Subsurface Investigation Report

Enbridge Line 5 Reroute
MP 24 HDD Crossing – Bad River
Borehole Location 56-C-1, North of Copper Falls Dr., at CN Railroad
Location 59-C-1, Butler Road near State Highway 169
Location 60-C, North of North Butler Road
Morse Town, Ashland County, Wisconsin

Prepared for

Enbridge Energy

Professional Certification:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Wisconsin.

Joseph C. Butler, PE
Senior Engineer
License Number: E-43286-6
May 27, 2020

Project B2001991

Braun Intertec Corporation

BRAUN INTERTEC
The Science You Build On.

Braun Intertec Corporation
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May 27, 2020 Project B2001991

Mr. Adam Erickson
Enbridge Energy
Manulife Place, 10180-101 Street
Edmonton, AB T5J 3S4

Re: Subsurface Investigation
Enbridge Line 5 Reroute
MP 24 HDD Crossing – Bad River
Location 56-C-1, North of Copper Falls Drive, at CN Railroad
Location 59-C-1, Butler Road near State Highway 169
Location 60-C, North of North Butler Road
Morse Town, Ashland County, Wisconsin

Dear Mr. Erickson:

We are pleased to present this Subsurface Investigation Report for the Line 5 Reroute Project at the MP 24 HDD Crossing under the Bad River in Morse Town, Ashland County, Wisconsin.

Thank you for making Braun Intertec your geotechnical consultant for this project. If you have questions about this report, or if there are other services that we can provide in support of our work to date, please contact Dave Morrison (dmorrison@braunintertec.com) at 218.624.4967.

Sincerely,

BRAUN INTERTEC CORPORATION

Kyle P. Warmuth
Staff Consultant

David E. Morrison
Project Consultant

Joseph C. Butler, PE
Business Unit Manager / Senior Engineer

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Appendix

Log of Boring Sheets 56-C-1, 59-C-1, 60-C
HDD Crossing Profile Sheet
Descriptive Terminology of Soil
Sieve Analysis of Soil Reports for samples 300522 through 300526, 302873 through 302879 and 302881 through 302883
Hydrometer & Sieve Analysis Reports 302829, 302830, 302832, and 302833
Moisture Content of Soil Reports for samples 300522 though 300526
Geotechnical Testing Report 302820

A. Introduction

A.1. Project Description

Enbridge Energy plans to relocated Line 5 around the Bad River Indian Reservation, as part of that project, a geotechnical investigation and evaluation is being completed. We are providing subsurface investigation surfaces as part of this effort.

This report provides a factual data obtained at Borehole Locations 56-C-1, 59-C-1, and 60-C for the HDD crossing under the Bad River which is located near MP 24 of the proposed pipeline alignment in Morse Town, Ashland County, Wisconsin.

A.2. Purpose

The purpose of our subsurface investigation is to characterize subsurface geologic conditions at the selected exploration location.

A.3. Reference Documents

We reviewed the following information:

- Wisconsin Geologic Map, “Soils of Wisconsin”, prepared by F. D. Hole, M.T Beatty, C.J. Milfred, G.B. Lee, and A.J Klingelhoets., dated 1968.
- Aerial photos from Google Earth Pro©.

A.4. Scope of Services

We performed our scope of services for the project in accordance with the terms of the Work Order (132013839) provided by Enbridge Energy. The following list describes the geotechnical tasks completed in accordance with our authorized scope of services.

- Reviewing the background information and reference documents previously cited.

- Lake Superior Consulting selected and staked the boring location and we cleared the exploration location of underground utilities. The Soil Boring Location Sketch included in the Appendix shows the approximate location of the boring.

- Performing three (3) standard penetration test (SPT) borings, denoted as 56-C-1, 59-C-1, 60-C to a nominal depth of 115 to 126 feet below grade.

- Performing laboratory testing on select samples as selected by Lake Superior Consulting.

- Preparing this report containing a boring location sketch, an exploration log, laboratory tests, a summary of the geologic materials encountered.

Our scope of services did not include environmental services or testing and our geotechnical personnel performing this evaluation are not trained to provide environmental services or testing. We can provide environmental services or testing at your request.

B. Results

B.1. Geologic Overview

We based the geologic origins used in this report on the soil types, in-situ and laboratory testing, and available common knowledge of the geological history of the site. Because of the complex depositional history, geologic origins can be difficult to ascertain. We did not perform a detailed investigation of the geologic history for the site.

B.2. Geologic Materials

The general geologic profile of the soils encountered between the 3 borings generally consisted (proceeding down from the ground surface) of 2 to 4 feet of topsoil over poorly graded sand (SP) or silty sand (SM) fill extending to a depth of 6 1/2 to 12 feet. The fill soils are underlain by glacial deposits consisting of alternating layers of silty sand (SM), silty clayey sand (SC-SM), poorly graded gravel with silt (GP-GM), poorly graded sand with silty (SP-SM), silt (ML), and silty gravel (GM) extending to the termination depths, the glacial soils contained variable amounts of gravel.

B.3. Estimated Soil Properties

Estimated soil properties, for each significant strata change are presented below in Table 1.

Table 1: Estimated Soil Properties

Soil Strata and Elevations (ft)	Soil Type	Blow Count per foot Range (BPF)	Wet Unit Weight Range (pcf)	Effective Friction Angle Range (degrees)	Undrained Friction Angle (degrees)	Effective Cohesion Range (ksf)	Modulus of Elasticity Range* (tsf)
Upper Strata (1226 1/2 to 1165 1/2)	Silt (ML)	8 - 16	105 - 120	26 - 30	27 - 30	0	48 - 52
	Silty Sand (SM)	4 - 24	115 - 120	28 – 31	10 - 20	0.4 – 1.9	81 - 98
	Silty Sand (SM)	25 - 38	120 - 125	32 - 34	25	2.0 – 4.0	184 - 224
	Poorly Graded Gravel with Silt (GP-GM)	30 - 50	127 - 135	39 - 45	35 - 43	0	461 - 480
	Poorly Graded Sand with Silt (SP-SM)	24 - 83 blows for 10 inches of penetration	118 - 127	35 - 40	34 - 36	0	350 - 360
Middle Strata (1194 to 1115 1/2)	Silty Clayey Sand (SC-SM)	50 blows for 5 inches of penetration - 50 blows for 4 inches of penetration	125 - 130	35 - 37	25	4.1+	240 - 259
	Silty Sand (SM)	4 - 24	115 - 120	28 - 31	10 - 20	0.4 – 1.9	81 - 98

Soil Strata and Elevations (ft)	Soil Type	Blow Count per foot Range (BPF)	Wet Unit Weight Range (pcf)	Effective Friction Angle Range (degrees)	Undrained Friction Angle (degrees)	Effective Cohesion Range (ksf)	Modulus of Elasticity Range* (tsf)
	Silty Sand (SM)	25 - 50 blows for 0 inches of penetration	120 - 130	32 - 37	25	2.0 – 4.1+	230 - 280
Lower Strata (1131 1/2 to 1099)	Silt (ML)	50 blows for 4 inches of penetration	125 - 127	34 - 36	35	0	240 - 260
	Silty Gravel (GM)	50 blows for 3 inches of penetration - 50 blows for 0 inches of penetration	130 - 135	42 - 45	43	0	691 - 720
	Silty Sand (SM)	97 blows for 10 inches of penetration - 50 blows for 0 inches of penetration	125 - 130	35 - 37	25	4.1+	518 - 630

*Sustained Young's Modulus values

B.4. Groundwater

We observed groundwater at an estimated depth to be approximately 7 to 20 feet across the 3 borings while advancing our boring.

Project planning should anticipate seasonal and annual fluctuations of groundwater. Mud-rotary drilling techniques were used to advance the borings, hindering the ability to observe groundwater.

B.5. Laboratory Test Results

The boring logs show the results of the sieve analysis, hydrometer with sieve analysis, Atterberg Limits, and moisture testing that was requested. The Appendix contains the results of these tests.

C. Procedures

C.1. Penetration Test Borings

We drilled the penetration test borings with an all-terrain tire-mounted core and auger drill equipped with hollow-stem auger. We performed the borings in general accordance with ASTM D6151 taking penetration test samples at 2 1/2- or 5-foot intervals in general accordance to ASTM D1586. We collected thin-walled tube samples in general accordance with ASTM D1587 at selected depths. The boring logs show the actual sample intervals and corresponding depths.

C.2. Exploration Logs

C.2.a. Log of Boring Sheets

The Appendix includes Log of Boring sheets for our penetration test borings. The logs identify and describe the penetrated geologic materials, and present the results of penetration resistance tests performed. The logs also present the results of laboratory tests performed on penetration test samples, and groundwater measurements.

We inferred strata boundaries from changes in the penetration test samples and the auger cuttings. Because we did not perform continuous sampling, the strata boundary depths are only approximate. The boundary depths likely vary away from the boring locations, and the boundaries themselves may occur as gradual rather than abrupt transitions.

C.2.b. Geologic Origins

We assigned geologic origins to the materials shown on the logs and referenced within this report, based on: (1) a review of the background information and reference documents cited above, (2) visual classification of the various geologic material samples retrieved during the course of our subsurface exploration, (3) penetration resistance and other in-situ testing performed for the project, (4) laboratory

test results, and (5) available common knowledge of the geologic processes and environments that have impacted the site and surrounding area in the past.

C.3. Material Classification and Testing

C.3.a. Visual and Manual Classification

We visually and manually classified the geologic materials encountered based on ASTM D2488. When we performed laboratory classification tests, we used the results to classify the geologic materials in accordance with ASTM D2487. The Appendix includes a chart explaining the classification system we used.

C.3.b. Laboratory Testing

The exploration logs in the Appendix note most of the results of the laboratory tests performed on geologic material samples. The remaining laboratory test results follow the exploration logs. We performed the tests in general accordance with ASTM or AASHTO procedures.

C.4. Groundwater Measurements

The drillers checked for groundwater while advancing the penetration test borings, and again after auger withdrawal. We then filled the boreholes, as noted on the boring logs.

D. Qualifications

D.1. Variations in Subsurface Conditions

D.1.a. Material Strata

We developed our evaluation, analyses and recommendations from a limited amount of site and subsurface information. It is not standard engineering practice to retrieve material samples from exploration locations continuously with depth. Therefore, we must infer strata boundaries and thicknesses to some extent. Strata boundaries may also be gradual transitions, and project planning should expect the strata to vary in depth, elevation and thickness, away from the exploration locations.

Variations in subsurface conditions present between exploration locations may not be revealed until performing additional exploration work, or starting construction. If future activity for this project reveals

any such variations, you should notify us so that we may reevaluate our recommendations. Such variations could increase construction costs, and we recommend including a contingency to accommodate them.

D.1.b. Groundwater Levels

We made groundwater measurements under the conditions reported herein and shown on the exploration logs, and interpreted in the text of this report. Note that the observation periods were relatively short, and project planning can expect groundwater levels to fluctuate in response to rainfall, flooding, irrigation, seasonal freezing and thawing, surface drainage modifications and other seasonal and annual factors.

D.2. Continuity of Professional Responsibility

D.2.a. Plan Review

We based this report on a limited amount of information, and we made a number of assumptions to help us develop our recommendations. We should be retained to review the geotechnical aspects of the designs and specifications. This review will allow us to evaluate whether we anticipated the design correctly, if any design changes affect the validity of our recommendations, and if the design and specifications correctly interpret and implement our recommendations.

D.2.b. Construction Observations and Testing

We recommend retaining us to perform the required observations and testing during construction as part of the ongoing geotechnical evaluation. This will allow us to correlate the subsurface conditions exposed during construction with those encountered by the borings and provide professional continuity from the design phase to the construction phase. If we do not perform observations and testing during construction, it becomes the responsibility of others to validate the assumption made during the preparation of this report and to accept the construction-related geotechnical engineer-of-record responsibilities.

D.3. Use of Report

This report is for the exclusive use of the addressed parties. Without written approval, we assume no responsibility to other parties regarding this report. Our evaluation, analyses and recommendations may not be appropriate for other parties or projects.

D.4. Standard of Care

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, express or implied, is made.

