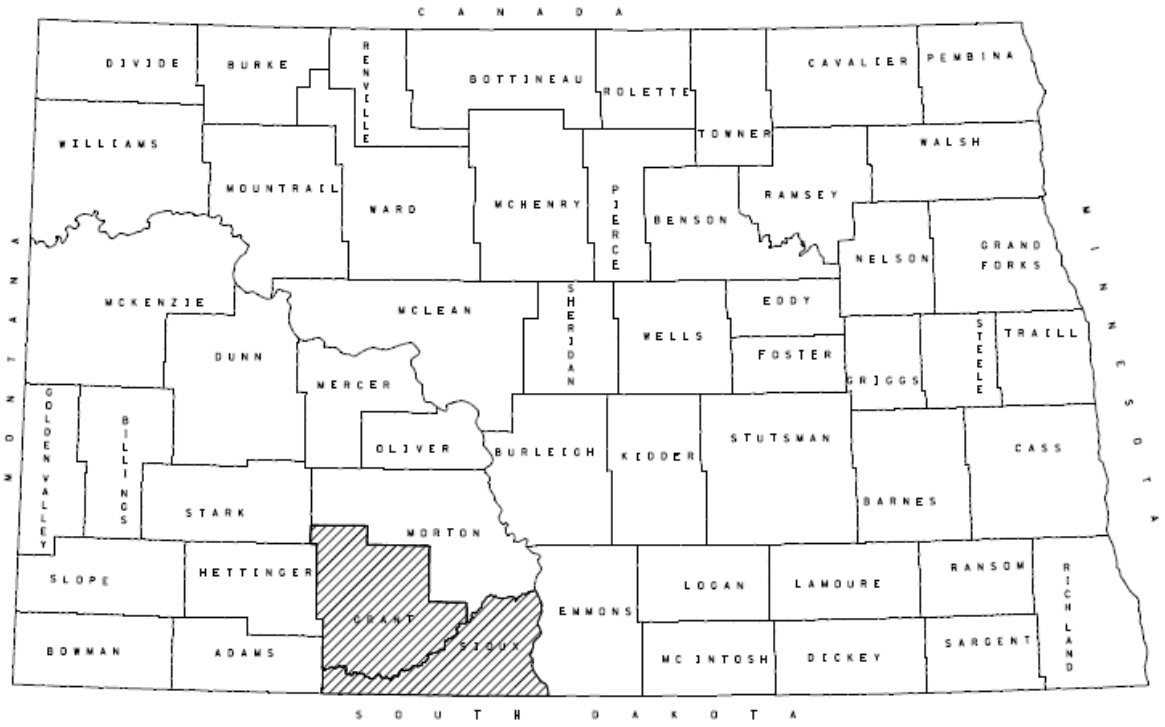
LINEAR SOILS SURVEY AND RECOMMENDATIONS

PROJECT NO. X-5-049(020)000

PCN 23274

COUNTY Sioux & Grant

Hwy 49, RP 0.000 to 29.762



PREPARED BY: Riley McAdoo-Roesler

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
MATERIALS AND RESEARCH DIVISION

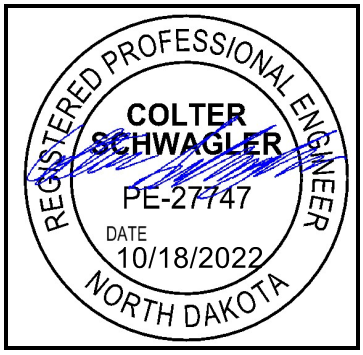
October 2022

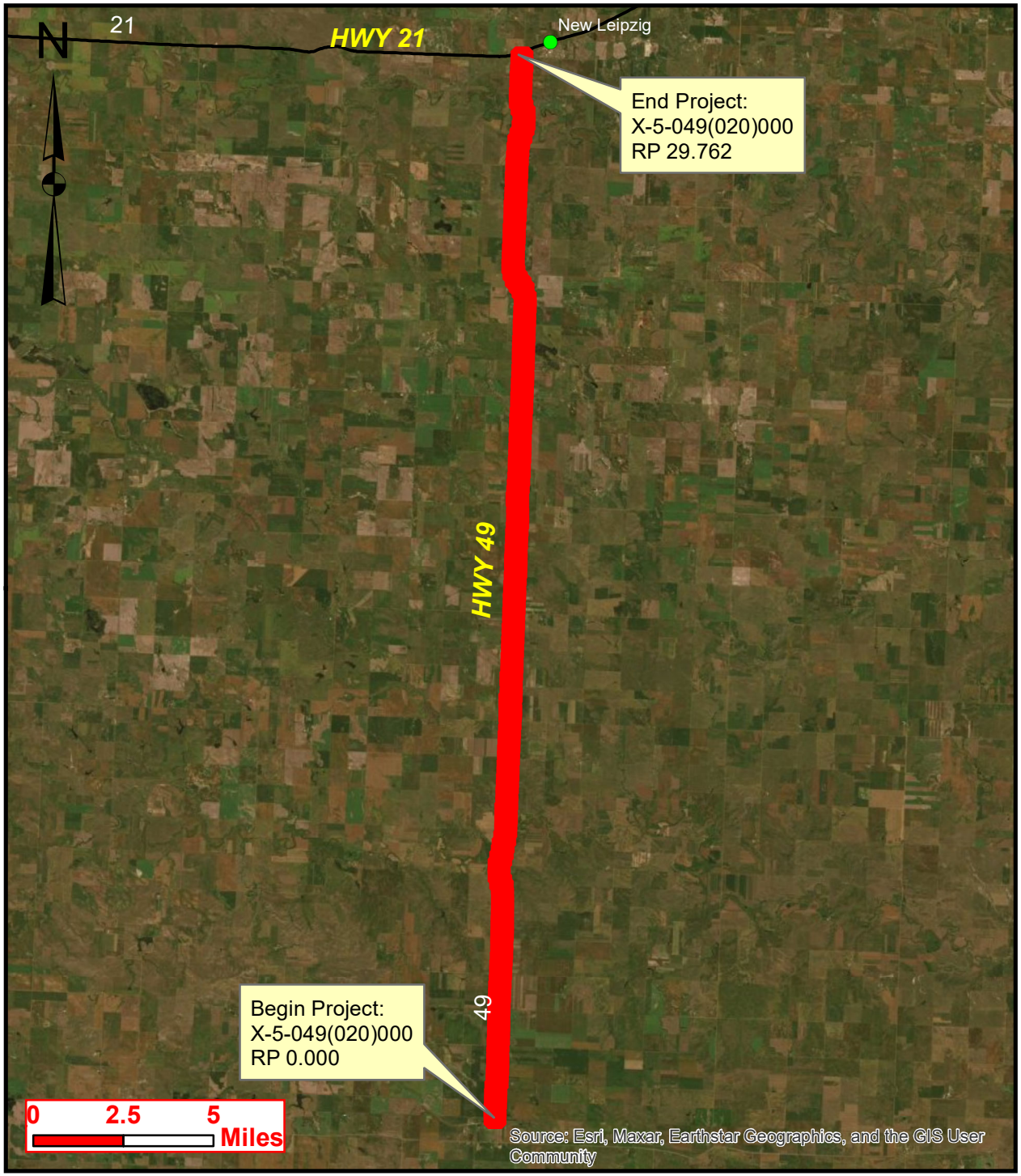
X-5-049(020)000

State line to Jct Hwy 21

CERTIFICATION

I hereby certify that this report was prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the State of North Dakota. This document was originally issued and sealed by Colter Schwagler, Registration number PE-27747 on 10/17/2022 and the original document is stored at the North Dakota Department of Transportation.





Project Location

Project: X-5-049(020)000
PCN: 23274
Scope: Structural Overlay
Location: RP 0.000 to RP 29.762

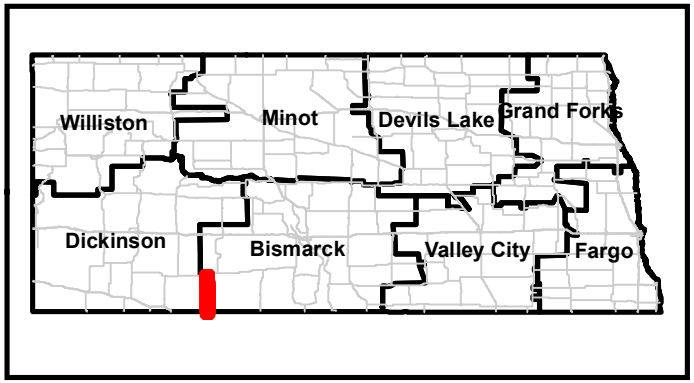


Table of Contents

Introduction 1
Maintenance Review 1
Summary of Soil Investigation 2
Summary of Soil Analysis 3
  Soil Sample Distribution 3
Design Recommendations 4
  Design Information 5
  Plan Notes 5

List of Figures

Figure 1 - Soil Sample Distribution 3

List of Tables

Table 1 – Identified Maintenance Areas 1
Table 2 – Boring Locations Summary 2
Table 3 – Subcut Recommendations 5

Appendices

Appendix A – Soil Classification
Appendix B – Maintenance Review and Subsurface Investigation Scope
Appendix C – Boring Locations
Appendix D – Summary of Soils Analysis
Appendix E – Lab Results

Introduction

Location: Hwy 49, State line to Jct Hwy 21
Reference Points: 0.000 to 29.762
Project Length: 29.762 Miles
Proposed Project Scope: Structural Overlay
Investigation Scope: 1000' Intervals and Identified Maintenance Areas

Maintenance Review

Date of Maintenance Review: 08/25/2021
Materials and Research Person Conducting the Review: Jamie Naumann
Maintenance Person Conducting Review: David Bohn

Table 1 – Identified Maintenance Areas

Location RP + Feet	Distress Identified	Maintenance Comments	Drilling Required
0+0000 to 29+4023	Transv. Cracks	Crack Seal in 2021	No
0+0447 to 3+0000	Alligator cracking	Periodic patching throughout	Yes
1+4767 to 2+0732	Raveling & Weather	Wash boarding	No
5+0600 to 5+2080	Alligator cracking	Will be patching this spot this year (2021)	Yes
7+2500	Dip in Road	Not a big issue	No
11+1150 to 11+1573	Bituminous Patch	Blade patched in 2021	No
15+1140 to 15+2700	Alligator cracking	Fixed in 2020	Yes
21+3000 to 21+3800	RT shoulder peeling off	Put recycled on to even out	No
23+5200 to 25+0900	Alligator cracking	Patched in 2021	Yes

Summary of Soil Investigation

The soil investigation was completed on 12/22/2021. The investigation consisted of 196 borings.

Table 2 – Boring Locations Summary

Boring Location	Pavement Distress	Justification for Boring	Boring Depth	Boring Locations/Comments
00+0000 to 29+4023	-	FDR	5 feet	Conduct borings at 1000' intervals along the project limits (taking into account previous borings, do not redrill). A total number of approximately 158 borings.
0+0447 to 3+0000	Alligator cracking	Identified Area	10 feet	Conduct fourteen borings in the distressed area and one boring on either side. A total number of sixteen borings.
5+0600 to 5+2080	Alligator cracking	Identified Area	10 feet	Conduct three borings in the distressed area and one boring on either side. A total number of five borings.
11+1150 to 11+1573	Bituminous Patch	Identified Area	10 feet	Conduct two borings in the distressed area and one boring on either side. A total number of four borings.
15+1140 to 15+2700	Alligator cracking	Identified Area	10 feet	Conduct three borings in the distressed area and one boring on either side. A total number of five borings.
23+5200 to 26+0900	Alligator cracking	Identified Area	10 feet	Conduct six borings in the distressed area and one boring on either side. A total number of eight borings.

Maps of the boring locations are shown in Appendix C. The lab results are included in Appendix E.

Summary of Soil Analysis

Soil Sample Distribution

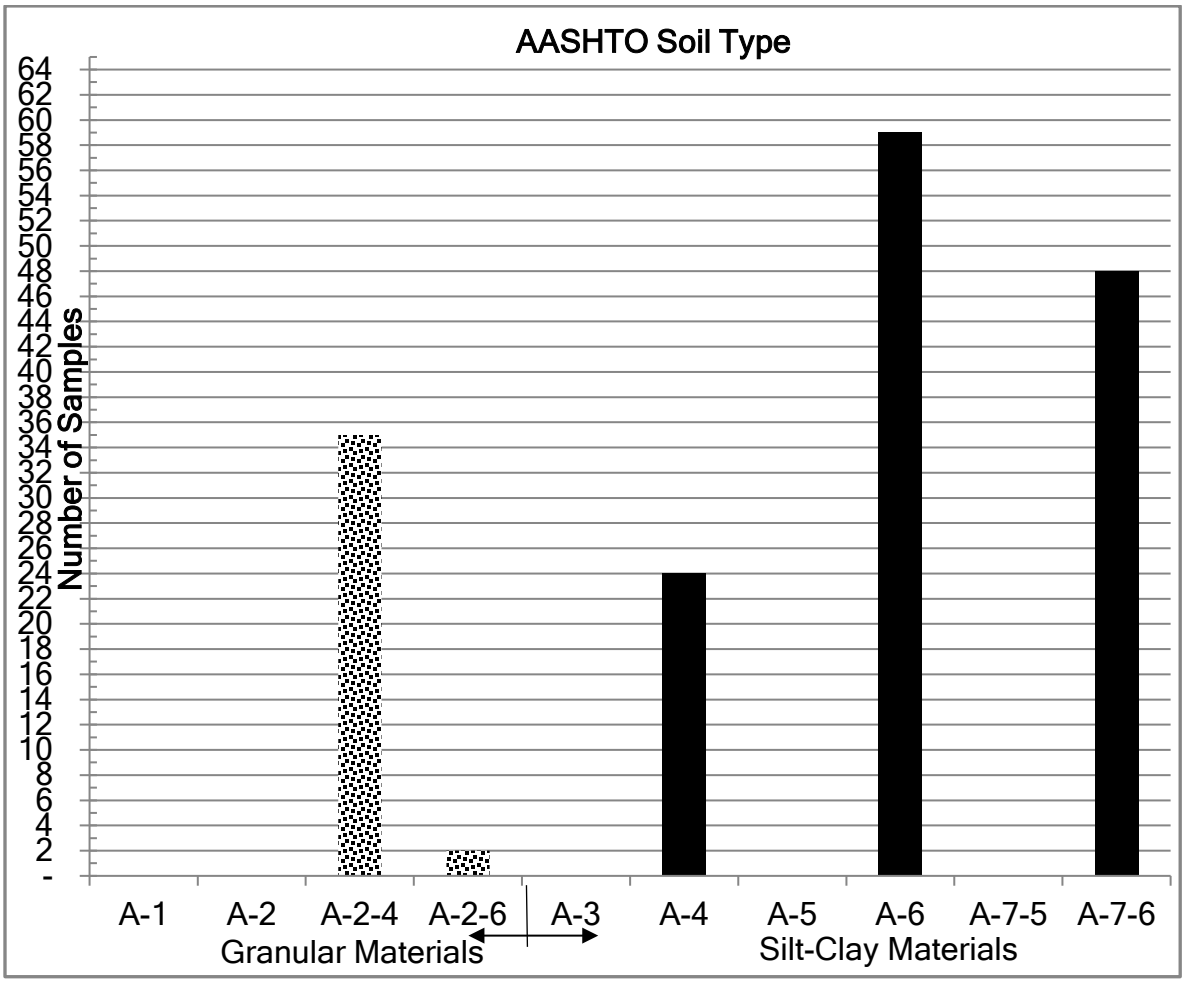


Figure 1 - Soil Sample Distribution

Design Recommendations

Project Limits – 0+0000 to 29+4023: The soils throughout the project can be broken into a few separate groups; clayey sand, lean clay and silty sand. Clayey sands and lean clay can be found throughout the project whereas the silty sands are typically found in cut area. These soils groups do not indicate that the subgrade is causing the roadway distress. No subgrade mitigation is recommended.

Identified Maintenance Area – 0+0447 to 3+0000: The soils in the maintenance area do not have an elevated water content and change throughout the maintenance area, while the observed required maintenance does not. No subgrade mitigation is recommended.

Identified Maintenance Area – 5+0600 to 5+2080: The soils within the identified maintenance area are clayey sand. There is not a change in soil type or water content that would indicate that the subgrade is causing the roadway distress at this location. No subgrade mitigation is recommended.

Identified Maintenance Area – 11+1150 to 11+1573: The soils within the identified maintenance area are fat clay. The in-place moistures of the soils well over both optimum and the plastic limit. Wet clayey soils are likely contributing to the maintenance area and it is recommend to perform a subcut from station 11+1100 to 11+1600 at a depth of 24”.

Identified Maintenance Area – 15+1140 to 15+2700: The soils within the identified maintenance area are primarily lean clays. The soils surrounding the maintenance are similar to the soils within the maintenance area therefore there is not a change in soil type that would indicate that the subgrade is causing the roadway distress at this location. No subgrade mitigation is recommended.

Identified Maintenance Area – 23+5200 to 26+0900: The soils within the identified maintenance area are lean clays. There is not a change in soil type or water content that would indicate that the subgrade is causing the roadway distress at this location. No subgrade mitigation is recommended.

Design Information

Pipe Replacement: None

Compaction Method: T-180

Subgrade Prep: None

Subcut Recommendations: None

Location RP + Feet	Length	Depth
11+1100 to 11+1600	500’	24”

Table 3 – Subcut Recommendations

Calculate the subcut quantity based on the lengths and depths as shown in Table 3 above and adhere to the guidelines stated below.

> **Remarks:** Subcut from the top of proposed pavement. Place geogrid (Type G) at the bottom of all subcut excavations and backfill with Class 5 aggregate. Place 10” of aggregate on the geogrid prior to compacting. Do not scarify the bottom of the subcut.

Drainage: None

Plan Notes

None

The recommendations in this report are based on the scope specified in the Introduction. If the scope of work, vertical profile or horizontal alignment is changed, in either the conceptual phase or the design phase, the Geotechnical Engineer must be notified as soon as possible to ensure that there is adequate geotechnical information addressing these areas.

APPENDIX A

SOIL CLASSIFICATION

AASHTO Classification System

Table 5.1. AASHTO Classification System

General Classification	*Granular materials (35% or less passing No. 200 Sieve (0.075 mm)*							*Silt-clay Materials More than 35% passing No. 200 Sieve (0.075 mm)*			
Group Classification	*A—1*		*A—3*	*A—2*				*A—4*	*A—5*	*A—6*	*A—7*
	A—1—a	*A—1—b*		*A—2—4*	*A—2—5*	*A—2—6*	*A—2—7*				*A—7—5 A—7—6*
(*a*) Sieve Analysis: Percent Passing											
(*i*) 2.00 mm (No. 10)	50 max										
(*ii*) 0.425 mm (No. 40)	30 max	50 max	51 min								
(*iii*) 0.075 mm (No. 200)	15 max	25 max	10 max	35 max	35 max	35 max	35 max	36 min	36 min	36 min	36 min
(*b*) Characteristics of fraction passing 0.425 mm (No. 40)											
(*i*) Liquid limit				40 max	41 min	40 max	41 min	40 max	41 min	40 max	41 min
(*ii*) Plasticity index	6 max		N.P.	10 max	10 max	11 min	11 min	10 max	10 max	11 min	11 min*
(*c*) Usual types of significant Constituent materials	Stone Fragments Gravel and sand		Fine Sand	Silty or Clayey Gravel Sand				Silty Soils		Clayey Soils	
(*d*) General rating as subgrade.	Excellent to Good							Fair to Poor			

* If plasticity index is equal to or less than (liquid Limit—30), the soil is A—7—5 (*i.e.* PL > 30%)
If plasticity index is greater than (Liquid Limit—30), the soil is A—7—6 (*i.e.* PL < 30%)

Unified Soil Classification System, USCS

Table 5.2 Unified Soil Classification System (Based on Material Passing 76.2-mm Sieve)

Criteria for assigning group symbols				Group symbol
Coarse-grained soils More than 50% of retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines[a]	$C_u \geq 4$ and $1 \leq C_c \leq 3$[c]	GW
			$C_u < 4$ and/or $1 > C_c > 3$[c]	GP
		Gravels with Fines More than 12% fines[a,d]	$PI < 4$ or plots below "A" line (Figure 5.3)	GM
			$PI > 7$ and plots on or above "A" line (Figure 5.3)	GC
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines[b]	$C_u \geq 6$ and $1 \leq C_c \leq 3$[c]	SW
			$C_u < 6$ and/or $1 > C_c > 3$[c]	SP
		Sands with Fines More than 12% fines[b,d]	$PI < 4$ or plots below "A" line (Figure 5.3)	SM
			$PI > 7$ and plots on or above "A" line (Figure 5.3)	SC
Fine-grained soils 50% or more passes No. 200 sieve	Silts and clays Liquid limit less than 50	Inorganic	$PI > 7$ and plots on or above "A" line (Figure 5.3)[e]	CL
			$PI < 4$ or plots below "A" line (Figure 5.3)[e]	ML
		Organic	$\frac{\text{Liquid limit — oven dried}}{\text{Liquid limit — not dried}} < 0.75$; see Figure 5.3; OL zone	OL
	Silts and clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line (Figure 5.3)	CH
			PI plots below "A" line (Figure 5.3)	MH
		Organic	$\frac{\text{Liquid limit — oven dried}}{\text{Liquid limit — not dried}} < 0.75$; see Figure 5.3; OH zone	OH
Highly Organic Soils	Primarily organic matter, dark in color, and organic odor			Pt

[a] Gravels with 5 to 12% fine require dual symbols: GW-GM, GW-GC, GP-GM, GP-GC.

[b] Sands with 5 to 12% fines require dual symbols: SW-SM, SW-SC, SP-SM, SP-SC.

[c] $C_u = \frac{D_{60}}{D_{10}}$; $C_c = \frac{(D_{30})^2}{D_{60} \times D_{10}}$

[d] If $4 \leq PI \leq 7$ and plots in the hatched area in Figure 5.3, use dual symbol GC-GM or SC-SM.

[e] If $4 \leq PI \leq 7$ and plots in the hatched area in Figure 5.3, use dual symbol CL-ML.

Plasticity Chart :

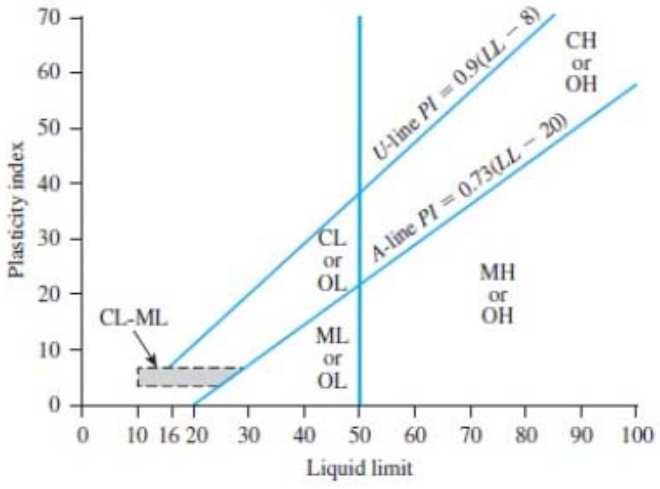


Table 7-12. Frost susceptibility classification of soils (NCHRP 1-37A).

Frost Group	Degree of Frost Susceptibility	Type of Soil	Percentage Finer than 0.075 mm (# 200) by wt.	Typical Soil Classification
F1	Negligible to low	Gravelly soils	3-10	GC, GP, GC-GM, GP-GM
F2	Low to medium	Gravelly soils	10-20	GM, GC-GM, GP-GM
		Sands	3-15	SW, SP, SM, SW-SM, SP-SM
F3	High	Gravelly Soils	Greater than 20	GM-GC
		Sands, except very fine silty sands	Greater than 15	SM, SC
		Clays PI>12	—	CL, CH
F4	Very high	All Silts	—	ML-MH
		Very Fine Silty Sands	Greater than 15	SM
		Clays PI<12	—	CL, CL-ML
		Varied clays and other fine grained, banded sediments	—	CL, ML, SM, CH

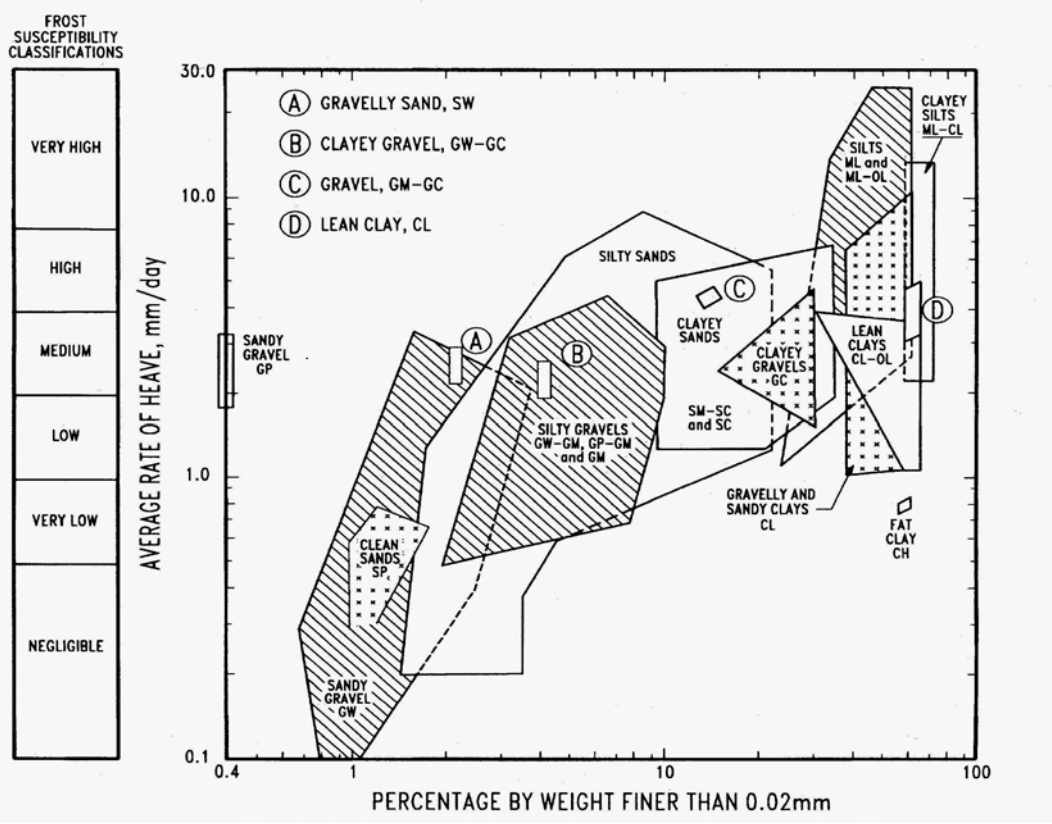


Figure 7-20. Average rate of heave versus % fines for natural soil gradations (Kaplar, 1974).

