Ness Ave)

Lanark St (From Mathers Ave to Taylor Ave)

Lanark St (Bay 789/817)

Lanark St (Bay 821/851)

Marjorie St (From Ness Ave to Portage Ave)

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Introduction

On January 14, 2025, H. Manalo Consulting Ltd. (HMCL) was authorized by Mr. Ryan Cunningham of AECOM to proceed with the geotechnical investigation, as outlined in the Subconsultant Agreement dated the same day. The objective was to assess the existing road conditions through pavement coring and subsurface soil sampling.

Field Work Program

The investigation adhered to the City of Winnipeg's guidelines, with core locations designated by AECOM Canada Ltd. Pavement cores were extracted at joints and mid-slab to assess their condition. Coring took place from February 25 to February 28 using a 160 mm diameter coring bit. Afterward, the pavement sections were refilled with aggregates and cold-mix asphalt. All collected samples were sent to HMCL laboratory for analysis.

Laboratory Analysis and Reporting

Subsurface soil samples were tested for moisture content and visually classified, with select samples undergoing plasticity index, particle size distribution, and CBR testing. Asphalt pavement thickness ranged from 80 mm to 180 mm, while concrete pavement thickness varied between 125 mm and 185 mm. Thickness measurements and core sample images were documented for reference.

We appreciated the opportunity to assist you in this project. Please call the undersigned if you require further information.

Prepared by:

Mayumi Kawano, EIT
Geotechnical Engineer Intern
Field and Laboratory Supervisor

Reviewed by:

Paul Bevel
Manager, Field and Laboratory Services

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APPENDIX A
Reconstruction Sites

A.1 Pavement Coring and Subsurface Drilling Locations
A.2 Pavement Structure Measurement
A.3 Picture of Cores
A.4 Soil Logs and Laboratory Test Reports

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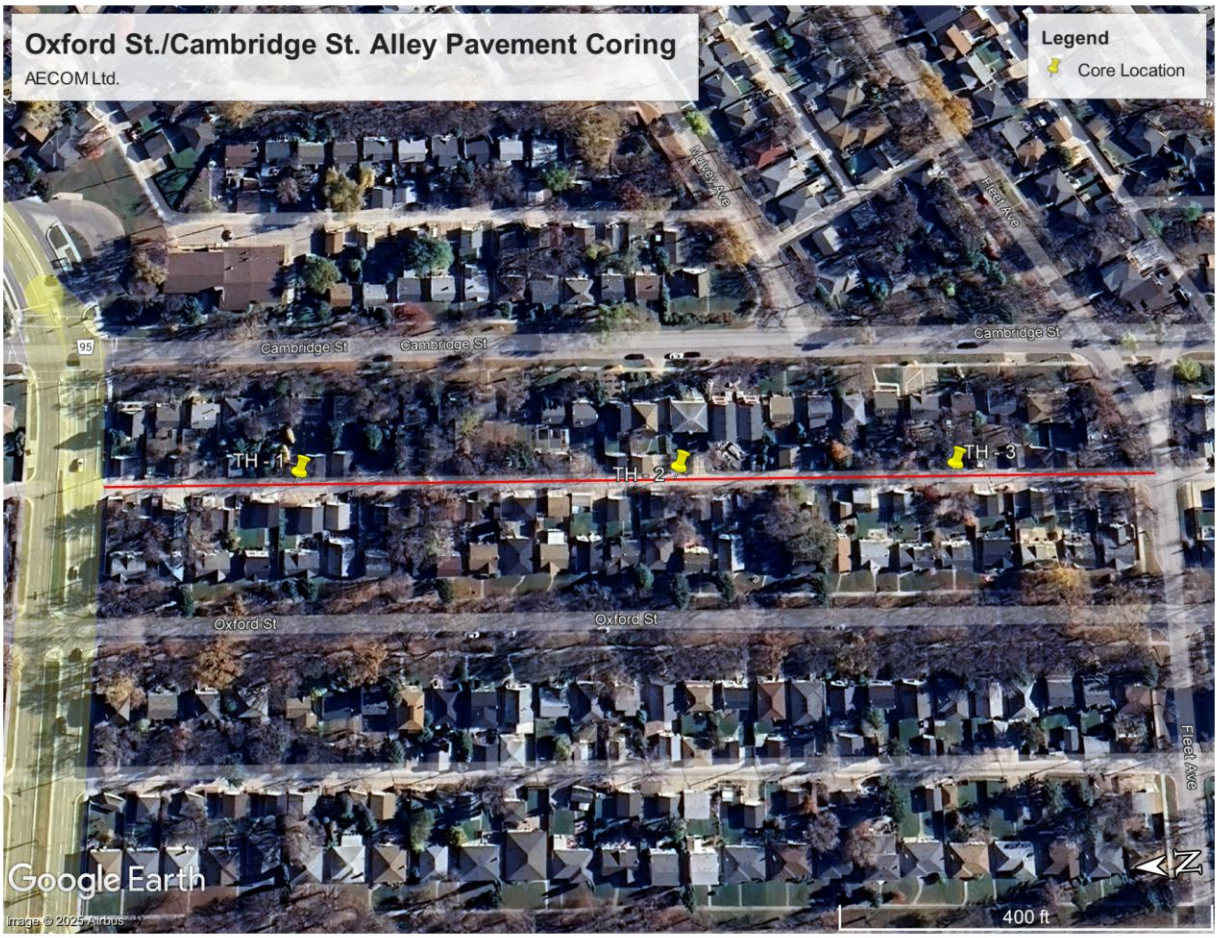
Reconstruction Sites

Pavement Coring and Subsurface Drilling Locations



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Reconstruction Sites

Pavement Coring and Subsurface Drilling Locations

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Reconstruction Sites

Pavement Coring and Subsurface Drilling Locations

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Reconstruction Sites

Pavement Structure Measurement

Test Hole No.	Test Hole Location	Asphalt Thickness (mm)	Concrete Thickness (mm)
Alley of Oxford St and Cambridge St *(From Corydon Ave to Fleet Ave)*			
TH1	Backlane of House # 615 Cambridge St (14U 631111 m E, 5524915 m N)	45	160
TH2	Backlane of House # 554 Oxford St (14U 631107 m E, 5524783 m N)		185
TH3	Backlane of House # 582 Oxford St (14U 631104 m E, 5524687 m N)	Top - 40 Bottom - 35	130
Alley of Garwood Ave and Dudley Ave *(From Guelph St to Harrow St)*			
TH1	Backlane House # 969 Dudley Ave (14 U 632080 m E, 5524996 m N)		190
TH2	Backlane House # 945 Dudley Ave (14 U, 632149 m E, 5525035 m N)		185
Alley of Grosvenor Ave and Dorchester Ave *(From Guelph St to Harrow St)*			
TH1	Backlane House # 967 Dorchester Ave (14 U 631737 m E, 5525663 m N)	35	190
TH2	Backlane House # 993 Dorchester Ave (14 U 631811 m E, 5525703 m N)	65	200

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Reconstruction Sites

Picture of Cores

Alley of Oxford St and Cambridge St
(From Corydon Ave to Fleet Ave)


Core 1


Core 2


Core 3

Alley of Garwood Ave and Dudley Ave
(From Guelph St to Harrow St)


Core 1


Core 2

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Reconstruction Sites

Picture of Cores

Alley of Grosvenor Ave and Dorchester Ave
(From Guelph St to Harrow St)

Core 1

Core 2

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Reconstruction Sites

Soil Logs and Laboratory Test Reports

H. MANALO CONSULTING LTD.

Project No: 112-2502

Project: Pavement Investigation Program

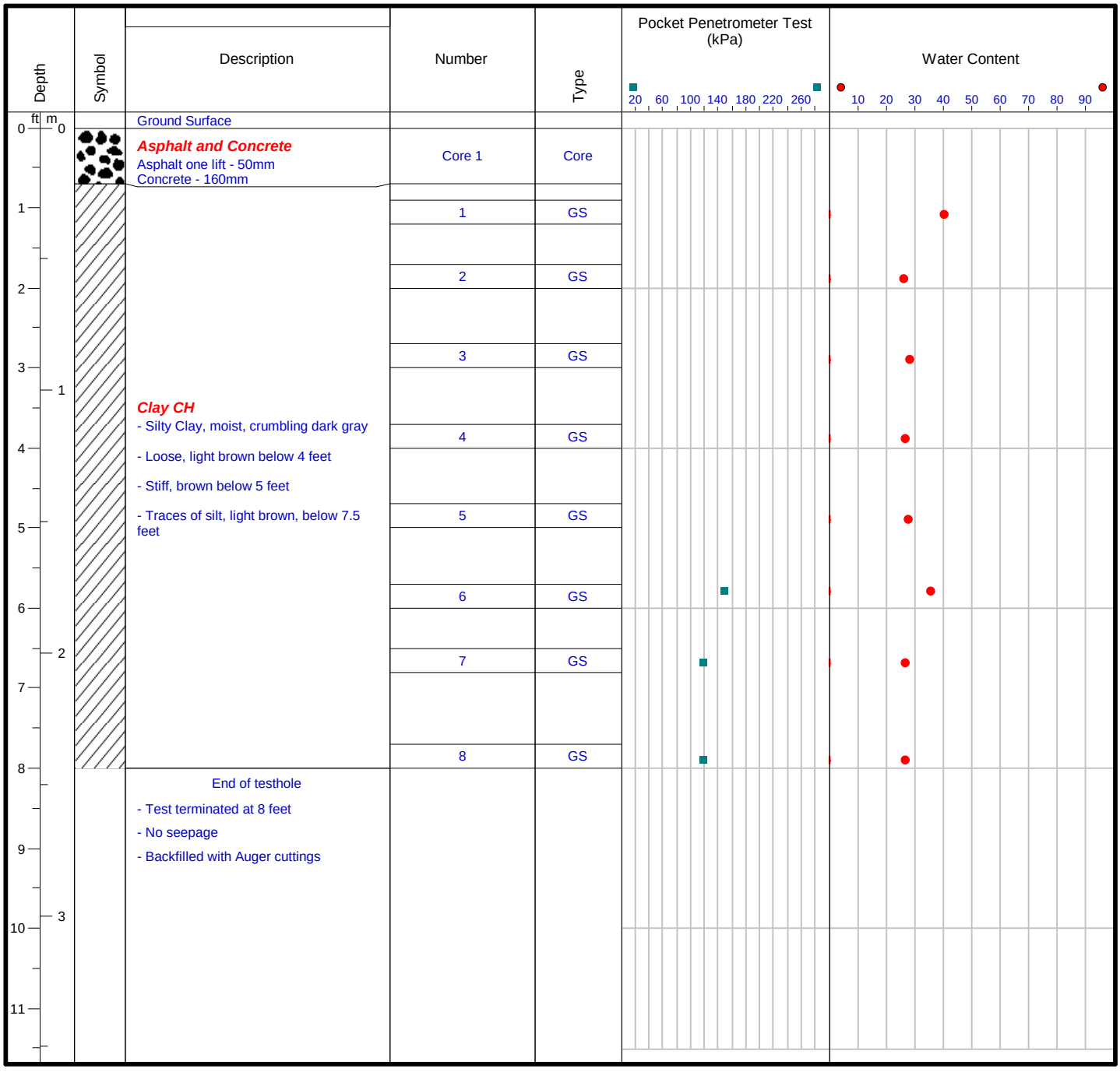
Client: Aecom Canada ULC

Location: Backlane of House No. 615 Cambridge St.