Appendix

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2001991
Geotechnical Evaluation
Enbridge Line 5 Re-Route
Various Locations
Ashland and Iron Counties, Wisconsin

BORING: **56-C-1**
LOCATION: See attached sketch
NORTHING: 229600 EASTING: 558838
DRILLER: M. Swenson LOGGED BY: S. Sullivan START DATE: 03/17/20 END DATE: 03/24/20
SURFACE ELEVATION: 1223.2 ft RIG: 7505 METHOD: 3 1/4" HSA SURFACING: WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
		FILL: SILTY SAND (SM), fine to medium-grained Sand, with Gravel, brown, moist		9-9-10 (19) 10"			
			5	10-8-12 (20) 12"			
1216.7							
6.5		SILT (ML), with Gravel, reddish brown, moist, medium dense (GLACIAL TILL)		2-7-9 (16) 13"			
1214.2							
9.0		SILTY SAND (SM), fine to medium-grained Sand, with Gravel, brown, moist to wet, medium to dense (GLACIAL TILL)	10	28-20-10 (30) 13"			
		layer of poorly graded Sand with Silt, dark brown at 10 feet		3-5-7 (12) 14"		11	Gradation result is in the attached lab report
			15	3-7-9 (16) 4"			
1205.7							
17.5	▽	SILTY SAND (SM), fine-grained Sand, reddish brown, wet, loose to medium dense (GLACIAL TILL)	20	5-5-3 (8) 15"			
			25	5-4-7 (11) 0"			No recovery
1194.2							
29.0		SILT (ML), reddish brown, wet, loose to medium dense (GLACIAL TILL)	30	6-5-3 (8) 8"		25	Gradation result is in the attached lab report

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Enbridge Line 5 Re-Route
Various Locations
Ashland and Iron Counties, Wisconsin

BORING: **56-C-1**
LOCATION: See attached sketch
NORTHING: 229600 EASTING: 558838
DRILLER: M. Swenson LOGGED BY: S. Sullivan START DATE: 03/17/20 END DATE: 03/24/20
SURFACE ELEVATION: 1223.2 ft RIG: 7505 METHOD: 3 1/4" HSA SURFACING: WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
		SILT (ML), reddish brown, wet, loose to medium dense (GLACIAL TILL)	35	3-4-4 (8) 12"			
			40	5-5-7 (12) 12"			
1181.2 / 42.0		POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, with Gravel, brown, wet to moist, medium dense to very dense (GLACIAL OUTWASH)	45	7-12-12 (24) 12"		16	Gradation result is in the attached lab report
			50	14-12-12 (24) 12"			
			55	22-33-50/4" (REF) 12"			
1165.7 / 57.5		SILTY SAND (SM), fine to coarse-grained, with Gravel, brown, moist, very dense (GLACIAL OUTWASH)	60	32-43-49 (92) 18"			

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Enbridge Line 5 Re-Route
Various Locations
Ashland and Iron Counties, Wisconsin

BORING: **56-C-1**
LOCATION: See attached sketch
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DRILLER: M. Swenson LOGGED BY: S. Sullivan START DATE: 03/17/20 END DATE: 03/24/20
SURFACE ELEVATION: 1223.2 ft RIG: 7505 METHOD: 3 1/4" HSA SURFACING: WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
		SILTY SAND (SM), fine to coarse-grained, with Gravel, brown, moist, very dense (GLACIAL OUTWASH)	65	32-40-42 (82) 18"		12	Gradation result is in the attached lab report
			70	28-41-42 (83) 18"			
			75	38-50/4" (REF) 10"			
			80	50/4" (REF) 4"			
			85	50/5" (REF) 5"		12	Gradation result is in the attached lab report
			90	50/5" (REF) 5"			
			95	50/5" (REF) 5"			

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Enbridge Line 5 Re-Route
Various Locations
Ashland and Iron Counties, Wisconsin

BORING: **56-C-1**
LOCATION: See attached sketch
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SURFACE ELEVATION: 1223.2 ft RIG: 7505 METHOD: 3 1/4" HSA SURFACING: WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
		SILTY SAND (SM), fine to coarse-grained, with Gravel, brown, moist, very dense (GLACIAL OUTWASH)					
			100	50/5" (REF) 5"			
			105	50/4" (REF) 4"			
1115.7							
107.5		SILTY GRAVEL (GM), with Sand, dark brown, moist, very dense, (WEATHERED BEDROCK)					
			110	0"			
			115	50/2" (REF) 2"			
			120	50/3" (REF) 3"			
1099.2							
124.0		END OF BORING		50/2" (REF) 2"			Water observed at 20.0 feet while drilling.
			125				
		Boring immediately backfilled with bentonite grout					

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2001991
Geotechnical Evaluation
Enbridge Line 5 Re-Route
Various Locations
Ashland and Iron Counties, Wisconsin

BORING: **59-C-1**

LOCATION: See attached sketch

LATITUDE: 46.33530 LONGITUDE: -90.65086

DRILLER: M. Swenson LOGGED BY: S. Sullivan START DATE: 04/13/20 END DATE: 04/17/20

SURFACE ELEVATION: 1217.1 ft RIG: 7505 METHOD: 4 1/4" HSA SURFACING: WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
1213.1		SILTY SAND (SM), fine to medium-grained Sand, trace Gravel, with organic, and roots, brown, moist (TOPSOIL)		0-1-3 (4) WOH/6" 0"			No recovery
4.0	▽	FILL: POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, brown, moist	5	1-1-2 (3) 8"			
				1-2-2 (4) 12"			
			10	0-2-6 (8) WOH/6" 10"			
1205.1							
12.0		SILTY SAND (SM), fine to medium-grained Sand, with Gravel, brown, moist, medium dense to dense (GLACIAL TILL)		6-7-4 (11) 8"			
			15	6-18-20 (38)			
1199.6							
17.5		POORLY GRADED GRAVEL with SILT (SP-SM), with Sand, brown, moist, dense (GLACIAL TILL)	20	18-16-14 (30) 8"			
			25	12-22-28 (50) 3"			
1189.6							
27.5		SILTY SAND (SM), fine to medium-grained Sand, with Gravel, brown, moist, loose to very dense (GLACIAL TILL)	30	10-9-11 (20) 7"			

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Project Number B2001991
Geotechnical Evaluation
Enbridge Line 5 Re-Route
Various Locations
Ashland and Iron Counties, Wisconsin

BORING: **59-C-1**

LOCATION: See attached sketch

LATITUDE: 46.33530 LONGITUDE: -90.65086

DRILLER: M. Swenson | LOGGED BY: S. Sullivan | START DATE: 04/13/20 | END DATE: 04/17/20

SURFACE ELEVATION: 1217.1 ft | RIG: 7505 | METHOD: 4 1/4" HSA | SURFACING: | WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
		SILTY SAND (SM), fine to medium-grained Sand, with Gravel, brown, moist, loose to very dense (GLACIAL TILL)					
35				0-5-4 (9) 8"			
40				3-2-2 (4) 8"			
45				22-18-20 (38) 7"			
50				50/0" (REF) 0"			No recovery
55				42-50-50/5" (REF) 13"			
60				45-50/4" (REF) 10"			

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Enbridge Line 5 Re-Route
Various Locations
Ashland and Iron Counties, Wisconsin

BORING: **59-C-1**
LOCATION: See attached sketch
LATITUDE: 46.33530 LONGITUDE: -90.65086
DRILLER: M. Swenson LOGGED BY: S. Sullivan START DATE: 04/13/20 END DATE: 04/17/20
SURFACE ELEVATION: 1217.1 ft RIG: 7505 METHOD: 4 1/4" HSA SURFACING: WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
		SILTY SAND (SM), fine to medium-grained Sand, with Gravel, brown, moist, loose to very dense (GLACIAL TILL)	65	27-42-50/5" (REF) 15"			
			70	48-50/4" (REF) 9"			
			75	60-50/4" (REF) 9"			
			80	50/1" (REF) 0"			No recovery
			85	50/4" (REF) 4"			
			90	50/5" (REF) 5"			
1123.1 94.0		SILT (ML), fine to medium-grained, trace Gravel, brown, moist, hard (GLACIAL TILL)	95	39-50/4" (REF) 8"			

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Various Locations
Ashland and Iron Counties, Wisconsin

BORING: **59-C-1**

LOCATION: See attached sketch

LATITUDE: 46.33530 LONGITUDE: -90.65086

DRILLER: M. Swenson | LOGGED BY: S. Sullivan | START DATE: 04/13/20 | END DATE: 04/17/20

SURFACE ELEVATION: 1217.1 ft | RIG: 7505 | METHOD: 4 1/4" HSA | SURFACING: | WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
		SILT (ML), fine to medium-grained, trace Gravel, brown, moist, hard (GLACIAL TILL)					
			100	31-50/4" (REF) 8"			
1113.6							
103.5		SILTY SAND (SM), fine to medium-grained Sand, brown, moist, very dense (GLACIAL TILL)					
			105	35-50/5" (REF) 7"			
			110	32-47-50/4" (REF) 10"			
1102.1							
115.0		END OF BORING	115	32-50/4" (REF) 7"			Water observed at 7.0 feet while drilling.
		Boring then backfilled with cement/bentonite grout					
			120				
			125				

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Project Number B2001991
Geotechnical Evaluation
Enbridge Line 5 Re-Route
Various Locations
Ashland and Iron Counties, Wisconsin

BORING: **60-C**

LOCATION: See attached sketch

LATITUDE: 46.33592 LONGITUDE: -90.64950

DRILLER: M. Swenson | LOGGED BY: S. Sullivan | START DATE: 03/24/20 | END DATE: 03/24/20

SURFACE ELEVATION: 1226.4 ft | RIG: 7505 | METHOD: 3 1/4" HSA | SURFACING: | WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
1224.4		SILTY SAND (SM), fine to medium-grained Sand, with organic, roots, brownish black, moist (TOPSOIL)					
2.0		SILTY SAND (SM), fine to medium-grained Sand, with Gravel, reddish brown, moist, medium dense to dense (GLACIAL TILL)		2-5-8 (13) 14"			
			5	2-6-7 (13) 12"			
				2-11-21 (32) 14"			
1217.4							
9.0		SILTY SAND (SM), fine to medium-grained, reddish brown, moist, soft to very stiff (GLACIAL TILL)	10	2-4-6 (10) 13"			
				2-7-11 (18) 12"			
	▽		15	2-4-4 (8) 10"			
			20	1-2-2 (4) 10"		14	Hydrometer and Sieve Analysis results are in the attached lab report
			25	6-3-4 (7) 14"			
1199.0							
27.5		SILTY SAND (SM), fine to medium-grained Sand, with Gravel, reddish brown, moist to wet, medium dense (GLACIAL TILL)	30	9-8-9 (17) 8"			

Continued on next page

BRAUN INTERTEC
The Science You Build On

LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2001991
Geotechnical Evaluation
Enbridge Line 5 Re-Route
Various Locations
Ashland and Iron Counties, Wisconsin

BORING: **60-C**
LOCATION: See attached sketch
LATITUDE: 46.33592 LONGITUDE: -90.64950
DRILLER: M. Swenson LOGGED BY: S. Sullivan START DATE: 03/24/20 END DATE: 03/24/20
SURFACE ELEVATION: 1226.4 ft RIG: 7505 METHOD: 3 1/4" HSA SURFACING: WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
1194.0		SILTY SAND (SM), fine to medium-grained Sand, with Gravel, reddish brown, moist to wet, medium dense (GLACIAL TILL)					
32.5		SILTY, CLAYEY SAND (SC-SM), fine to medium-grained, Cobbles, reddish brown, moist to wet, hard (GLACIAL TILL)	35	29-50/5" (REF) 8"			
			40	48-50/4" (REF) 7"			
			45	48-50/4" (REF) 8"		9	Hydrometer and Sieve Analysis results are in the attached lab report LL=19, PL=12, PI=7
			50	29-49-50/4" (REF) 14"			
			55	23-48-50/4" (REF) 12"			
			60	29-50/5" (REF) 9"			

Continued on next page

BRAUN INTERTEC
The Science You Build On

LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2001991
Geotechnical Evaluation
Enbridge Line 5 Re-Route
Various Locations
Ashland and Iron Counties, Wisconsin

BORING: **60-C**
LOCATION: See attached sketch
LATITUDE: 46.33592 LONGITUDE: -90.64950
DRILLER: M. Swenson LOGGED BY: S. Sullivan START DATE: 03/24/20 END DATE: 03/24/20
SURFACE ELEVATION: 1226.4 ft RIG: 7505 METHOD: 3 1/4" HSA SURFACING: WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
		SILTY, CLAYEY SAND (SC-SM), fine to medium-grained, Cobbles, reddish brown, moist to wet, hard (GLACIAL TILL)	65	14-26-50/4" (REF) 14"			
1159.0							
67.5		SILTY SAND (SM), fine to medium-grained Sand, with Gravel, reddish brown, moist, very dense (GLACIAL TILL)	70	18-28-36 (64) 16"			
1154.0							
72.5		SILTY SAND (SM), fine to medium-grained, Cobbles, reddish brown, moist, very dense (GLACIAL TILL)	75	18-40-48 (88) 16"		14	Hydrometer and Sieve Analysis results are in the attached lab report LL=16, PL=15, PI=1
			80	50-50/5" (REF) 8"			
			85	48-50/3" (REF) 9"			
			90	50-50/3" (REF) 9"			
1131.4			95	50/4" (REF) 4"			
95.0		SILTY SAND (SM), fine to medium-grained,					

Continued on next page

BRAUN INTERTEC
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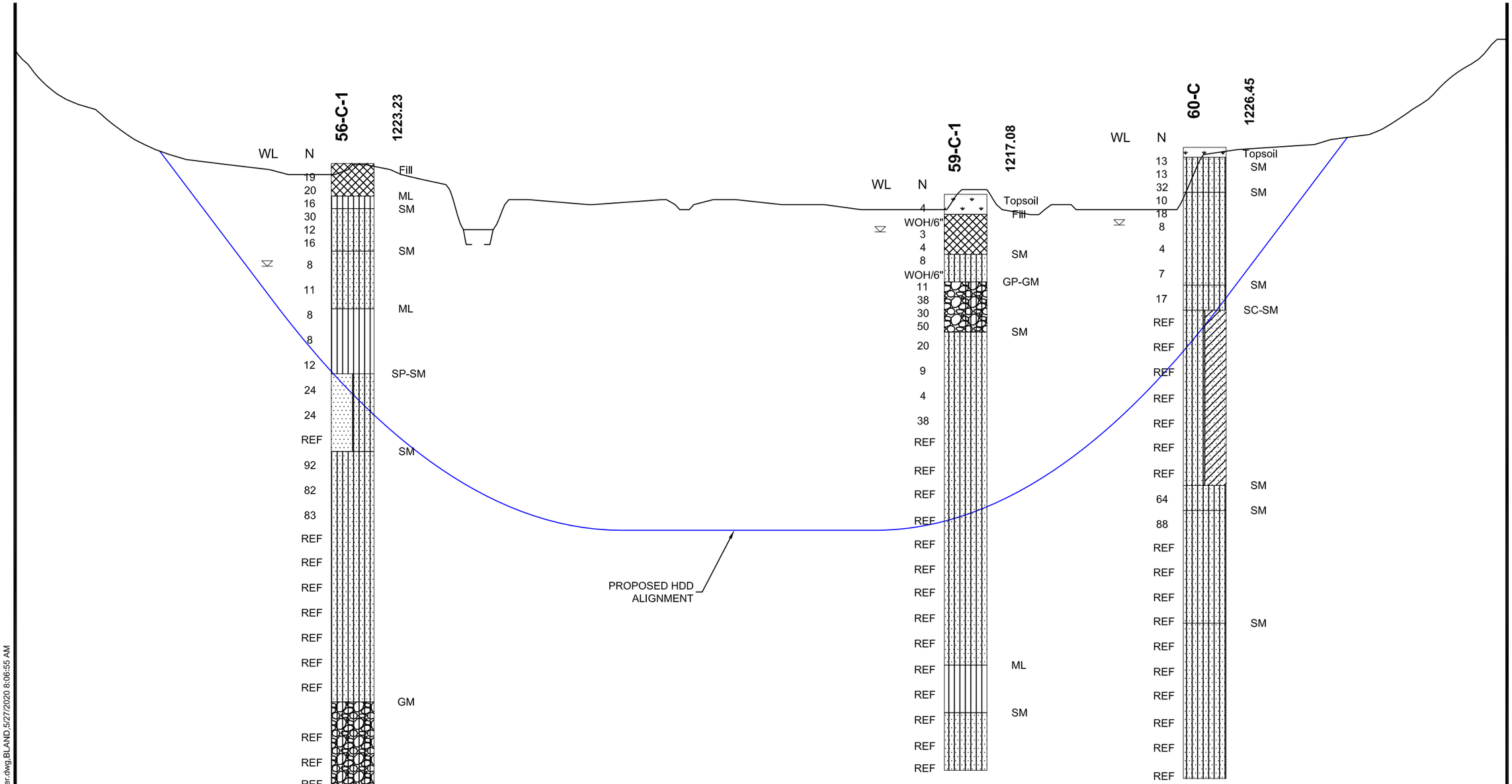
LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2001991
Geotechnical Evaluation
Enbridge Line 5 Re-Route
Various Locations
Ashland and Iron Counties, Wisconsin