Frost Depth Map



APPENDIX B

MAINTENANCE REVIEW AND SUBSURFACE INVESTIGATION SCOPE

PAVEMENT EVALUATION LOG FOR LINEAR SOIL SURVEY

North Dakota Department of Transportation, Materials & Research
SFN 60472 (6-2017)

Sheet 1 of 1

Project Number	PCN	Date of Survey
X-5-049(020)000	23274	08/25/2021

Section Maintenance Contact	Completed By
David Bohn	Jamie Naumann

Highway Reference Points	Surface Types
0+0000 to 29+4023	Asphalt

Location	Pavement Distress	Description	Maintenance Comment	Picture Number	Drilling Required
0+0000 to 29+4023	Transv. Cracks	Good Ride	Crack seals in 2021		No
0+0447 to 3 +0000	Alligator Cracking	Pavement deteriorating, patched in 2020	periodic patching throughout	1	Yes
1+4767 to 2 +0732	Raveling & Weather	Patched	Wash boarding	2	No
5+0600 to 5+2080	Alligator Cracking	What the Beginning of the problem area looks like.	Will be patching this spot this year	3-9	Yes
7+2500	Other	Dip in road	Not a big issue	10-11	No
11+1150 to 11+1573	Bituminous Patch	Pushing and Rutting	Blade patched in 2021	12	No
15+1140 to 15+2700	Alligator Cracking	Water pumping	Fixed in 2020	13	Yes
21+3000 to 21+3800	Other	RT shoulder peeling off	Put recycled on to even out.	14-15	No
23+5200 to 25+0900	Alligator Cracking		Patched in 2021	16-18	Yes

Comments



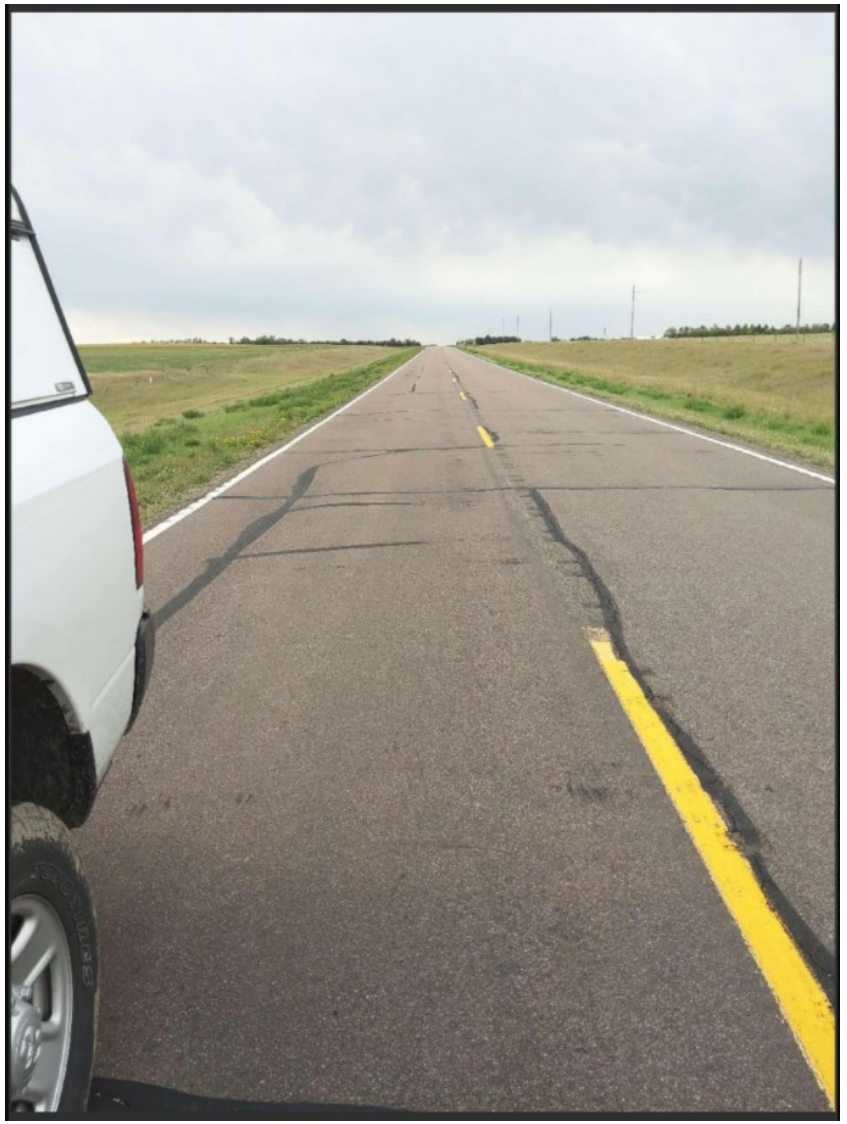
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0+0447 to 3+0000



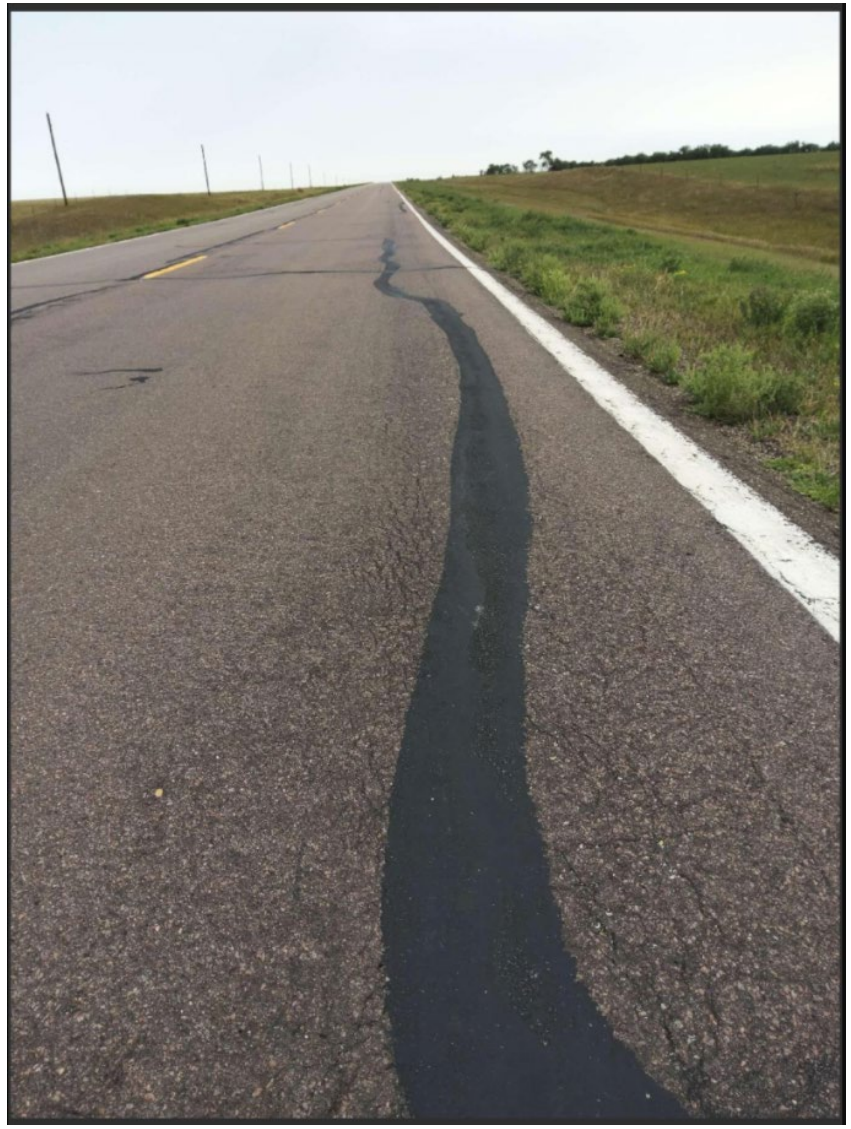
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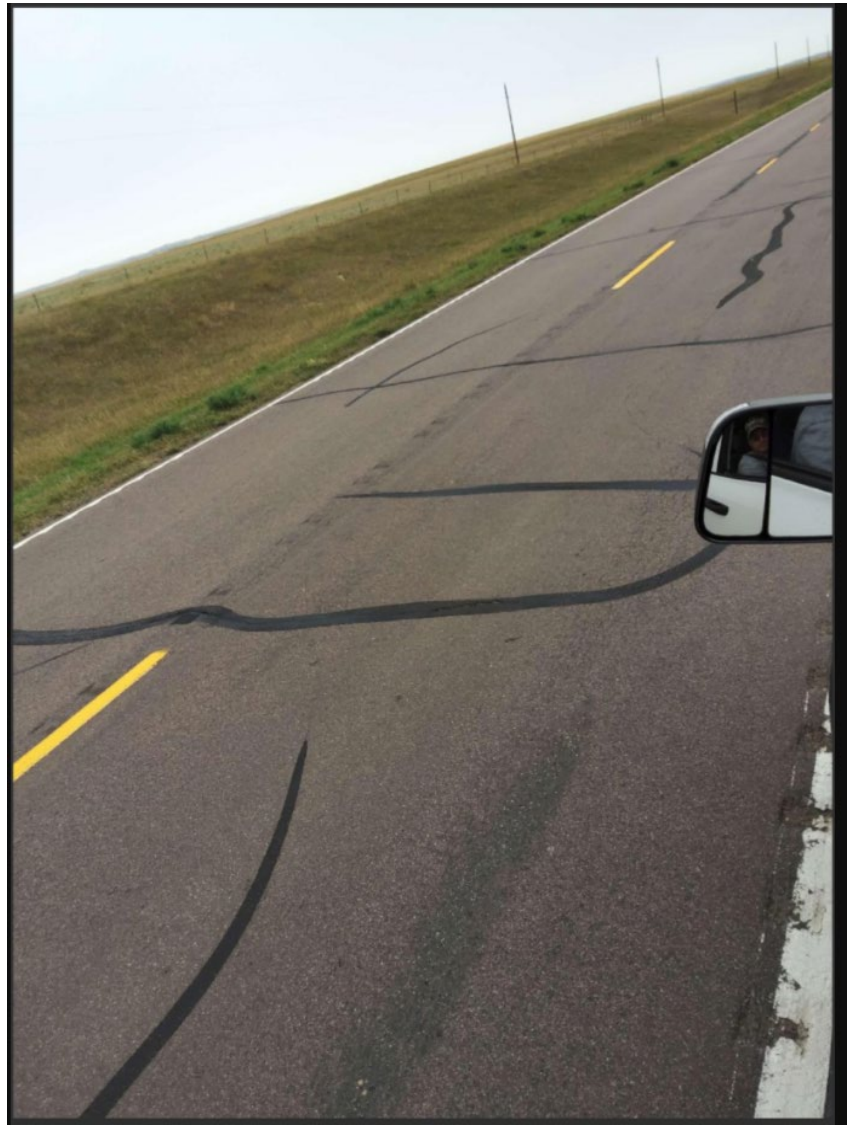
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4
5+0600 to 5+2080



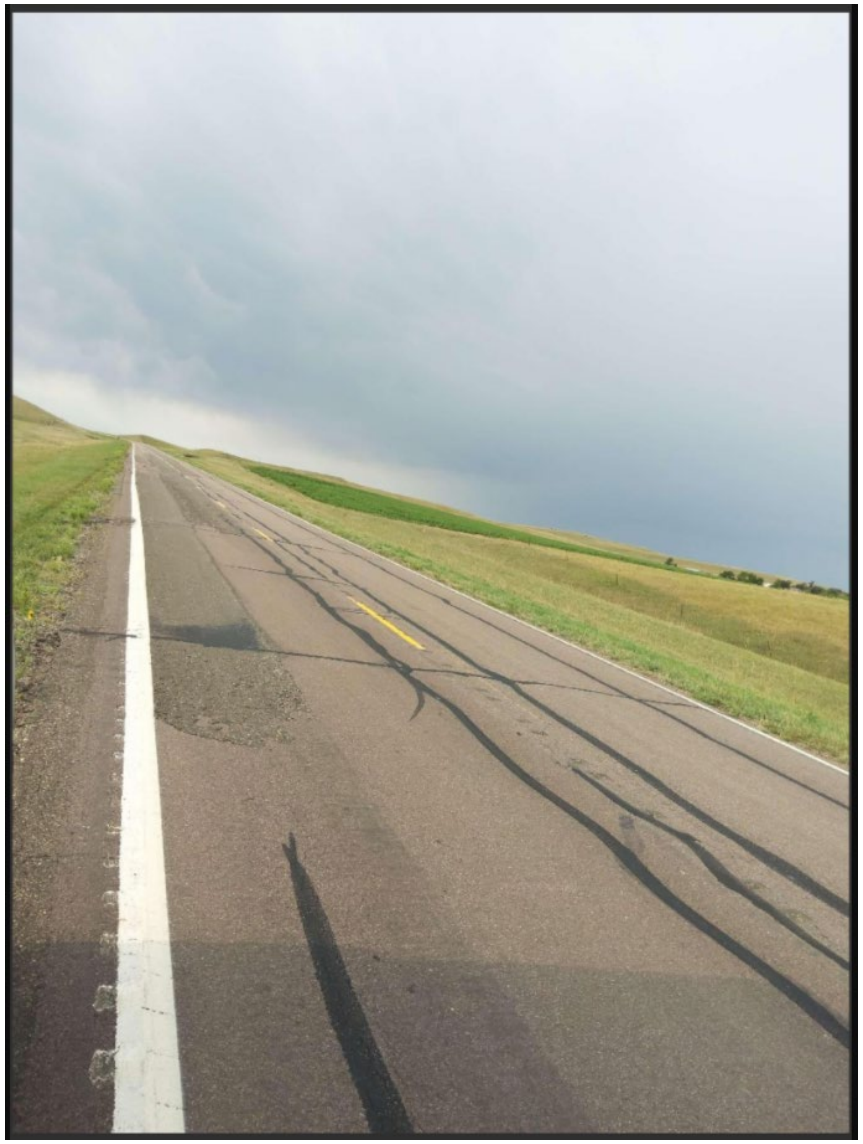
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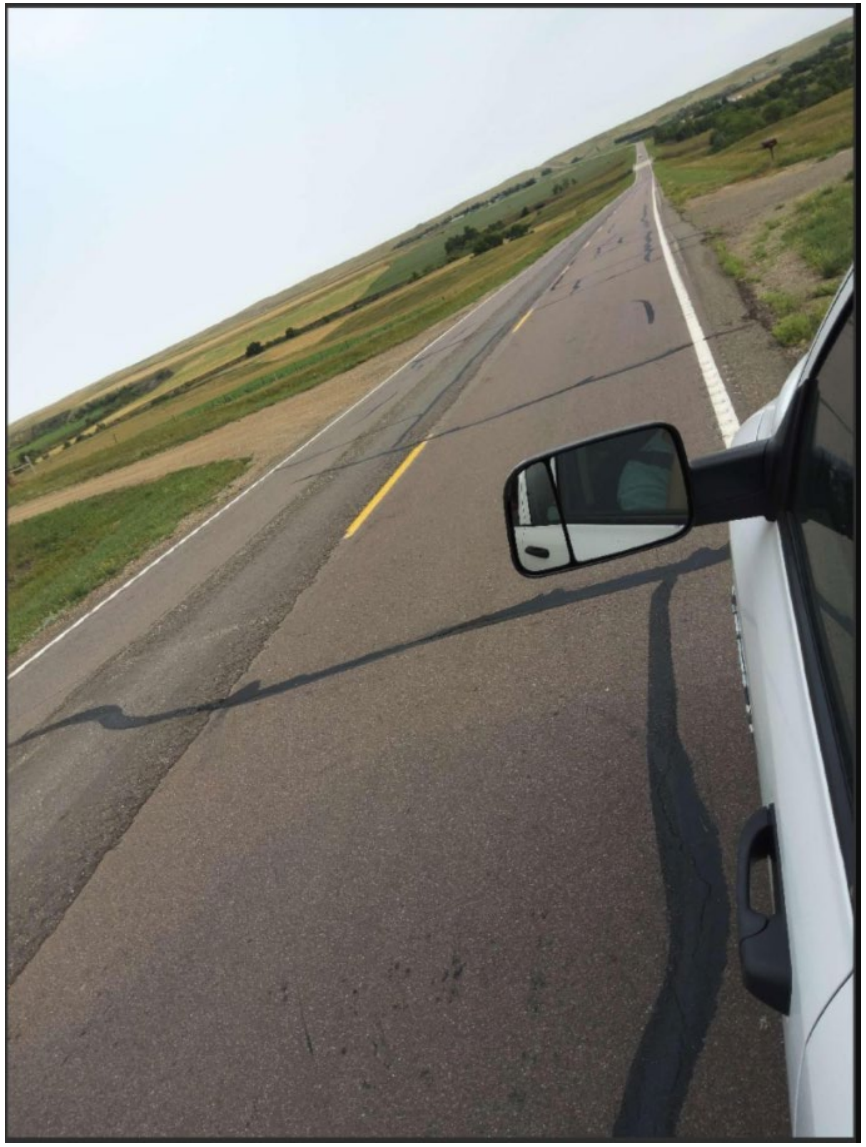
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7
5+0600 to 5+2080



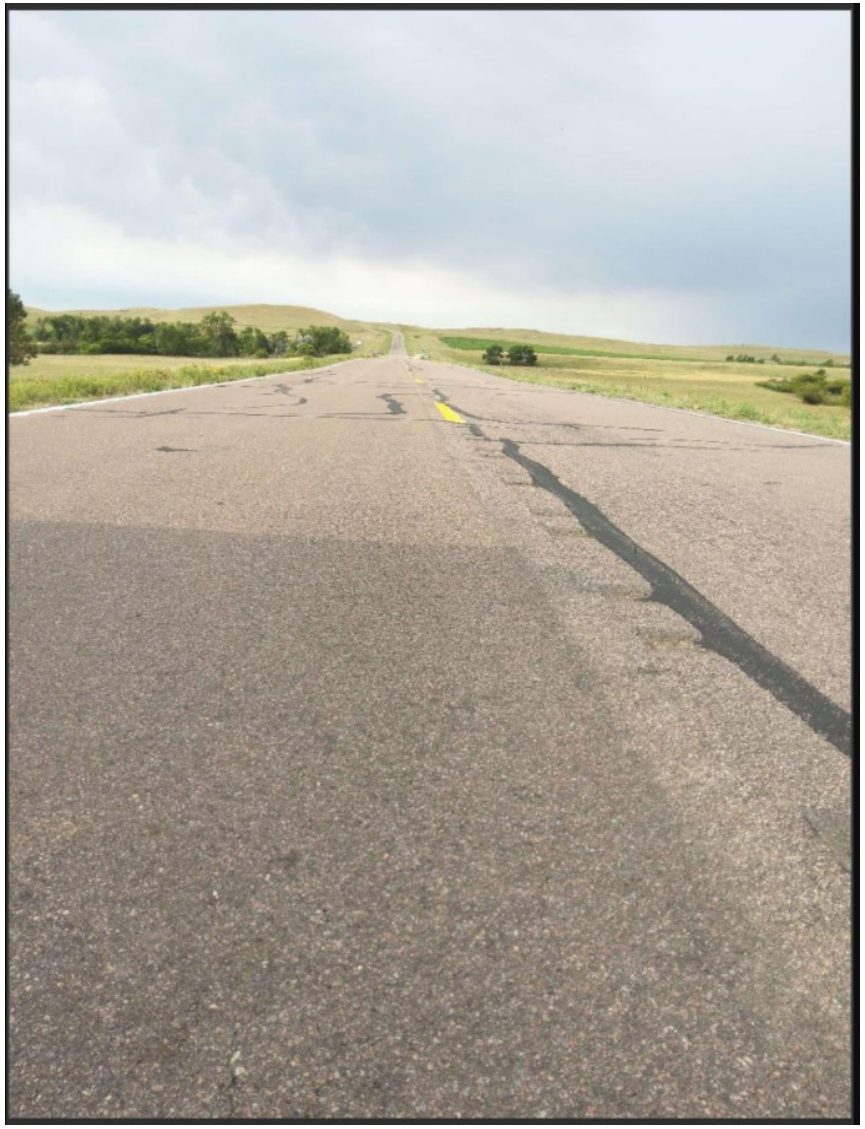
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5+0600 to 5+2080



9
5+0600 to 5+2080



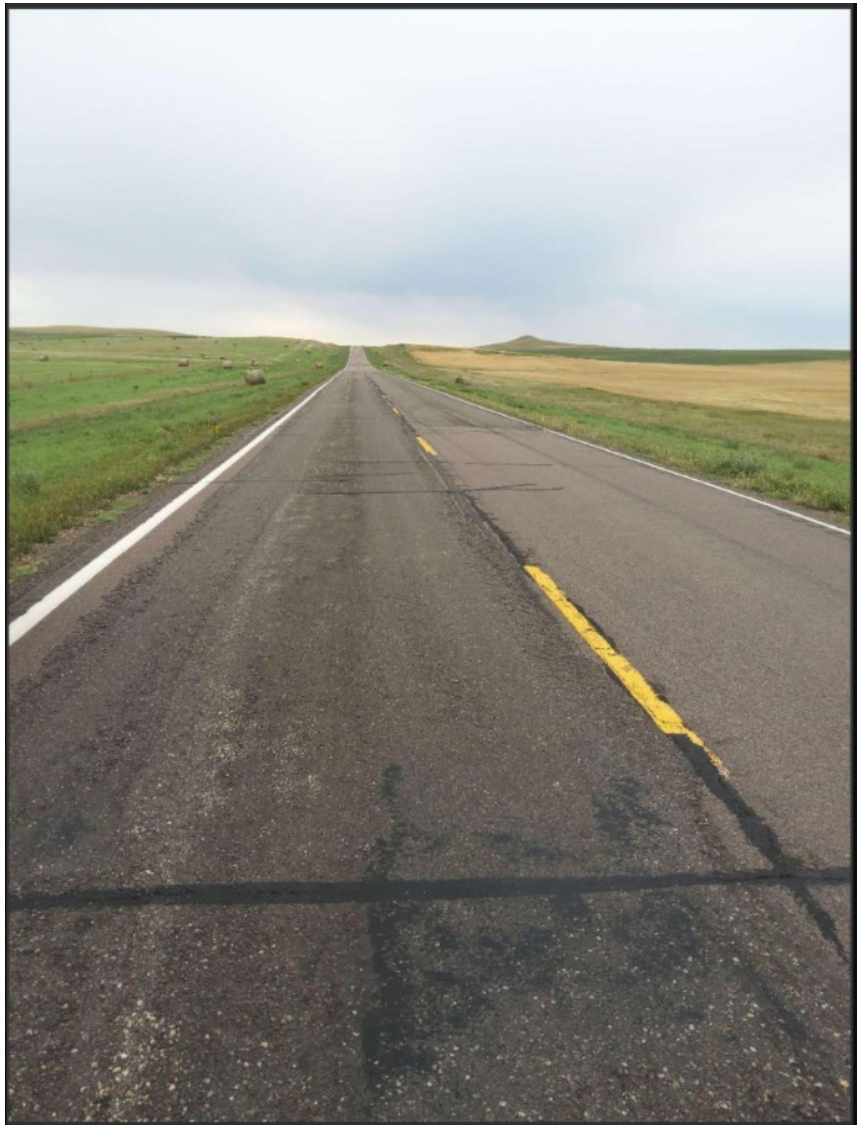
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7+2500 to 7+2500