TH1

Logged By: Mayumi

Engineer: M. Kawano EIT



Drill Method: Auger

Drill Date: February 28, 2025

Hole Size: 6 inches

Datum:

Checked by: Paul Bevel

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

Project No: 112-2502

Project: Pavement Investigation Program

Client: Aecom Canada ULC

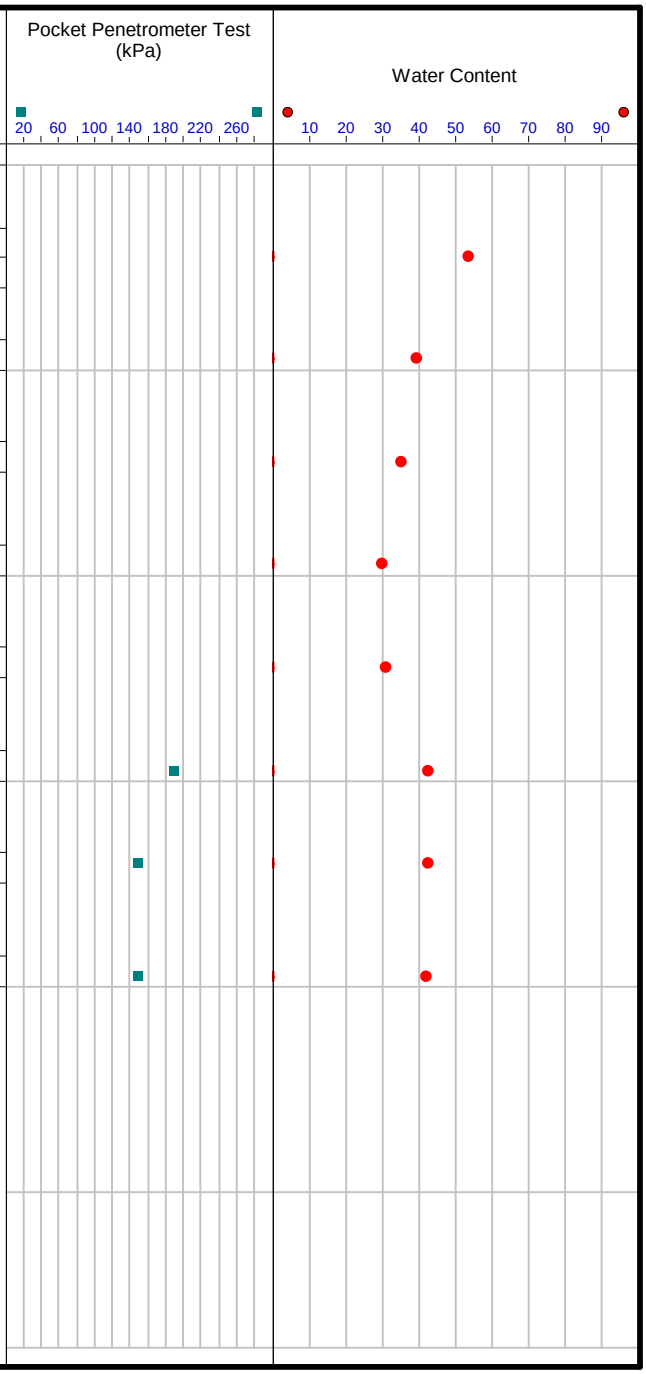
Location: Backlane of House No. 554 Oxford St.

TH2

Logged By: Mayumi

Engineer: M. Kawano EIT

Depth (ft)	Depth (m)	Description	Number	Type
0	0	Ground Surface		
0	0	***Concrete*** 185mm Length of Core	Core 2	Core
1		***Sand SP*** - with Clay, saturated, loose, dark brown	1	GS
2			2	GS
3	1		3	GS
4		***Clay CH*** - Silty, moist, crumbling dark brown	4	GS
		- Moist, loose, light brown below 3 feet		
5		- Stiff, brown, traces of silt below 5 feet	5	GS
6		Lab Test Result (HM 29), 2-4 FT LL= 67, PL=19, PI = 47 G=0, S=2, M=31, C=67	6	GS
7	2		7	GS
8			8	GS
8		End of testhole - Test terminated at 8 feet - No seepage - Backfilled with Auger cuttings		
10	3			
11				



Drill Method: Auger

Drill Date: February 28, 2025

Hole Size: 6 inches

Datum:

Checked by: Paul Bevel

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

Project No: 112-2502

Project: Pavement Investigation Program

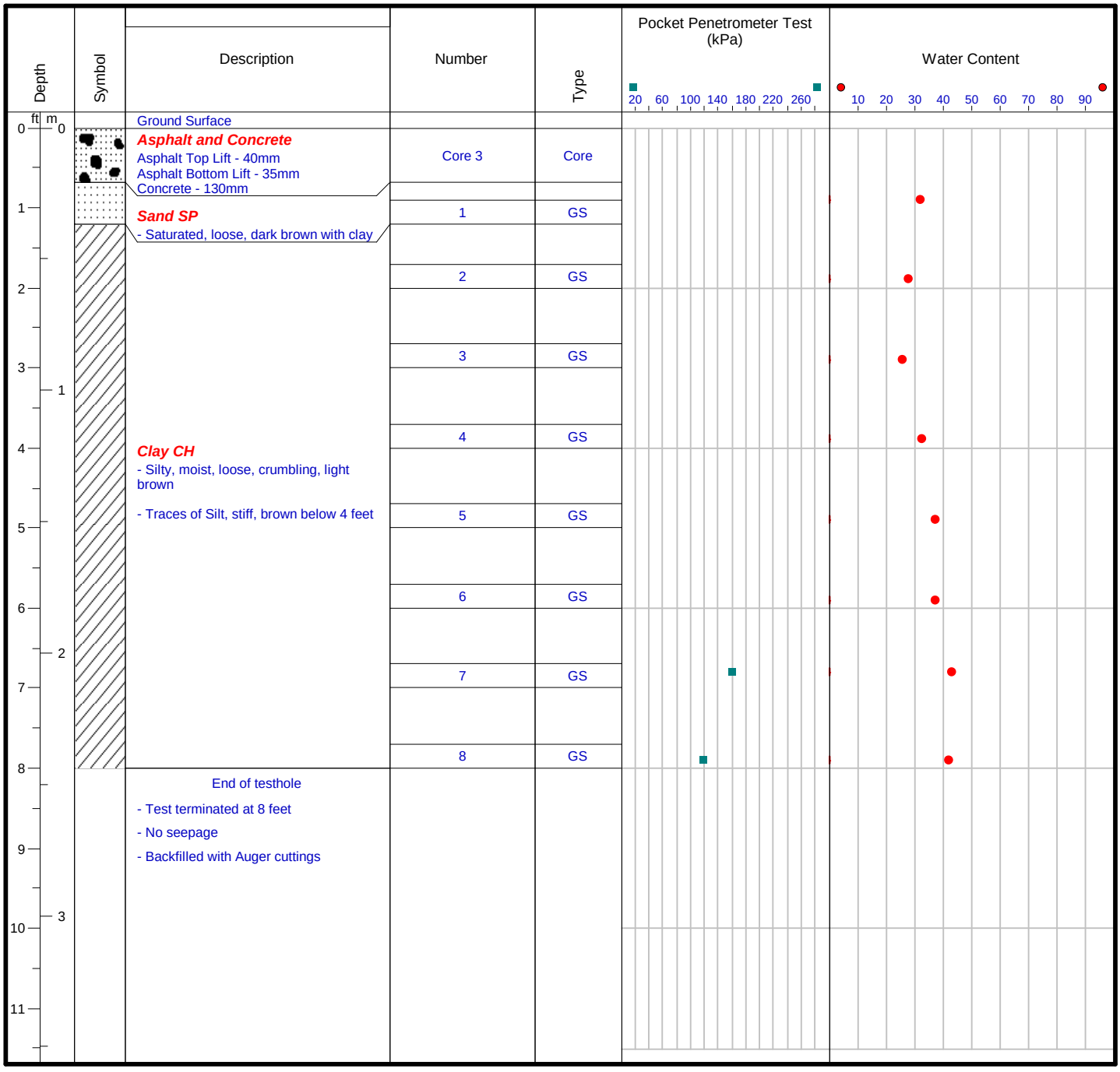
Client: Aecom Canada ULC

Location: Backlane of House No. 582 Oxford St.

TH3

Logged By: Mayumi

Engineer: M. Kawano EIT



Drill Method: Auger

Drill Date: February 28, 2025

Hole Size: 6 inches

Datum:

Checked by: Paul Bevel

Sheet: 1 of 1

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CCIL Canadian Council of Independent Laboratories

MOISTURE CONTENT OF SOIL (ASTM D2216)

Client:	AECOM Canada ULC 99 Commerce Drive, Winnipe MB R3P 0Y7	Project No: Test No.: Lab No.:	112-2502 HM 29 - (Oxford St Alley)	
Attention:	Ryan Cunningham	Date Sampled / By:	28-Feb-25	Mayumi Kawar
Project:	Pavement Investigation Prog	Date Received:	28-Feb-25	
		Date Tested / By:	04-Mar-25	Carla Labadan