BORING: **60-C**
LOCATION: See attached sketch
LATITUDE: 46.33592 LONGITUDE: -90.64950
DRILLER: M. Swenson LOGGED BY: S. Sullivan START DATE: 03/24/20 END DATE: 03/24/20
SURFACE ELEVATION: 1226.4 ft RIG: 7505 METHOD: 3 1/4" HSA SURFACING: WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
		SILTY SAND (SM), fine to medium-grained, with Gravel, Cobbles, reddish brown, wet, very dense (GLACIAL TILL)					
100				50/4" (REF) 4"		15	Hydrometer and Sieve Analysis results are in the attached lab report
105				50/5" (REF) 5"			
110				50/0" (REF) 0"			No recovery
115				45-50/5" (REF) 9"			
120				49-50/4" (REF) 10"			
125				41-50/5" (REF)			
1100.4							
126.0		END OF BORING					Water observed at 15.0 feet while drilling.
		Boring immediately backfilled with bentonite grout					



F:\2020\B2001991\CAD\MP 24 Bad River\B2001991_MP24_Bad-River.dwg,BLAND,5/27/2020 8:06:55 AM

75' 0 150'

HORIZONTAL SCALE: 1" = 150'

10' 0 20'

VERTICAL SCALE: 1" = 20'

VERTICAL EXAGGERATION: 7.5x

BRAUN INTERTEC
The Science You Build On.
11001 Hampshire Avenue S
Minneapolis, MN 55438
952.995.2000
braunintertec.com

Drawing Information

Project No: B2001991

Drawing No: B2001991_MP24_BAD-RIVER

Drawn By:	BJB
Date Drawn:	5/26/20
Checked By:	DM
Last Modified:	5/27/20

Project Information

Enbridge Line 5 Re-route

MP 24 - Bad River Crossing

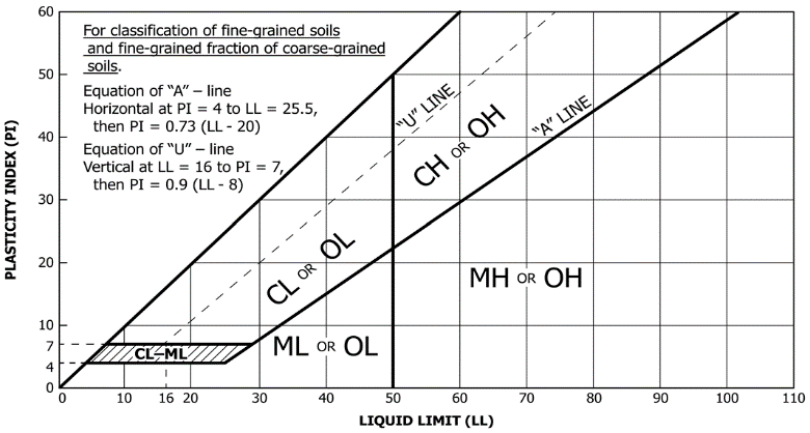
BRAUN INTERTEC
The Science You Build On.

Descriptive Terminology of Soil

Based on Standards ASTM D2487/2488
(Unified Soil Classification System)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]				Soil Classification	
				Group Symbol	Group Name[B]
Coarse-grained Soils (more than 50% retained on No. 200 sieve)	Gravels (More than 50% of coarse fraction retained on No. 4 sieve)	Clean Gravels (Less than 5% fines[C])	$C_u \geq 4$ and $1 \leq C_c \leq 3$[D]	GW	Well-graded gravel[E]
			$C_u < 4$ and/or ($C_c < 1$ or $C_c > 3$)[D]	GP	Poorly graded gravel[E]
		Gravels with Fines (More than 12% fines[C])	Fines classify as ML or MH	GM	Silty gravel[E F G]
			Fines Classify as CL or CH	GC	Clayey gravel[E F G]
	Sands (50% or more coarse fraction passes No. 4 sieve)	Clean Sands (Less than 5% fines[H])	$C_u \geq 6$ and $1 \leq C_c \leq 3$[D]	SW	Well-graded sand[I]
			$C_u < 6$ and/or ($C_c < 1$ or $C_c > 3$)[D]	SP	Poorly graded sand[J]
		Sands with Fines (More than 12% fines[H])	Fines classify as ML or MH	SM	Silty sand[F G I]
			Fines classify as CL or CH	SC	Clayey sand[F G I]
Fine-grained Soils (50% or more passes the No. 200 sieve)	Silts and Clays (Liquid limit less than 50)	Inorganic	PI > 7 and plots on or above "A" line[J]	CL	Lean clay[K L M]
			PI < 4 or plots below "A" line[J]	ML	Silt[K L M]
		Organic	Liquid Limit – oven dried / Liquid Limit – not dried <0.75	OL	Organic clay[K L M N] / Organic silt[K L M O]
	Silts and Clays (Liquid limit 50 or more)	Inorganic	PI plots on or above "A" line	CH	Fat clay[K L M]
			PI plots below "A" line	MH	Elastic silt[K L M]
		Organic	Liquid Limit – oven dried / Liquid Limit – not dried <0.75	OH	Organic clay[K L M P] / Organic silt[K L M Q]
Highly Organic Soils		Primarily organic matter, dark in color, and organic odor		PT	Peat

A. Based on the material passing the 3-inch (75-mm) sieve.
B. If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
C. Gravels with 5 to 12% fines require dual symbols:
   GW-GM well-graded gravel with silt
   GW-GC well-graded gravel with clay
   GP-GM poorly graded gravel with silt
   GP-GC poorly graded gravel with clay
D. $C_u = D_{60} / D_{10}$ $C_c = (D_{30})^2 / (D_{10} \times D_{60})$
E. If soil contains ≥ 15% sand, add "with sand" to group name.
F. If fines classify as CL-ML, use dual symbol GC-GM or SC-SM.
G. If fines are organic, add "with organic fines" to group name.
H. Sands with 5 to 12% fines require dual symbols:
   SW-SM well-graded sand with silt
   SW-SC well-graded sand with clay
   SP-SM poorly graded sand with silt
   SP-SC poorly graded sand with clay
I. If soil contains ≥ 15% gravel, add "with gravel" to group name.
J. If Atterberg limits plot in hatched area, soil is CL-ML, silty clay.
K. If soil contains 15 to < 30% plus No. 200, add "with sand" or "with gravel", whichever is predominant.
L. If soil contains ≥ 30% plus No. 200, predominantly sand, add "sandy" to group name.
M. If soil contains ≥ 30% plus No. 200 predominantly gravel, add "gravelly" to group name.
N. PI ≥ 4 and plots on or above "A" line.
O. PI < 4 or plots below "A" line.
P. PI plots on or above "A" line.
Q. PI plots below "A" line.



Particle Size Identification

Boulders..... over 12"
Cobbles..... 3" to 12"
Gravel
  Coarse..... 3/4" to 3" (19.00 mm to 75.00 mm)
  Fine..... No. 4 to 3/4" (4.75 mm to 19.00 mm)
Sand
  Coarse..... No. 10 to No. 4 (2.00 mm to 4.75 mm)
  Medium..... No. 40 to No. 10 (0.425 mm to 2.00 mm)
  Fine..... No. 200 to No. 40 (0.075 mm to 0.425 mm)
Silt..... No. 200 (0.075 mm) to .005 mm
Clay..... < .005 mm

Relative Proportions[L, M]

trace..... 0 to 5%
little..... 6 to 14%
with..... ≥ 15%

Inclusion Thicknesses

lens..... 0 to 1/8"
seam..... 1/8" to 1"
layer..... over 1"

Apparent Relative Density of Cohesionless Soils

Very loose ..... 0 to 4 BPF
Loose ..... 5 to 10 BPF
Medium dense..... 11 to 30 BPF
Dense..... 31 to 50 BPF
Very dense..... over 50 BPF

Consistency of Cohesive Soils	Blows Per Foot	Approximate Unconfined Compressive Strength
Very soft	0 to 1 BPF	< 0.25 tsf
Soft	2 to 4 BPF	0.25 to 0.5 tsf
Medium	5 to 8 BPF	0.5 to 1 tsf
Stiff	9 to 15 BPF	1 to 2 tsf
Very Stiff	16 to 30 BPF	2 to 4 tsf
Hard	over 30 BPF	> 4 tsf

Moisture Content:

Dry: Absence of moisture, dusty, dry to the touch.
Moist: Damp but no visible water.
Wet: Visible free water, usually soil is below water table.

Drilling Notes:

Blows/N-value: Blows indicate the driving resistance recorded for each 6-inch interval. The reported N-value is the blows per foot recorded by summing the second and third interval in accordance with the Standard Penetration Test, ASTM D1586.

Partial Penetration: If the sampler could not be driven through a full 6-inch interval, the number of blows for that partial penetration is shown as #/x" (i.e. 50/2"). The N-value is reported as "REF" indicating refusal.

Recovery: Indicates the inches of sample recovered from the sampled interval. For a standard penetration test, full recovery is 18", and is 24" for a thinwall/shelby tube sample.

WOH: Indicates the sampler penetrated soil under weight of hammer and rods alone; driving not required.

WOR: Indicates the sampler penetrated soil under weight of rods alone; hammer weight and driving not required.

Water Level: Indicates the water level measured by the drillers either while drilling (▽), at the end of drilling (▼), or at some time after drilling (▼).

Laboratory Tests

DD	Dry density, pcf	**OC**	Organic content, %	**LL**	Liquid limit
WD	Wet density, pcf	**q_p**	Pocket penetrometer strength, tsf	**PL**	Plastic limit
P200	% Passing #200 sieve	**MC**	Moisture content, %	**PI**	Plasticity index
		q_U	Unconfined compression test, tsf		

3/2019

Sieve Analysis Of Soil

ASTM D6913

4/7/2020

4511 West First Street
Suite 4
Duluth, MN 55807
Phone: 218-624-4967

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

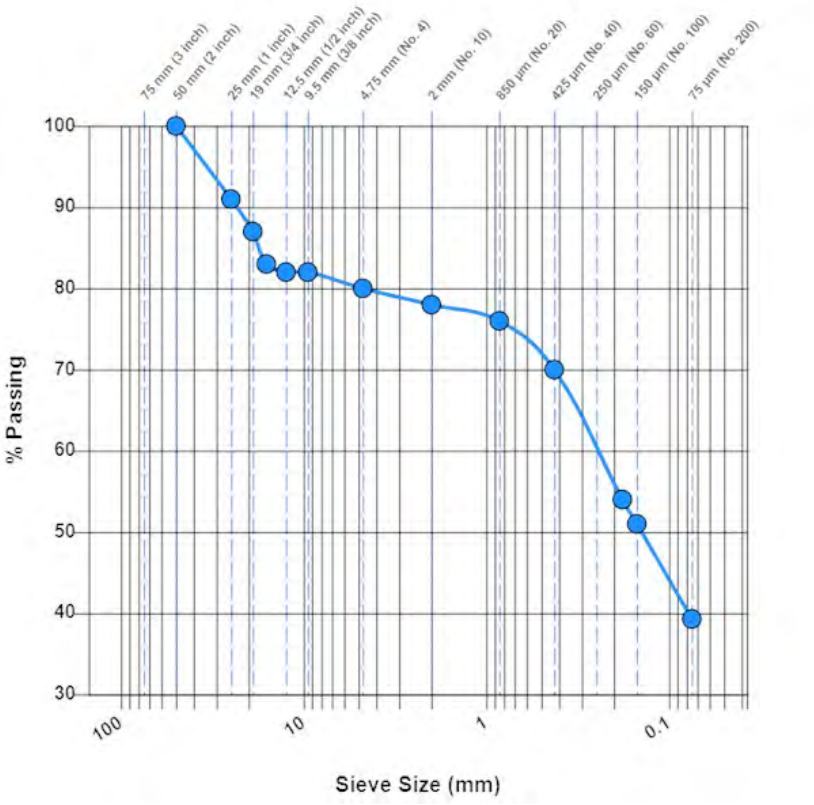
B2001991
Enbridge Line 5 Re-route
Enbridge Line 5
<Blank>, <Blank>

Sample Information

Sample Number:	300522	**Alternate ID:**	56-C-1 12'-14.5'
Sampling Method:	Auger Boring ASTM D1452	**Depth (ft):**	12'-14.5'
Boring Number:	56-C-1	**Sampled By:**	Patterson, Gregg
Location:	In-place		
Location Details:	Boring 56-C-1 12'-14.5'		
Sample Date:	04/03/2020		
Received Date:	04/06/2020	**Lab:**	4511 West First Street, Suite 4, Duluth, MN
Tested Date:	04/06/2020		

Laboratory Data

Sieve Size	% Passing	Specification
50 mm (2 inch)	100	
25 mm (1 inch)	91	
19 mm (3/4 inch)	87	
16 mm (5/8 inch)	83	
12.5 mm (1/2 inch)	82	
9.5 mm (3/8 inch)	82	
4.75 mm (No. 4)	80	
2 mm (No. 10)	78	
850 µm (No. 20)	76	
425 µm (No. 40)	70	
180 µm (No. 80)	54	
150 µm (No. 100)	51	
75 µm (No. 200)	39.3	



Test Method: Method A (Composite Sieving)

Specimen Obtained: Oven Dry

Classification: SM Silty sand with gravel

General

Results: The test is for informational purposes.