11
7+2500 to 7+2500



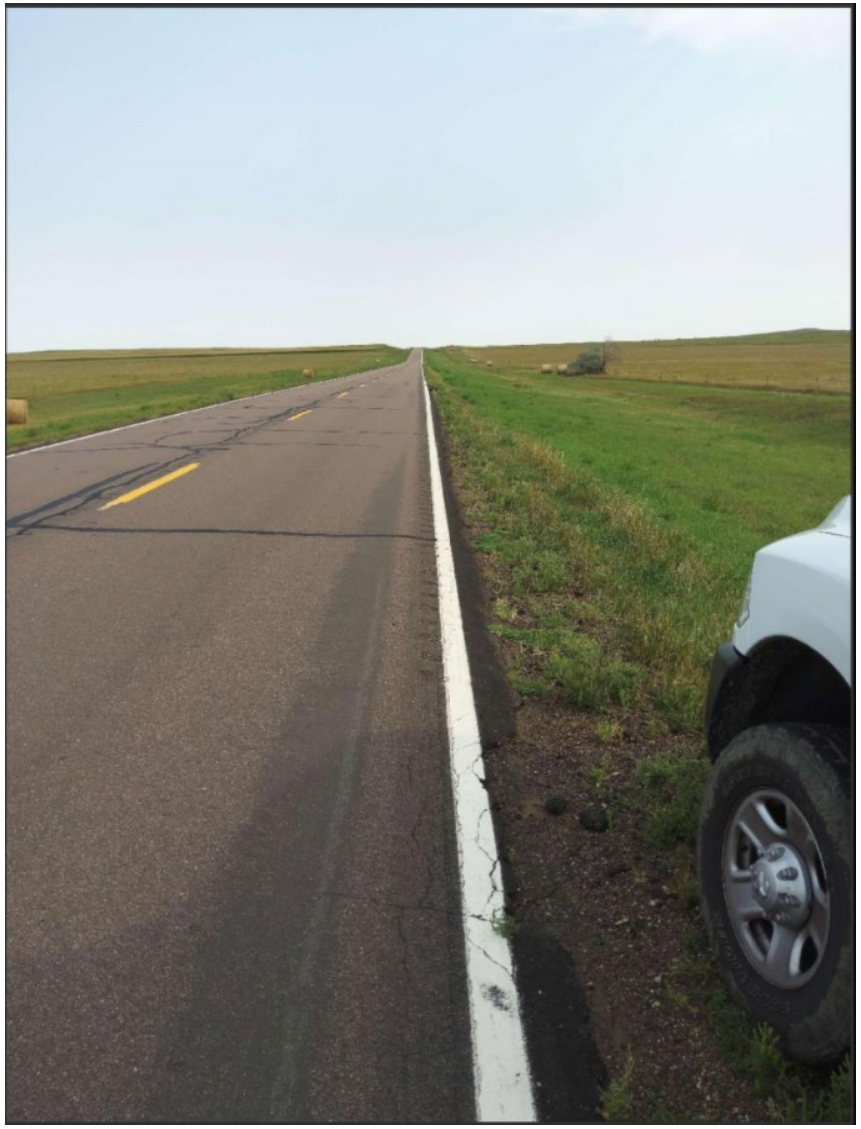
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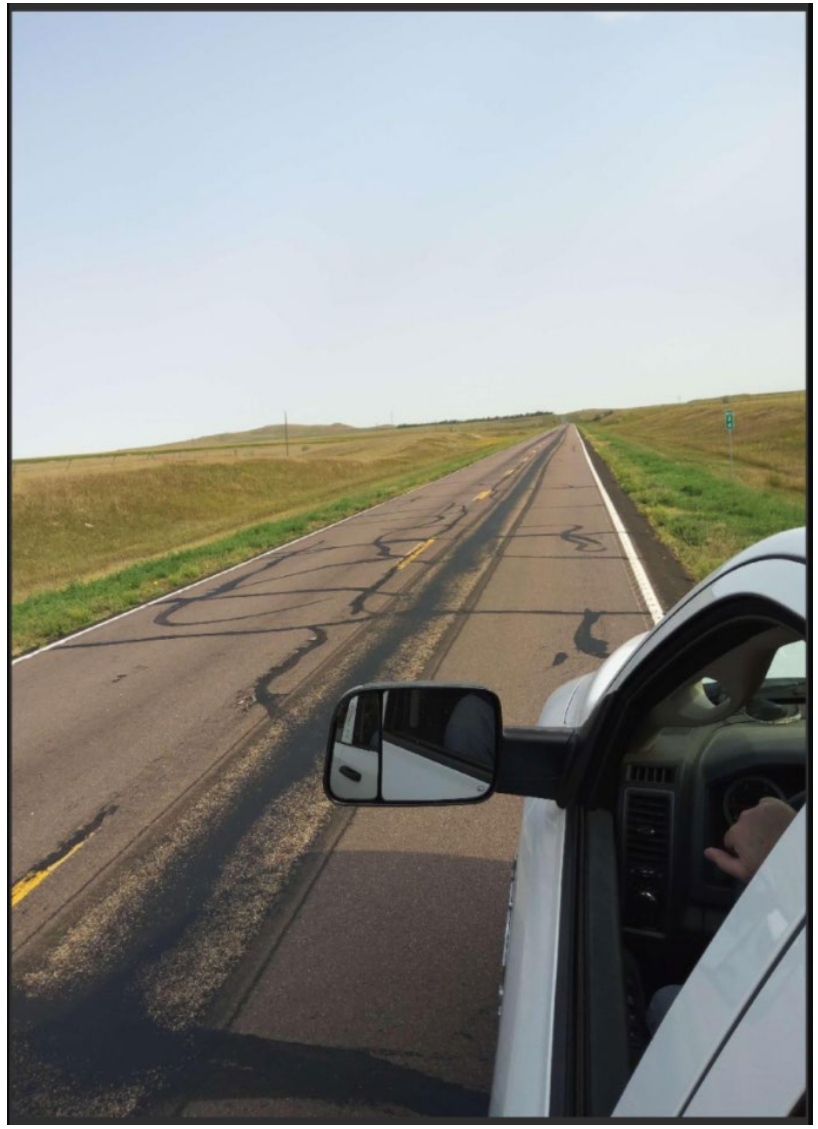
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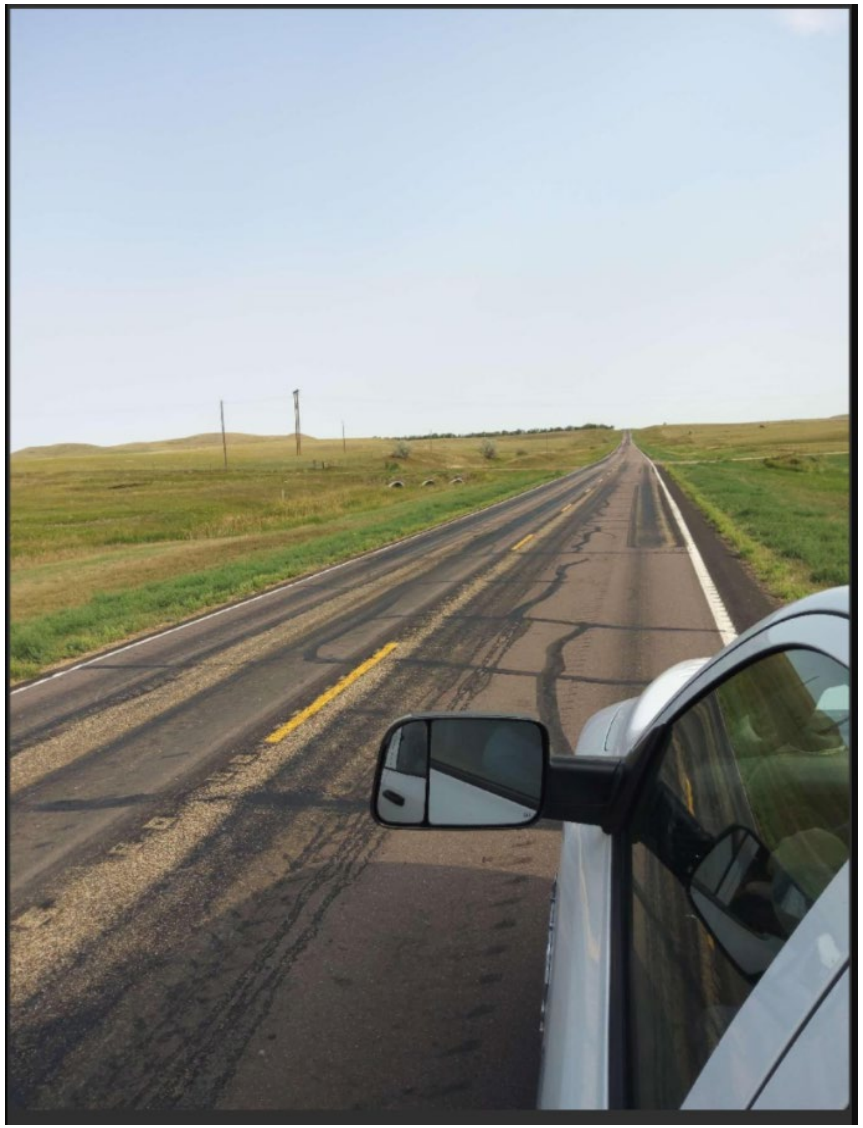
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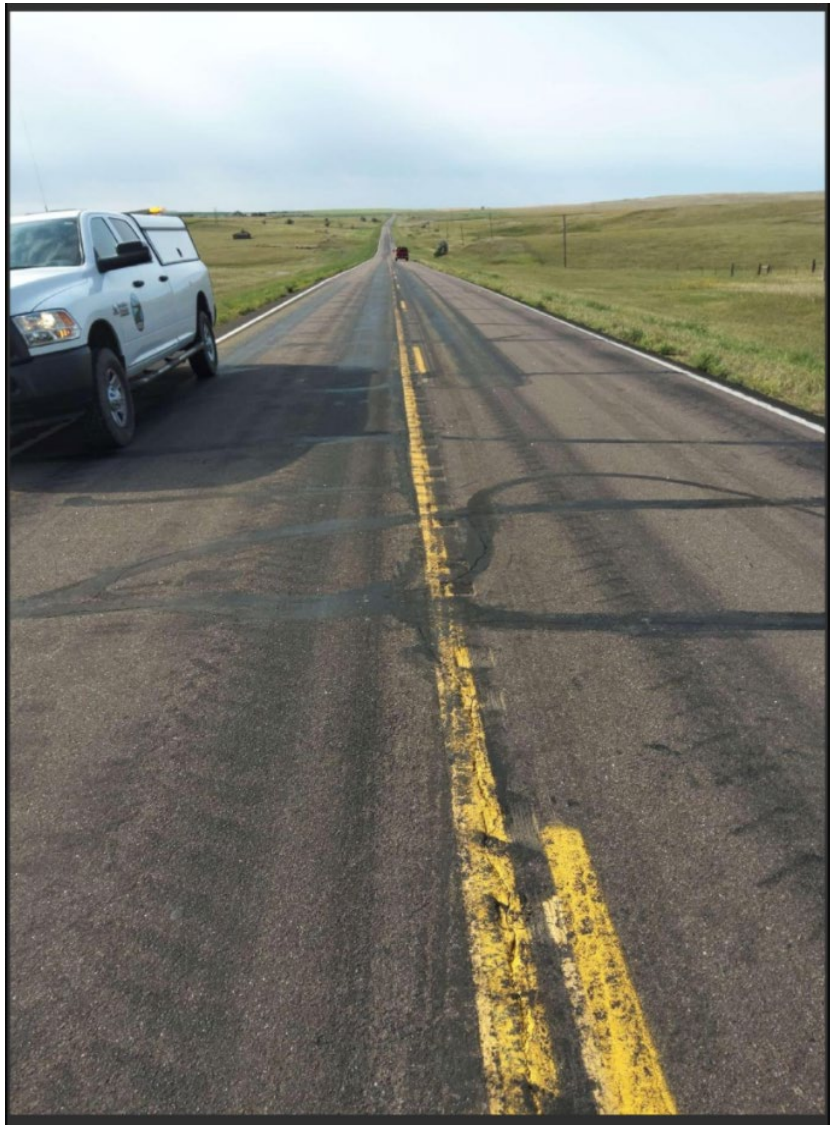
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21+3000 to 21+3800



16
23+5200 to 25+0900



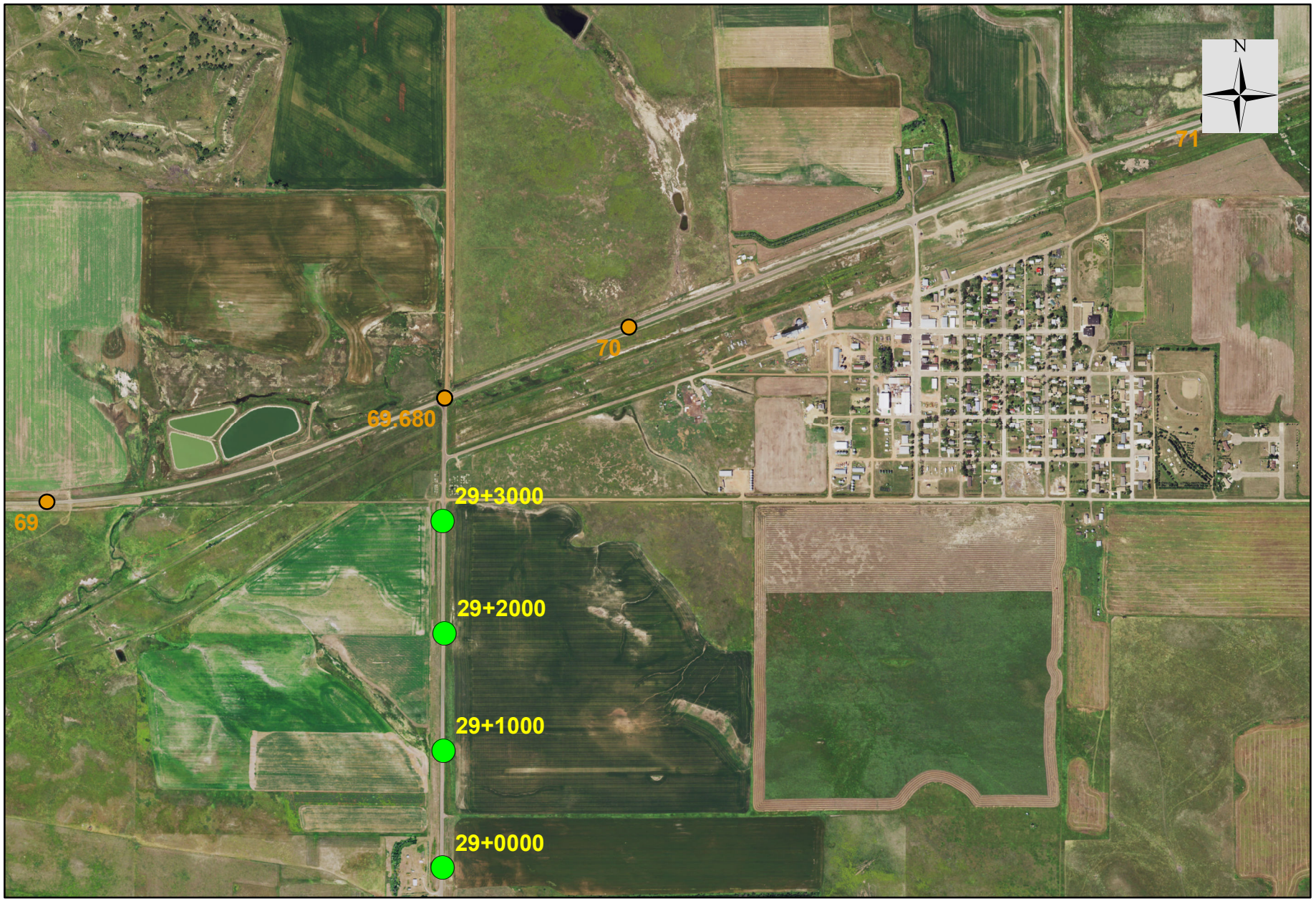
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23+5200 to 25+0900



18
23+5200 to 25+0900

APPENDIX C

BORING LOCATIONS

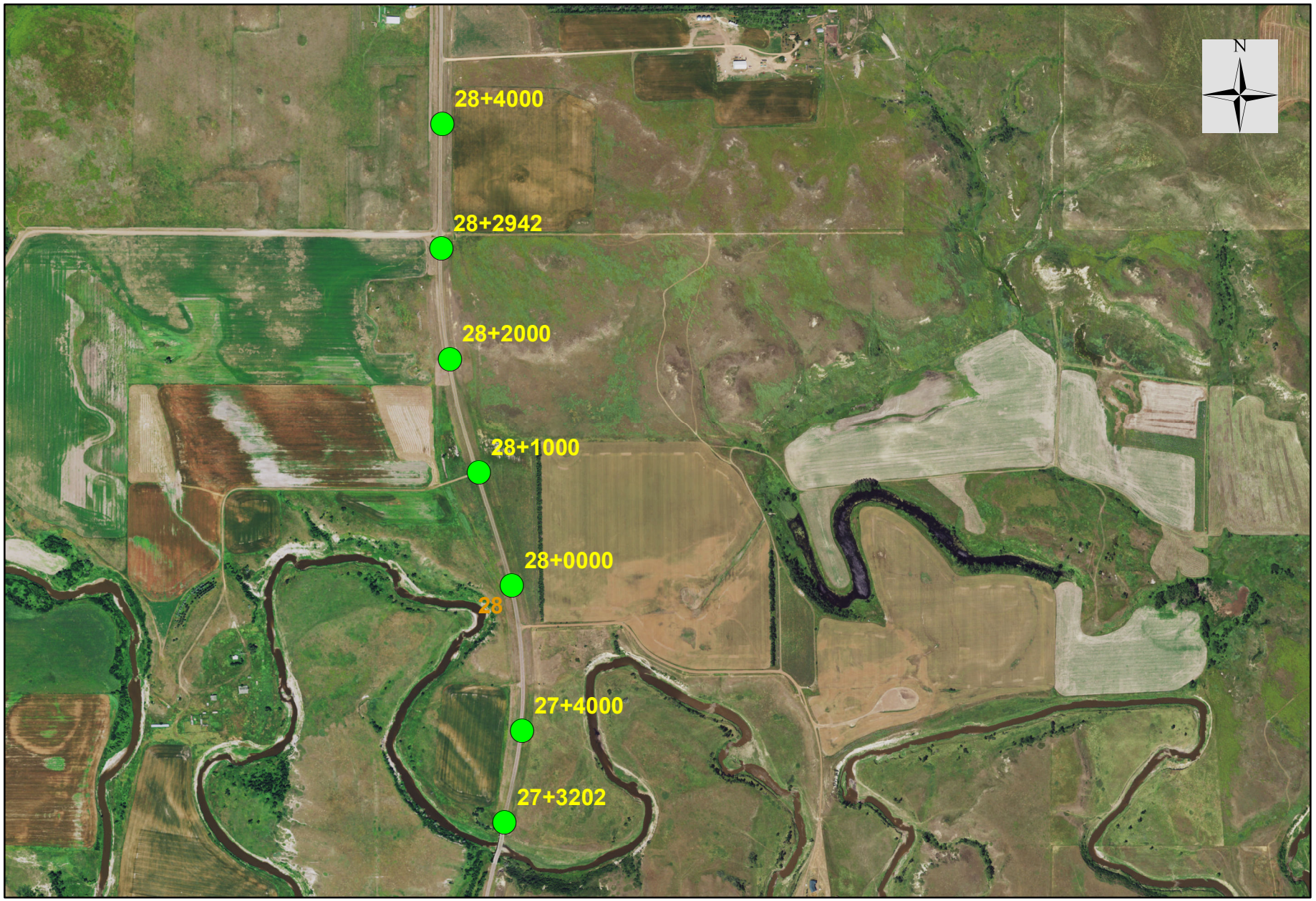


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- Boring Locations

0 2,250 4,500 Feet

Project Number: X-5-049(020)000

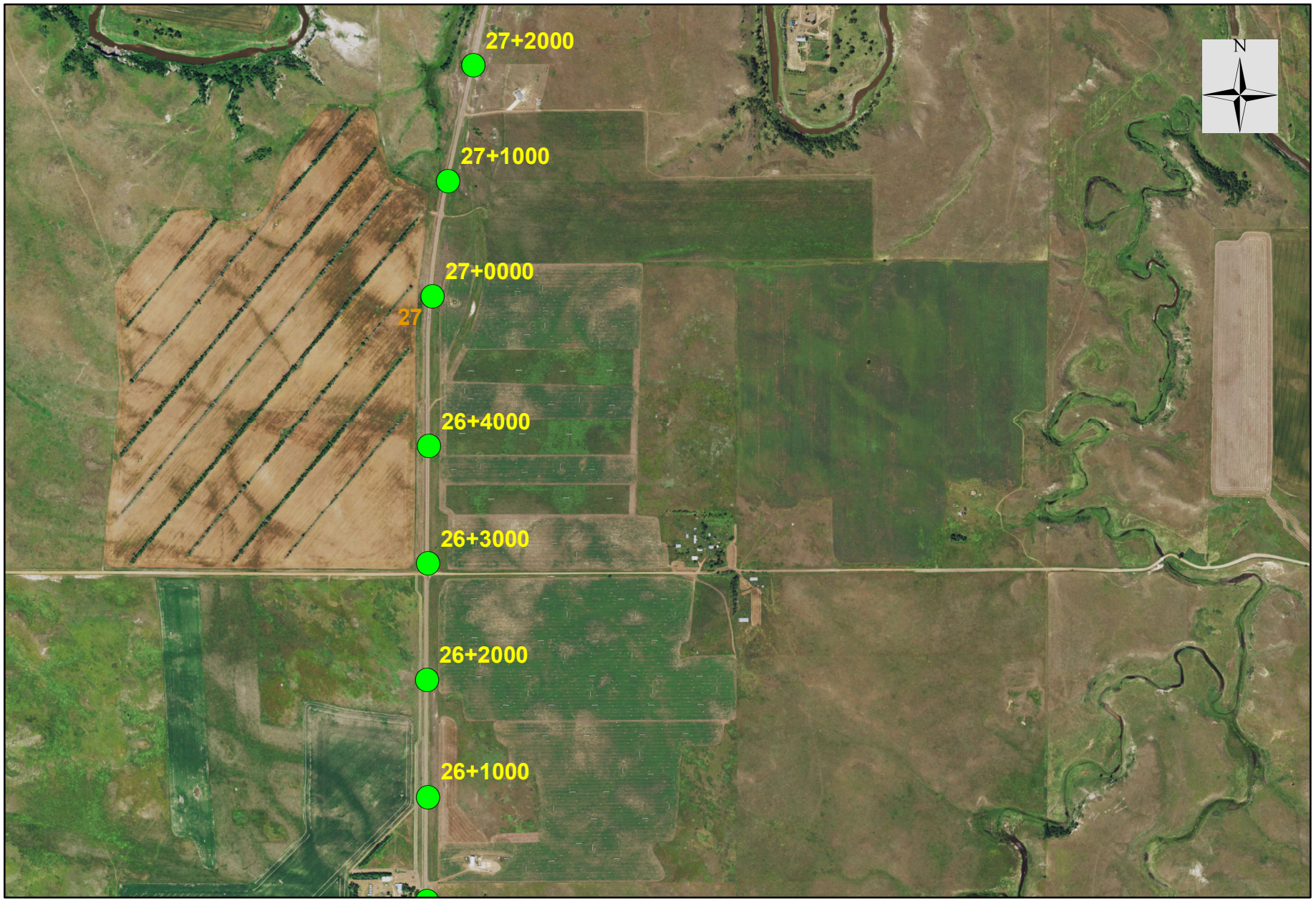


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0 2,250 4,500 Feet

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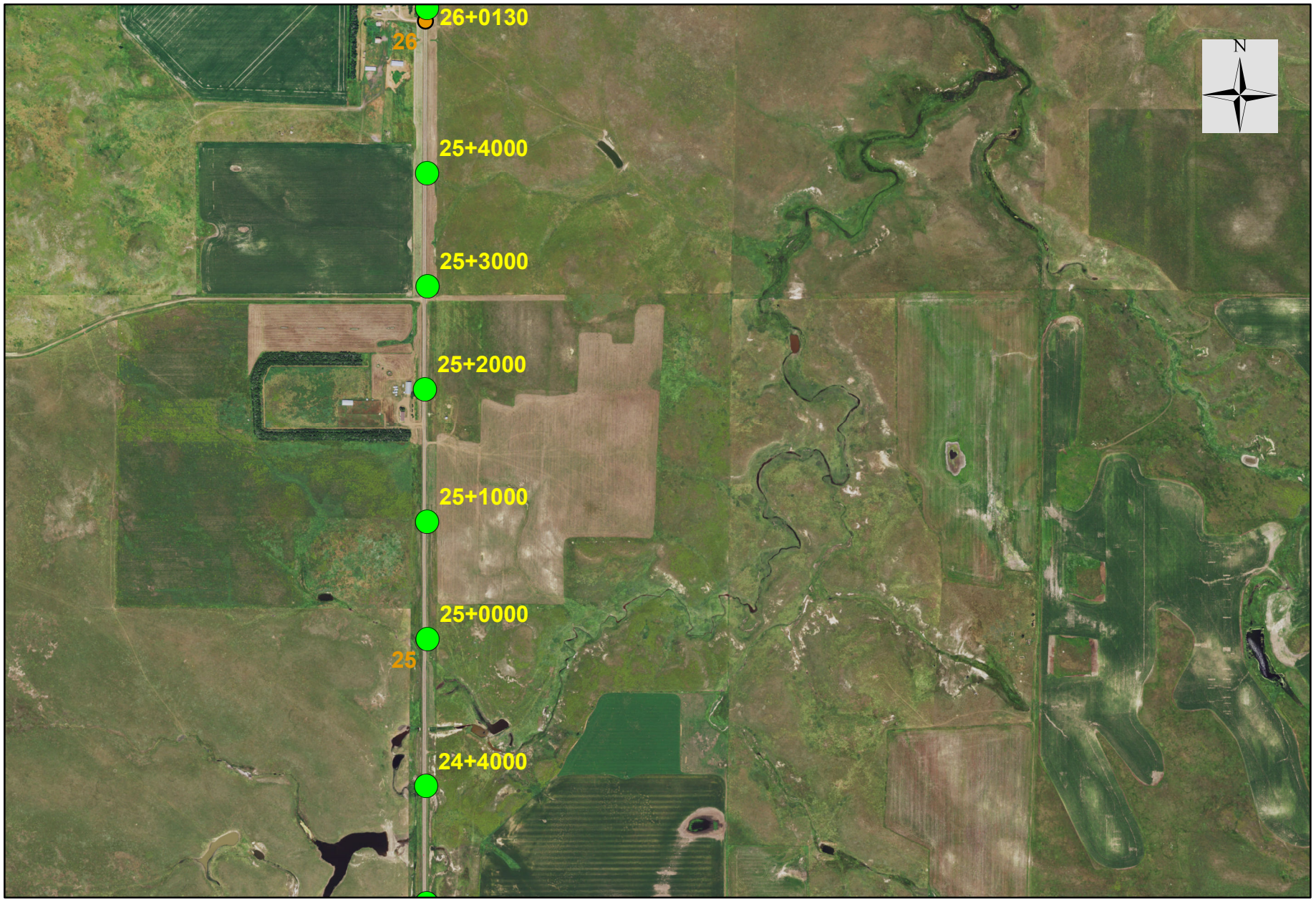


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0 2,250 4,500 Feet

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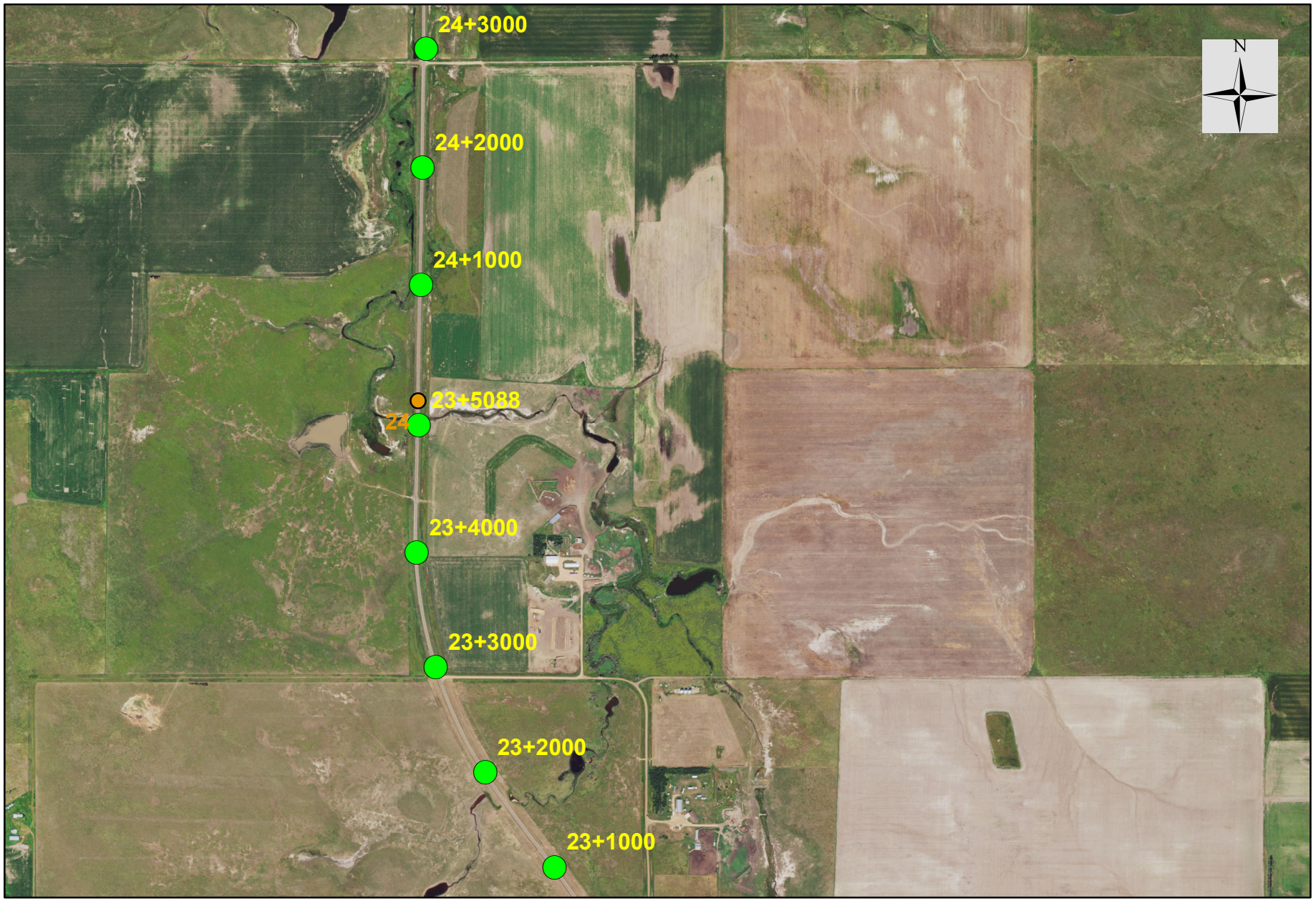