Test Hole No.	TH-1	TH-1	TH-1	TH-1	TH-1
Depth	**0'-1'**	**1'-2.5'**	**2.5'-3**	**3'-4'**	**4'-5'**
Tare No.	H-15	H-16	H-17	H-18	H-19
Wt Wet Sample + Tare	233.1	233.1	228.1	230.3	244.2
Wt Dry Sample + Tare	166.9	185.1	178.3	182.3	192.1
Wt Water	66.2	48.0	49.8	48.0	52.1
Wt Tare	4.5	4.5	4.5	4.5	4.5
Wt Dry Sample	162.4	180.6	173.8	177.8	187.6
Moisture Content (%)	**40.8**	**26.6**	**28.7**	**27.0**	**27.8**
Test Hole No.	TH-1	TH-1	TH-1	TH-1	
Depth	**5'-5.5'**	**5.5'-6'**	**6'-7'**	**7'-8'**	
Tare No.	H-20	H-21	A-21	A-25	
Wt Wet Sample + Tare	235.7	235.5	235.6	235.7	
Wt Dry Sample + Tare	174.4	186.9	186.3	186.5	
Wt Water	61.3	48.6	49.3	49.2	
Wt Tare	4.4	4.5	4.5	4.5	
Wt Dry Sample	170.0	182.4	181.8	182.0	
Moisture Content (%)	**36.1**	**26.6**	**27.1**	**27.0**	
Test Hole No.	TH-2	TH-2	TH-2	TH-2	TH-2
Depth	**0'-1'**	**1'-2'**	**2'-3'**	**3'-4'**	**4'-5'**
Tare No.	H-22	H-23	H-24	H-25	H-26
Wt Wet Sample + Tare	231.5	213.1	220.6	225.4	217.1
Wt Dry Sample + Tare	152.2	153.9	175.4	174	166.9
Wt Water	79.3	59.2	45.2	51.4	50.2
Wt Tare	4.5	4.5	4.4	4.5	4.4
Wt Dry Sample	147.7	149.4	171.0	169.5	162.5
Moisture Content (%)	**53.7**	**39.6**	**26.4**	**30.3**	**30.9**
Test Hole No.	TH-2	TH-2	TH-2		
Depth	**5'-6.5'**	**6.5'-7'**	**7'-8'**		
Tare No.	H-27	W-21	H-20		
Wt Wet Sample + Tare	228.8	230.3	231.8		
Wt Dry Sample + Tare	161.7	162.8	164.3		
Wt Water	67.1	67.5	67.5		
Wt Tare	4.5	4.5	4.5		
Wt Dry Sample	157.2	158.3	159.8		
Moisture Content (%)	**42.7**	**42.6**	**42.2**		

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MOISTURE CONTENT OF SOIL (ASTM D2216)

Client:	AECOM Canada ULC 99 Commerce Drive, Winnipe MB R3P 0Y7	Project No: Test No.: Lab No.:	112-2502 2 HM 29 - (Oxford St Alley)	
Attention:	Ryan Cunningham	Date Sampled / By:	28-Feb-25	Mayumi Kawar
Project:	Pavement Investigation Prog	Date Received:	28-Feb-25	
		Date Tested / By:	04-Mar-25	Camille Barela

Test Hole No.	TH-3	TH-3	TH-3	TH-3	TH-3
Depth	0'-1'	1'-2'	2'-3'	3'-4'	4'-5'
Tare No.	CO-1	CO-2	CO-3	CO-4	CO-5
Wt Wet Sample + Tare	222.9	244.6	237.6	233.4	246.1
Wt Dry Sample + Tare	169.9	192.3	189.4	177.2	180.3
Wt Water	53.0	52.3	48.2	56.2	65.8
Wt Tare	4.5	4.5	4.4	4.4	4.4
Wt Dry Sample	165.4	187.8	185.0	172.8	175.9
Moisture Content (%)	**32.0**	**27.8**	**26.1**	**32.5**	**37.4**
Test Hole No.	TH-3	TH-2	TH-2		
Depth	5'-6'	6'-7'	7'-8'		
Tare No.	CO-6	A-1	H-20		
Wt Wet Sample + Tare	236.2	232.2	231.8		
Wt Dry Sample + Tare	173.1	163.5	164.3		
Wt Water	63.1	68.7	67.5		
Wt Tare	4.4	4.5	4.5		
Wt Dry Sample	168.7	159.0	159.8		
Moisture Content (%)	**37.4**	**43.2**	**42.2**		
Test Hole No.					
Depth					
Tare No.					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
Moisture Content (%)					
Test Hole No.					
Depth					
Tare No.					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
Moisture Content (%)					

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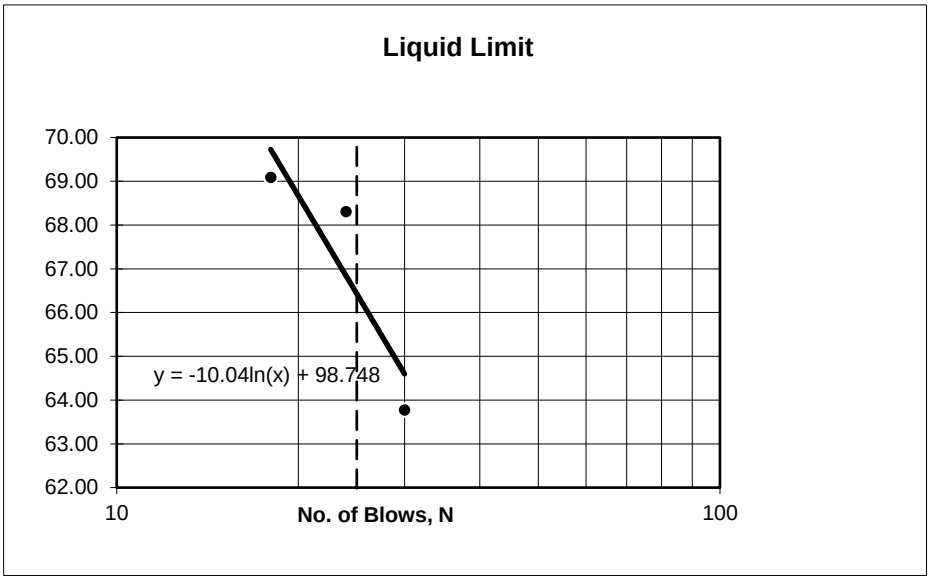
Atterberg Limits (ASTM D4318)

CLIENT: AECOM Canada ULC
99 Commerce Drive, Winnipeg
MB R3P 0Y7
ATTENTION: Ryan Cunningham
PROJECT: Pavement Investigation Program - Residential Streets Package 2

Project No.: 112-2502
PSA Test No.: 2
Lab No.: HM 29

Liquid Limit Determination					Liquid Limit
Dish No.:	2	2	3	Feb 29, 2025	25 Blows
Wet Soil + Dish:	35.34	46.97	47.65		
Dry Soil + Dish:	32.77	44.47	45.08		
Moisture:	2.57	2.5	2.57		
Dish:	29.05	40.81	41.05		
Dry Soil:	3.72	3.66	4.03		
% Moisture:	69.09	68.31	63.77		
No. of Blows:	18	24	30		
Liquid Limit:					67



Material Identification:
CH - Fat clay
Oxford St and Cambridge Alley
TH 2 at 2-4 ft

Liquid Limit, %: **67**
Plastic Limit, %: **19**
Plasticity Index: **47**
(LL-PL)

Plastic Limit Determination					
Dish No.:	1	2	3		
Wet Soil + Dish:	46.79	47.36	47.52		
Dry Soil + Dish:	45.87	46.32	46.35		
Moisture:	0.92	1.04	1.17		
Dish:	40.82	41.22	40.46		
Dry Soil:	5.05	5.1	5.89		
% Moisture:	18.22	20.39	19.86		
				Average:	**19**

Test Method : ASTM: D4318, D2216
Remarks:

P. Bevel

Reviewed by: Paul Bevel

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PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

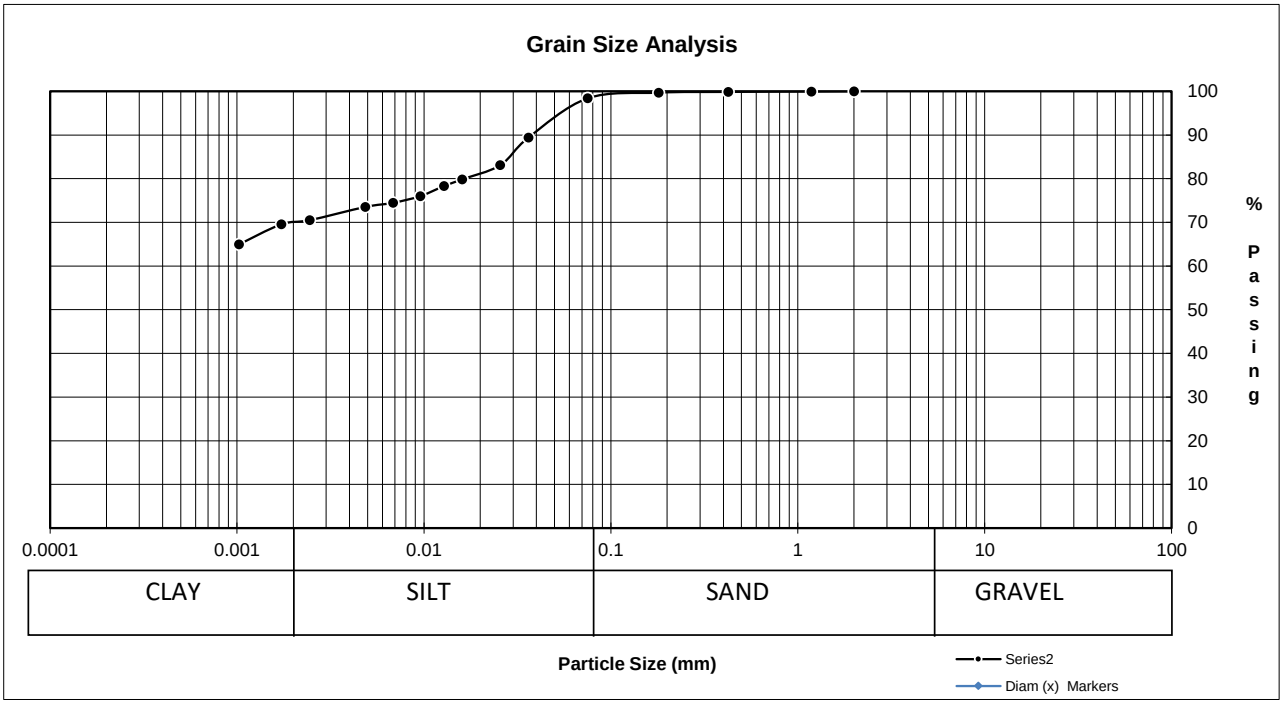
CLIENT: AECOM Canada ULC
99 Commerce Drive, Winnipeg
MB R3P 0Y7
ATTENTION: Ryan Cunningham
PROJECT: Pavement Investigation Program - Residential Streets Package 2

Project No.: 112-2502
PSA Test No.: 2
Lab No.: HM 29

Date Sampled:	28-Feb-25	Date Received:	Feb 28, 2025
Sampled By:	MK, CL	Date Tested:	Feb 29, 2025

Material ID	**CH - Fat clay**
Sample Source	Oxford St and Cambridge Alley
B.H./T.H. No.	TH 2 at 2-4 ft

Sieve Analysis		Hydrometer Analysis	
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	0.0362	89.4
9.50	100.0	0.0256	83.1
4.75	100.0	0.0160	79.8
2.00	100.0	0.0128	78.3
1.18	100.0	0.0096	76.0
0.425	99.9	0.0068	74.5
0.18	99.7	0.0049	73.5
0.075	98.4	0.0010	64.9