Sieve Analysis Of Soil

ASTM D6913

4/7/2020

4511 West First Street
Suite 4
Duluth, MN 55807
Phone: 218-624-4967

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

B2001991
Enbridge Line 5 Re-route
Enbridge Line 5
<Blank>, <Blank>

Sample Information

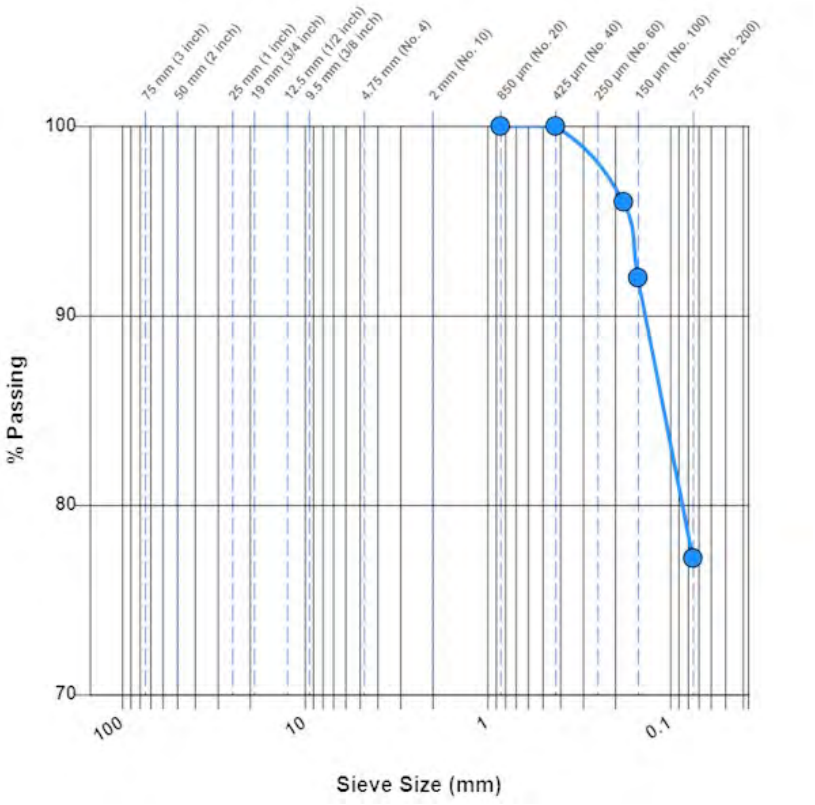
Sample Number:	300523	**Alternate ID:**	56-C-1 29.5'
Sampling Method:	Auger Boring ASTM D1452	**Depth (ft):**	29.5'
Boring Number:	56-C-1	**Sampled By:**	Patterson, Gregg
Location:	In-place		
Location Details:	Boring 56-C-1 29.5'		
Sample Date:	04/03/2020		
Received Date:	04/06/2020	**Lab:**	4511 West First Street, Suite 4, Duluth, MN
Tested Date:	04/06/2020		

Laboratory Data

Sieve Size	% Passing	Specification
850 µm (No. 20)	100	
425 µm (No. 40)	100	
180 µm (No. 80)	96	
150 µm (No. 100)	92	
75 µm (No. 200)	77.2	

Test Method: Method A (Composite Sieving)

Specimen Obtained: Oven Dry



Classification: ML Sandy silt

General

Results: The test is for informational purposes.

Sieve Analysis Of Soil

ASTM D6913

4/7/2020

4511 West First Street
Suite 4
Duluth, MN 55807
Phone: 218-624-4967

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

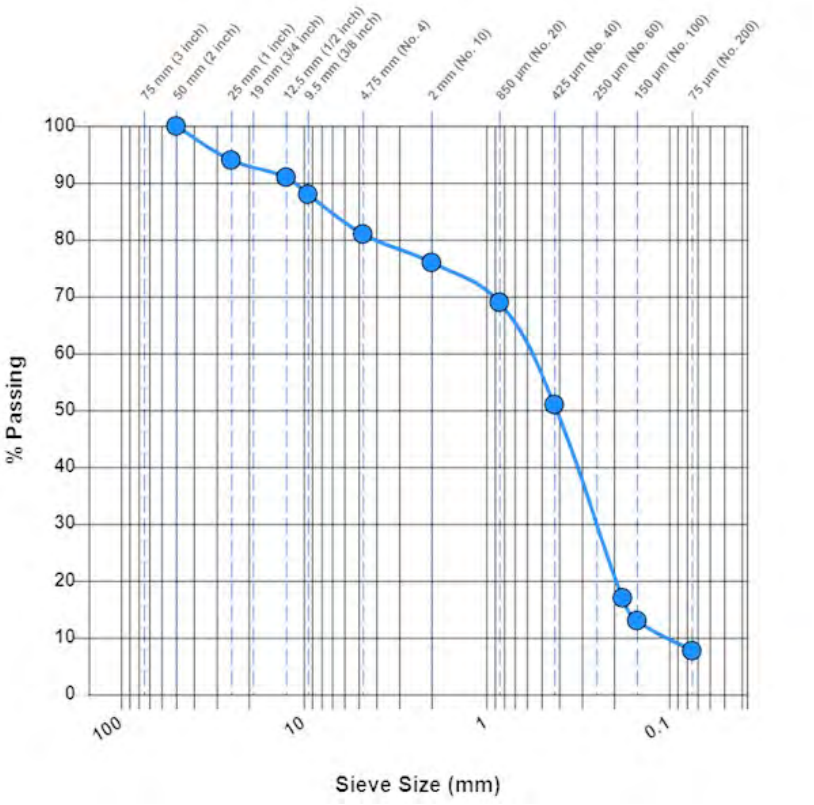
B2001991
Enbridge Line 5 Re-route
Enbridge Line 5
<Blank>, <Blank>

Sample Information

Sample Number:	300524	**Alternate ID:**	56-C-1 44.5'-49.5'
Sampling Method:	Auger Boring ASTM D1452	**Depth (ft):**	44.5'-99.5'
Boring Number:	56-C-1	**Sampled By:**	Patterson, Gregg
Location:	In-place		
Location Details:	Boring 56-C-1 44.5'-49.5'		
Sample Date:	04/03/2020		
Received Date:	04/06/2020	**Lab:**	4511 West First Street, Suite 4, Duluth, MN
Tested Date:	04/06/2020		

Laboratory Data

Sieve Size	% Passing	Specification
50 mm (2 inch)	100	
25 mm (1 inch)	94	
12.5 mm (1/2 inch)	91	
9.5 mm (3/8 inch)	88	
4.75 mm (No. 4)	81	
2 mm (No. 10)	76	
850 µm (No. 20)	69	
425 µm (No. 40)	51	
180 µm (No. 80)	17	
150 µm (No. 100)	13	
75 µm (No. 200)	7.7	



Test Method: Method A (Composite Sieving)

Specimen Obtained: Oven Dry

Classification: SP-SM Poorly graded sand with silt and gravel

General

Results: The test is for informational purposes.

Sieve Analysis Of Soil

ASTM D6913

4/7/2020

4511 West First Street
Suite 4
Duluth, MN 55807
Phone: 218-624-4967

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

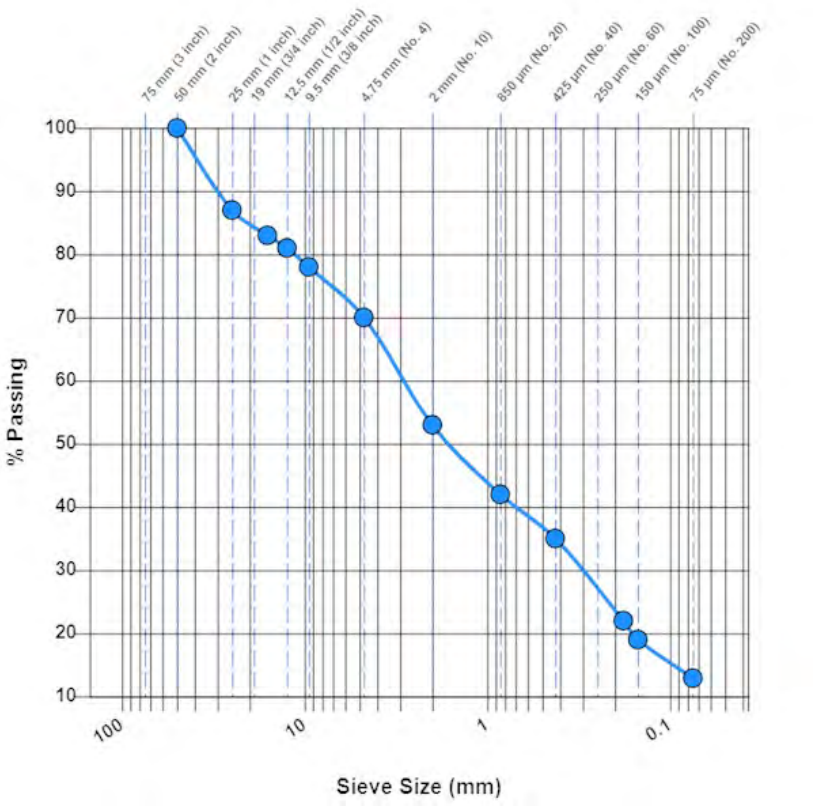
B2001991
Enbridge Line 5 Re-route
Enbridge Line 5
<Blank>, <Blank>

Sample Information

Sample Number:	300525	**Alternate ID:**	56-C-1 64.5'-79.5'
Sampling Method:	Auger Boring ASTM D1452	**Depth (ft):**	64.5'-79.5'
Boring Number:	56-C-1	**Sampled By:**	Patterson, Gregg
Location:	In-place		
Location Details:	Boring 56-C-1 64.5'-79.5'		
Sample Date:	04/03/2020		
Received Date:	04/06/2020	**Lab:**	4511 West First Street, Suite 4, Duluth, MN
Tested Date:	04/06/2020		

Laboratory Data

Sieve Size	% Passing	Specification
50 mm (2 inch)	100	
25 mm (1 inch)	87	
16 mm (5/8 inch)	83	
12.5 mm (1/2 inch)	81	
9.5 mm (3/8 inch)	78	
4.75 mm (No. 4)	70	
2 mm (No. 10)	53	
850 µm (No. 20)	42	
425 µm (No. 40)	35	
180 µm (No. 80)	22	
150 µm (No. 100)	19	
75 µm (No. 200)	12.9	



Test Method: Method A (Composite Sieving)

Specimen Obtained: Oven Dry

Classification: SM Silty sand with gravel

General

Results: The test is for informational purposes.

Sieve Analysis Of Soil

ASTM D6913

4/7/2020

4511 West First Street
Suite 4
Duluth, MN 55807
Phone: 218-624-4967

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

B2001991
Enbridge Line 5 Re-route
Enbridge Line 5
<Blank>, <Blank>

Sample Information

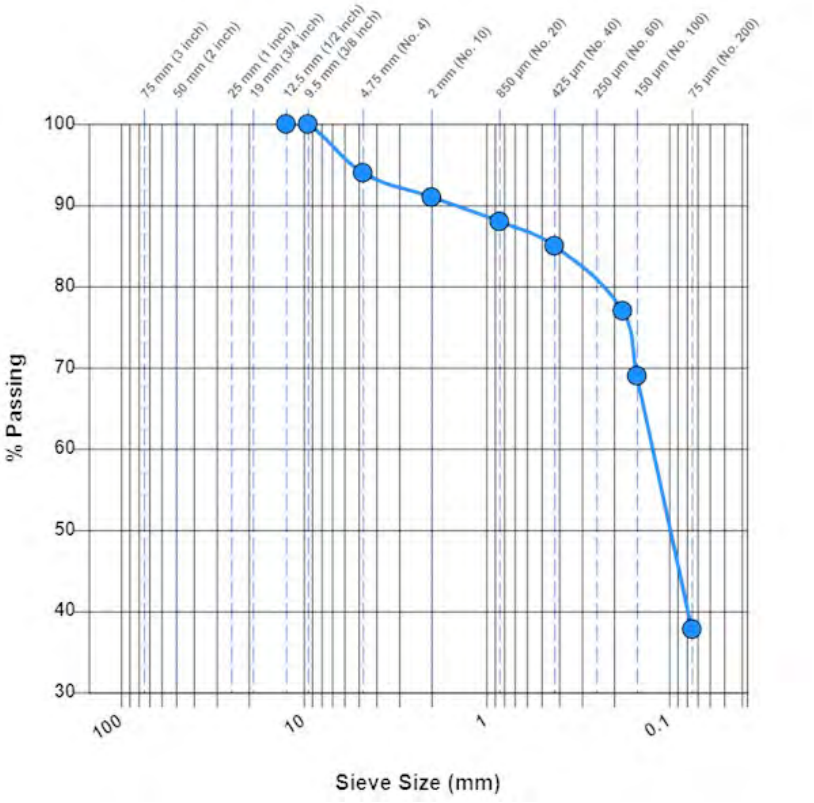
Sample Number:	300526	**Alternate ID:**	56-C-1 84.5'-104.5'
Sampling Method:	Auger Boring ASTM D1452	**Depth (ft):**	84.5'-104.5'
Boring Number:	56-C-1	**Sampled By:**	Patterson, Gregg
Location:	In-place		
Location Details:	Boring 56-C-1 84.5'-104.5'		
Sample Date:	04/03/2020		
Received Date:	04/06/2020	**Lab:**	4511 West First Street, Suite 4, Duluth, MN
Tested Date:	04/06/2020		

Laboratory Data

Sieve Size	% Passing	Specification
12.5 mm (1/2 inch)	100	
9.5 mm (3/8 inch)	100	
4.75 mm (No. 4)	94	
2 mm (No. 10)	91	
850 µm (No. 20)	88	
425 µm (No. 40)	85	
180 µm (No. 80)	77	
150 µm (No. 100)	69	
75 µm (No. 200)	37.8	

Test Method: Method A (Composite Sieving)

Specimen Obtained: Oven Dry



Classification: SM Silty sand

General

Results: The test is for informational purposes.