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0 2,250 4,500 Feet

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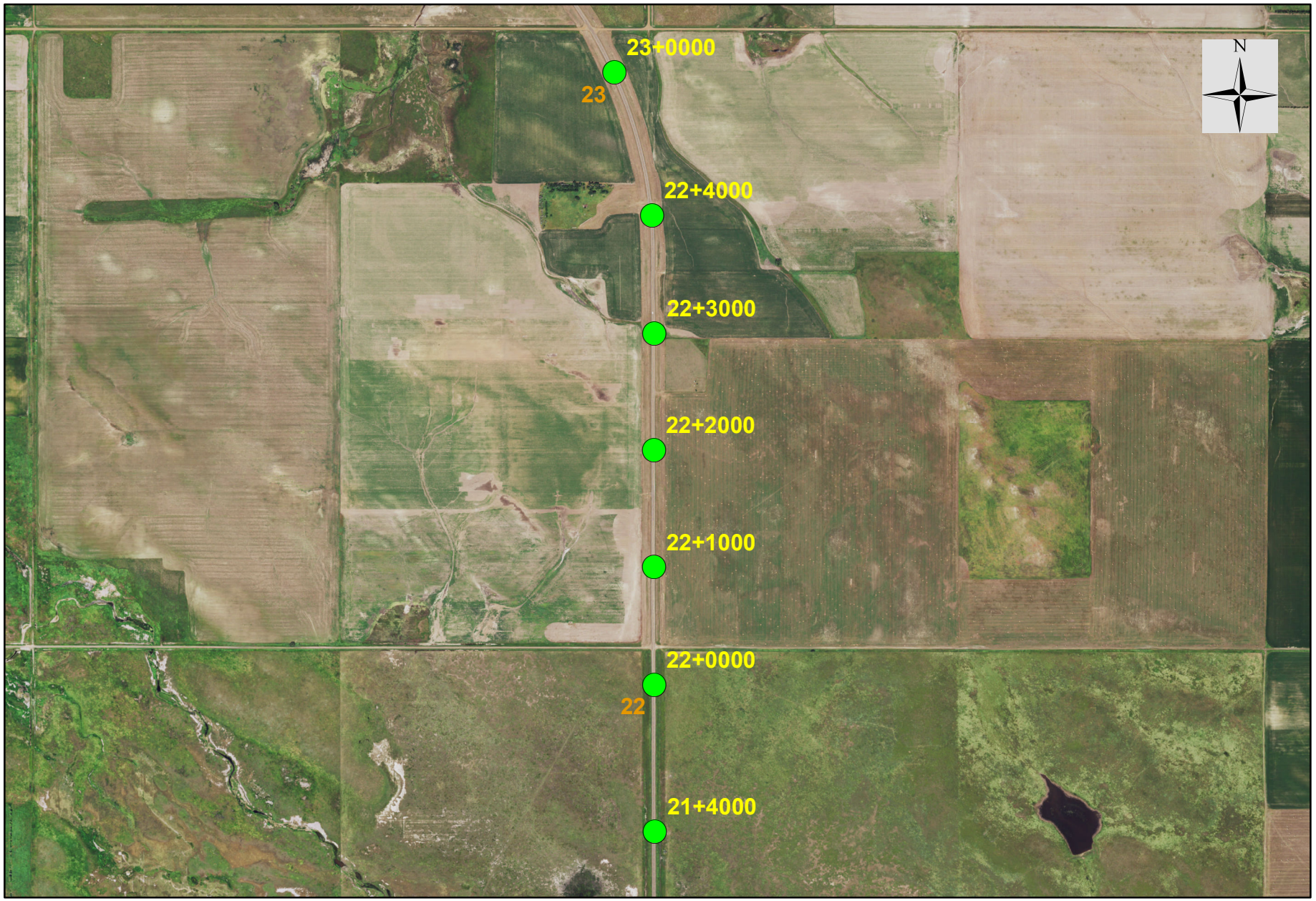


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0 2,250 4,500 Feet

Project Number: X-5-049(020)000

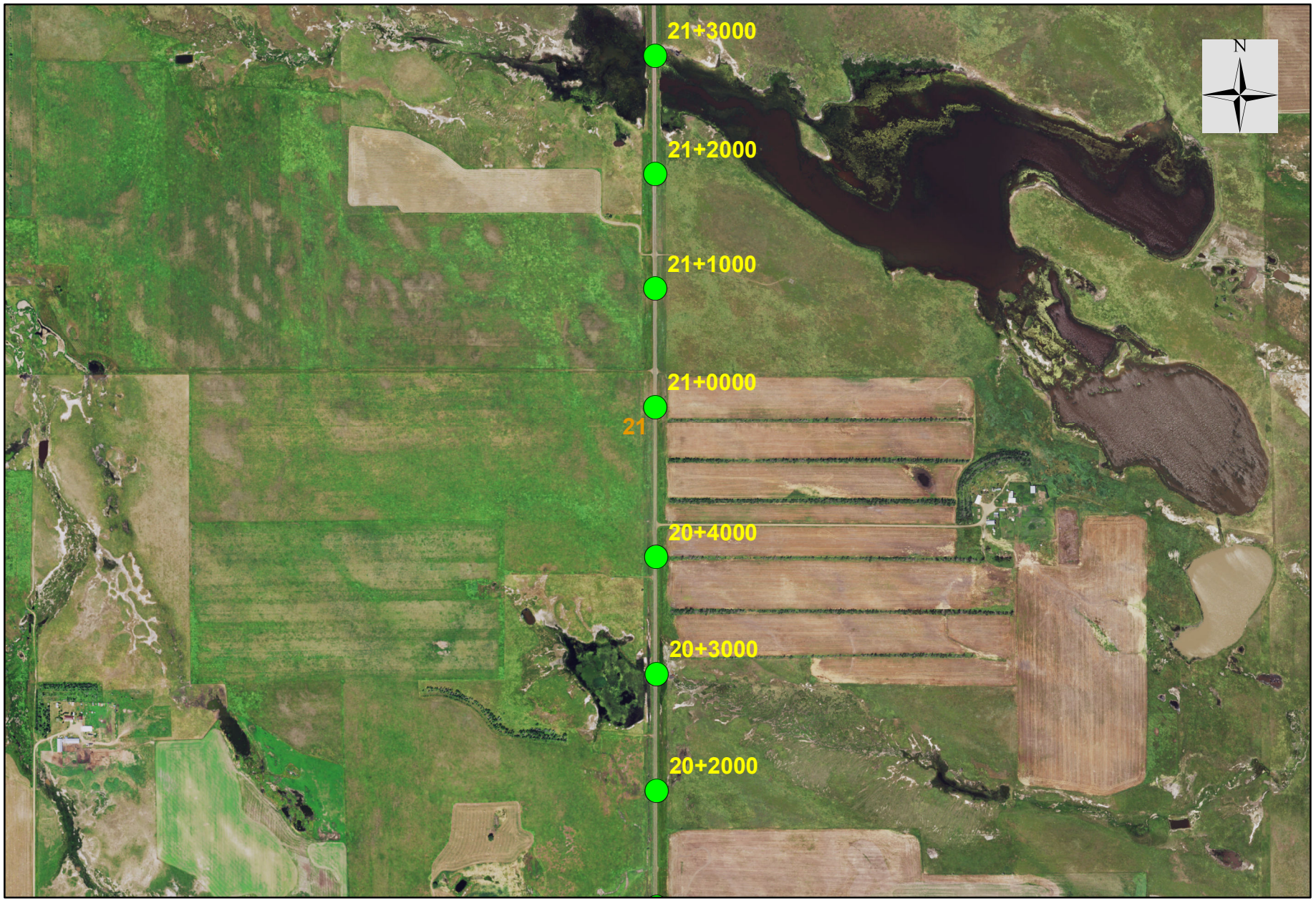


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- Reference Point
- Boring Locations

0 2,250 4,500 Feet

Project Number: X-5-049(020)000



Legend

- Reference Point
- Boring Locations

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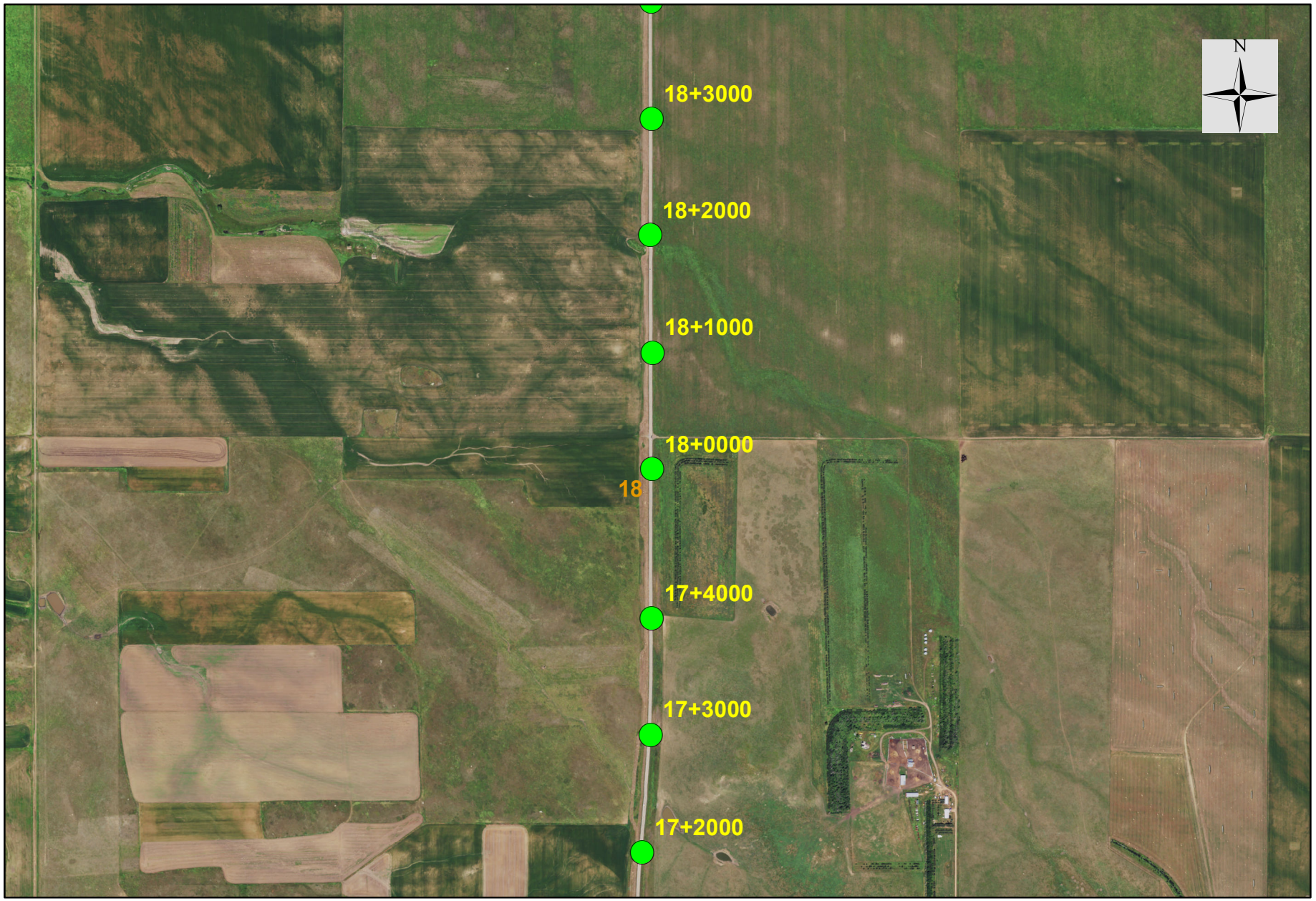


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- Reference Point
- Boring Locations

0 2,250 4,500 Feet

Project Number: X-5-049(020)000



Legend

- Reference Point
- Boring Locations

0 2,250 4,500 Feet

Project Number: X-5-049(020)000



Legend

- Reference Point
- Boring Locations

0 2,250 4,500 Feet

Project Number: X-5-049(020)000

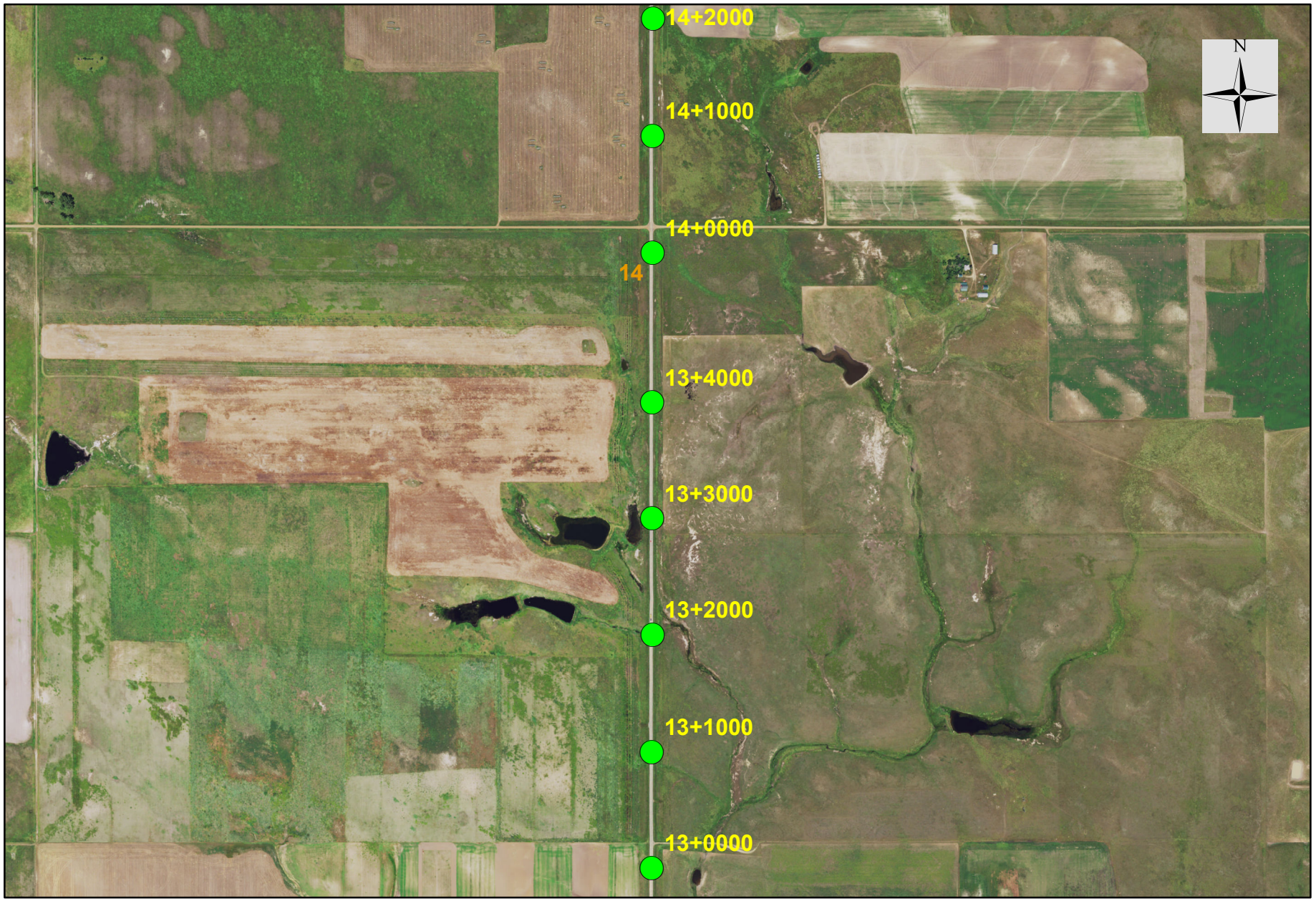


Legend

- Reference Point
- Boring Locations

0 2,250 4,500 Feet

Project Number: X-5-049(020)000



Legend

- Reference Point
- Boring Locations

0 2,250 4,500 Feet

Project Number: X-5-049(020)000



Legend

- Reference Point
- Boring Locations

0 2,250 4,500 Feet

Project Number: X-5-049(020)000

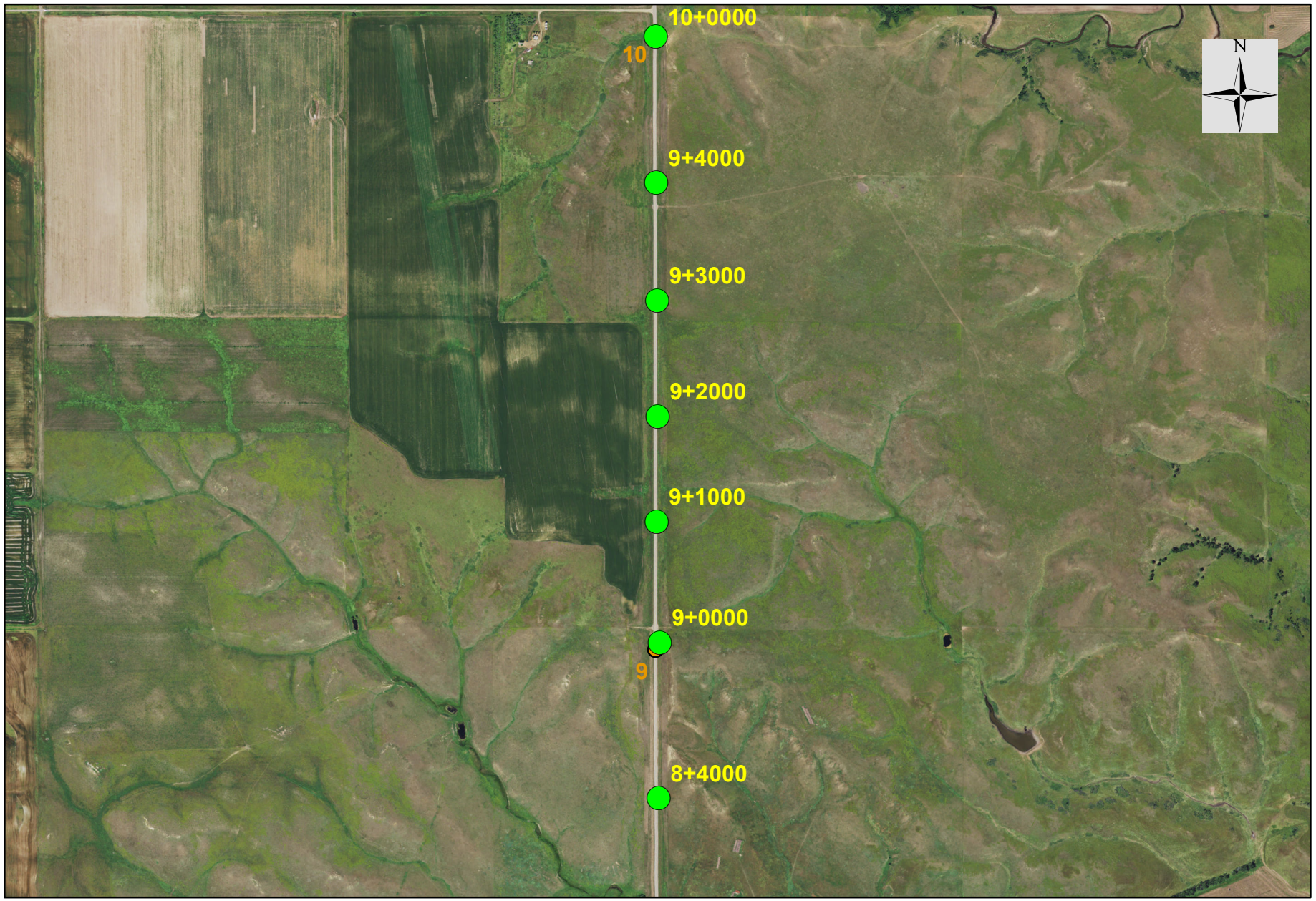


Legend

- Reference Point
- Boring Locations

0 2,250 4,500 Feet

Project Number: X-5-049(020)000

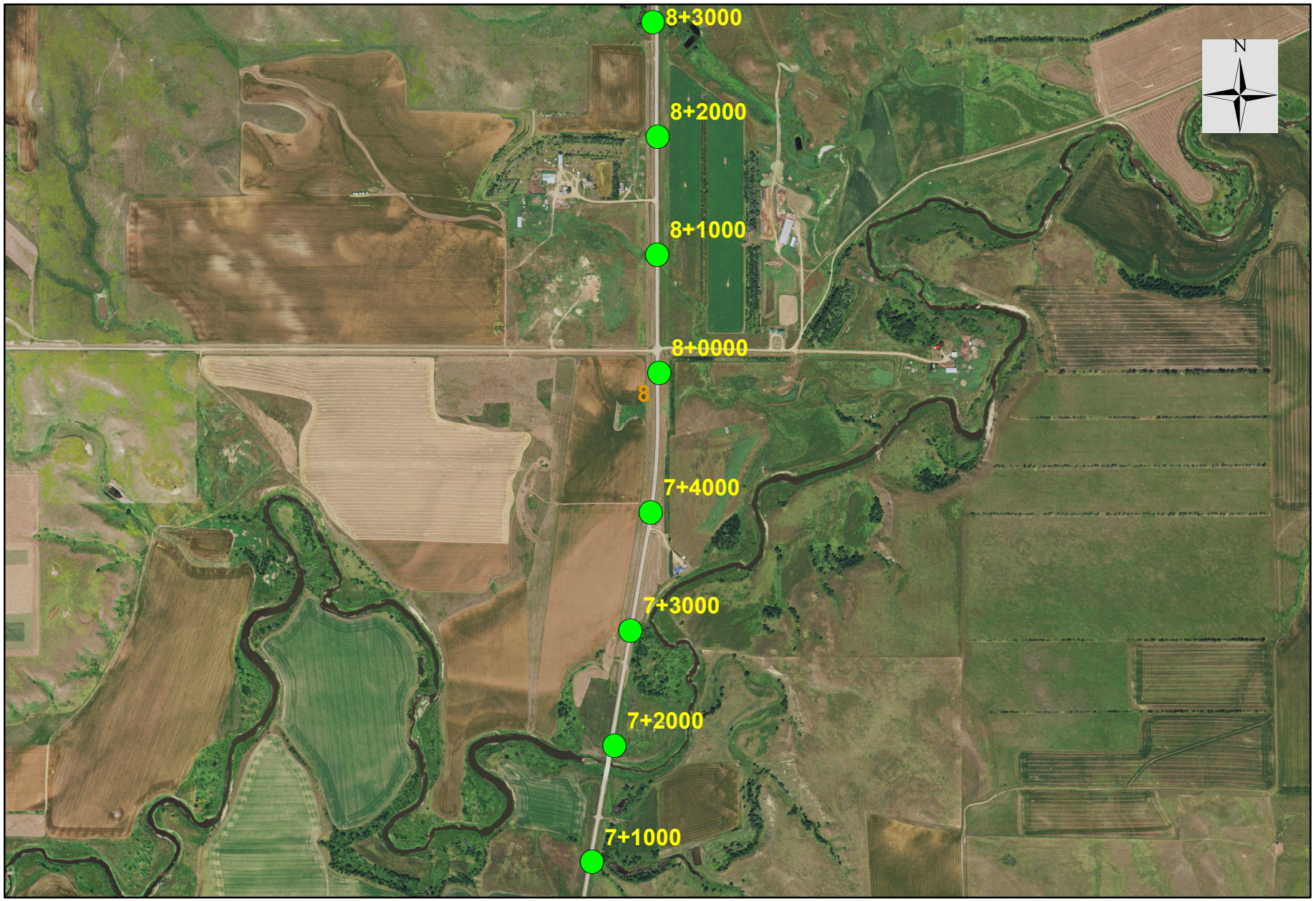


Legend

- Reference Point
- Boring Locations

0 2,250 4,500 Feet

Project Number: X-5-049(020)000

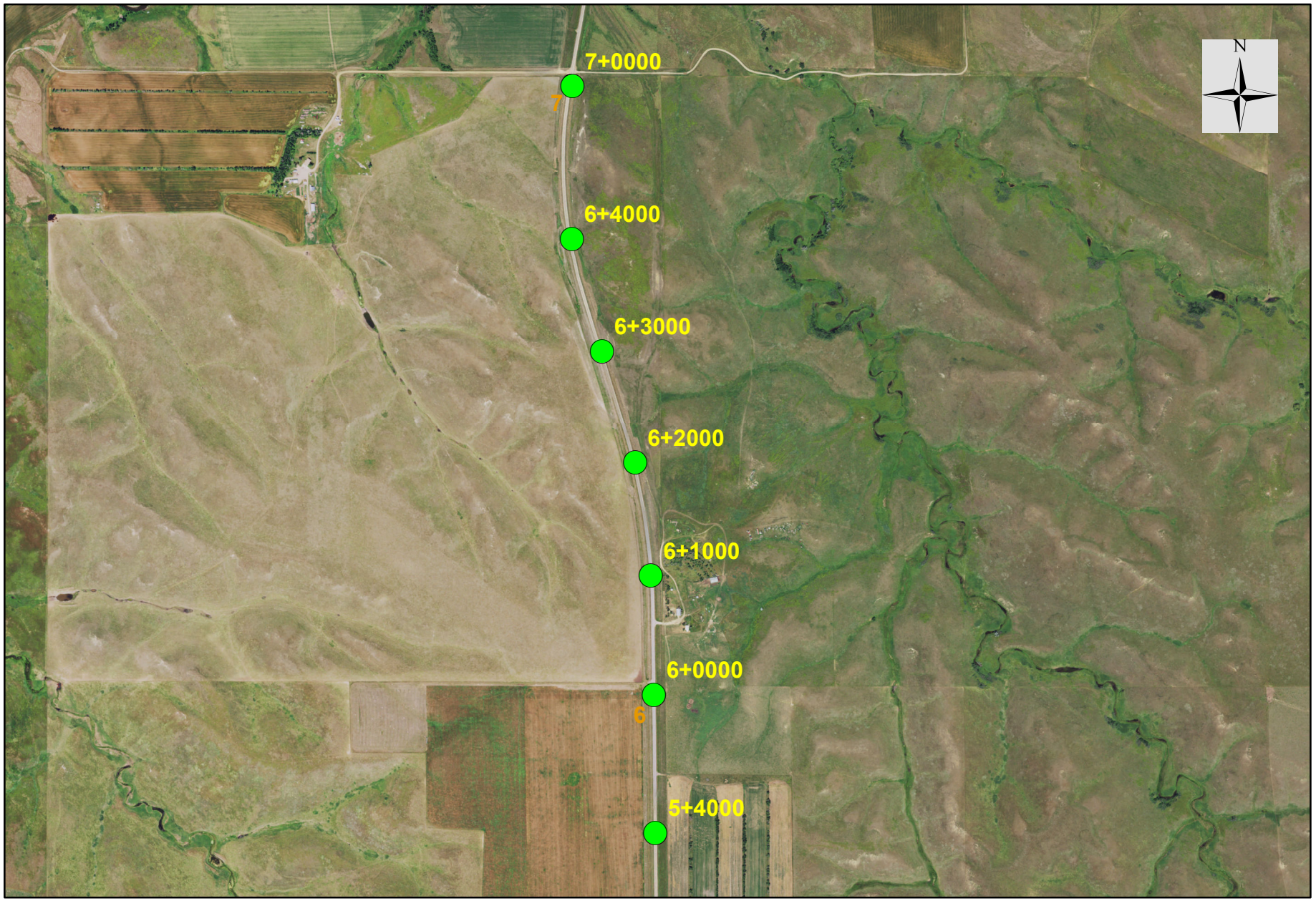


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- Reference Point
- Boring Locations