% Composition	
	Gravel
1.62	Sand
31.68	Silt
66.70	Clay

D10
D30
D60
Cu
Cc

Remarks:

Technician: MK

Reviewed by Paul Bevel

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Canadian Council of Independent Laboratories

CALIFORNIA BEARING RATIO (CBR) TEST - ASTM D 1883

Client:	AECOM Canada ULC	Project No:	112-2502
	99 Commerce Drive, Winnipeg		
	MB R3P 0Y7	Lab No:	HM 29
Attention:	Ryan Cunningham	Date sampled:	February 28, 2025
Project	Pavement Investigation Program - Residential Streets Package	Date Received:	February 28, 2025
Location:		Date Tested /By:	March 5, 2025 Jaehang Jeong

SAMPLE DATA

Sample Type:	CH - Fat clay		
Source:	Oxford St. and Cambridge St. Alley		
Sampled by:	MK		
Optimum Moisture Content:	32.0	%	
Maximum Dry Density:	1320	kg/cm^3	
Method of Compaction:	Standard Proctor		
Tested by:	MK	Date Tested:	05-Mar-25

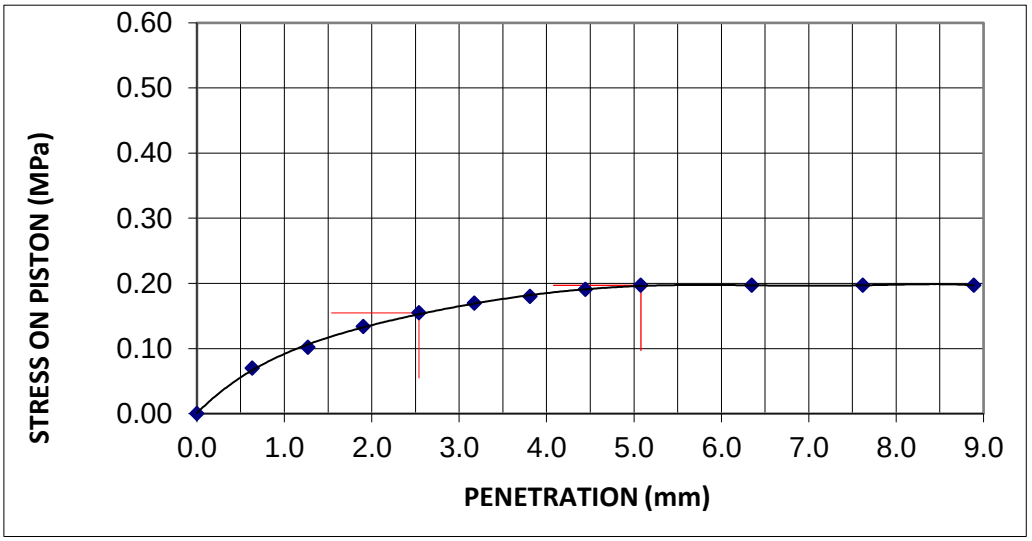
SPECIMEN DATA

DESCRIPTION	Before Soaking	After Testing
Moisture Content (MC), %	33.3	39.8
MC of top 25mm layer, %		
Dry Density, kg/m^3	1251	1213
Compaction,%	95%	
CBR (at 2.5mm penetration), %		2.2
Swell, %		1.5

LOAD DATA

PENETRATION mm	STRESS MPa
0	0.00
0.64	0.07
1.27	0.10
1.91	0.13
2.54	0.15
3.18	0.17
3.81	0.18
4.45	0.19
5.08	0.20
6.35	0.20
7.62	0.20
8.89	0.20

LOAD PENETRATION CURVE



PENETRATION mm	STANDARD LOAD MPa	TEST LOAD ACTUAL MPa	TEST LOAD CORRECTED MPa	BEARING RATIO (soaked) at 2.5 mm penetration	BEARING RATIO (soaked) at 5.1 mm penetration
2.54	6.9	0.15	0.15	2.2	-
5.08	10.3	0.20	0.20	-	1.9

Remarks:

Reviewed by: Paul Bevel

H. MANALO CONSULTING LTD.

Project No: 112-2502

Project: Pavement Investigation Program

Client: Aecom Canada ULC

Location: Backlane of House No. 969 Dudley Ave

TH1

Logged By: Mayumi

Engineer: M. Kawano EIT

Depth (ft)	Depth (m)	Symbol	Description	Number	Type
0	0		Ground Surface		
0	0		***Concrete*** Concrete - 190mm	Core 1	Core
1				1	GS
2				2	GS
3	1			3	GS
4			***Clay CH*** - Silty, trace fine sand, moist, soft, crumbling brown - Firm, light brown, silty below 3 feet	4	GS
5				5	GS
6	2		Lab Test Result (HM 19), 0-4 FT LL= 70, PL=29, PI = 41 G=0, S=5, M=45, C=50	6	GS
7				7	GS
8				8	GS
8			End of testhole - Test terminated at 8 feet - No seepage - Backfilled with Auger cuttings		
10	3				
11					

Pocket Penetrometer Test (kPa): 20 60 100 140 180 220 260

Water Content: 10 20 30 40 50 60 70 80 90

Drill Method: Auger

Drill Date: February 17, 2025

Hole Size: 6 inches

Datum:

Checked by: Paul Bevel

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

Project No: 112-2502

Project: Pavement Investigation Program

Client: AECOM Canada ULC

Location: Backlane of House No. 945 Dudley Ave

TH2

Logged By: Mayumi

Engineer: M. Kawano EIT

Depth (ft)	Depth (m)	Symbol	Description	Number	Type
0	0		Ground Surface		
0	0		***Concrete*** Concrete - 185mm	Core 2	Core
1			***Organic Clay OL*** - Some silt, trace sand, soft, loose, crumbling, moist, black	1	GS
2				2	GS
3	1			3	GS
4			***Clay CH*** - Some silt, soft, loose, dark brown - Silty, firm, brown below 3 feet - Trace of silt pockets, stiff below 6 feet	4	GS
5				5	GS
6	2			6	GS
7				7	GS
8				8	GS
8			End of testhole - Test terminated at 8 feet - No seepage - Backfilled with Auger cuttings		
9					
10	3				
11					

Pocket Penetrometer Test (kPa): 20 60 100 140 180 220 260

Water Content: 10 20 30 40 50 60 70 80 90

Drill Method: Auger

Drill Date: February 17, 2025

Hole Size: 6 inches

Datum:

Checked by: Paul Bevel

Sheet: 1 of 1

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CCIL Canadian Council of Independent Laboratories

MOISTURE CONTENT OF SOIL (ASTM D2216)

Client:	AECOM Canada ULC 99 Commerce Drive, Winnipeg MB R3P 0Y7	Project No: Test No.: Lab No.:	112-2502 1 HM 19 - (Garwood Ave Alley)	
Attention:	Ryan Cunningham	Date Sampled / By:	Feb 11, 2025	H. Abedinzadeh
Project:	Pavement Investigation Program - Residential Streets Package 2	Date Received:	Feb 11, 2025	
		Date Tested / By:	Feb 13, 2025	C. Labadan

Test Hole No.	TH1	TH1	TH1	TH1	TH1
Depth	1'	2'	3'	4'	5'
Tare No.	69	6-23	M51	T118	BR22
Wt Wet Sample + Tare	228.4	229.5	217.8	209.8	222
Wt Dry Sample + Tare	167	169.7	163.1	158	169.4
Wt Water	61.4	59.8	54.7	51.8	52.6
Wt Tare	4.4	4.6	4.7	4.2	5.0
Wt Dry Sample	162.6	165.1	158.4	153.8	164.4
Moisture Content (%)	**37.8**	**36.2**	**34.5**	**33.7**	**32.0**

Test Hole No.	TH1	TH1	TH1		
Depth	6'	7'	8'		
Tare No.	T107	62	BR31		
Wt Wet Sample + Tare	222.5	244.9	236.8		
Wt Dry Sample + Tare	169.6	176.4	167.3		
Wt Water	52.9	68.5	69.5		
Wt Tare	4.8	4.7	4.3		
Wt Dry Sample	164.8	171.7	163.0		
Moisture Content (%)	**32.1**	**39.9**	**42.6**		

Test Hole No.	TH2	TH2	TH2	TH2	TH2
Depth	1'	2'	3'	4'	5'
Tare No.	Y-03	M25	T125	4-23	65
Wt Wet Sample + Tare	182.6	215.8	218.6	238.9	228.2
Wt Dry Sample + Tare	131.2	159	161.7	199.7	188.9
Wt Water	51.4	56.8	56.9	39.2	39.3
Wt Tare	4.1	4.7	4.1	4.8	4.6
Wt Dry Sample	127.1	154.3	157.6	194.9	184.3
Moisture Content (%)	**40.4**	**36.8**	**36.1**	**20.1**	**21.3**

Test Hole No.	TH2	TH2	TH2		
Depth	6'	7'	8'		
Tare No.	321	B82	Y-1		
Wt Wet Sample + Tare	229.4	237.1	203.4		
Wt Dry Sample + Tare	169	166.8	146		
Wt Water	60.4	70.3	57.4		
Wt Tare	4.4	4.5	4.5		
Wt Dry Sample	164.6	162.3	141.5		
Moisture Content (%)	**36.7**	**43.3**	**40.6**		

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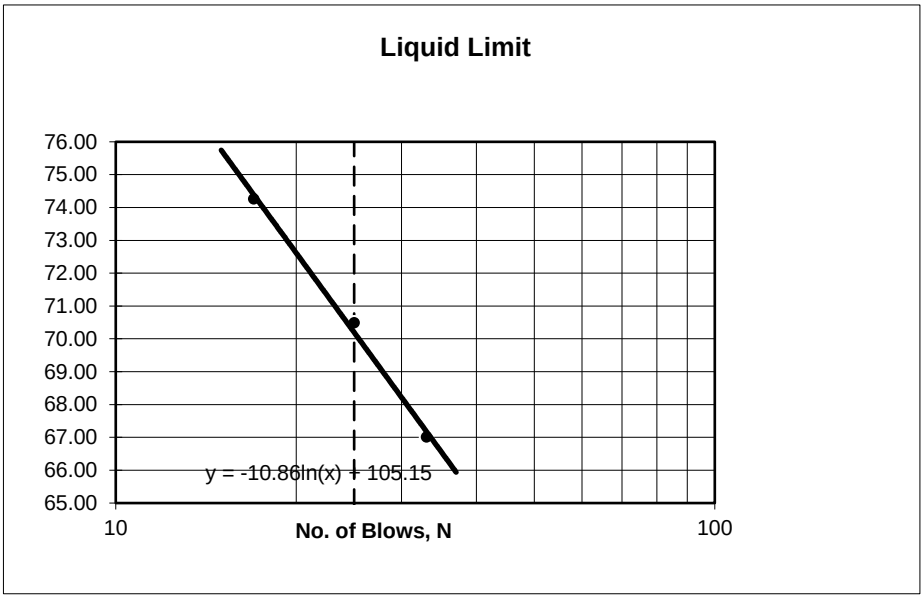
Atterberg Limits (ASTM D4318)