Sieve Analysis Of Soil

ASTM D6913

4/27/2020

4511 West First Street
Suite 4
Duluth, MN 55807
Phone: 218-624-4967

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

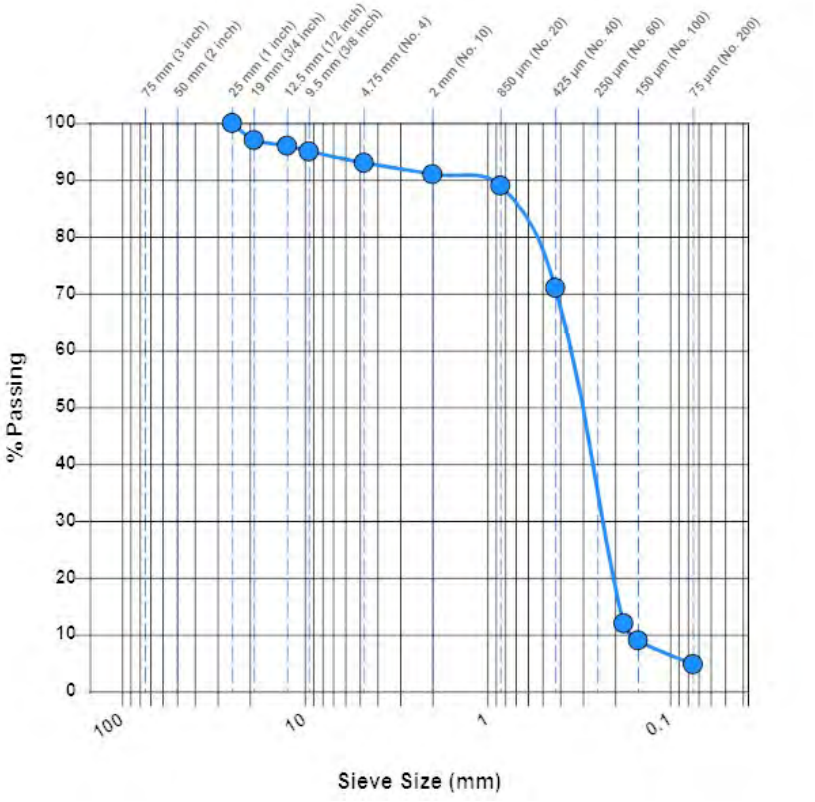
B2001991
Enbridge Line 5 Re-route
Enbridge Line 5
<Blank>, <Blank>

Sample Information

Sample Number:	303873	**Alternate ID:**	59-C-1 7.5'-10'
Sampling Method:	Auger Boring ASTM D1452	**Depth (ft):**	7.5-10
Boring Number:	59-C-1	**Sampled By:**	Patterson, Gregg
Location:	In-place		
Location Details:	Boring 59-C-1 7.5'-10'		
Sample Date:	04/23/2020		
Received Date:	04/23/2020	**Lab:**	4511 West First Street, Suite 4, Duluth, MN
Tested Date:	04/27/2020		

Laboratory Data

Sieve Size	% Passing	Specification
25 mm (1 inch)	100	
19 mm (3/4 inch)	97	
12.5 mm (1/2 inch)	96	
9.5 mm (3/8 inch)	95	
4.75 mm (No. 4)	93	
2 mm (No. 10)	91	
850 µm (No. 20)	89	
425 µm (No. 40)	71	
180 µm (No. 80)	12	
150 µm (No. 100)	9	
75 µm (No. 200)	4.8	



Test Method: Method A (Composite Sieving)
Dispersion Apparatus: Shaking
Specimen Obtained: Moist

Classification: SP Poorly graded sand

General

Results: The test is for informational purposes.
Remarks: Total dry weight of sample 451.4 grams

Sieve Analysis Of Soil

ASTM D6913

4/27/2020

4511 West First Street
Suite 4
Duluth, MN 55807
Phone: 218-624-4967

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

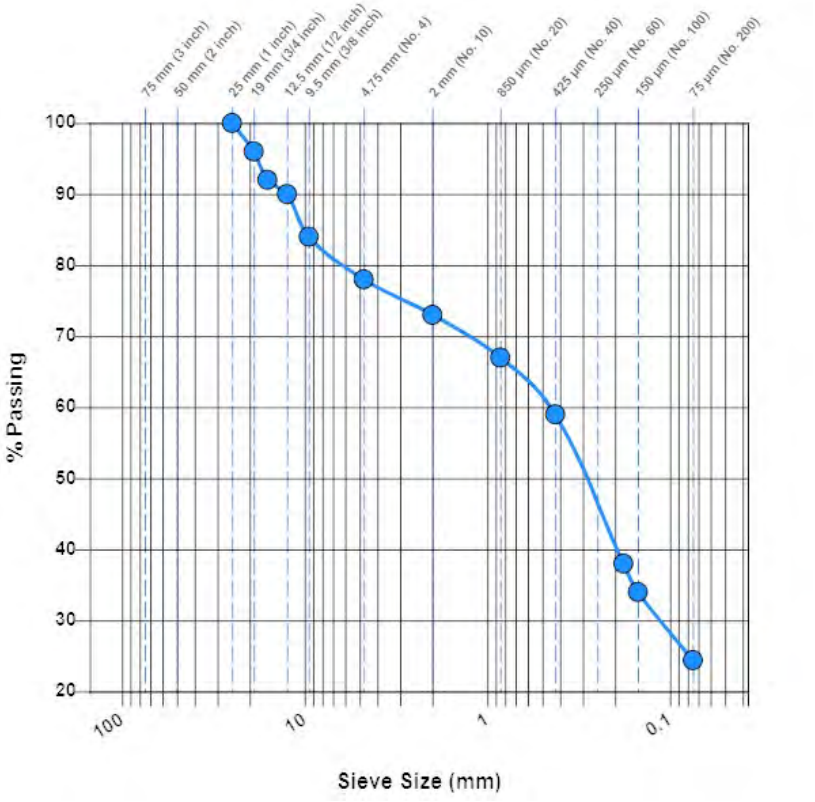
B2001991
Enbridge Line 5 Re-route
Enbridge Line 5
<Blank>, <Blank>

Sample Information

Sample Number:	303874	**Alternate ID:**	59-C-1 12.5'-15'
Sampling Method:	Auger Boring ASTM D1452	**Depth (ft):**	12.5-15
Boring Number:	59-C-1	**Sampled By:**	Patterson, Gregg
Location:	In-place		
Location Details:	Boring 59-C-1 12.5'-15'		
Sample Date:	04/23/2020		
Received Date:	04/23/2020	**Lab:**	4511 West First Street, Suite 4, Duluth, MN
Tested Date:	04/27/2020		

Laboratory Data

Sieve Size	% Passing	Specification
25 mm (1 inch)	100	
19 mm (3/4 inch)	96	
16 mm (5/8 inch)	92	
12.5 mm (1/2 inch)	90	
9.5 mm (3/8 inch)	84	
4.75 mm (No. 4)	78	
2 mm (No. 10)	73	
850 µm (No. 20)	67	
425 µm (No. 40)	59	
180 µm (No. 80)	38	
150 µm (No. 100)	34	
75 µm (No. 200)	24.4	



Test Method: Method A (Composite Sieving)
Dispersion Apparatus: Shaking
Specimen Obtained: Moist

Classification: SM Silty sand with gravel

General

Results: The test is for informational purposes.
Remarks: Total dry weight of sample 535.3 grams

Sieve Analysis Of Soil

ASTM D6913

4/27/2020

4511 West First Street
Suite 4
Duluth, MN 55807
Phone: 218-624-4967

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

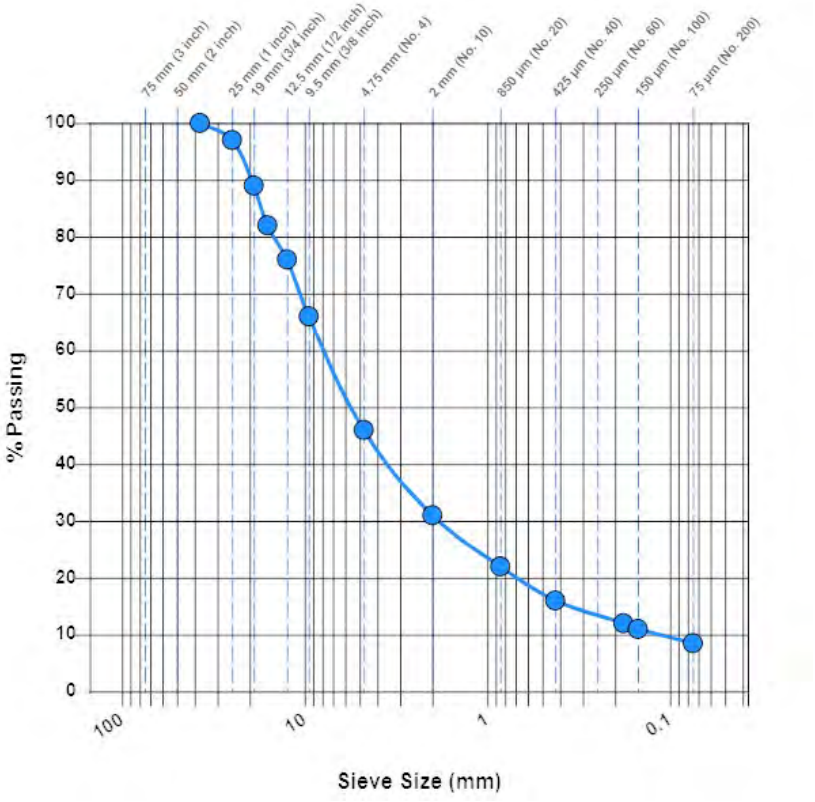
B2001991
Enbridge Line 5 Re-route
Enbridge Line 5
<Blank>, <Blank>

Sample Information

Sample Number:	303875	**Alternate ID:**	59-C-1 19.5'-30
Sampling Method:	Auger Boring ASTM D1452	**Depth (ft):**	19.5-30
Boring Number:	59-C-1	**Sampled By:**	Patterson, Gregg
Location:	In-place		
Location Details:	Boring 59-C-1 19.5'-30'		
Sample Date:	04/23/2020		
Received Date:	04/23/2020	**Lab:**	4511 West First Street, Suite 4, Duluth, MN
Tested Date:	04/27/2020		

Laboratory Data

Sieve Size	% Passing	Specification
37.5 mm (1.5 inch)	100	
25 mm (1 inch)	97	
19 mm (3/4 inch)	89	
16 mm (5/8 inch)	82	
12.5 mm (1/2 inch)	76	
9.5 mm (3/8 inch)	66	
4.75 mm (No. 4)	46	
2 mm (No. 10)	31	
850 µm (No. 20)	22	
425 µm (No. 40)	16	
180 µm (No. 80)	12	
150 µm (No. 100)	11	
75 µm (No. 200)	8.5	



Test Method: Method A (Composite Sieving)
Dispersion Apparatus: Shaking
Specimen Obtained: Moist
Classification: GP-GM Poorly graded gravel with silt and sand

General

Results: The test is for informational purposes.
Remarks: Total dry weight of sample 636.0 grams

Sieve Analysis Of Soil

ASTM D6913

4/27/2020

4511 West First Street
Suite 4
Duluth, MN 55807
Phone: 218-624-4967

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

B2001991
Enbridge Line 5 Re-route
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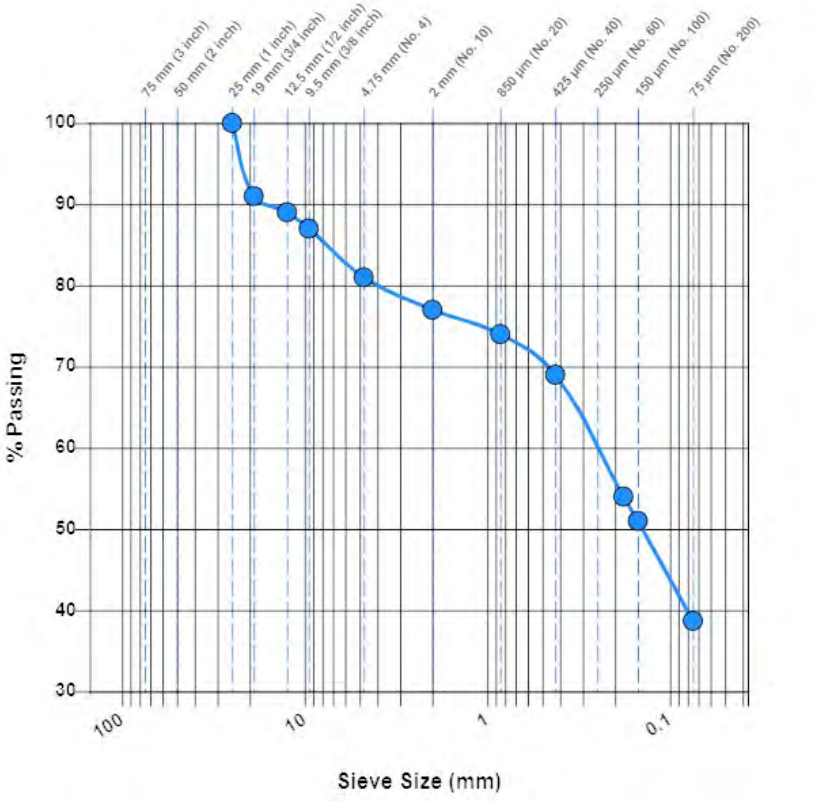
Sample Information

Sample Number:	303876	**Alternate ID:**	59-C-1 35'-40
Sampling Method:	Auger Boring ASTM D1452	**Depth (ft):**	35-40
Boring Number:	59-C-1	**Sampled By:**	Patterson, Gregg
Location:	In-place		
Location Details:	Boring 59-C-1 35'-40'		
Sample Date:	04/23/2020		
Received Date:	04/23/2020	**Lab:**	4511 West First Street, Suite 4, Duluth, MN
Tested Date:	04/27/2020		