0 2,250 4,500 Feet

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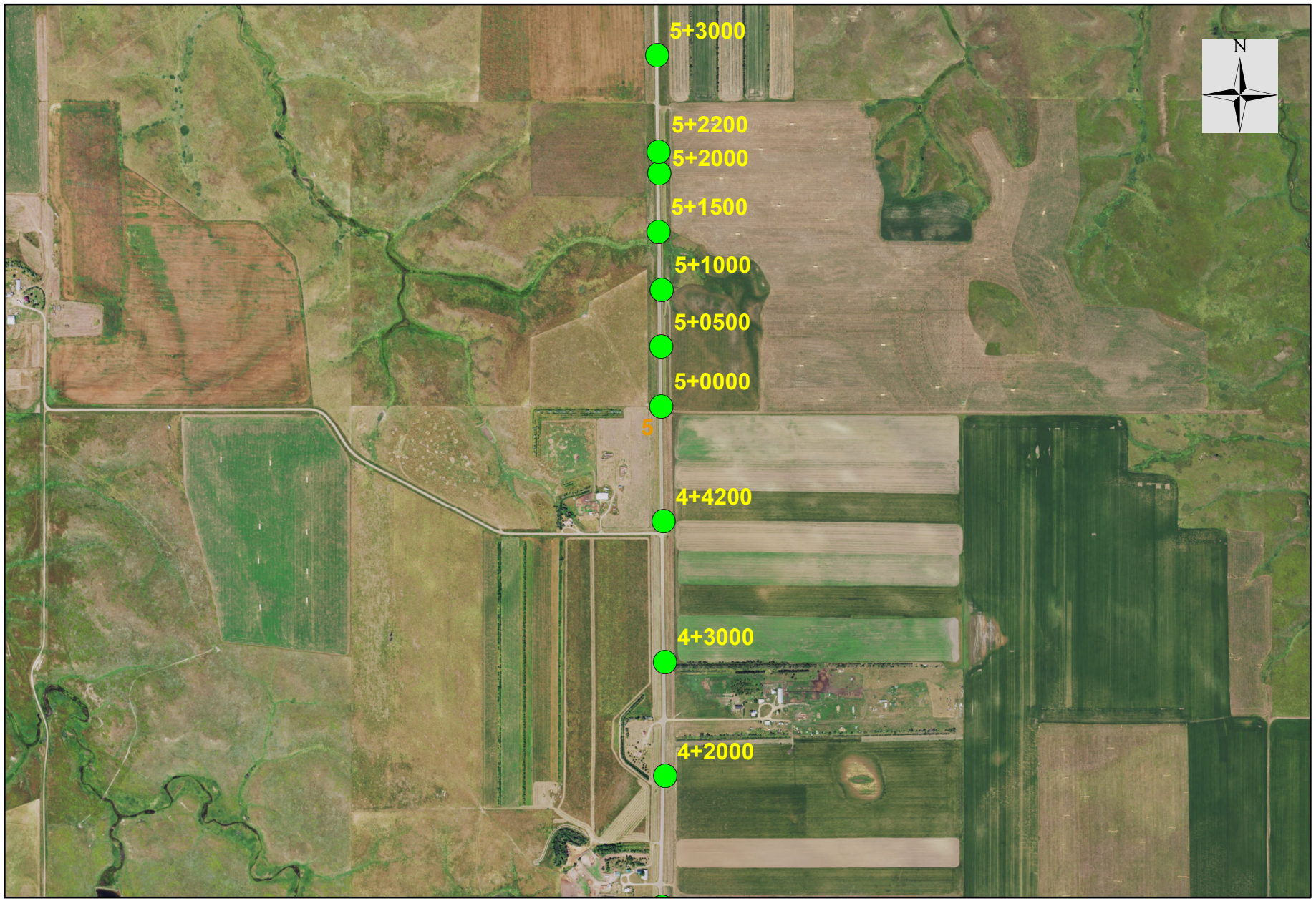


Legend

- Reference Point
- Boring Locations

0 2,250 4,500 Feet

Project Number: X-5-049(020)000

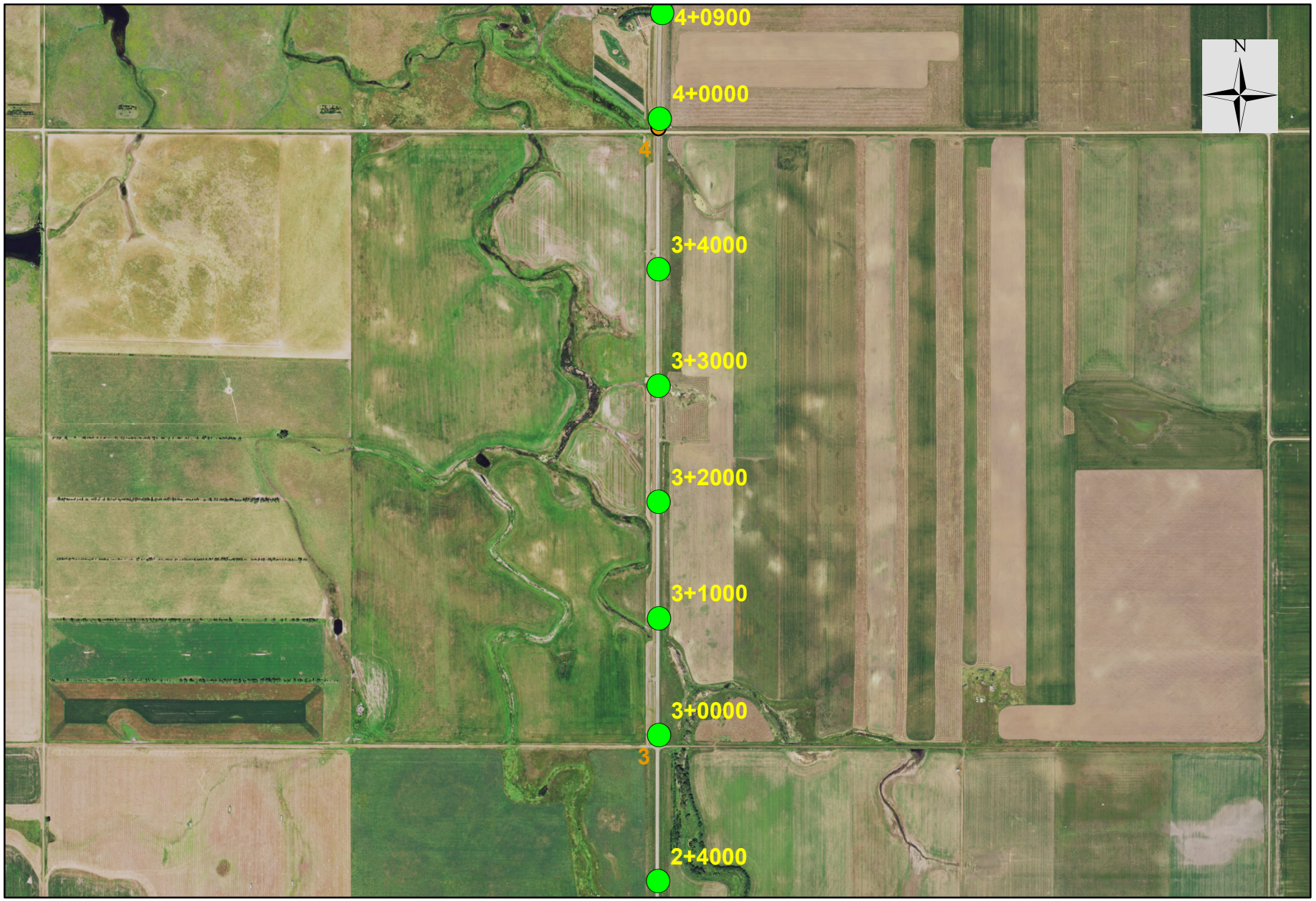


Legend

- Reference Point
- Boring Locations

0 2,250 4,500 Feet

Project Number: X-5-049(020)000



Legend

- Reference Point
- Boring Locations

0 2,250 4,500 Feet

Project Number: X-5-049(020)000



Legend

- Reference Point
- Boring Locations

0 2,250 4,500 Feet

Project Number: X-5-049(020)000



Legend

- Reference Point
- Boring Locations

0 2,250 4,500 Feet

Project Number: X-5-049(020)000

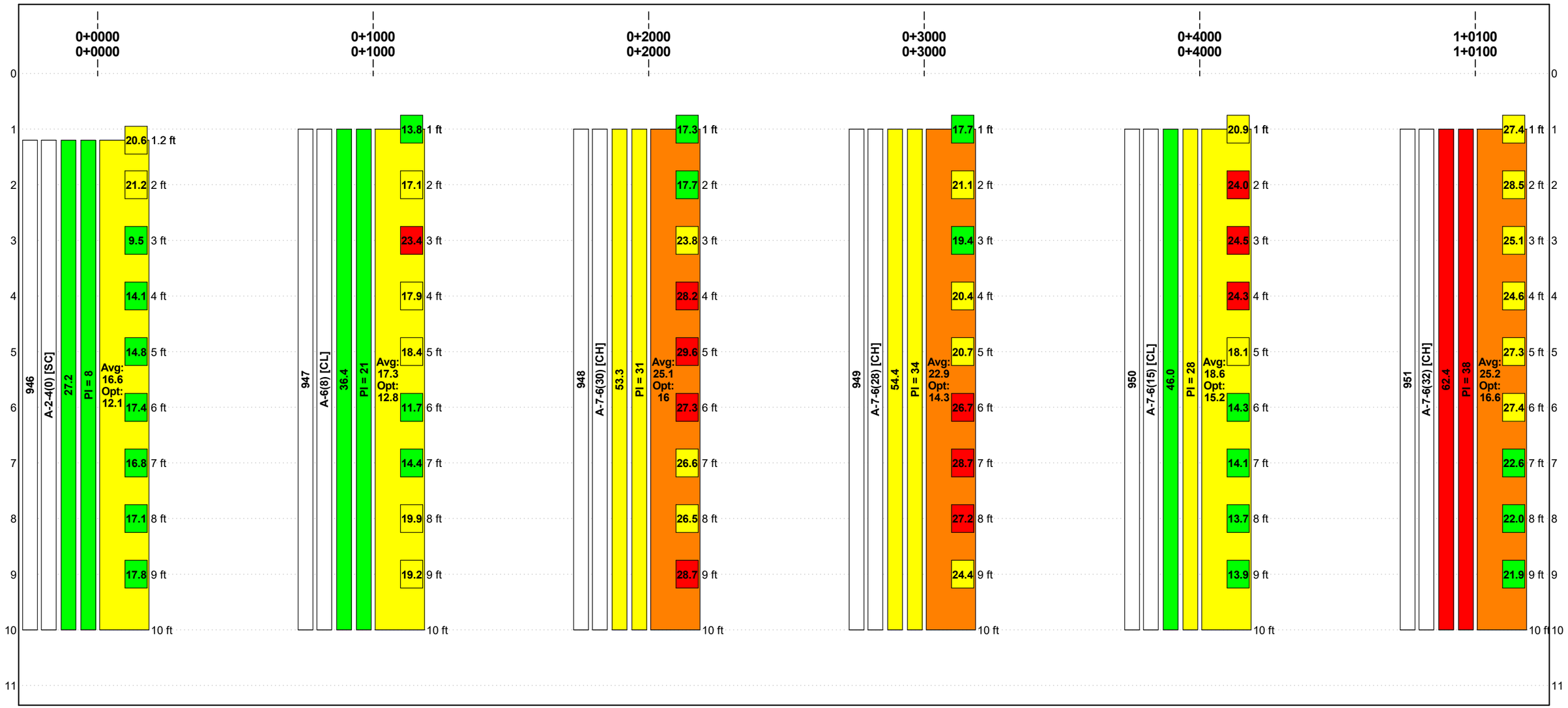
APPENDIX D

SUMMARY OF SOILS ANALYSIS

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

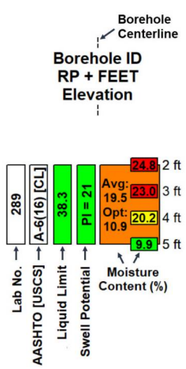
PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County

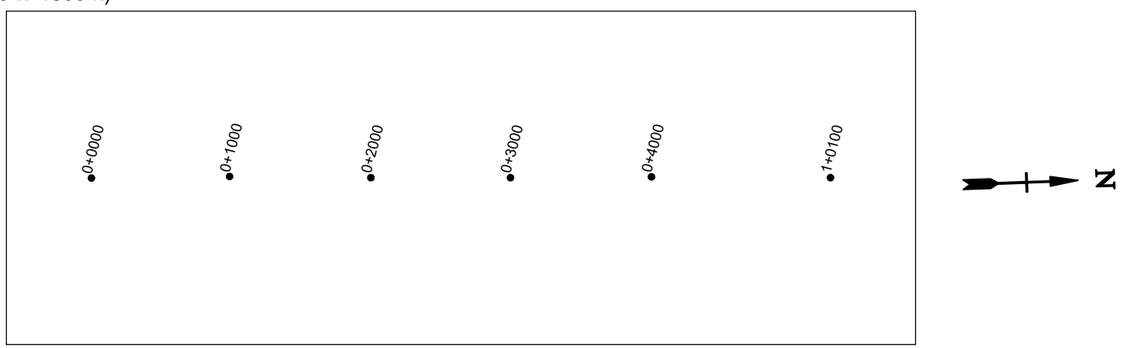


Boreholes Equally Spaced (0 to 1800 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt



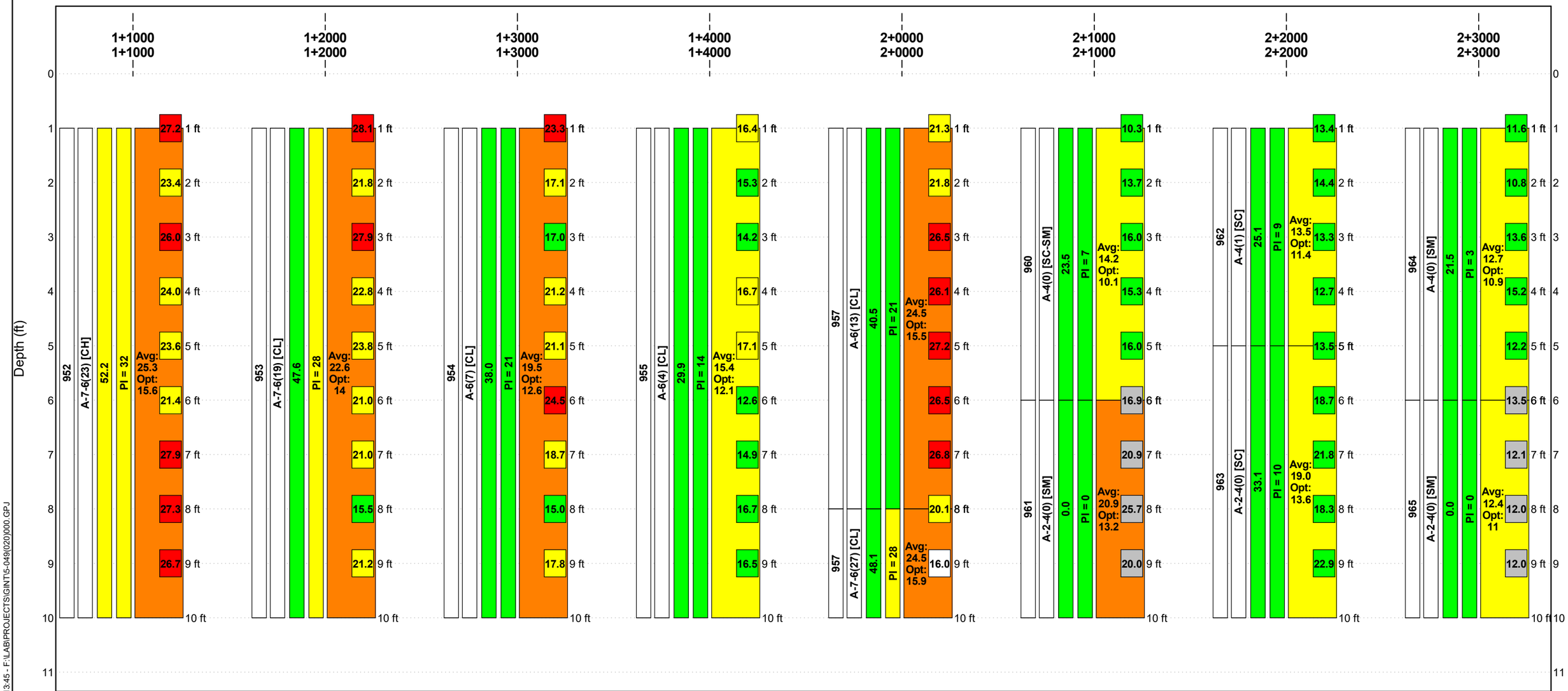
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NDDOT North Dakota Department of Transportation

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

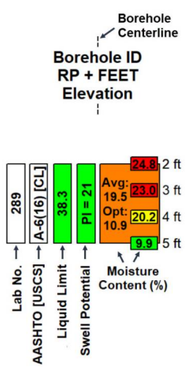
PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County



Boreholes Equally Spaced (0 to 2400 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt

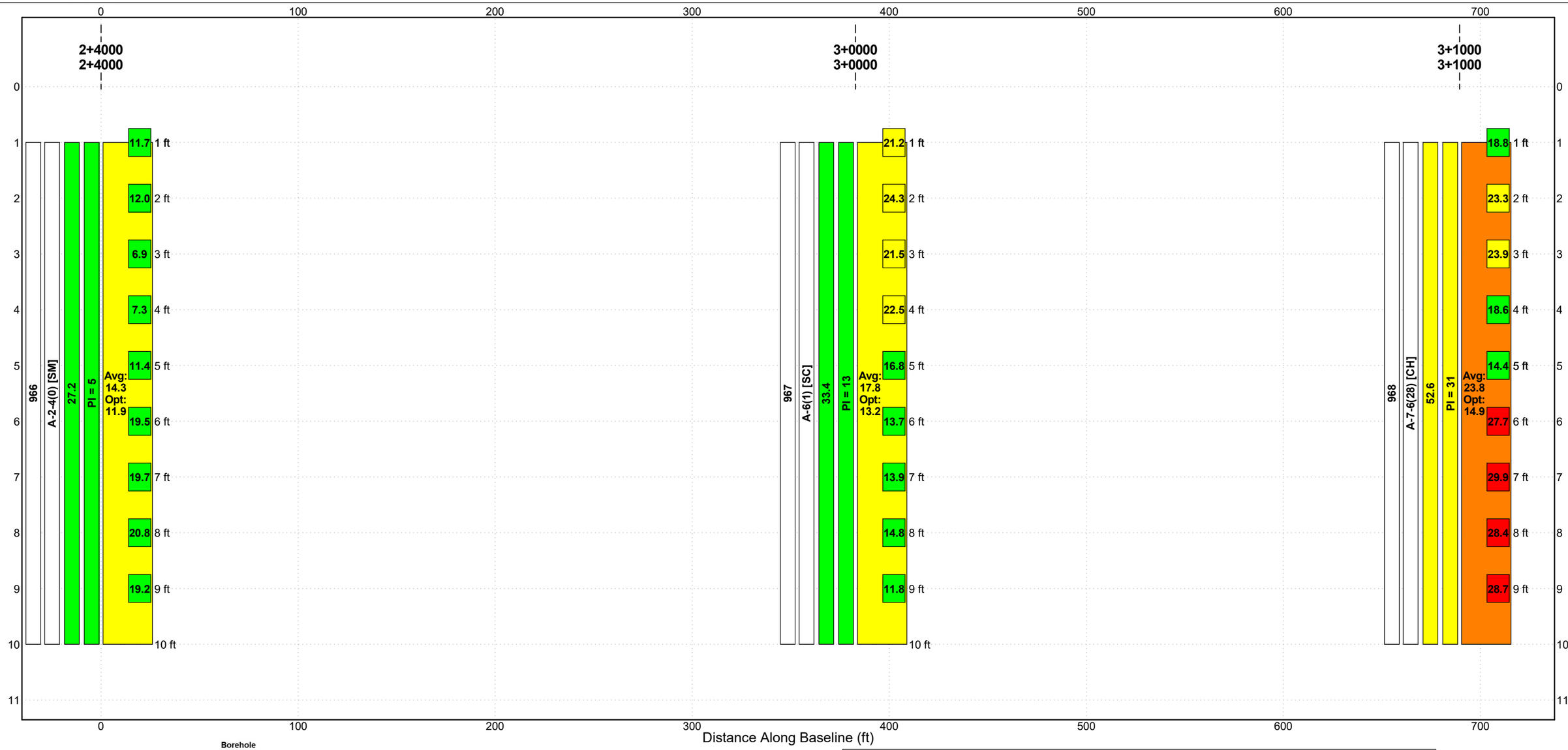


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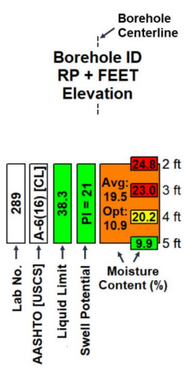
NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **PCN** 23274

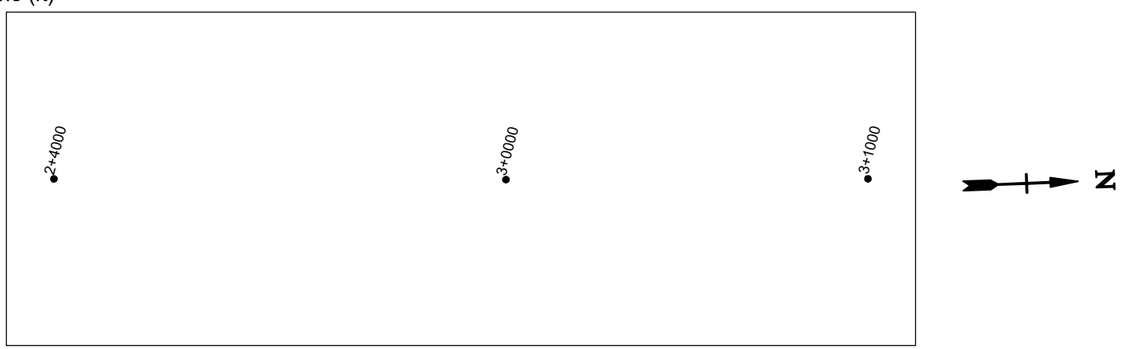
LOCATION Sioux & Grant County



LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt

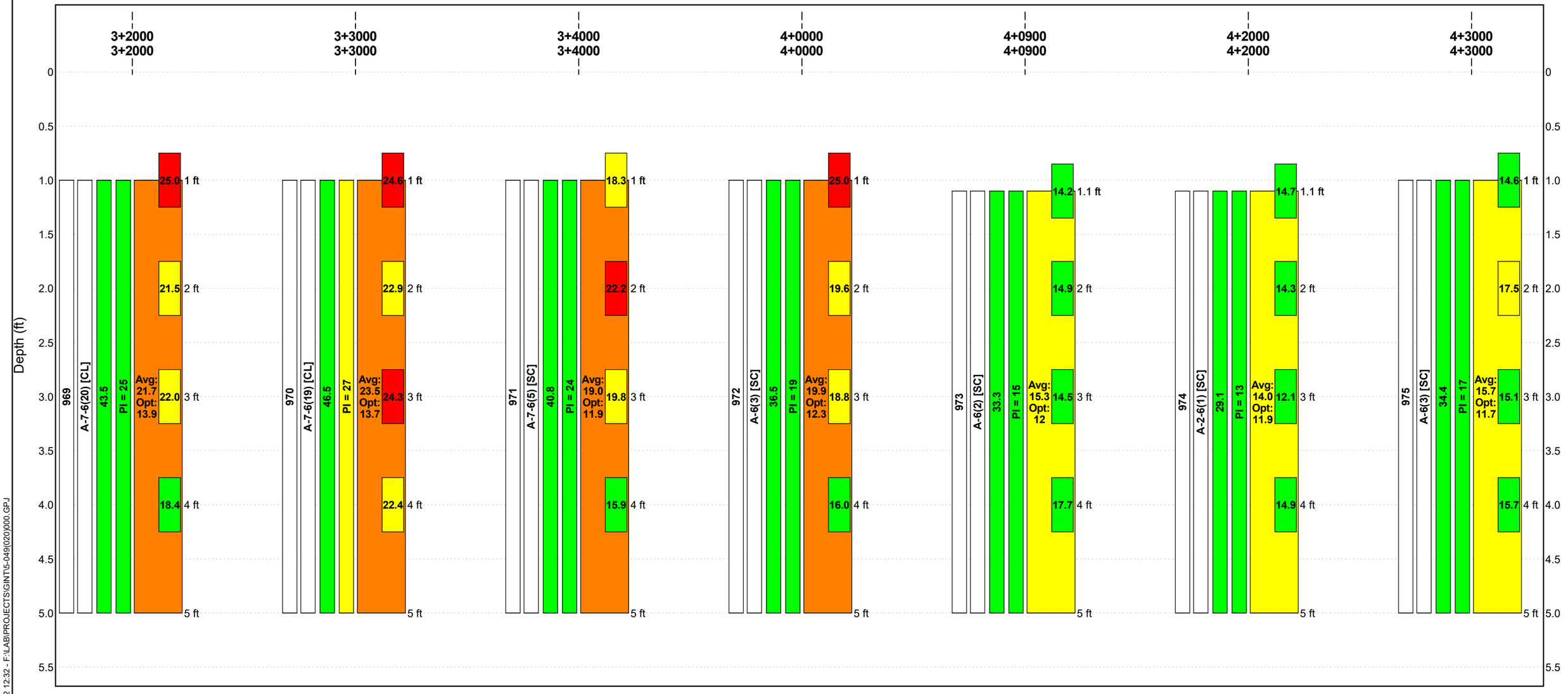


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NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