Client:	AECOM Canada ULC	Project No.:	112-2502
	99 Commerce Drive, Winnipeg	PI Test No.:	1
	MB R3P 0Y7	Lab No.:	HM 19
Attention.:	Ryan Cunningham	Date Sampled/By:	February 1 Hamid Abedinz
Project:	Pavement Investigation Program - Residen	Date Received:	February 17, 2025
		Date Tested / By:	February 2 Edel Santiago

Liquid Limit Determination					Liquid Limit 25 Blows
Dish No.:	1	2	3		
Wet Soil + Dish:	56.91	59.37	56.51		
Dry Soil + Dish:	50.47	51.99	49.7		
Moisture:	6.44	7.38	6.81		
Dish:	40.86	41.52	40.53		
Dry Soil:	9.61	10.47	9.17		
% Moisture:	67.01	70.49	74.26		
No. of Blows:	33	25	17		
Liquid Limit:					70



Material Identification:
CH - Fat Clay
Garwood Ave Alley
TH1 at 0-4 ft

Liquid Limit, %:	**70**
Plastic Limit, %:	**29**
Plasticity Index:	**41**
(LL-PL)	

Plastic Limit Determination					
Dish No.:	1	2	3		
Wet Soil + Dish:	47.64	47.66	48.43		
Dry Soil + Dish:	46.18	46.05	46.89		
Moisture:	1.46	1.61	1.54		
Dish:	40.88	40.75	41.57		
Dry Soil:	5.3	5.3	5.32		
% Moisture:	27.55	30.38	28.95		
				Average:	**29**

Test Method : ASTM: D4318, D2216
Remarks:

Reviewed by: Paul Bevel

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PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

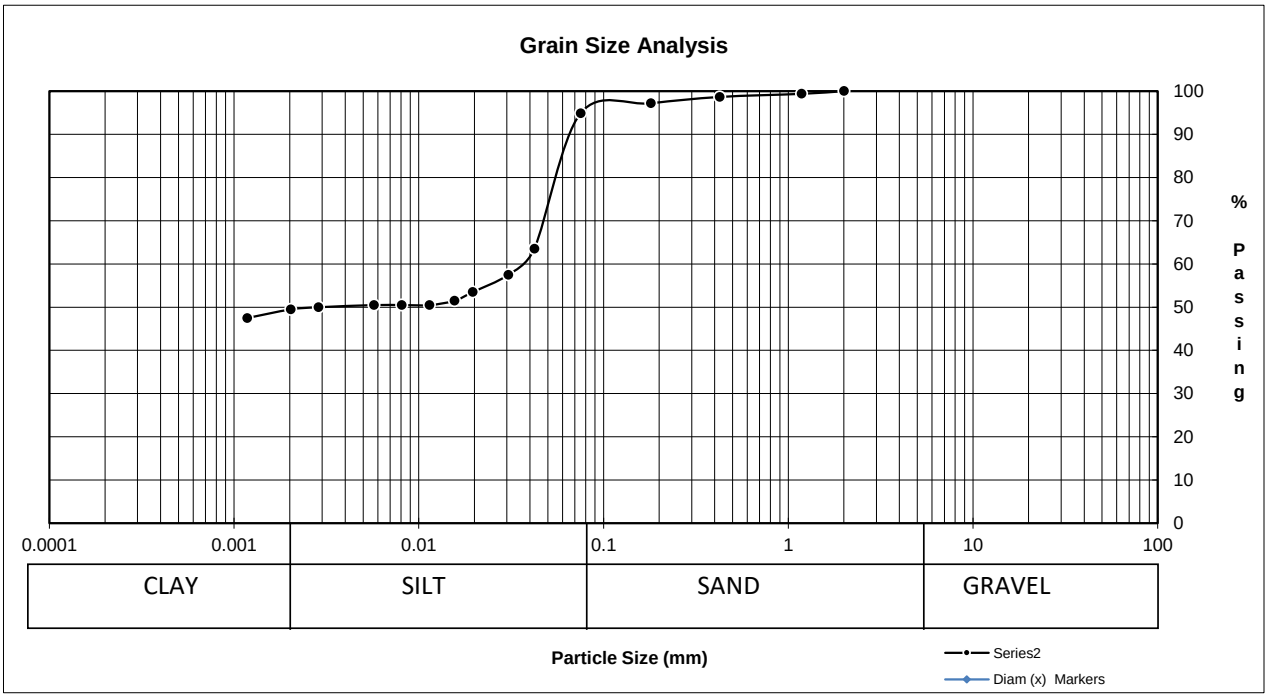
CLIENT: AECOM Canada ULC
99 Commerce Drive, Winnipeg
MB R3P 0Y7
ATTENTION: Ryan Cunningham
PROJECT: Pavement Investigation Program - Residential Streets Package 2

Project No.: 112-2502
PSA Test No.: 1
Lab No.: HM 19

Date Sampled: February 17, 20
Sampled By: Hamid Abedin
Date Received: February 17, 2
Date Tested: February 26, 2

Material ID: **CH - Fat clay**
Sample Source: Garwood Ave Alley
B.H./T.H. No.: TH 1 at 0-4 ft

Sieve Analysis		Hydrometer Analysis	
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	0.0421	63.5
9.50	100.0	0.0305	57.5
4.75	100.0	0.0196	53.5
2.00	100.0	0.0156	51.5
1.18	99.4	0.0114	50.5
0.425	98.7	0.0081	50.5
0.180	97.2	0.0057	50.5
0.075	94.8	0.0012	47.5



% Composition		
0.00	Gravel	D10
5.16	Sand	D30
45.41	Silt	D60
49.43	Clay	Cu
		Cc

Remarks:

Technician: ECS

Reviewed by: Paul Bevel

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Canadian Council of Independent Laboratories

CALIFORNIA BEARING RATIO (CBR) TEST - ASTM D 1883

Client:	AECOM Canada ULC	Project No:	112-2502
	99 Commerce Drive, Winnipeg		
	MB R3P 0Y7	Lab No:	HM 19
Attention:	Ryan Cunningham	Date sampled:	February 17, 2025
Project	Pavement Investigation Program - Residential Streets Package	Date Received:	February 17, 2025
Location:	Garwood Ave Alley	Date Tested /By:	February 21, 2 Jaehang Jeong

SAMPLE DATA

Sample Type:	Clay		
Source:	Garwood Ave Alley		
Sampled by:	Hamid Abedinzadeh		
Optimum Moisture Content:	31.8	%	
Maximum Dry Density:	1420	kg/cm^3	
Method of Compaction:	Standard Proctor		
Tested by:	JJ	Date Tested:	21-Feb-25

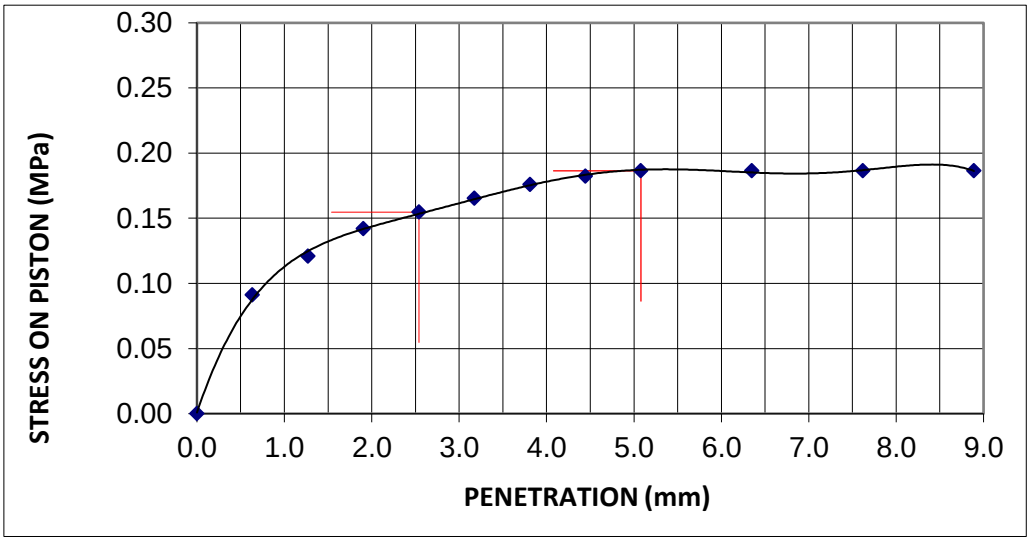
SPECIMEN DATA

DESCRIPTION	Before Soaking	After Testing
Moisture Content (MC), %	31.5	40.8
MC of top 25mm layer, %		
Dry Density, kg/m^3	1364	1346
Compaction,%	96%	
CBR (at 2.5mm penetration), %		2.2
Swell, %		1.1

LOAD DATA

PENETRATION mm	STRESS MPa
0	0.00
0.64	0.09
1.27	0.12
1.91	0.14
2.54	0.15
3.18	0.17
3.81	0.18
4.45	0.18
5.08	0.19
6.35	0.19
7.62	0.19
8.89	0.19

LOAD PENETRATION CURVE



PENETRATION mm	STANDARD LOAD MPa	TEST LOAD ACTUAL MPa	TEST LOAD CORRECTED MPa	BEARING RATIO (soaked) at 2.5 mm penetration	BEARING RATIO (soaked) at 5.1 mm penetration
2.54	6.9	0.15	0.15	2.2	-
5.08	10.3	0.19	0.19	-	1.8

Remarks:

Reviewed by: Paul Bevel

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Project No: 112-2502

Project: Pavement Investigation Program

Client: AECOM Canada ULC

Location: Backlane of House No. 967 Dorchester Av

TH1

Logged By: Mayumi

Engineer: M. Kawano EIT

Depth (ft)	Depth (m)	Symbol	Description	Number	Type
0	0		Ground Surface		
0			***Asphalt and Concrete*** Asphalt one lift - 35mm Concrete - 190mm	Core 1	Core
1				1	GS
2			***Clay CL*** - Silty clay, moist, loose, crumbling light brown	2	GS
3	1			3	GS
4			***Silt ML*** - Clayey silt, moist, soft, crumbling light brown - Some clay, loose, crumbling below 4 feet	4	GS
5				5	GS
6	2		***Clay CH*** - Silty clay, Saturated crumbling light brown - Traces of silt, moist, Stiff, redish brown below 6 feet	6	GS
7				7	GS
8				8	GS
8			End of testhole - Test terminated at 8 feet - No seepage - Backfilled with Auger cuttings		
9					
10	3				
11					