Laboratory Data

Sieve Size	% Passing	Specification
25 mm (1 inch)	100	
19 mm (3/4 inch)	91	
12.5 mm (1/2 inch)	89	
9.5 mm (3/8 inch)	87	
4.75 mm (No. 4)	81	
2 mm (No. 10)	77	
850 µm (No. 20)	74	
425 µm (No. 40)	69	
180 µm (No. 80)	54	
150 µm (No. 100)	51	
75 µm (No. 200)	38.7	



Test Method: Method A (Composite Sieving)
Dispersion Apparatus: Shaking
Specimen Obtained: Moist

Classification: SM Silty sand with gravel

General

Results: The test is for informational purposes.
Remarks: Total dry weight of sample 557.7 grams

Sieve Analysis Of Soil

ASTM D6913

4/28/2020

4511 West First Street
Suite 4
Duluth, MN 55807
Phone: 218-624-4967

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

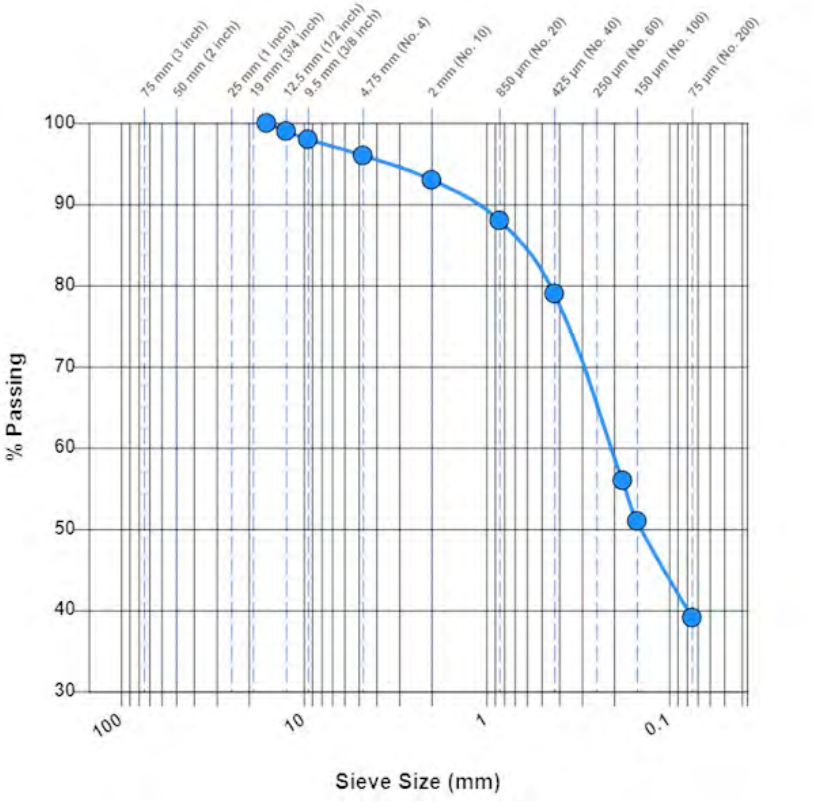
B2001991
Enbridge Line 5 Re-route
Enbridge Line 5
<Blank>, <Blank>

Sample Information

Sample Number:	303877	**Alternate ID:**	59-C-1 55'-65
Sampling Method:	Auger Boring ASTM D1452	**Depth (ft):**	55-65
Boring Number:	59-C-1	**Sampled By:**	Patterson, Gregg
Location:	In-place		
Location Details:	Boring 59-C-1 55'-65'		
Sample Date:	04/23/2020		
Received Date:	04/23/2020	**Lab:**	4511 West First Street, Suite 4, Duluth, MN
Tested Date:	04/28/2020		

Laboratory Data

Sieve Size	% Passing	Specification
16 mm (5/8 inch)	100	
12.5 mm (1/2 inch)	99	
9.5 mm (3/8 inch)	98	
4.75 mm (No. 4)	96	
2 mm (No. 10)	93	
850 µm (No. 20)	88	
425 µm (No. 40)	79	
180 µm (No. 80)	56	
150 µm (No. 100)	51	
75 µm (No. 200)	39.1	



Test Method: Method A (Composite Sieving)
Dispersion Apparatus: Shaking
Specimen Obtained: Moist

Classification: SM Silty sand

General

Results: The test is for informational purposes.
Remarks: Total dry weight of sample 571.9 grams

Sieve Analysis Of Soil

ASTM D6913

4/27/2020

4511 West First Street
Suite 4
Duluth, MN 55807
Phone: 218-624-4967

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

B2001991
Enbridge Line 5 Re-route
Enbridge Line 5
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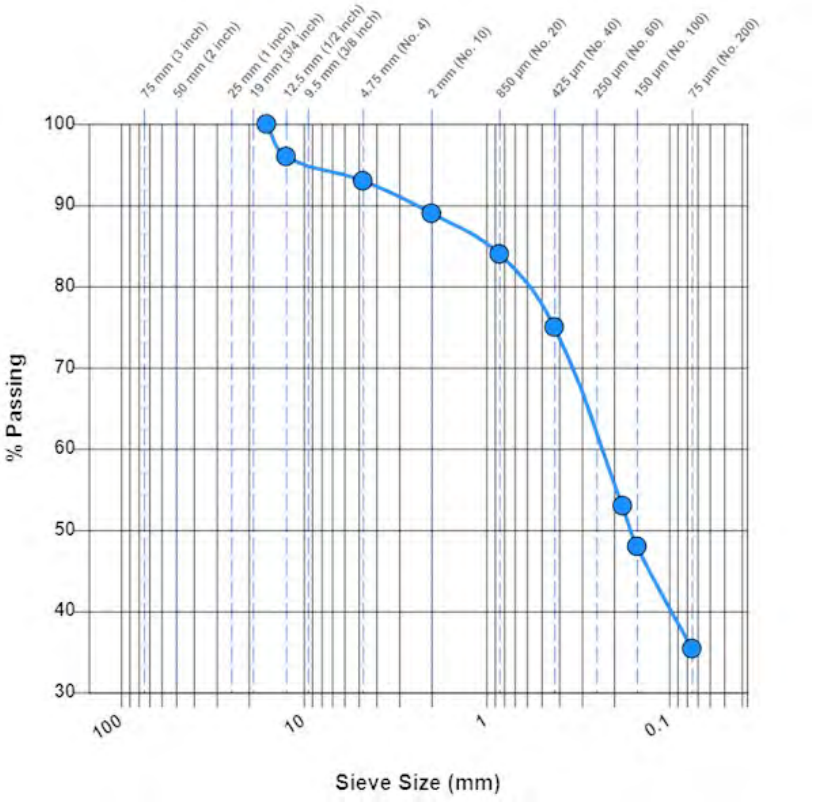
Sample Information

Sample Number:	303878	**Alternate ID:**	59-C-1 70'
Sampling Method:	Auger Boring ASTM D1452	**Depth (ft):**	70
Boring Number:	59-C-1	**Sampled By:**	Patterson, Gregg
Location:	In-place		
Location Details:	Boring 59-C-1 70'		
Sample Date:	04/23/2020		
Received Date:	04/23/2020	**Lab:**	4511 West First Street, Suite 4, Duluth, MN
Tested Date:	04/27/2020		

Laboratory Data

Sieve Size	% Passing	Specification
16 mm (5/8 inch)	100	
12.5 mm (1/2 inch)	96	
4.75 mm (No. 4)	97	
2 mm (No. 10)	93	
850 µm (No. 20)	88	
425 µm (No. 40)	78	
180 µm (No. 80)	56	
150 µm (No. 100)	52	
75 µm (No. 200)	35.4	



Test Method: Method A (Composite Sieving)
Dispersion Apparatus: Shaking
Specimen Obtained: Moist

Classification: SM Silty sand

General

Results: The test is for informational purposes.
Remarks: Total dry weight of sample 173.3 grams

Sieve Analysis Of Soil

ASTM D6913

4/28/2020

4511 West First Street
Suite 4
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Phone: 218-624-4967

Client:

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Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

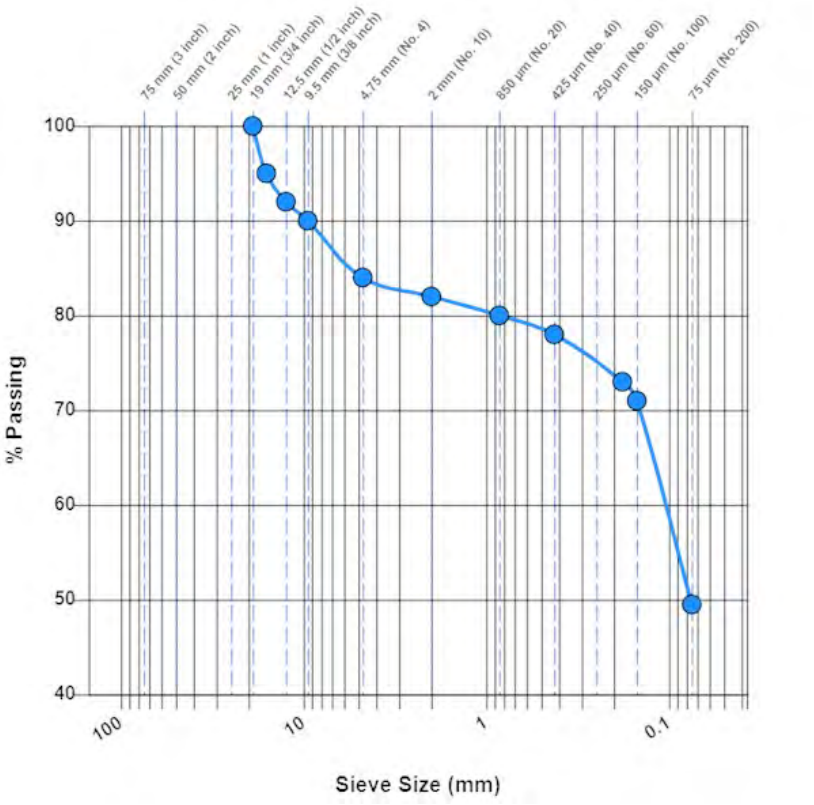
B2001991
Enbridge Line 5 Re-route
Enbridge Line 5
<Blank>, <Blank>

Sample Information

Sample Number:	303879	**Alternate ID:**	59-C-1 85'
Sampling Method:	Auger Boring ASTM D1452	**Depth (ft):**	85
Boring Number:	59-C-1	**Sampled By:**	Patterson, Gregg
Location:	In-place		
Location Details:	Boring 59-C-1 85'		
Sample Date:	04/23/2020		
Received Date:	04/23/2020	**Lab:**	4511 West First Street, Suite 4, Duluth, MN
Tested Date:	04/28/2020		

Laboratory Data

Sieve Size	% Passing	Specification
19 mm (3/4 inch)	100	
16 mm (5/8 inch)	95	
12.5 mm (1/2 inch)	92	
9.5 mm (3/8 inch)	90	
4.75 mm (No. 4)	84	
2 mm (No. 10)	82	
850 µm (No. 20)	80	
425 µm (No. 40)	78	
180 µm (No. 80)	73	
150 µm (No. 100)	71	
75 µm (No. 200)	49.5	



Test Method: Method A (Composite Sieving)
Dispersion Apparatus: Shaking
Specimen Obtained: Moist

Classification: SM Silty sand with gravel

General

Results: The test is for informational purposes.
Remarks: Total dry weight of sample 184.3 grams

Sieve Analysis Of Soil

ASTM D6913

4/28/2020

4511 West First Street
Suite 4
Duluth, MN 55807
Phone: 218-624-4967

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

B2001991
Enbridge Line 5 Re-route
Enbridge Line 5
<Blank>, <Blank>

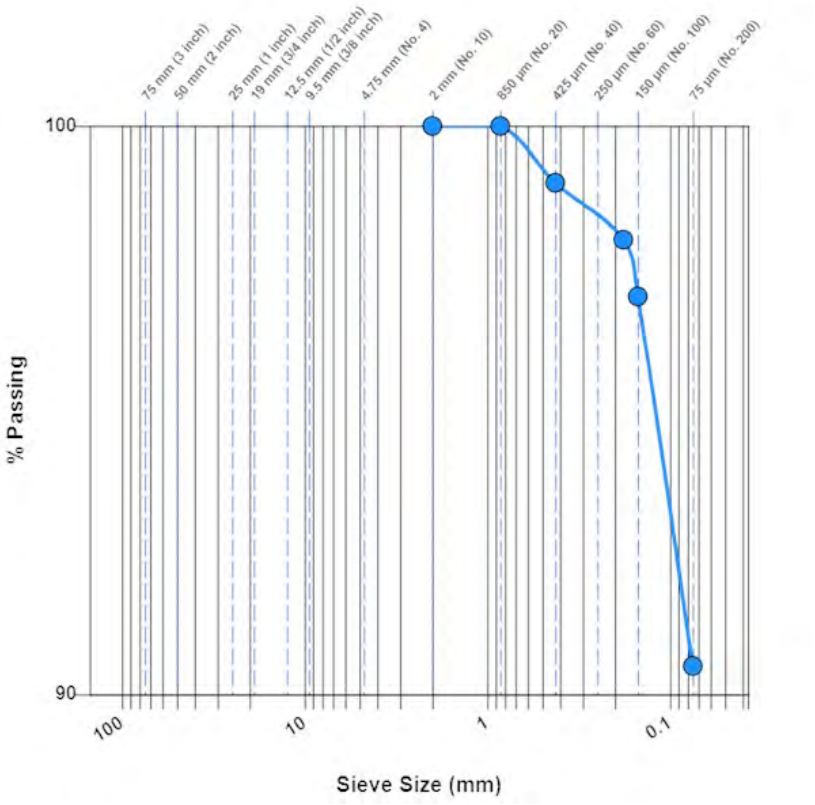
Sample Information

Sample Number:	303881	**Alternate ID:**	59-C-1 95'
Sampling Method:	Auger Boring ASTM D1452	**Depth (ft):**	95
Boring Number:	59-C-1	**Sampled By:**	Patterson, Gregg
Location:	In-place		
Location Details:	Boring 59-C-1 95'		
Sample Date:	04/23/2020		
Received Date:	04/23/2020	**Lab:**	4511 West First Street, Suite 4, Duluth, MN
Tested Date:	04/28/2020		