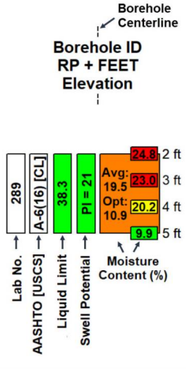
PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County

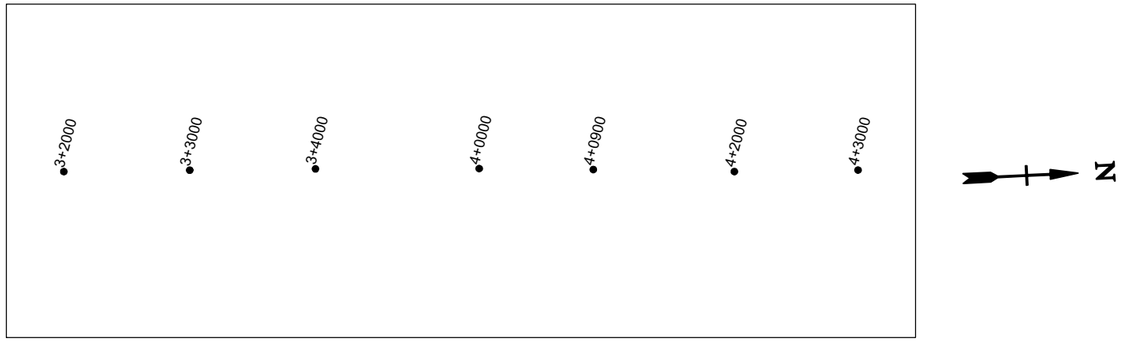


Boreholes Equally Spaced (0 to 2000 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt



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NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

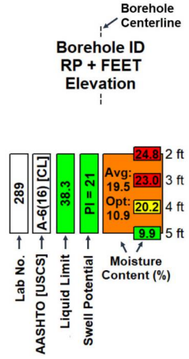
PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County

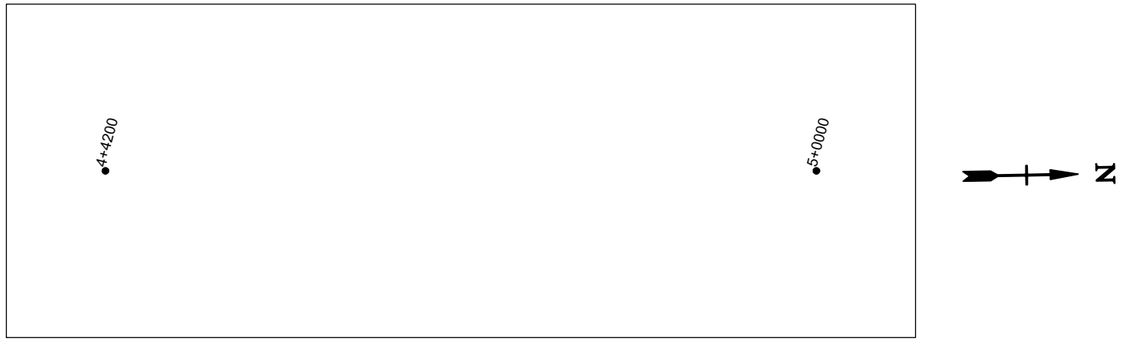


Boreholes Equally Spaced (0 to 350 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt

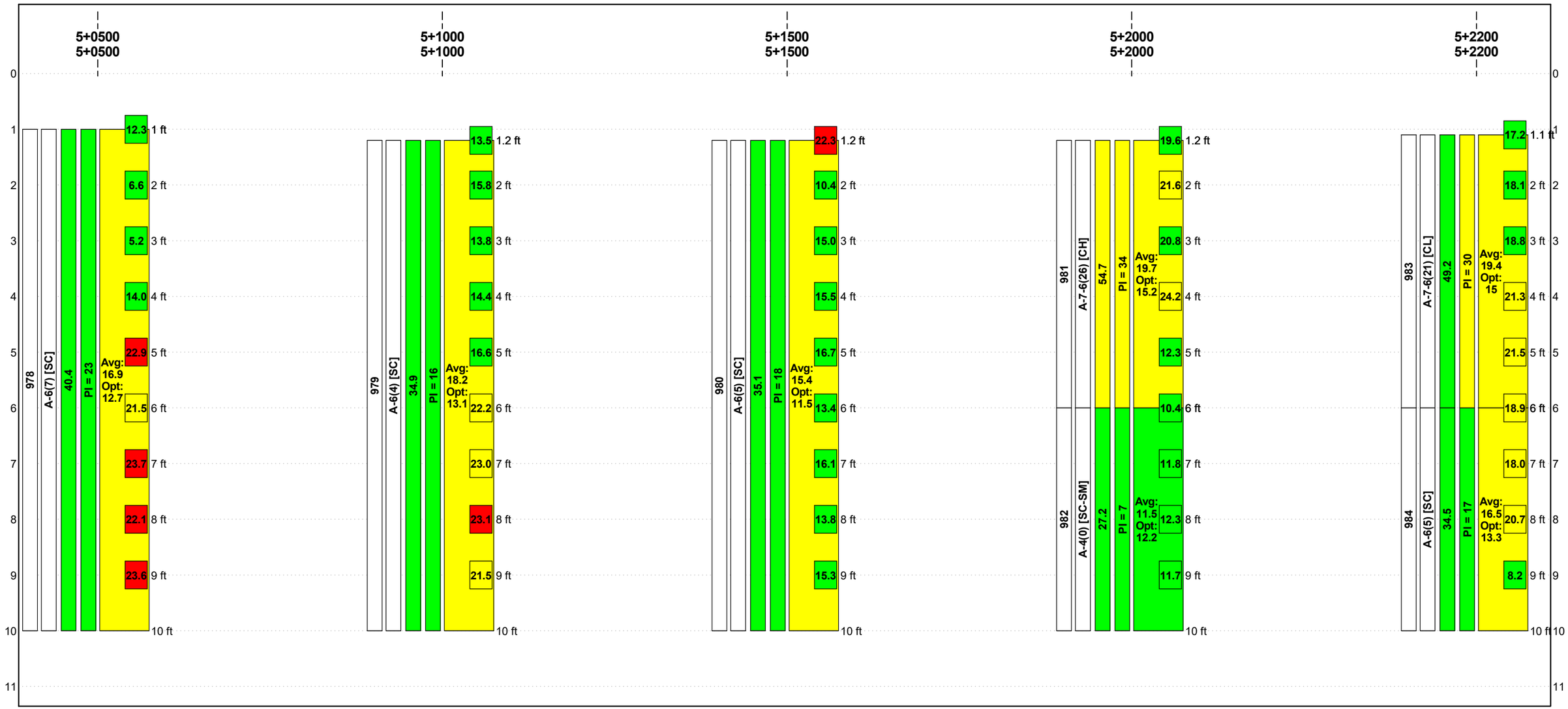


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NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

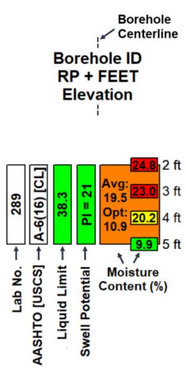
PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County

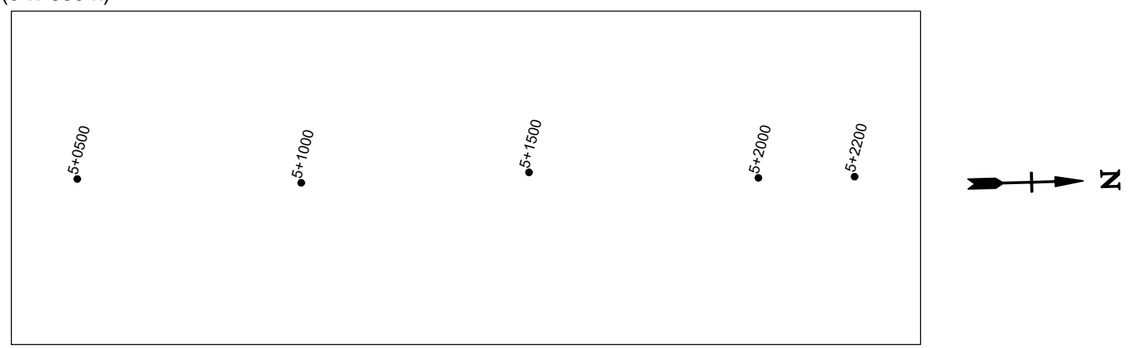


Boreholes Equally Spaced (0 to 550 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt

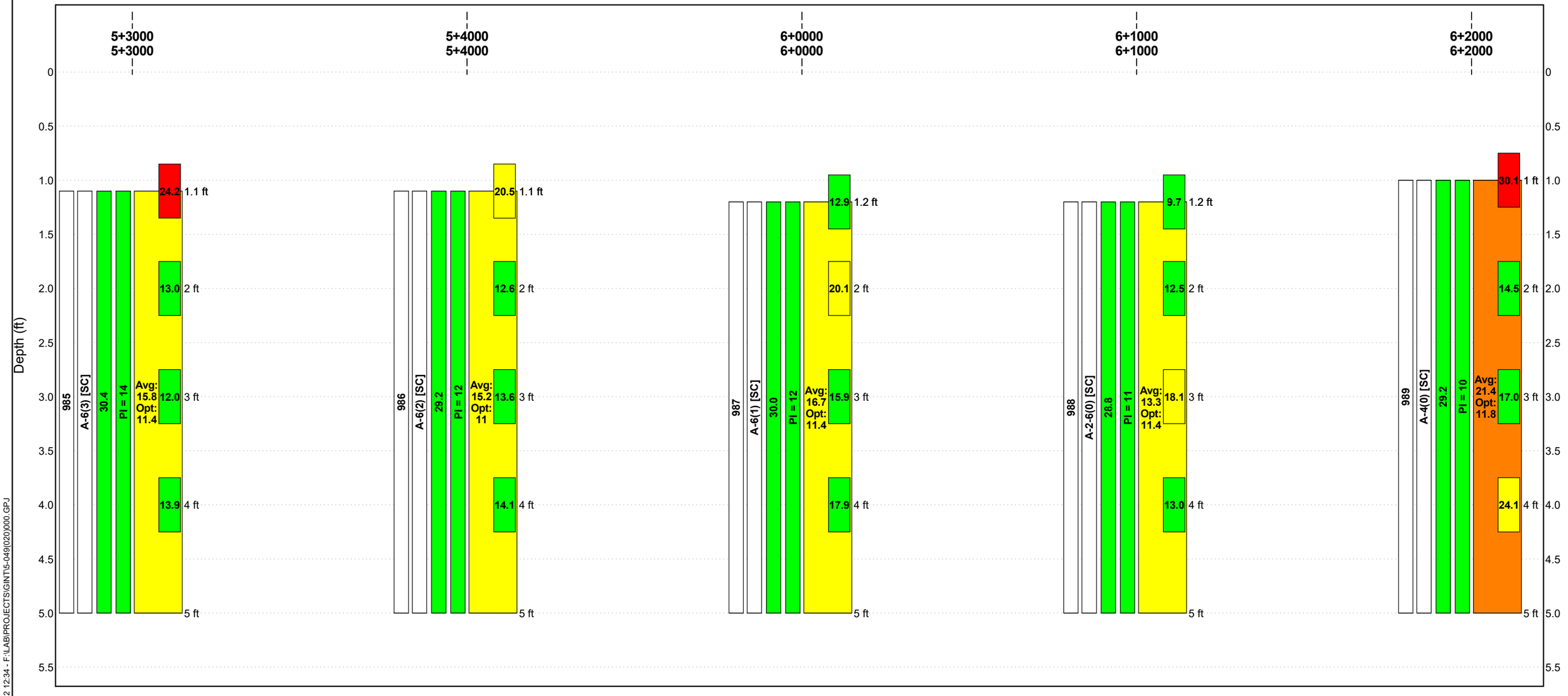


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NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

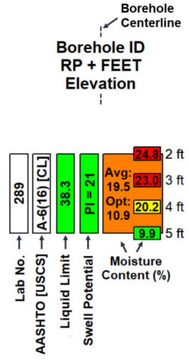
PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County

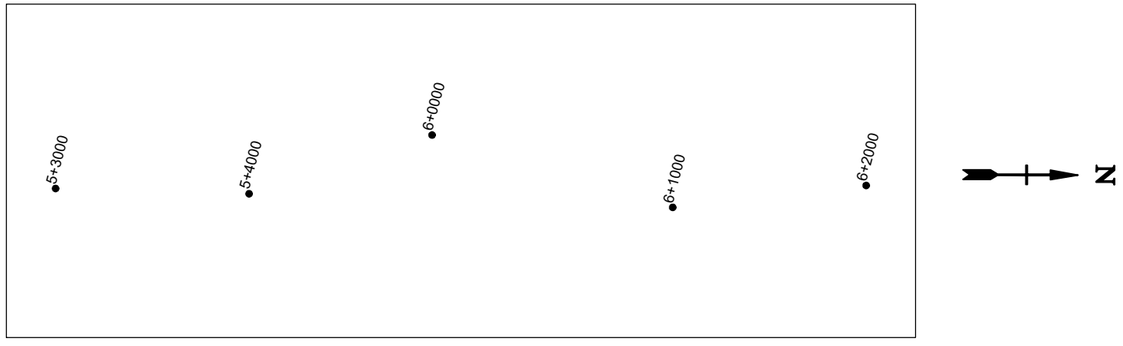


Boreholes Equally Spaced (0 to 1300 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt



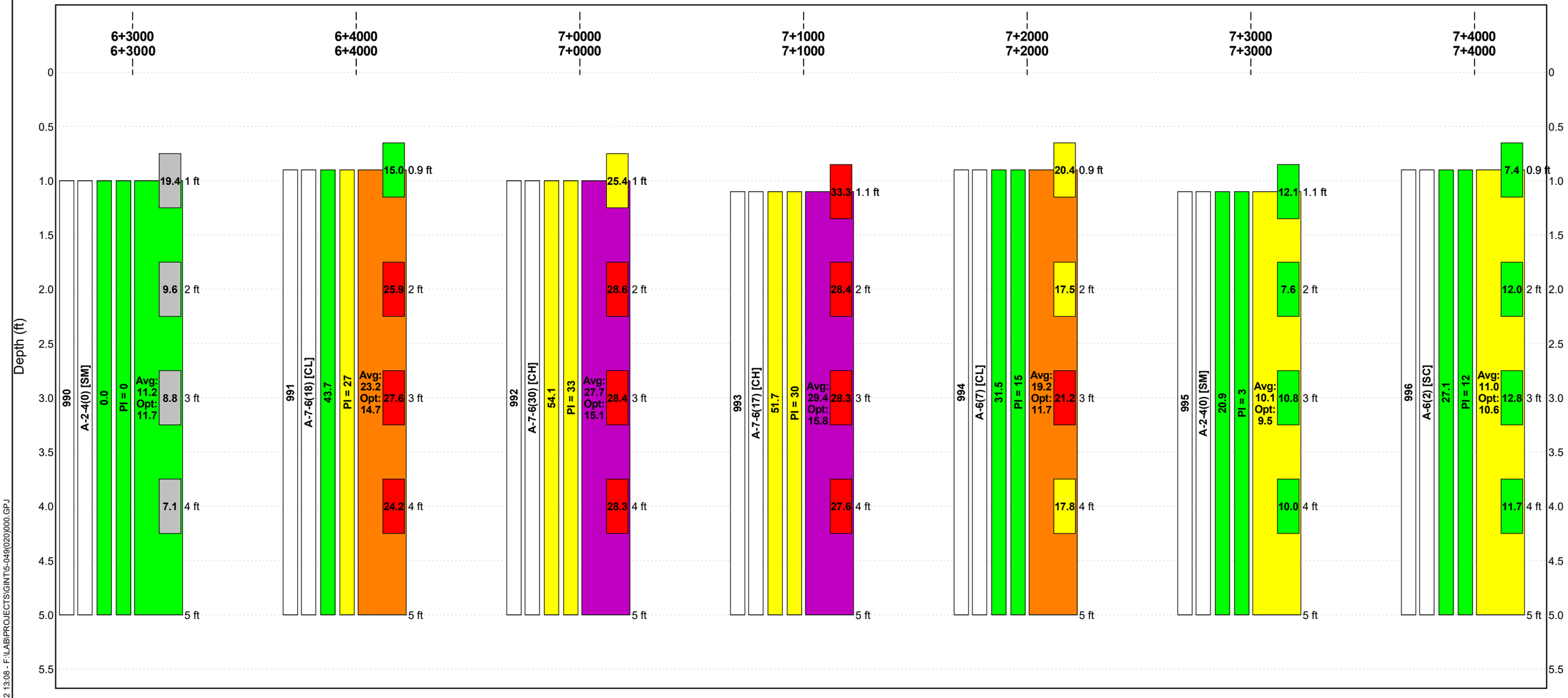
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NDDOT North Dakota Department of Transportation

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

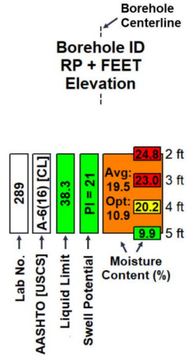
PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County



Boreholes Equally Spaced (0 to 2000 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt



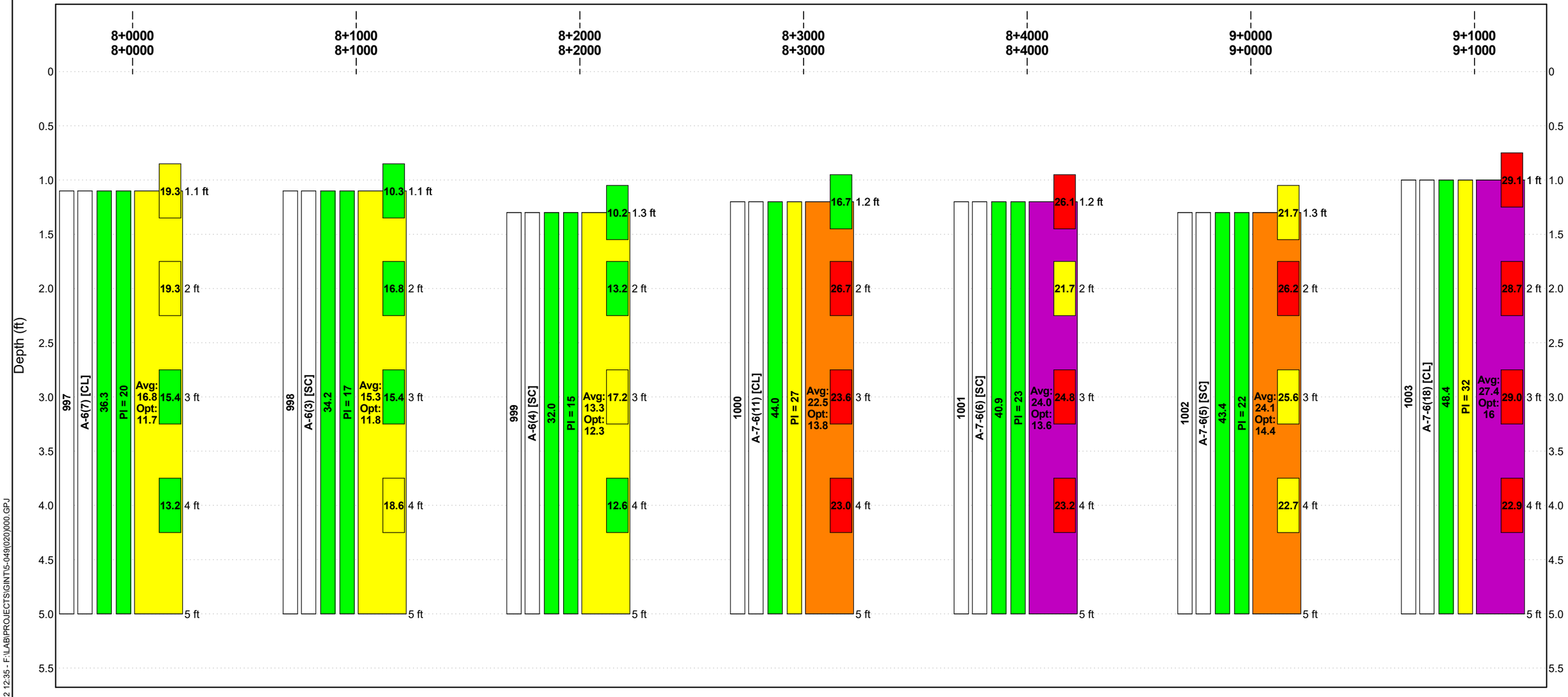
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NDDOT
North Dakota Department of Transportation

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

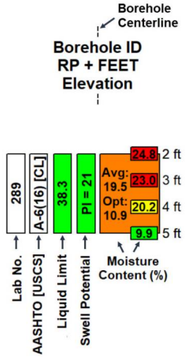
PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County



Boreholes Equally Spaced (0 to 2000 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt



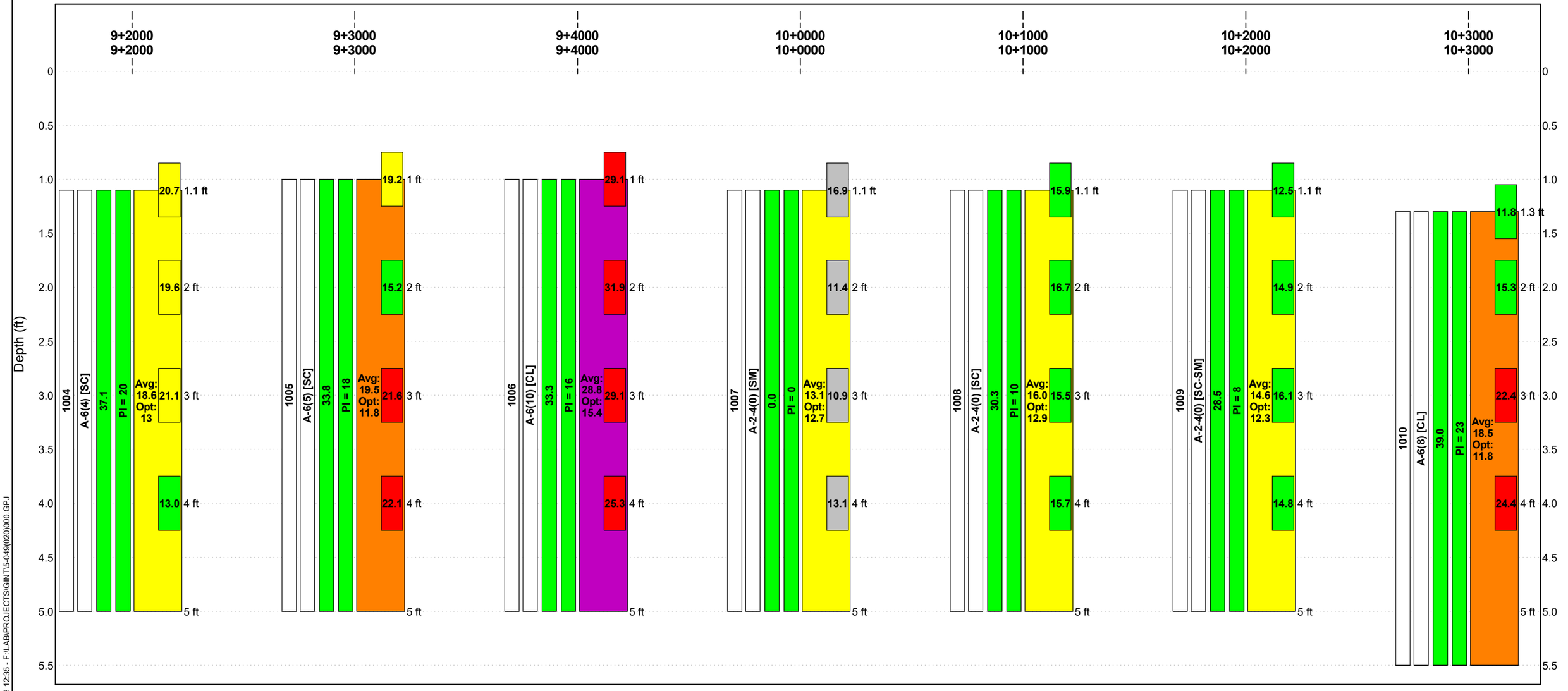
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NDDOT North Dakota Department of Transportation

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

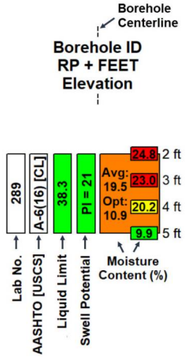
PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County



Boreholes Equally Spaced (0 to 2000 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt



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NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

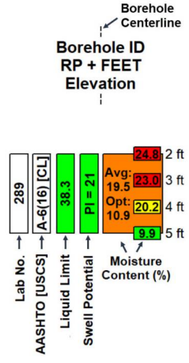
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LOCATION Sioux & Grant County

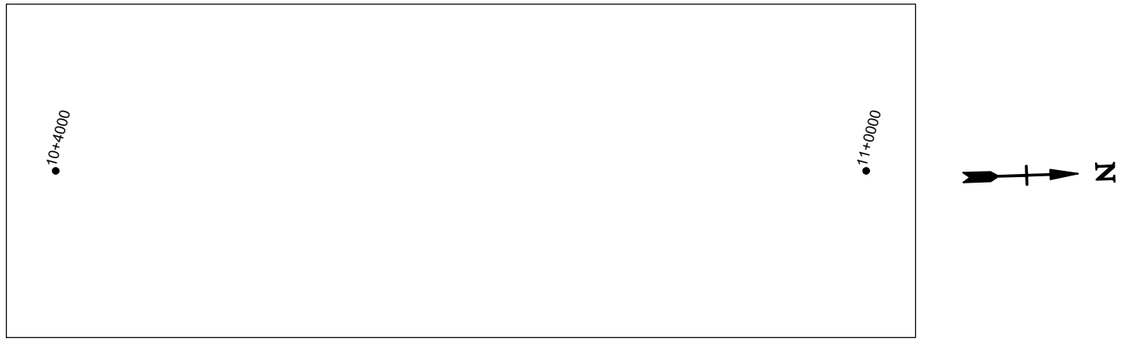


Boreholes Equally Spaced (0 to 400 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt

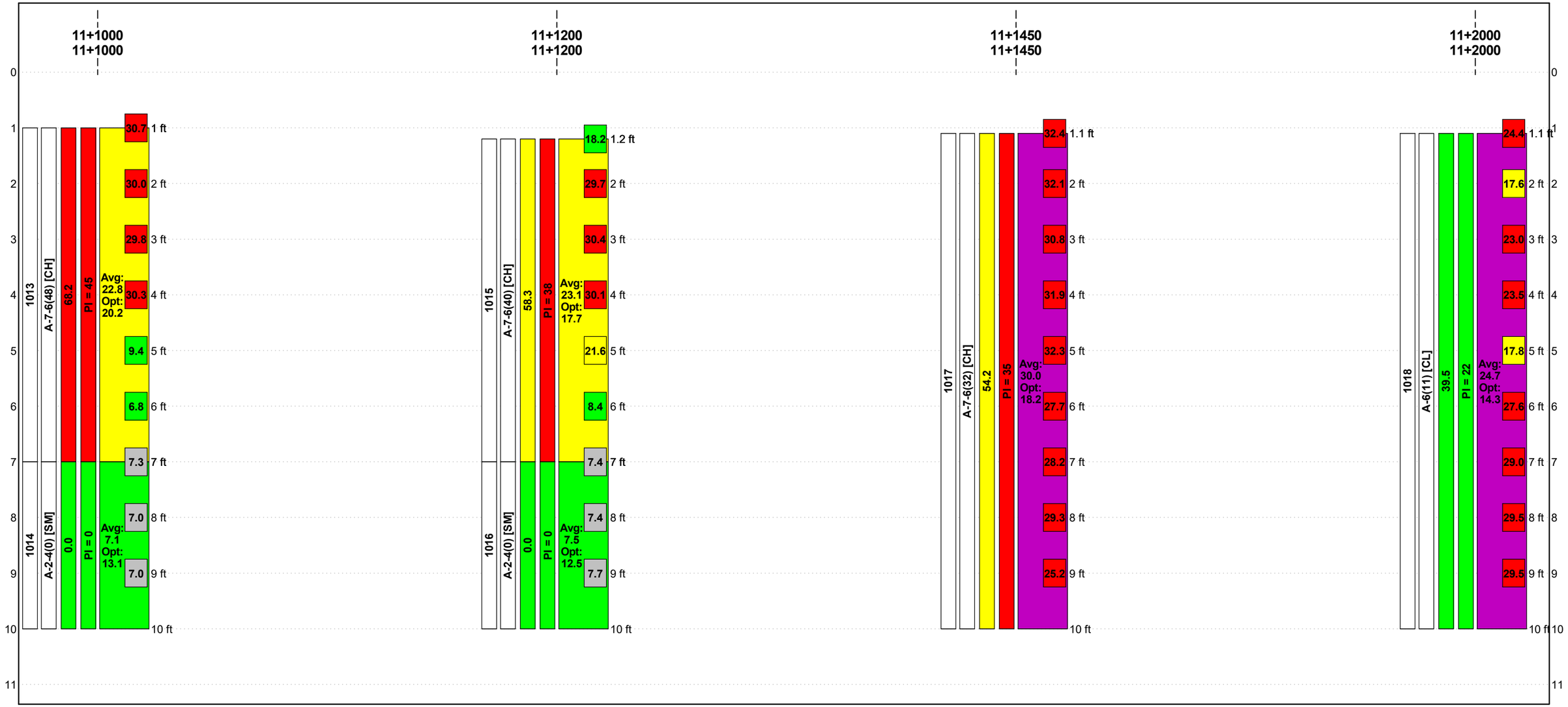


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NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

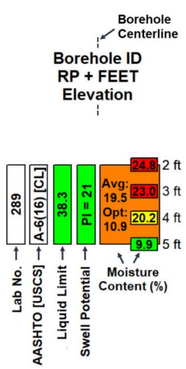
PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County

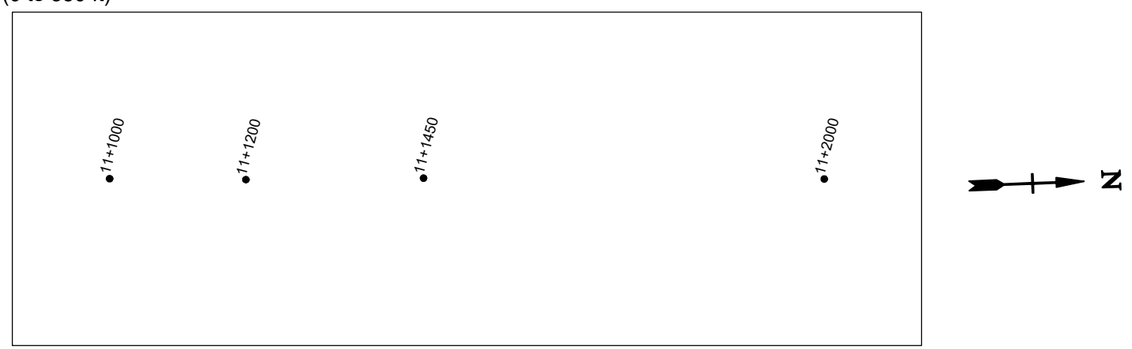


Boreholes Equally Spaced (0 to 350 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt

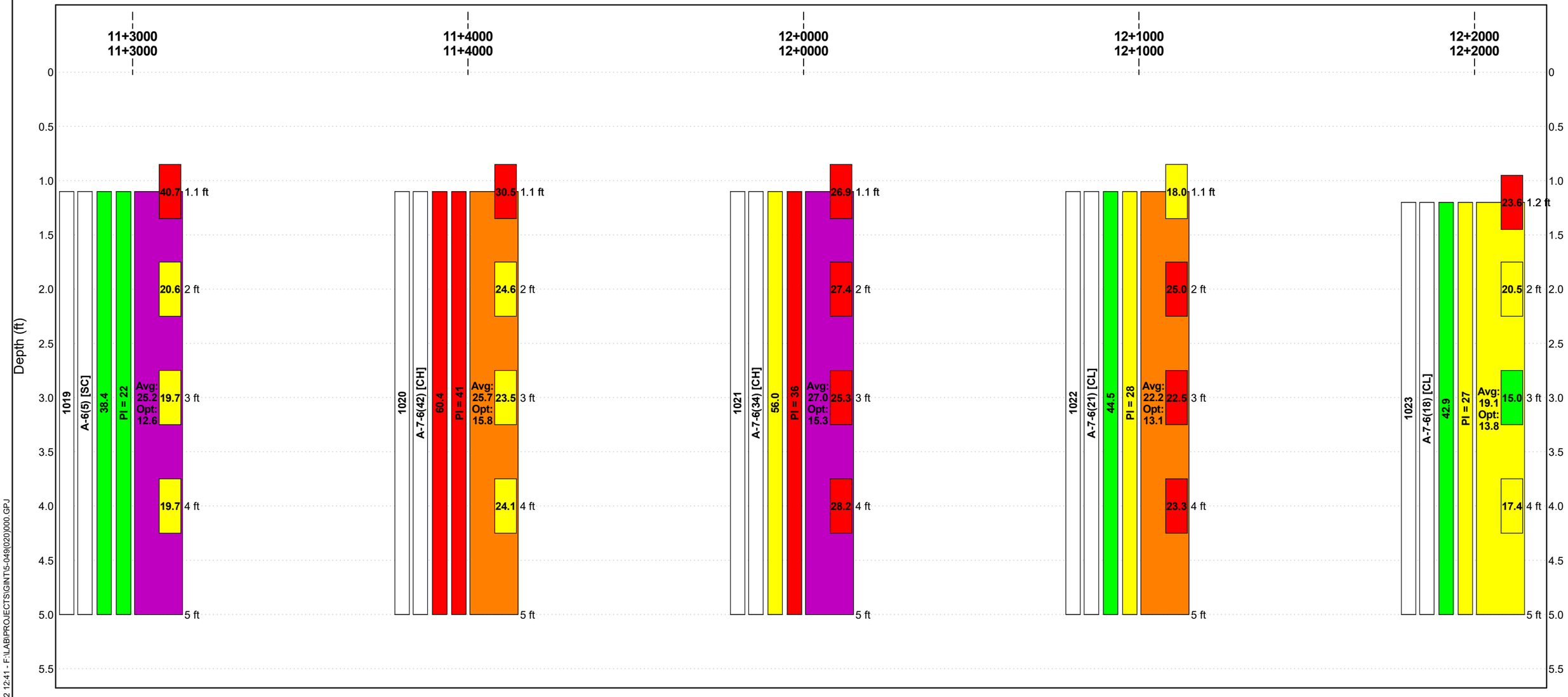


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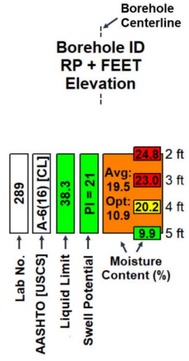
NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County

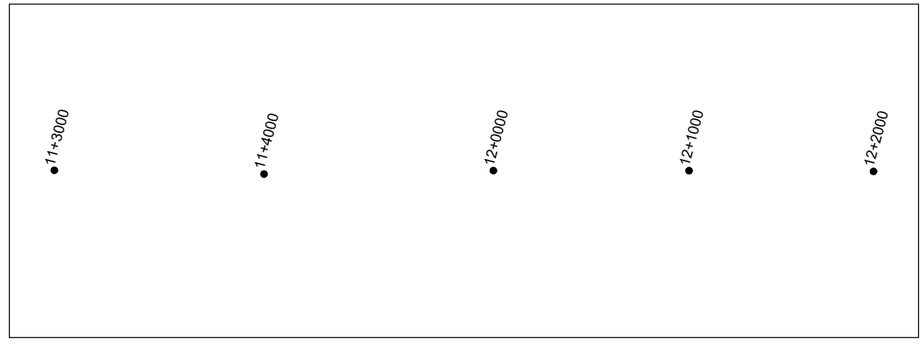


LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt

Boreholes Equally Spaced (0 to 1300 ft)

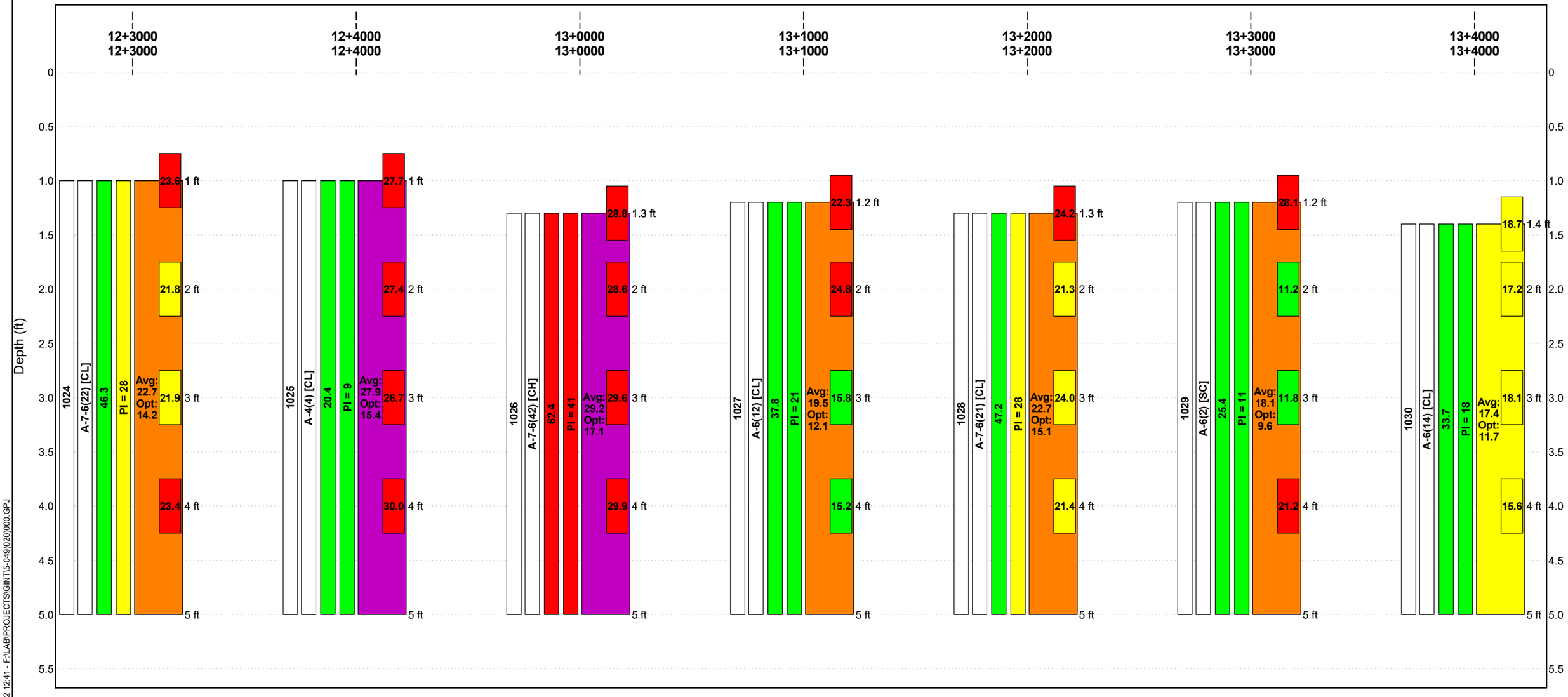


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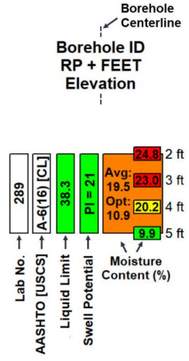
NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County



LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt

Boreholes Equally Spaced (0 to 2000 ft)

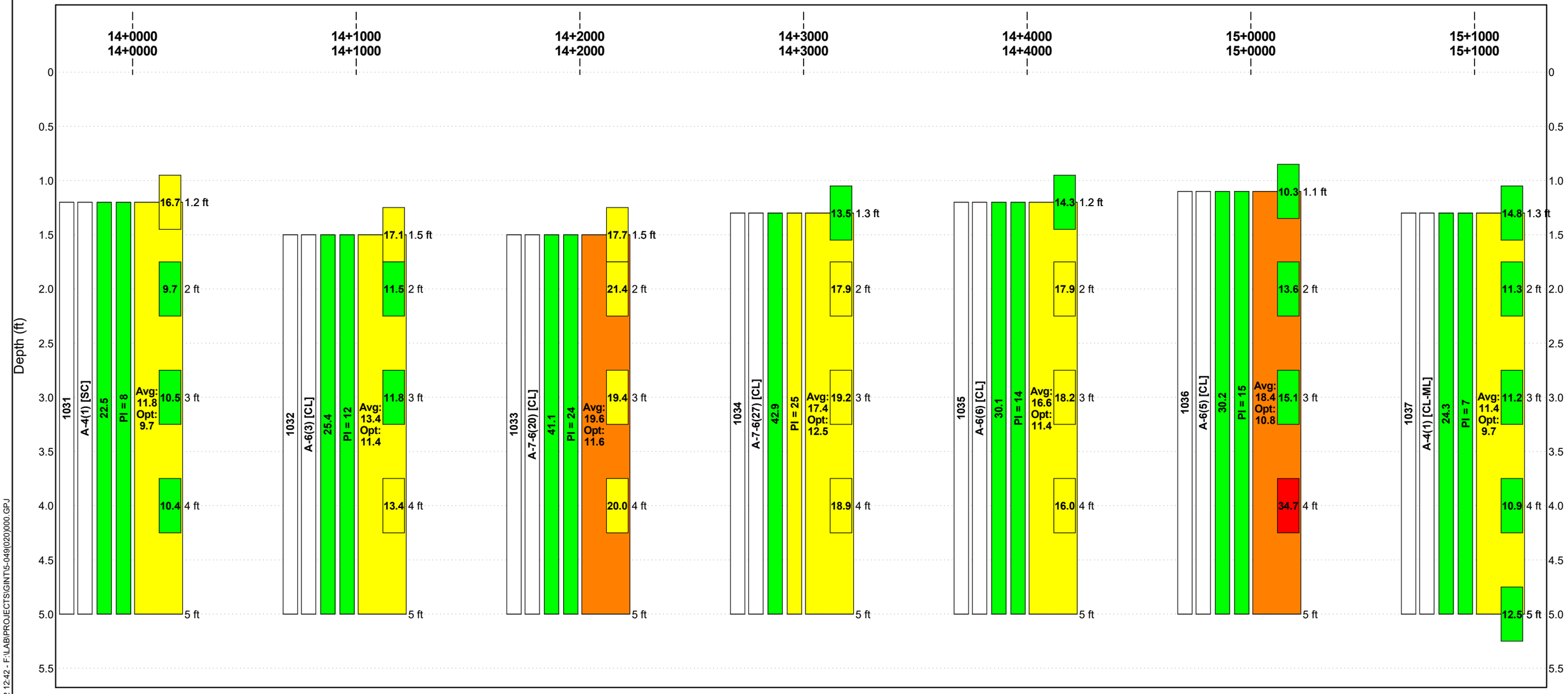


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NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

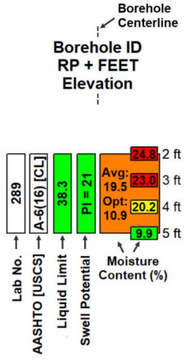
PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County



Boreholes Equally Spaced (0 to 2000 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt



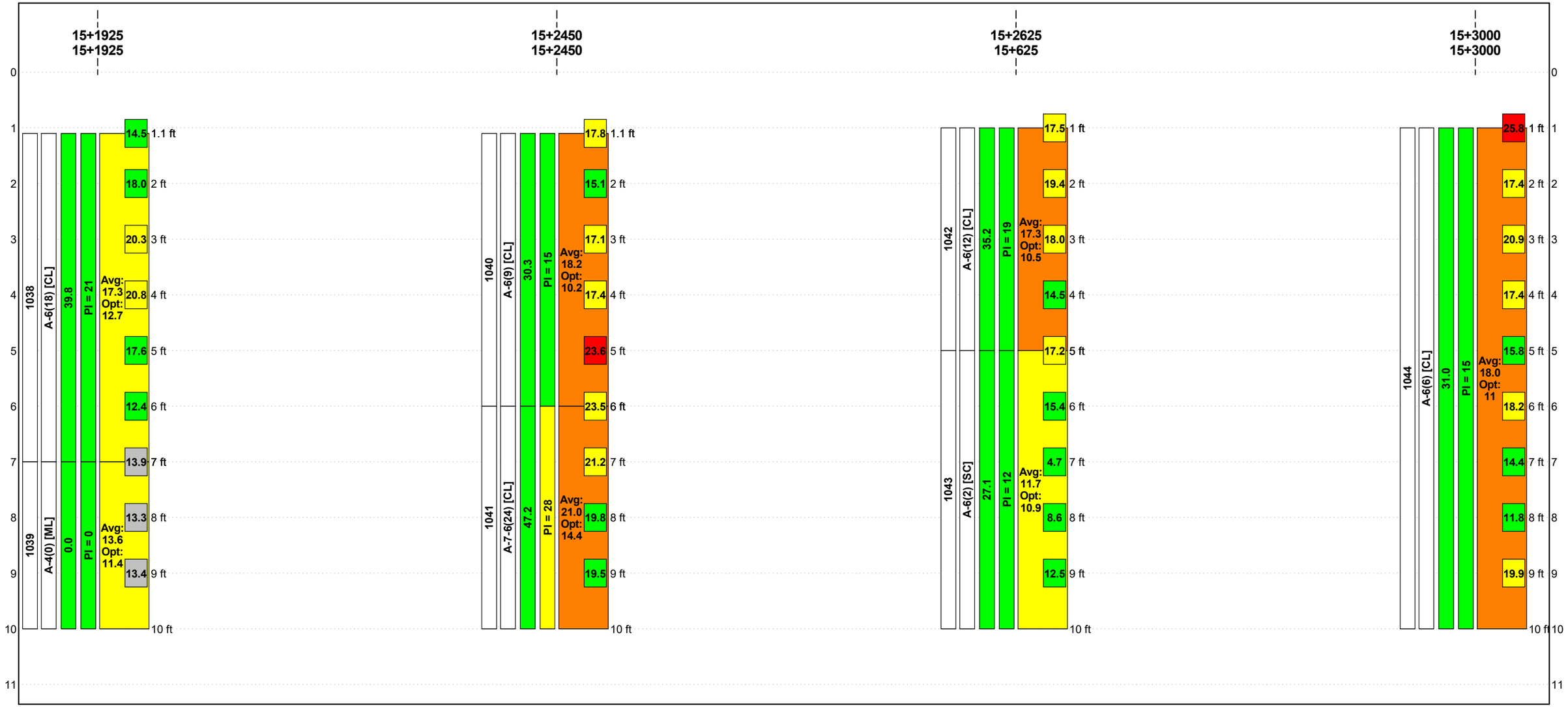
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NDDOT North Dakota Department of Transportation

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

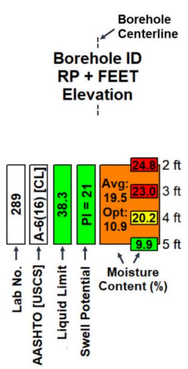
PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County

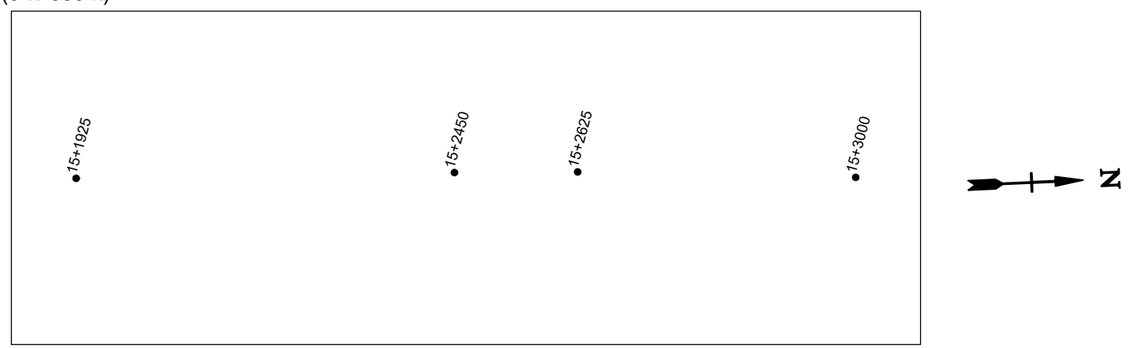


Boreholes Equally Spaced (0 to 350 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt

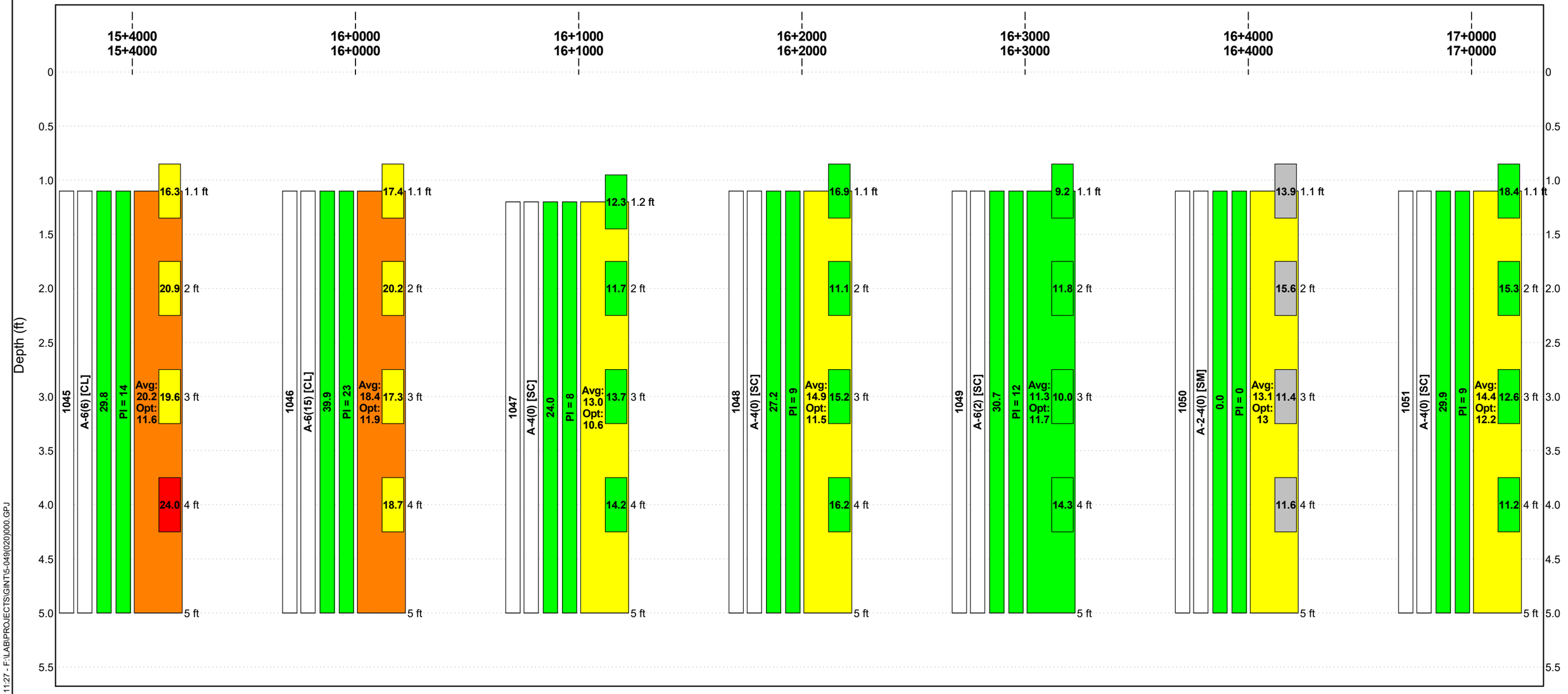


NDDOT_LINEARCOLORFENCE_DEPTH - 20171219.GDT - 10/12/22 12:43 - F:\LAB\PROJECTS\GINT\5-049(020)000.GPJ

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

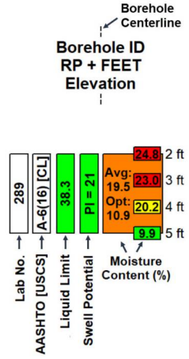
PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County