Pocket Penetrometer Test (kPa): 20 60 100 140 180 220 260

Water Content: 10 20 30 40 50 60 70 80 90

Drill Method: Auger

Drill Date: February 29, 2025

Hole Size: 6 inches

Datum:

Checked by: Paul Bevel

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

Project No: 112-2502

Project: Pavement Investigation Program

Client: AECOM Canada ULC

Location: Backlane of House No. 993 Dorchester Av

TH2

Logged By: Mayumi

Engineer: M. Kawano EIT

Depth (ft)	Depth (m)	Symbol	Description	Number	Type
0	0		Ground Surface		
			Asphalt and Concrete Asphalt one lift - 65mm Concrete - 200mm	Core 2	Core
1			***Clay CL*** - Silty, saturated, loose, crumbling light brown	1	GS
2				2	GS
3	1			3	GS
4			***Clay CH*** - Silty, moist, crumbling brown	4	GS
5			- Some gravel and sand with trace silt, with coal cinder, stiff, black and brown below 4 feet	5	GS
6			- Traces of silt, stiff, redish brown, oxidation below 6 feet Lab Test Result (HM 30), 2-4 FT LL= 62, PL=17, PI = 46 G=0, S=10, M=31, C=59	6	GS
7	2			7	GS
8				8	GS
			End of testhole - Test terminated at 8 feet - No seepage - Backfilled with Auger cuttings		
9					
10	3				
11					

Pocket Penetrometer Test (kPa): 20 60 100 140 180 220 260

Water Content: 10 20 30 40 50 60 70 80 90

Drill Method: Auger

Drill Date: February 29, 2025

Hole Size: 6 inches

Datum:

Checked by: Paul Bevel

Sheet: 1 of 1

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MOISTURE CONTENT OF SOIL (ASTM D2216)

Client:	AECOM Canada ULC 99 Commerce Drive, Winnipe MB R3P 0Y7	Project No: Test No.: Lab No.:	112-2502 HM 30 - (Dorchester Ave Alley)	
Attention:	Ryan Cunningham	Date Sampled / By:	28-Feb-25	Mayumi Kawar
Project:	Pavement Investigation Prog	Date Received:	28-Feb-25	
		Date Tested / By:	04-Mar-25	Carla Labadan

Test Hole No.	TH-1	TH-1	TH-1	TH-1	TH-1
Depth	**0'-1'**	**1'-1.5'**	**1.5'-2.5'**	**2.5'-4'**	**4'-5'**
Tare No.	H-1	H-2	H-3	H-4	H-5
Wt Wet Sample + Tare	225.8	219.4	228.9	221	220.3
Wt Dry Sample + Tare	176.3	171.1	176.3	188.8	172.8
Wt Water	49.5	48.3	52.6	32.2	47.5
Wt Tare	4.3	4.4	4.3	4.4	4.3
Wt Dry Sample	172.0	166.7	172.0	184.4	168.5
Moisture Content (%)	**28.8**	**29.0**	**30.6**	**17.5**	**28.2**
Test Hole No.	TH-1	TH-1	TH-1		
Depth	**5'-6'**	**6'-7'**	**7'-8'**		
Tare No.	H-6	H-7	I-1		
Wt Wet Sample + Tare	230	228.6	229		
Wt Dry Sample + Tare	172.1	181	177		
Wt Water	57.9	47.6	52.0		
Wt Tare	4.4	4.5	4.5		
Wt Dry Sample	167.7	176.5	172.5		
Moisture Content (%)	**34.5**	**27.0**	**30.1**		
Test Hole No.	TH-2	TH-2	TH-2	TH-2	TH-2
Depth	**0'-1'**	**1'-1.5'**	**1.5'-2.5'**	**2.5'-3'**	**3'-4'**
Tare No.	H-8	H-9	H-10	H-11	H-12
Wt Wet Sample + Tare	216.8	220	215.4	233.7	225.5
Wt Dry Sample + Tare	167	163.2	166.5	177.4	166.6
Wt Water	49.8	56.8	48.9	56.3	58.9
Wt Tare	4.3	4.5	4.5	4.5	4.5
Wt Dry Sample	162.7	158.7	162.0	172.9	162.1
Moisture Content (%)	**30.6**	**35.8**	**30.2**	**32.6**	**36.3**
Test Hole No.	TH-2	TH-2	TH-1		
Depth	**4'-5'**	**5'-6'**	**7'-8'**		
Tare No.	H-13	H-14	H-15		
Wt Wet Sample + Tare	222.6	233.1	231		
Wt Dry Sample + Tare	172.4	173.2	177		
Wt Water	50.2	59.9	54.0		
Wt Tare	4.5	4.5	4.5		
Wt Dry Sample	167.9	168.7	172.5		
Moisture Content (%)	**29.9**	**35.5**	**31.3**		

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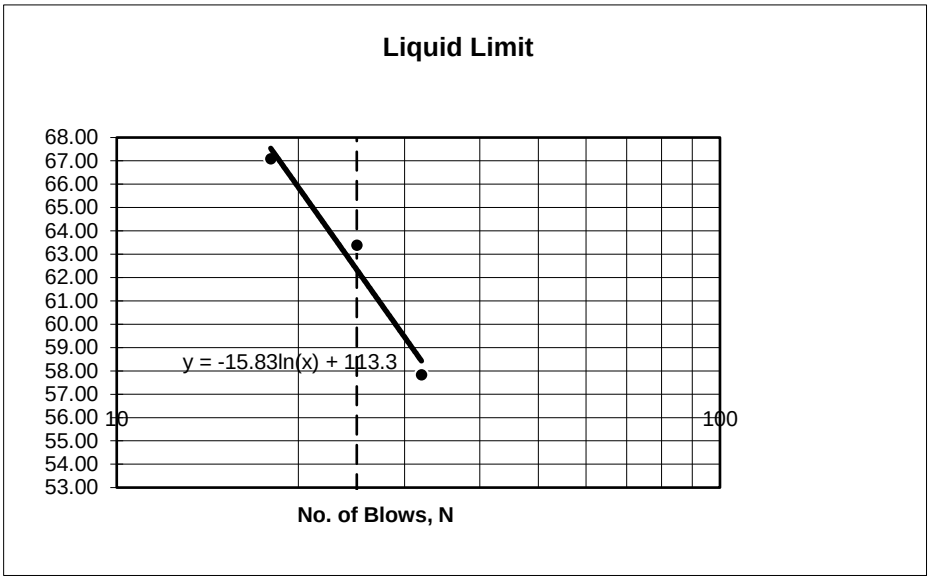
Atterberg Limits (ASTM D4318)

CLIENT: AECOM Canada ULC
99 Commerce Drive, Winnipeg
MB R3P 0Y7
ATTENTION: Ryan Cunningham
PROJECT: Pavement Investigation Program - Residential Streets Package 2

Project No.: 112-2502
PSA Test No.: 3
Lab No.: HM 30

Liquid Limit Determination					Liquid Limit
Dish No.:	2	2	3	Feb 29, 2025	25 Blows
Wet Soil + Dish:	48.48	37.94	50.21		
Dry Soil + Dish:	45.30	34.53	46.85		
Moisture:	3.18	3.41	3.36		
Dish:	40.56	29.15	41.04		
Dry Soil:	4.74	5.38	5.81		
% Moisture:	67.09	63.38	57.83		
No. of Blows:	18	25	32		
Liquid Limit:					62



Material ID:
CH - Fat Clay
Grosvenor Ave Alley
TH 2 at 2-4 ft

Liquid Limit, %:	**62**
Plastic Limit, %:	**17**
Plasticity Index:	**46**
(LL-PL)	

Plastic Limit Determination					
Dish No.:	1	2	3		
Wet Soil + Dish:	47.23	46.38	46.78		
Dry Soil + Dish:	46.28	45.61	45.87		
Moisture:	0.95	0.77	0.91		
Dish:	40.86	40.31	40.69		
Dry Soil:	5.42	5.3	5.18		
% Moisture:	17.53	14.53	17.57		
				Average:	**17**

Test Method : ASTM: D4318, D2216
Remarks:

P. Bevel

Reviewed by: Paul Bevel

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PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

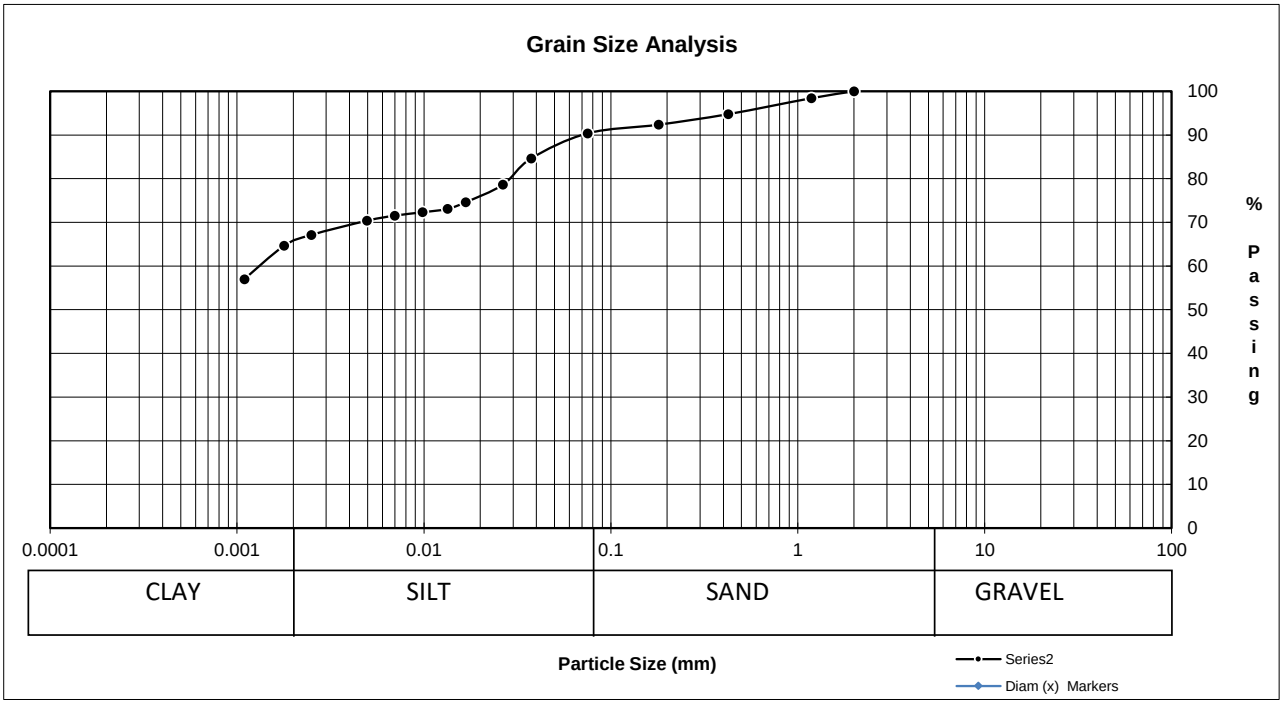
CLIENT: AECOM Canada ULC
99 Commerce Drive, Winnipeg
MB R3P 0Y7
ATTENTION: Ryan Cunningham
PROJECT: Pavement Investigation Program - Residential Streets Package 2