Laboratory Data

Sieve Size	% Passing	Specification
2 mm (No. 10)	100	
850 µm (No. 20)	100	
425 µm (No. 40)	99	
180 µm (No. 80)	98	
150 µm (No. 100)	97	
75 µm (No. 200)	90.5	

Test Method: Method A (Composite Sieving)
Dispersion Apparatus: Shaking
Specimen Obtained: Moist



Classification: ML Silt

General

Results: The test is for informational purposes.
Remarks: Total dry weight of sample 165.5 grams

Sieve Analysis Of Soil

ASTM D6913

4/28/2020

4511 West First Street
Suite 4
Duluth, MN 55807
Phone: 218-624-4967

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

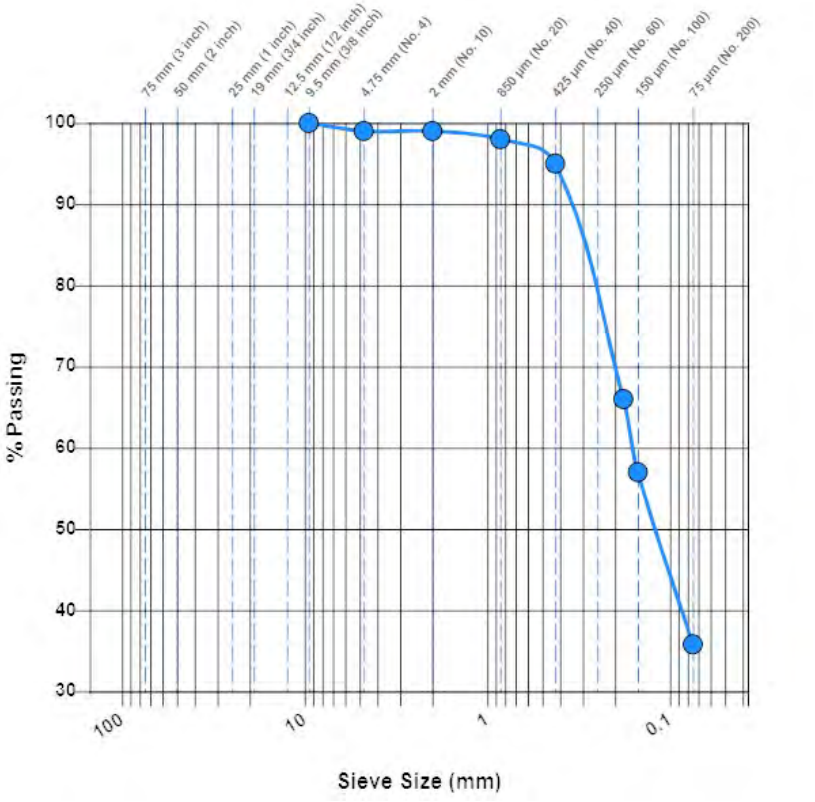
B2001991
Enbridge Line 5 Re-route
Enbridge Line 5
<Blank>, <Blank>

Sample Information

Sample Number:	303882	**Alternate ID:**	59-C-1 105'
Sampling Method:	Auger Boring ASTM D1452	**Depth (ft):**	105
Boring Number:	59-C-1	**Sampled By:**	Patterson, Gregg
Location:	In-place		
Location Details:	Boring 59-C-1 105'		
Sample Date:	04/23/2020		
Received Date:	04/23/2020	**Lab:**	4511 West First Street, Suite 4, Duluth, MN
Tested Date:	04/27/2020		

Laboratory Data

Sieve Size	% Passing	Specification
9.5 mm (3/8 inch)	100	
4.75 mm (No. 4)	99	
2 mm (No. 10)	99	
850 µm (No. 20)	98	
425 µm (No. 40)	95	
180 µm (No. 80)	66	
150 µm (No. 100)	57	
75 µm (No. 200)	35.8	



Test Method: Method A (Composite Sieving)
Dispersion Apparatus: Shaking
Specimen Obtained: Moist

Classification: SM Silty sand

General

Results: The test is for informational purposes.
Remarks: Total dry weight of sample 342.2 grams

Sieve Analysis Of Soil

ASTM D6913

4/28/2020

4511 West First Street
Suite 4
Duluth, MN 55807
Phone: 218-624-4967

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

B2001991
Enbridge Line 5 Re-route
Enbridge Line 5
<Blank>, <Blank>

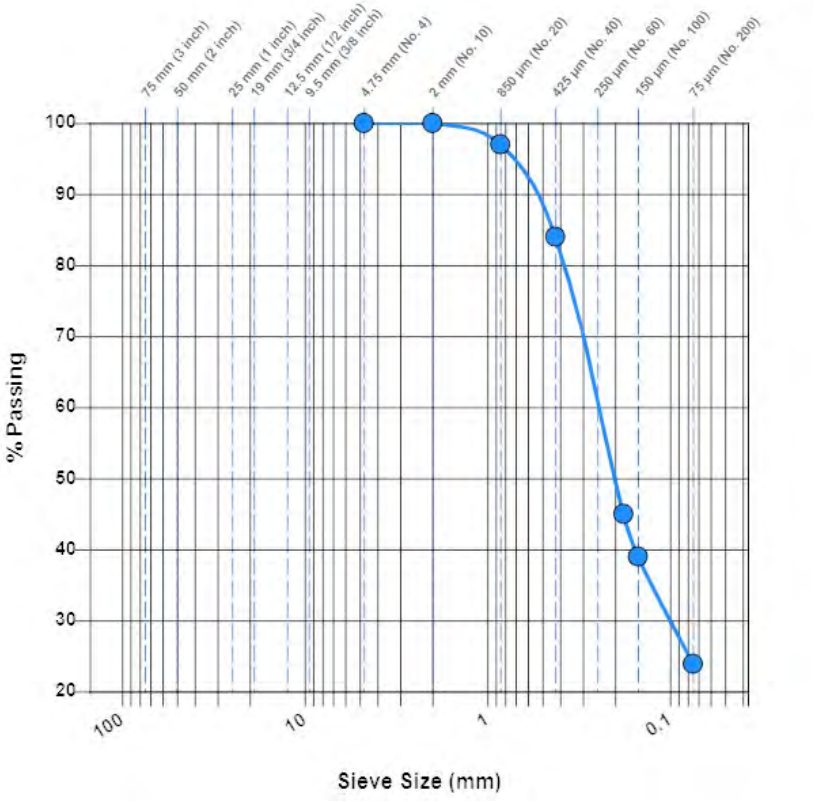
Sample Information

Sample Number:	303883	**Alternate ID:**	59-C-1 115'
Sampling Method:	Auger Boring ASTM D1452	**Depth (ft):**	115
Boring Number:	59-C-1	**Sampled By:**	Patterson, Gregg
Location:	In-place		
Location Details:	Boring 59-C-1 115'		
Sample Date:	04/23/2020		
Received Date:	04/23/2020	**Lab:**	4511 West First Street, Suite 4, Duluth, MN
Tested Date:	04/27/2020		

Laboratory Data

Sieve Size	% Passing	Specification
4.75 mm (No. 4)	100	
2 mm (No. 10)	100	
850 µm (No. 20)	97	
425 µm (No. 40)	84	
180 µm (No. 80)	45	
150 µm (No. 100)	39	
75 µm (No. 200)	23.9	

Test Method: Method A (Composite Sieving)
Dispersion Apparatus: Shaking
Specimen Obtained: Moist



Classification: SM Silty sand

General

Results: The test is for informational purposes.
Remarks: Total dry weight of sample 284.0 grams

Hydrometer And Sieve Analysis

ASTM D422

4/20/2020

11001 Hampshire Avenue S
Minneapolis, MN 55438
Phone: 952-995-2000

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

B2001991
Enbridge Line 5 Re-route
Enbridge Line 5

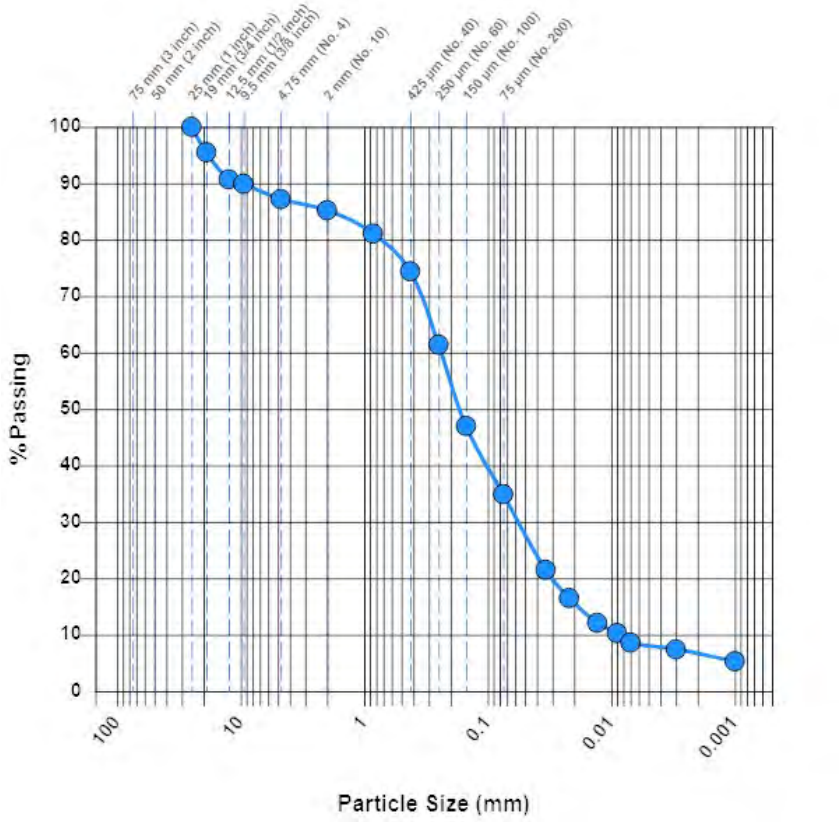
Sample Information

Sample Number:	302829	**Depth (ft):**	19.5-24.5
Boring Number:	60-C	**Sampled By:**	Drill Crew
Sample Date:	04/20/2020		
Received Date:	04/20/2020	**Lab:**	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	04/20/2020	**Tested By:**	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
25 mm (1 inch)	100.0	-
19 mm (3/4 inch)	95.5	-
12.5 mm (1/2 inch)	90.7	-
9.5 mm (3/8 inch)	89.9	-
4.75 mm (No. 4)	87.2	-
2 mm (No. 10)	85.2	-
850 µm (No. 20)	81.1	-
425 µm (No. 40)	74.4	-
250 µm (No. 60)	61.4	-
150 µm (No. 100)	47.0	-
75 µm (No. 200)	34.9	-
33.7 (µm)	21.5	-
21.7 (µm)	16.5	-
12.8 (µm)	12.1	-
9.1 (µm)	10.3	-
6.5 (µm)	8.6	-
3.1 (µm)	7.4	-
1.4 (µm)	5.3	-



Soil Classification: SM Silty sand

Gravel (%):	12.8	**Sand (%):**	52.3	**Silt (%):**	26.9	**Clay (%):**	8.0		
D_{60} (µm):	240.3	**D_{30} (µm):**	60.0	**D_{10} (µm):**	8.6	**C_u:**	27.94	**C_c:**	1.74

General

Hydrometer And Sieve Analysis

ASTM D422

4/20/2020

11001 Hampshire Avenue S
Minneapolis, MN 55438
Phone: 952-995-2000

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

B2001991
Enbridge Line 5 Re-route
Enbridge Line 5

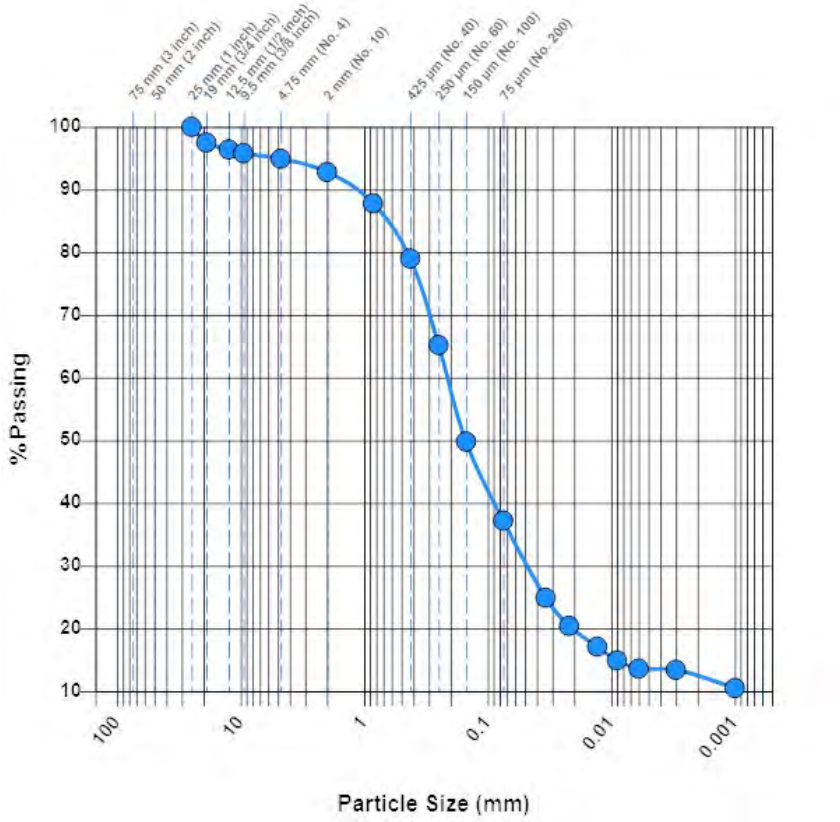
Sample Information

Sample Number:	302830	**Depth (ft):**	44.5-54.5
Boring Number:	60-C	**Sampled By:**	Drill Crew
Sample Date:	04/20/2020		
Received Date:	04/20/2020	**Lab:**	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	04/20/2020	**Tested By:**	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
25 mm (1 inch)	100.0	-
19 mm (3/4 inch)	97.5	-
12.5 mm (1/2 inch)	96.4	-
9.5 mm (3/8 inch)	95.8	-
4.75 mm (No. 4)	94.9	-
2 mm (No. 10)	92.8	-
850 µm (No. 20)	87.8	-
425 µm (No. 40)	79.0	-
250 µm (No. 60)	65.2	-
150 µm (No. 100)	49.8	-
75 µm (No. 200)	37.2	-
33.8 (µm)	24.9	-
21.7 (µm)	20.4	-
12.6 (µm)	17.1	-
9.0 (µm)	14.9	-
6.3 (µm)	13.6	-
3.1 (µm)	13.4	-
1.4 (µm)	10.5	-