Project No.: 112-2502
PSA Test No.: 2
Lab No.: HM 29

Date Sampled:	28-Feb-25	Date Received:	Feb 28, 2025
Sampled By:	MK, CL	Date Tested:	Feb 29, 2025

Material ID: **CH - Fat clay with trace sand**
Sample Source: Grosvenor Ave and Dorchester Ave Alley
B.H./T.H. No.: TH 2 at 2-4 ft

Sieve Analysis		Hydrometer Analysis	
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	0.0374	84.6
9.50	100.0	0.0264	78.6
4.75	100.0	0.0167	74.6
2.00	100.0	0.0134	73.1
1.18	98.4	0.0098	72.3
0.425	94.8	0.0070	71.5
0.180	92.4	0.0050	70.4
0.075	90.4	0.0011	57.0



% Composition		
0.00	Gravel	D10
9.63	Sand	D30
31.05	Silt	D60
59.32	Clay	Cu
		Cc

Remarks:

P. Bevel

Technician: MK

Reviewed by Paul Bevel

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CALIFORNIA BEARING RATIO (CBR) TEST - ASTM D 1883

Client:	AECOM Canada ULC	Project No:	112-2502
	99 Commerce Drive, Winnipeg		
	MB R3P 0Y7	Lab No:	HM 30
Attention:	Ryan Cunningham	Date sampled:	February 28, 2025
Project	Pavement Investigation Program - Residential Streets Package	Date Received:	February 28, 2025
Location:		Date Tested /By:	March 5, 2025 Jaehang Jeong

SAMPLE DATA

Sample Type:	CH - Fat clay		
Source:	Grosevenor Av and Dorchester Av Alley		
Sampled by:	MK		
Optimum Moisture Content:	35.6	%	
Maximum Dry Density:	1455	kg/cm^3	
Method of Compaction:	Standard Proctor		
Tested by:	JJ	Date Tested:	05-Mar-25

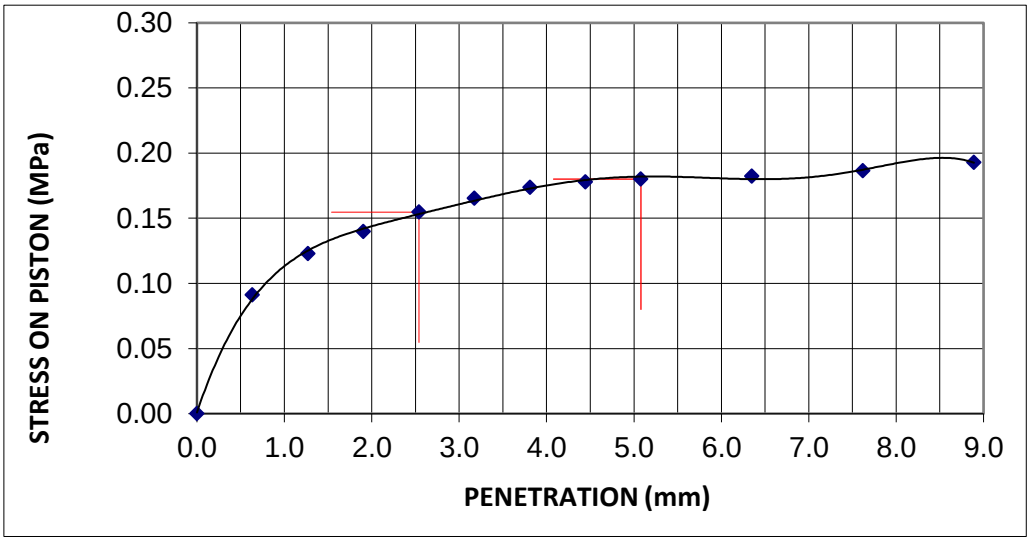
SPECIMEN DATA

DESCRIPTION	Before Soaking	After Testing
Moisture Content (MC), %	40.2	44.6
MC of top 25mm layer, %		
Dry Density, kg/m^3	1383	1378
Compaction,%	95%	
CBR (at 2.5mm penetration), %		2.2
Swell, %		4.2

LOAD DATA

PENETRATION mm	STRESS MPa
0	0.00
0.64	0.09
1.27	0.12
1.91	0.14
2.54	0.15
3.18	0.17
3.81	0.17
4.45	0.18
5.08	0.18
6.35	0.18
7.62	0.19
8.89	0.19

LOAD PENETRATION CURVE



PENETRATION mm	STANDARD LOAD MPa	TEST LOAD ACTUAL MPa	TEST LOAD CORRECTED MPa	BEARING RATIO (soaked) at 2.5 mm penetration	BEARING RATIO (soaked) at 5.1 mm penetration
2.54	6.9	0.15	0.15	2.2	-
5.08	10.3	0.18	0.18	-	1.7

Remarks:

Reviewed by: Paul Bevel

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APPENDIX B
Rehabilitation Sites

B.1 Pavement Coring Locations
B.2 Pavement Structure Measurement
B.3 Picture of Cores

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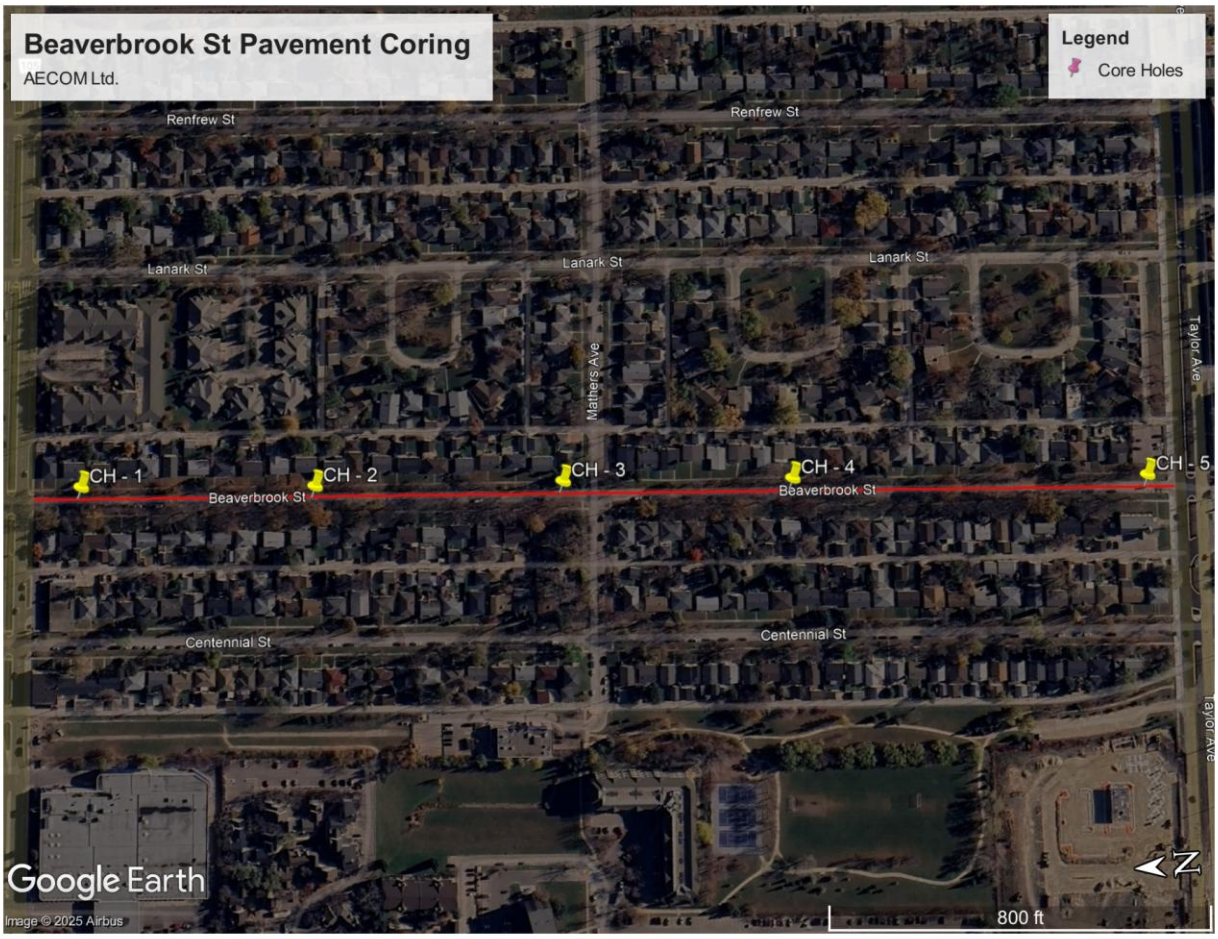
Rehabilitation Sites

Pavement Coring



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Rehabilitation Sites

Pavement Coring

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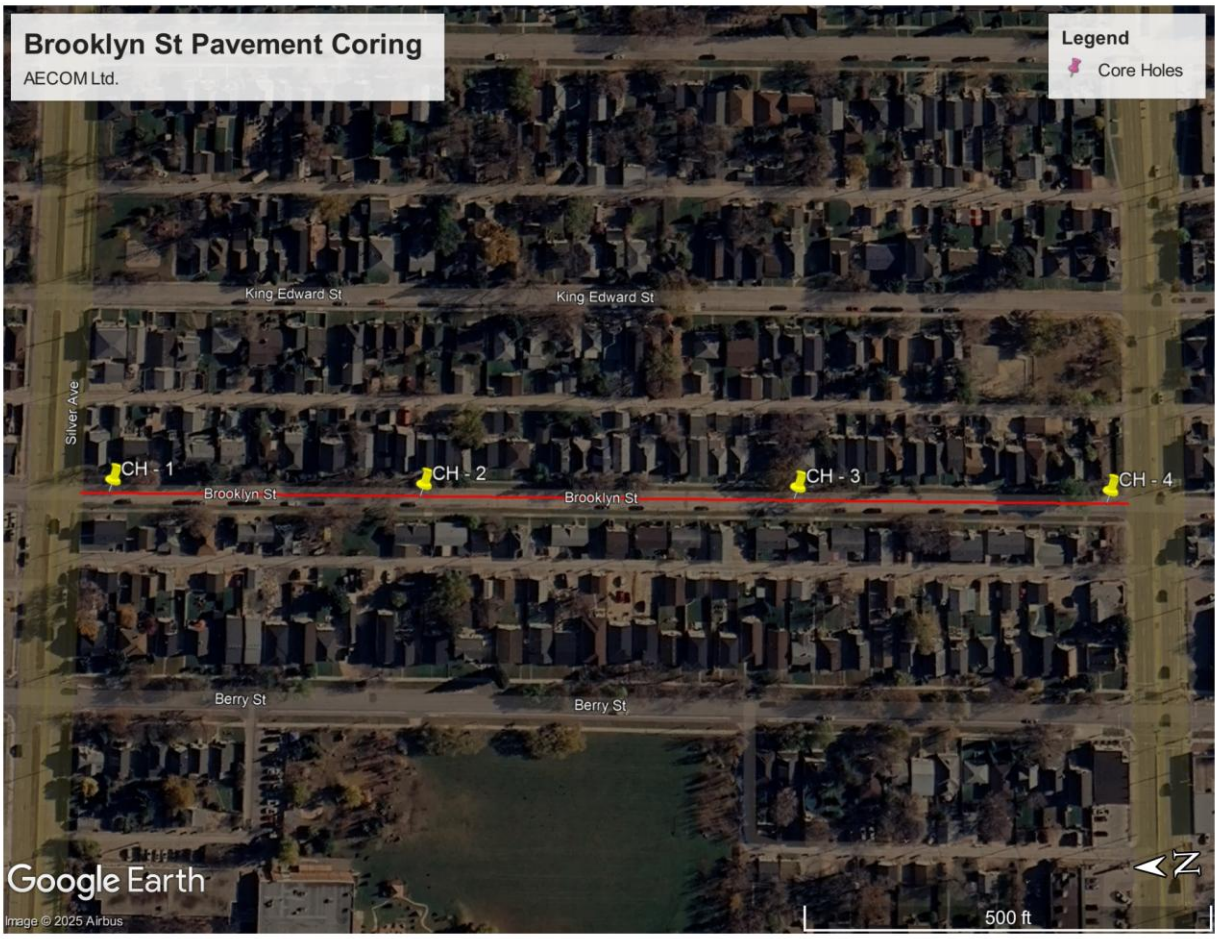
Rehabilitation Sites

Pavement Coring



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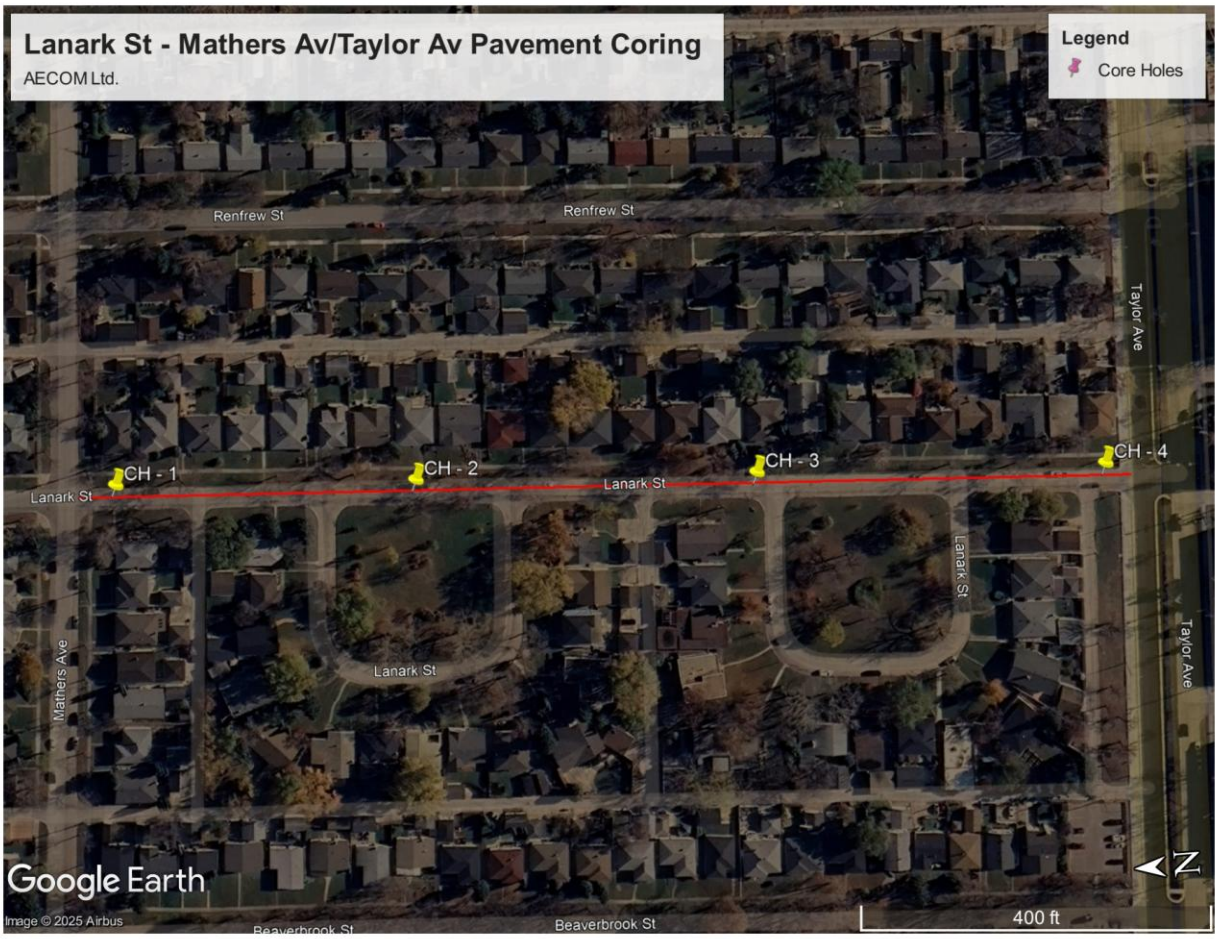
Rehabilitation Sites

Pavement Coring



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Rehabilitation Sites

Pavement Coring

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Rehabilitation Sites

Pavement Structure Measurement

Test Hole No.	Test Hole Location	Asphalt Thickness (mm)	Concrete Thickness (mm)
Beaverbrook St *(From Grant Ave to Taylor Ave)*			
CH1	Front of House # 756 Beaverbrook St (14 U 629333 m E, 5524244 m N)		190
CH2	Front of House # 802 Beaverbrook St (14 U 629327 m E, 5524091 m N)		170
CH3	Front of House # 859 Beaverbrook St (14 U 629319 m E, 5523922 m N)		190
CH4	Front of House # 906 Beaverbrook St (14 U 629315 m E, 5523779 m N)		180
CH5	Side of New Apostolic Church (14 U 629306 m E, 5523571 m N)		190
Brooklyn St *(From Ness Ave to Portage Ave)*			
CH1	Front of House # 317 Brooklyn St (14 U 628601 m E, 5527211 m N)		145
CH2	Front of House # 279 Brooklyn St (14 U 628597 m E, 5527127 m N)		150
CH3	Front of House # 239 Brooklyn St (14 U 628587 m E, 5526898 m N)		165
CH4	Side of Royal Canadian Legion No 4 (14 U 628586 m E, 5526746 m N)		190

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Pavement Structure Measurement

Test Hole No.	Test Hole Location	Asphalt Thickness (mm)	Concrete Thickness (mm)
Brooklyn St *(From Silver Ave to Ness Ave)*			
CH1	Front of House # 424 Brooklyn St (14 U 628615 m E, 5527651 m N)		175
CH2	Front of House # 396 Brooklyn St (14 U 628611 m E, 5527532 m N)		190
CH3	Front of House # 360 Brooklyn St (14 U 628605 m E, 5527395 m N)		165
CH4	Front of House # 324 Brooklyn St (14 U 628601 m E, 5527272 m N)		160
Lanark St *(From Mathers Ave to Taylor Ave)*			
CH1	Front of House # 792 Lanark St (14 U 629470 m E, 5523876 m N)		185
CH2	Front of House # 822 Lanark St (14 U 629467 m E, 5523774 m N)		200
CH3	Front of House # 854 Lanark St (14 U 629463 m E, 5523649 m N)		165
CH4	Front of House # 886 Lanark St (14 U 629459 m E, 5523534 m N)		175

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Pavement Structure Measurement

Test Hole No.	Test Hole Location	Asphalt Thickness (mm)	Concrete Thickness (mm)
Lanark St *(Bay 789/817)*			
CH1	Front of House # 789 Lanark St (14 U 629447 m E, 5523809 m N)		170
CH2	Front of House # 803 Lanark St (14 U 629403 m E, 5523776 m N)		155
CH3	Front of House # 817 Lanark St (14 U 629448 m E, 5523745 m N)	20	180
Lanark St *(Bay 821/851)*			
CH1	Front of House # 821 Lanark St (14 U 629447 m E, 5523647 m N)		185
CH2	Front of House # 835 Lanark St (14 U 629397 m E, 5523612 m N)		180
CH3	Front of House # 851 Lanark St (14 U 629444 m E, 5523581 m N)	30	130

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Pavement Structure Measurement

Test Hole No.	Test Hole Location	Asphalt Thickness (mm)	Concrete Thickness (mm)
Marjorie St *(From Ness Ave to Portage Ave)*			
CH1	Front of House # 332 Marjorie St (14 U628332 m E, 5527236 m N)		200
CH2	Front of House # 296 Marjorie St (14 U 628329 m E, 5527103 m N)		165
CH3	Front of House # 258 Marjorie St (14 U 628324 m E, 5526966 m N)		160
CH4	Front of House # 230 Marjorie St (14 U 628319 m E, 5526846 m N)		155
CH5	Side of Olympia Cycle & Ski (14 U 628313 m E, 5526714 m N)	30	180

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Reconstruction Sites

Picture of Cores

Beaverbrook St
(From Grant Ave to Taylor Ave)


Core 1


Core 2


Core 3


Core 4


Core 5

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Reconstruction Sites

Picture of Cores

Brooklyn St
(From Ness Ave to Portage Ave)

Core 1

Core 2

Core 3

Core 4

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Reconstruction Sites

Picture of Cores

Brooklyn St
(From Silver Ave to Ness Ave)

Core 1

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Core 3

Core 4

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Reconstruction Sites

Picture of Cores

Lanark St

(From Mathers Ave to Taylor Ave)

Core 1

Core 2

Core 3

Core 4

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Reconstruction Sites

Picture of Cores

Lanark St
(Bay 789/817)


Core 1


Core 2


Core 3

Lanark St
(Bay 821/851)


Core 1


Core 2


Core 3

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Reconstruction Sites

Picture of Cores

Marjorie St
(From Ness Ave to Portage Ave)


Core 1


Core 2


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Core 5