Soil Classification: SC-SM Silty clayey sand

Gravel (%):	5.1	**Sand (%):**	57.7	**Silt (%):**	23.7	**Clay (%):**	13.5
D_{60} (µm):	216.2	**D_{30} (µm):**	51.0				

General

Hydrometer And Sieve Analysis

ASTM D422

4/20/2020

11001 Hampshire Avenue S
Minneapolis, MN 55438
Phone: 952-995-2000

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

B2001991
Enbridge Line 5 Re-route
Enbridge Line 5

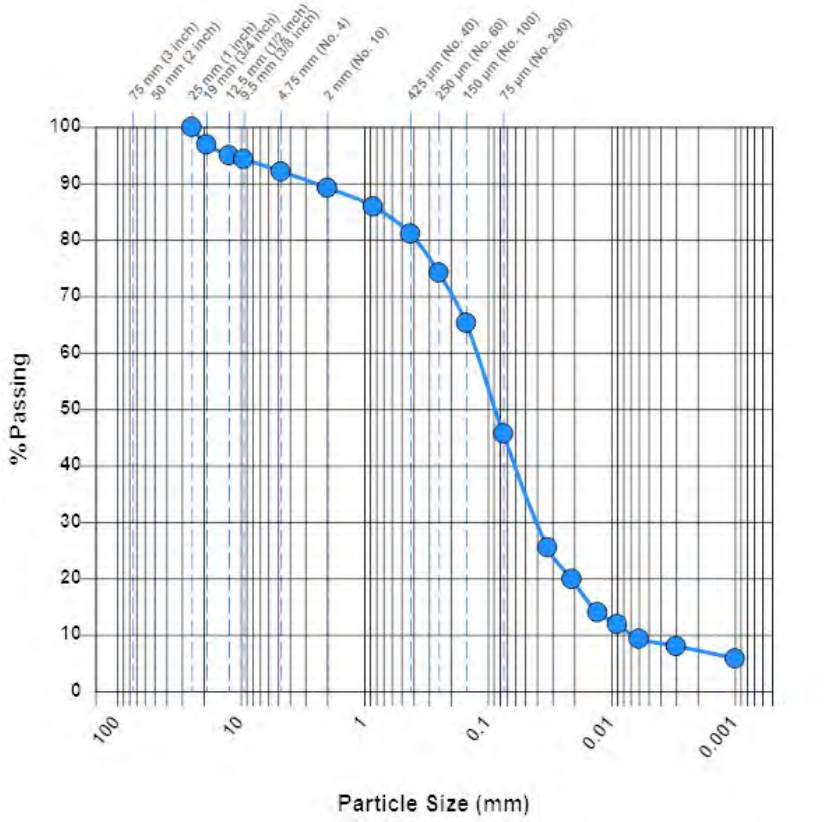
Sample Information

Sample Number:	302832	**Depth (ft):**	74.5-84.5
Boring Number:	60-C	**Sampled By:**	Drill Crew
Sample Date:	04/20/2020		
Received Date:	04/20/2020	**Lab:**	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	04/20/2020	**Tested By:**	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
25 mm (1 inch)	100.0	-
19 mm (3/4 inch)	96.9	-
12.5 mm (1/2 inch)	95.0	-
9.5 mm (3/8 inch)	94.3	-
4.75 mm (No. 4)	92.1	-
2 mm (No. 10)	89.2	-
850 µm (No. 20)	85.9	-
425 µm (No. 40)	81.1	-
250 µm (No. 60)	74.2	-
150 µm (No. 100)	65.3	-
75 µm (No. 200)	45.7	-
32.9 (µm)	25.5	-
21.3 (µm)	19.9	-
12.6 (µm)	14.0	-
9.0 (µm)	11.9	-
6.4 (µm)	9.3	-
3.1 (µm)	8.0	-
1.4 (µm)	5.8	-



Soil Classification: SM Silty sand

Gravel (%):	7.9	**Sand (%):**	46.4	**Silt (%):**	36.8	**Clay (%):**	8.9		
D_{60} (µm):	129.7	**D_{30} (µm):**	42.4	**D_{10} (µm):**	6.8	**C_u:**	19.07	**C_c:**	2.04

General

Hydrometer And Sieve Analysis

ASTM D422

4/20/2020

11001 Hampshire Avenue S
Minneapolis, MN 55438
Phone: 952-995-2000

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

B2001991
Enbridge Line 5 Re-route
Enbridge Line 5

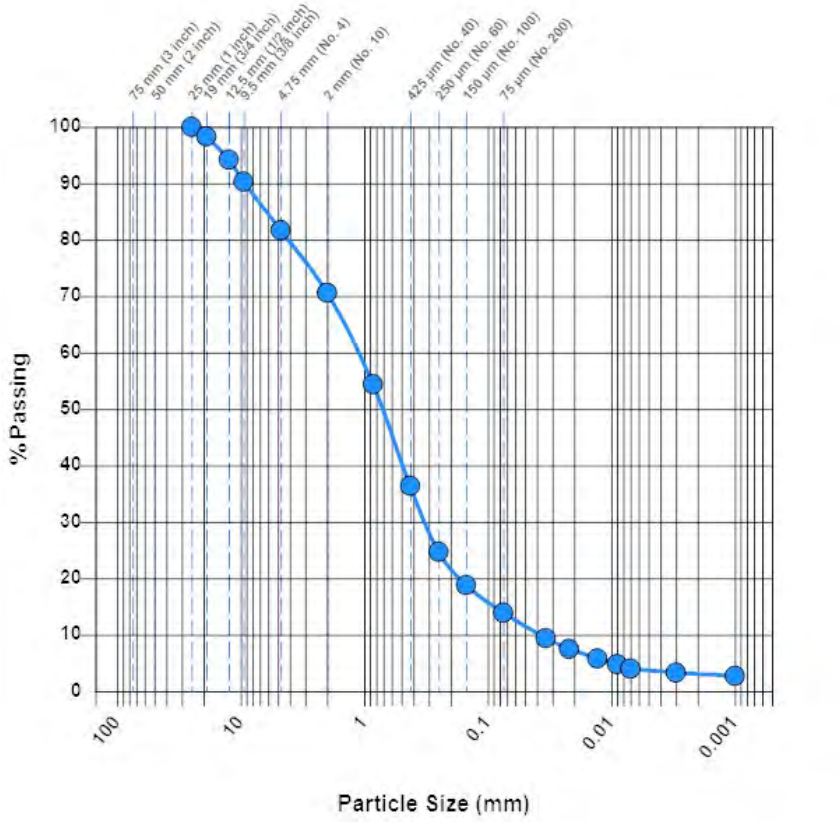
Sample Information

Sample Number:	302833	**Depth (ft):**	99.5-115.5
Boring Number:	60-C	**Sampled By:**	Drill Crew
Sample Date:	04/20/2020		
Received Date:	04/20/2020	**Lab:**	11001 Hampshire Ave S, Bloomington, MN
Tested Date:	04/20/2020	**Tested By:**	Streier, Jim

Laboratory Data

Sieve-Hydrometer Analysis

Particle Size	% Passing	Specification
25 mm (1 inch)	100.0	-
19 mm (3/4 inch)	98.3	-
12.5 mm (1/2 inch)	94.2	-
9.5 mm (3/8 inch)	90.3	-
4.75 mm (No. 4)	81.7	-
2 mm (No. 10)	70.6	-
850 µm (No. 20)	54.4	-
425 µm (No. 40)	36.4	-
250 µm (No. 60)	24.7	-
150 µm (No. 100)	18.8	-
75 µm (No. 200)	13.9	-
33.8 (µm)	9.4	-
21.8 (µm)	7.5	-
12.7 (µm)	5.8	-
9.1 (µm)	4.8	-
6.5 (µm)	4.0	-
3.2 (µm)	3.3	-
1.4 (µm)	2.7	-



Soil Classification: SM Silty sand with gravel

Gravel (%):	18.3	**Sand (%):**	67.8	**Silt (%):**	10.2	**Clay (%):**	3.7		
D_{60} (µm):	1247.5	**D_{30} (µm):**	329.3	**D_{10} (µm):**	39.5	**C_u:**	31.58	**C_c:**	2.20

General

Moisture Content Of Soil

ASTM D2216

4/6/2020

4511 West First Street
Suite 4
Duluth, MN 55807
Phone: 218-624-4967

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

B2001991
Enbridge Line 5 Re-route
Enbridge Line 5
<Blank>, <Blank>

Sample Information

Sample Number: 300522
Alternate ID: 56-C-1 12'-14.5'
Sampling Method: Auger Boring ASTM D1452
Sampled By: Patterson, Gregg
Location: In-place
Location Details: Boring 56-C-1 12'-14.5'
Sample Date: 04/03/2020
Received Date: 04/06/2020
Lab: 4511 West First Street, Suite 4, Duluth, MN
Tested Date: 04/06/2020
Tested By: Falwey, Shane

Laboratory Data

Boring #	Sample #	Depth (ft)	Moisture Content (%)
56-C-1	6 & 7	13.0	10.5

General

Results: The test is for informational purposes.

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Suite 4
Duluth, MN 55807
Phone: 218-624-4967

Moisture Content Of Soil

ASTM D2216

4/6/2020

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

B2001991
Enbridge Line 5 Re-route
Enbridge Line 5
<Blank>, <Blank>

Sample Information

Sample Number: 300523
Alternate ID: 56-C-1 29.5'
Sampling Method: Auger Boring ASTM D1452
Sampled By: Patterson, Gregg
Location: In-place
Location Details: Boring 56-C-1 29.5'
Sample Date: 04/03/2020
Received Date: 04/06/2020
Lab: 4511 West First Street, Suite 4, Duluth, MN
Tested Date: 04/06/2020
Tested By: Falwey, Shane

Laboratory Data

Boring #	Sample #	Depth (ft)	Moisture Content (%)
56-C-1	10	29.5	25.0

General

Results: The test is for informational purposes.

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Moisture Content Of Soil

ASTM D2216

4/6/2020

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

B2001991
Enbridge Line 5 Re-route
Enbridge Line 5
<Blank>, <Blank>

Sample Information

Sample Number: 300524
Alternate ID: 56-C-1 44.5'-49.5'
Sampling Method: Auger Boring ASTM D1452
Sampled By: Patterson, Gregg
Location: In-place
Location Details: Boring 56-C-1 44.5'-49.5'
Sample Date: 04/03/2020
Received Date: 04/06/2020
Lab: 4511 West First Street, Suite 4, Duluth, MN
Tested Date: 04/06/2020
Tested By: Falwey, Shane

Laboratory Data

Boring #	Sample #	Depth (ft)	Moisture Content (%)
56-C-1	13 & 14	47.0	16.1

General

Results: The test is for informational purposes.

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Moisture Content Of Soil

ASTM D2216

4/7/2020

4511 West First Street
Suite 4
Duluth, MN 55807
Phone: 218-624-4967

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

B2001991
Enbridge Line 5 Re-route
Enbridge Line 5
<Blank>, <Blank>

Sample Information

Sample Number: 300525
Alternate ID: 56-C-1 64.5'-79.5'
Sampling Method: Auger Boring ASTM D1452
Sampled By: Patterson, Gregg
Location: In-place
Location Details: Boring 56-C-1 64.5'-79.5'
Sample Date: 04/03/2020
Received Date: 04/06/2020
Lab: 4511 West First Street, Suite 4, Duluth, MN
Tested Date: 04/06/2020
Tested By: Falwey, Shane

Laboratory Data

Boring #	Sample #	Depth (ft)	Moisture Content (%)
56-C-1	17 & 20	72.0	11.5

General

Results: The test is for informational purposes.

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Suite 4
Duluth, MN 55807
Phone: 218-624-4967

Moisture Content Of Soil

ASTM D2216

4/7/2020

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

B2001991
Enbridge Line 5 Re-route
Enbridge Line 5
<Blank>, <Blank>

Sample Information

Sample Number: 300526
Alternate ID: 56-C-1 84.5'-104.5'
Sampling Method: Auger Boring ASTM D1452
Sampled By: Patterson, Gregg
Location: In-place
Location Details: Boring 56-C-1 84.5'-104.5'
Sample Date: 04/03/2020
Received Date: 04/06/2020
Lab: 4511 West First Street, Suite 4, Duluth, MN
Tested Date: 04/06/2020
Tested By: Falwey, Shane

Laboratory Data

Boring #	Sample #	Depth (ft)	Moisture Content (%)
56-C-1	22-25	97.0	20.7

General

Results: The test is for informational purposes.

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11001 Hampshire Avenue S
Minneapolis, MN 55438
Phone: 952-995-2000

Geotechnical Testing

Various ASTM

4/20/2020

Client:

Enbridge Energy, Limited Partnership
Attn: Accounts Payable5400 Westheimer Ct
Houston, TX 77056

Project:

B2001991
Enbridge Line 5 Re-route
Enbridge Line 5

Sample Information

Metafield ID: 302820

Completed Date: 04/20/2020 **Prepared By:** Streier, Jim

Laboratory Results Summary

Boring	Sample	Depth (ft)	MC (%)	Wash Loss (%)	LL	PL	PI	Organic Content %	Dry Density (pcf)	Resistivity (ohm-cm)	Q_u (tsf)	Specific Gravity
60-C	8,9	19.5	13.6									
60-C	13,14,15	44.5	9.2		19	12	7					
60-C	19,20,21	74.5	13.5		16	15	1					
60-C	24,25,27	99.5	15.0									

General