Boreholes Equally Spaced (0 to 2000 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt



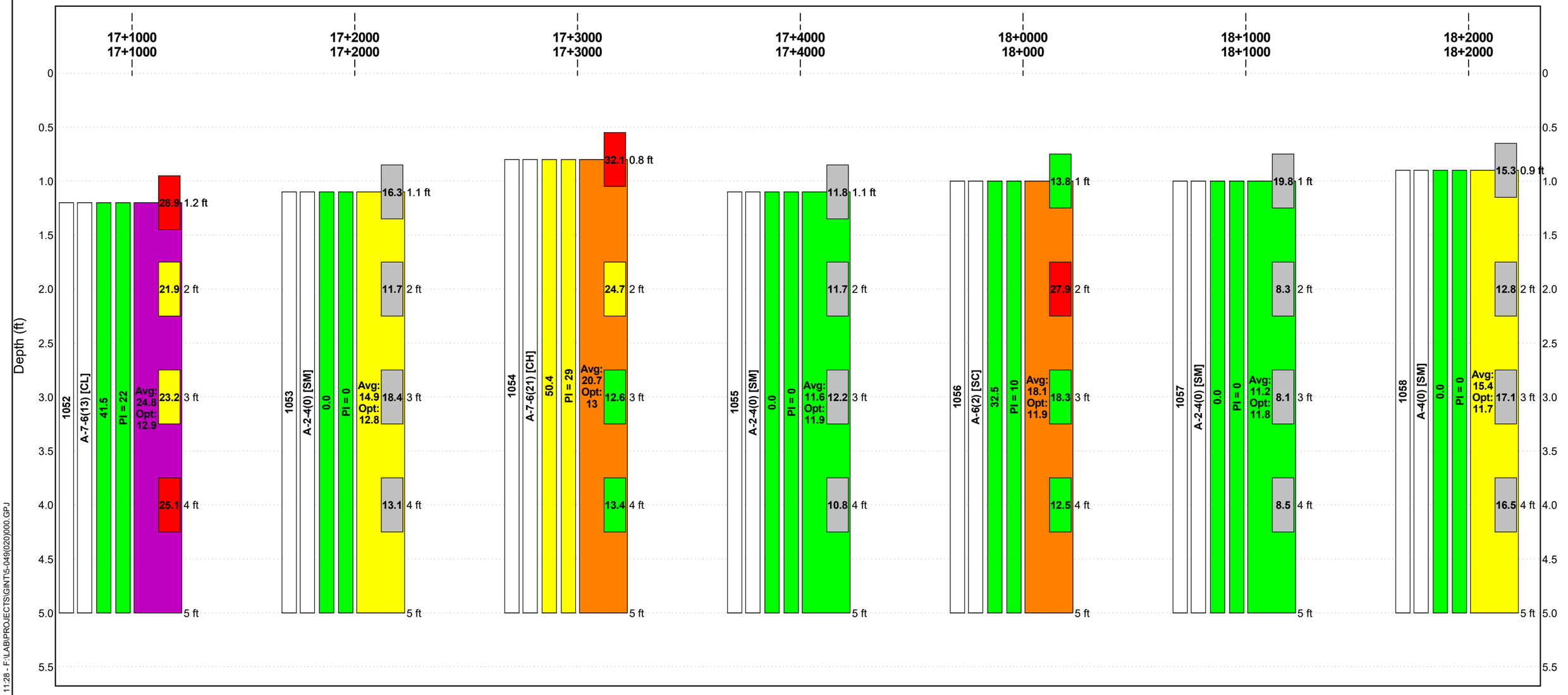
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NDDOT North Dakota Department of Transportation

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

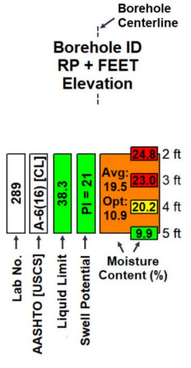
PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County



Boreholes Equally Spaced (0 to 2000 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt

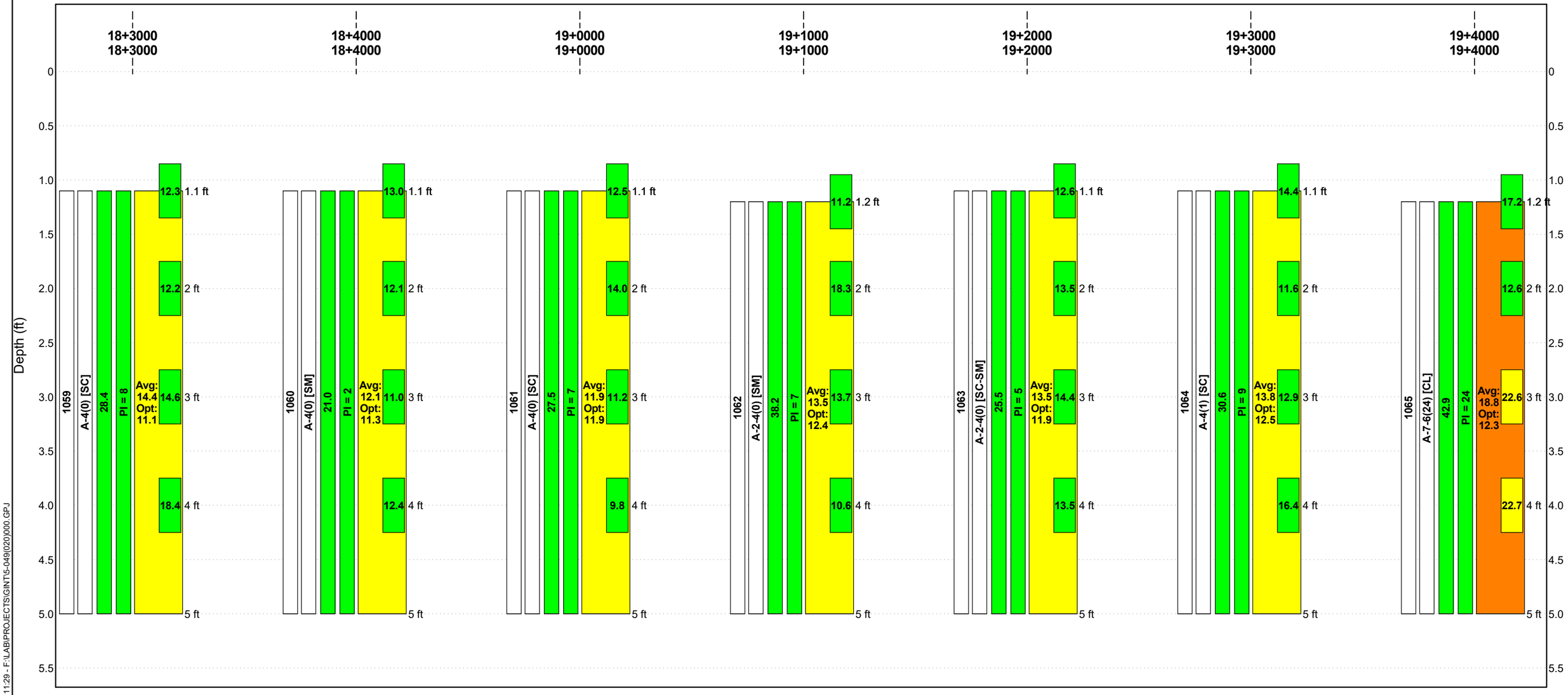


NDDOT_LINEARCOLORFENCE_DEPTH - 20171219.GDT - 9/19/22 11:28 - F:\LAB\PROJECTS\GINT\5-049(020)000.GPJ

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

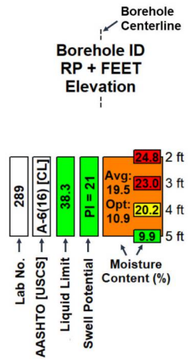
PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County



Boreholes Equally Spaced (0 to 2000 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt

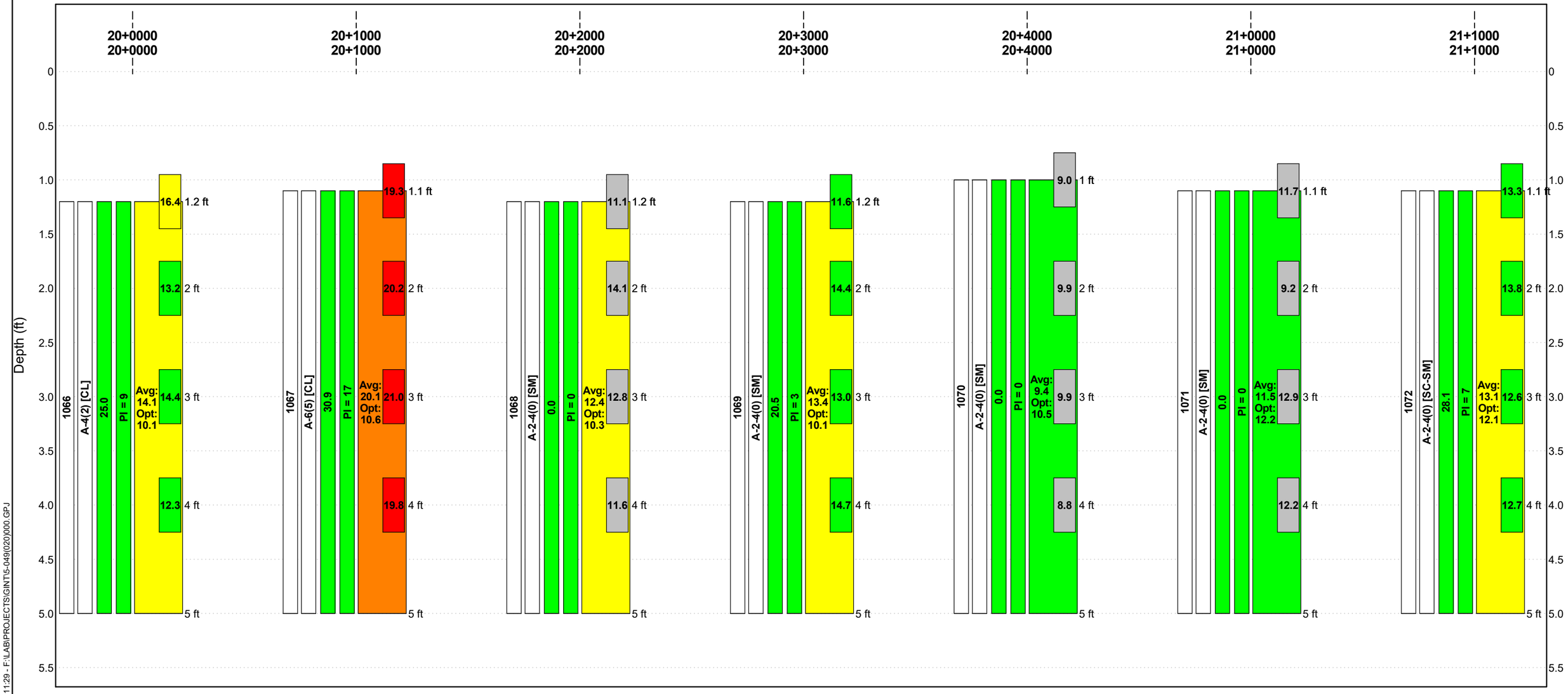


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NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

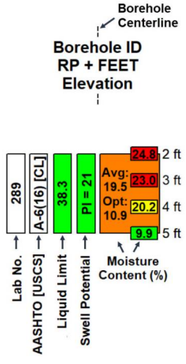
PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County

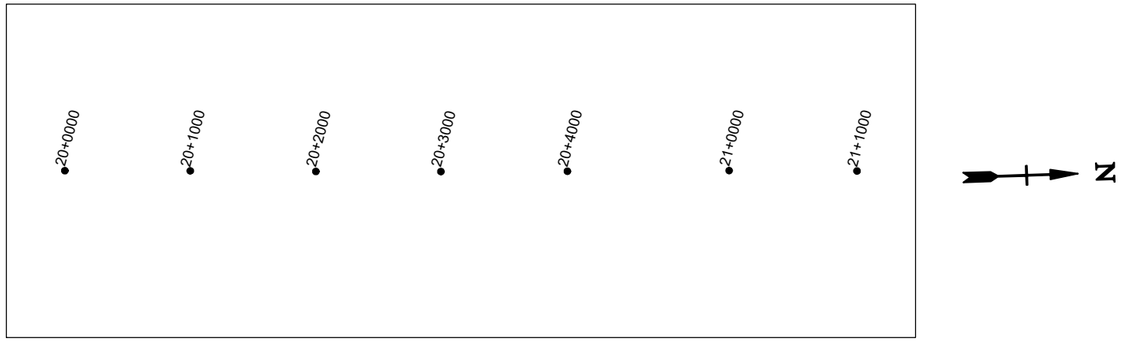


Boreholes Equally Spaced (0 to 2000 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt



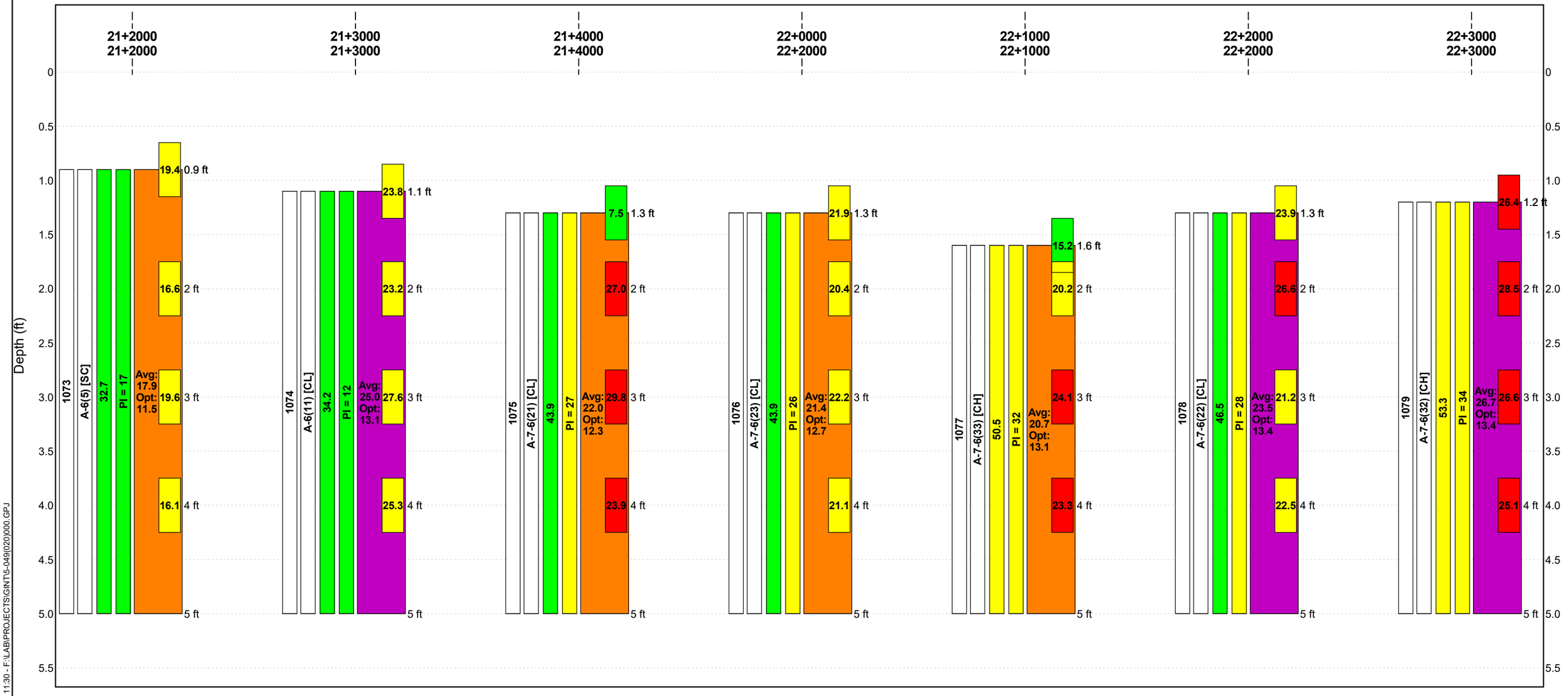
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NDDOT North Dakota Department of Transportation

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

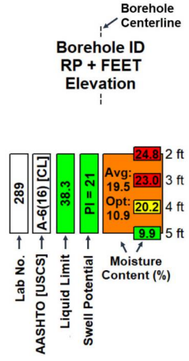
PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County



Boreholes Equally Spaced (0 to 2000 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt

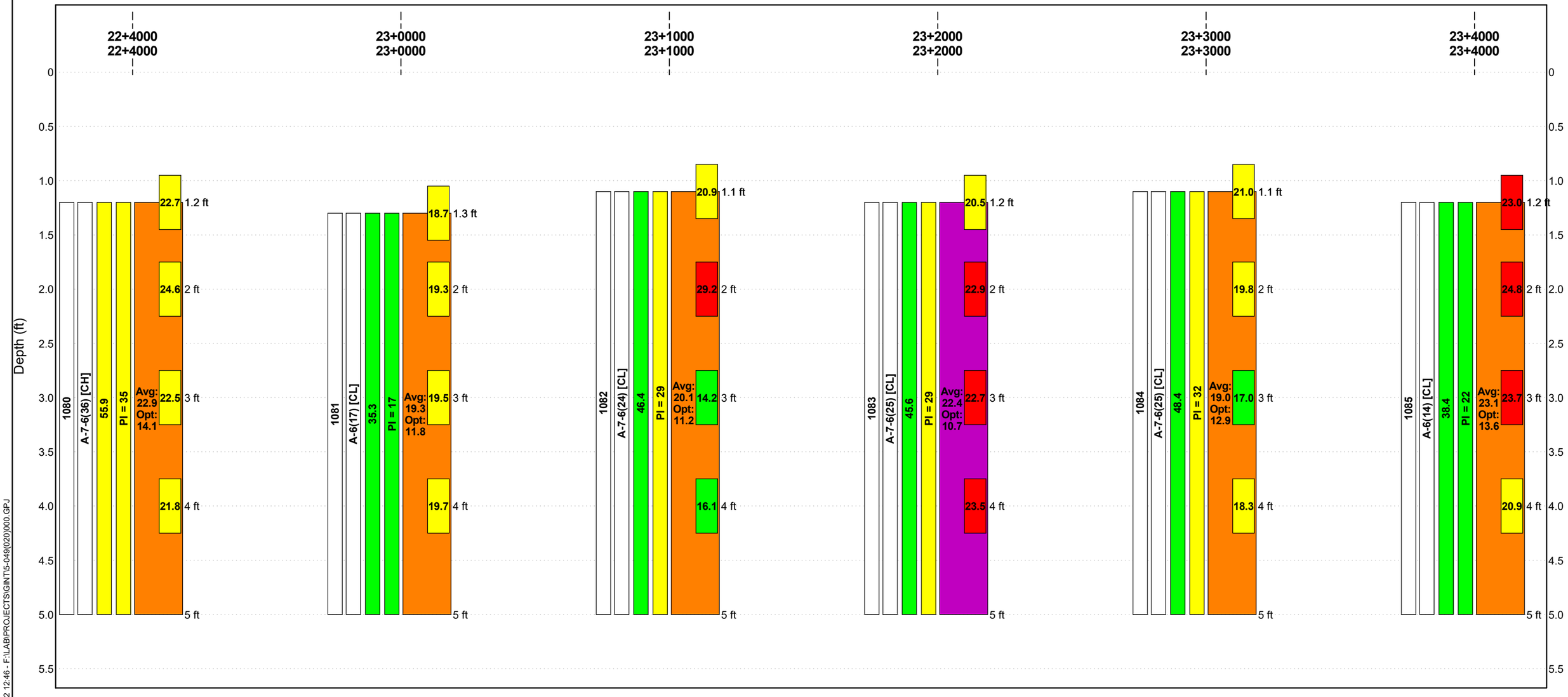


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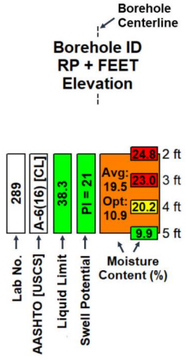
NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County

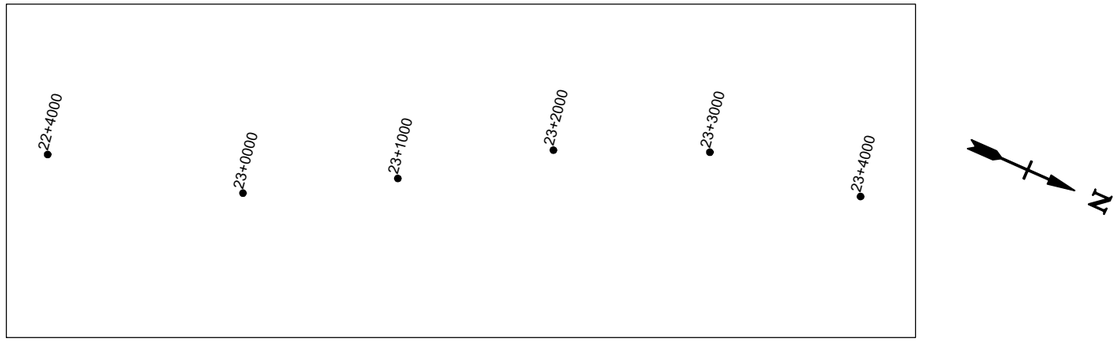


LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt

Boreholes Equally Spaced (0 to 1600 ft)

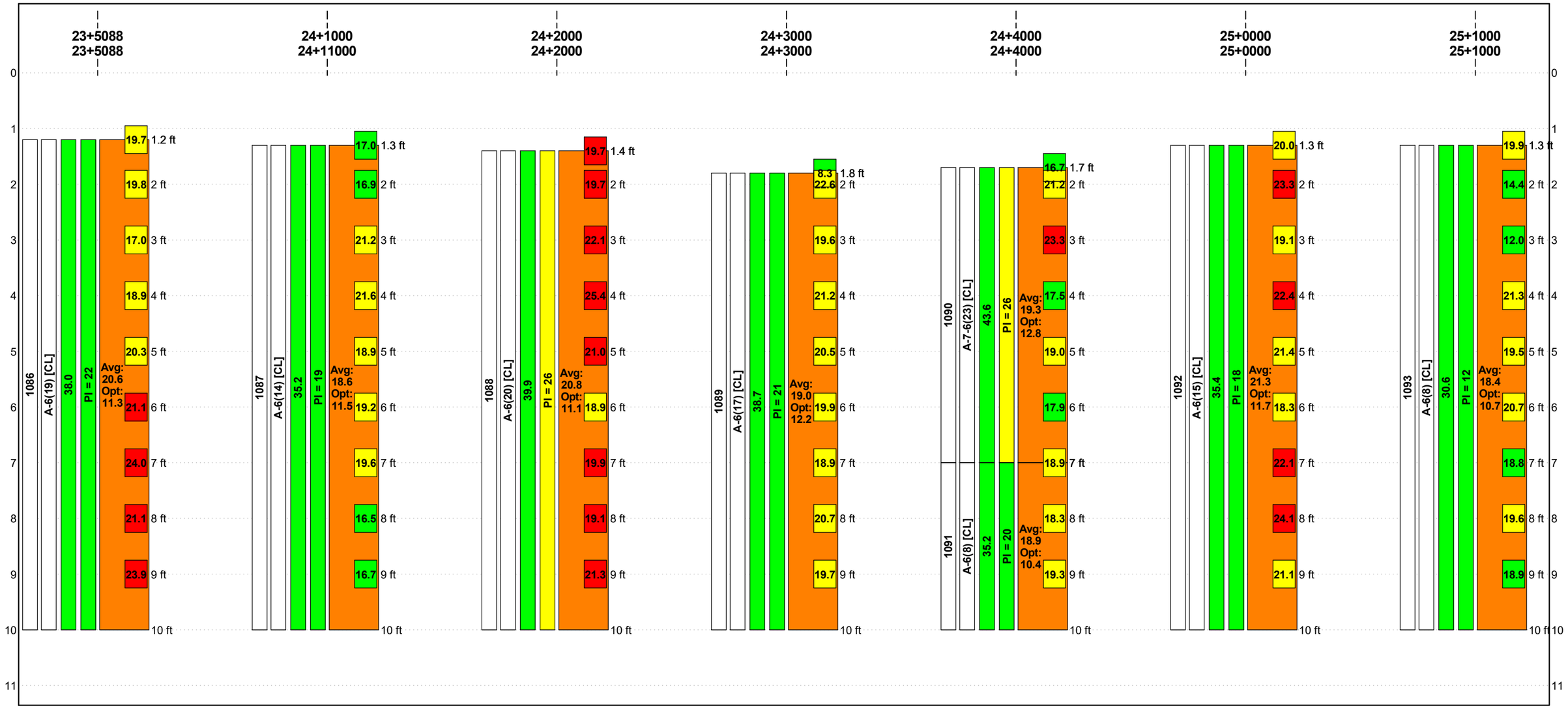


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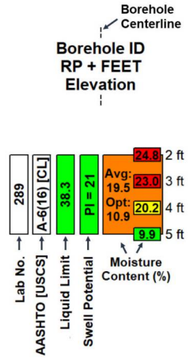
NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County



LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt

Boreholes Equally Spaced (0 to 2000 ft)

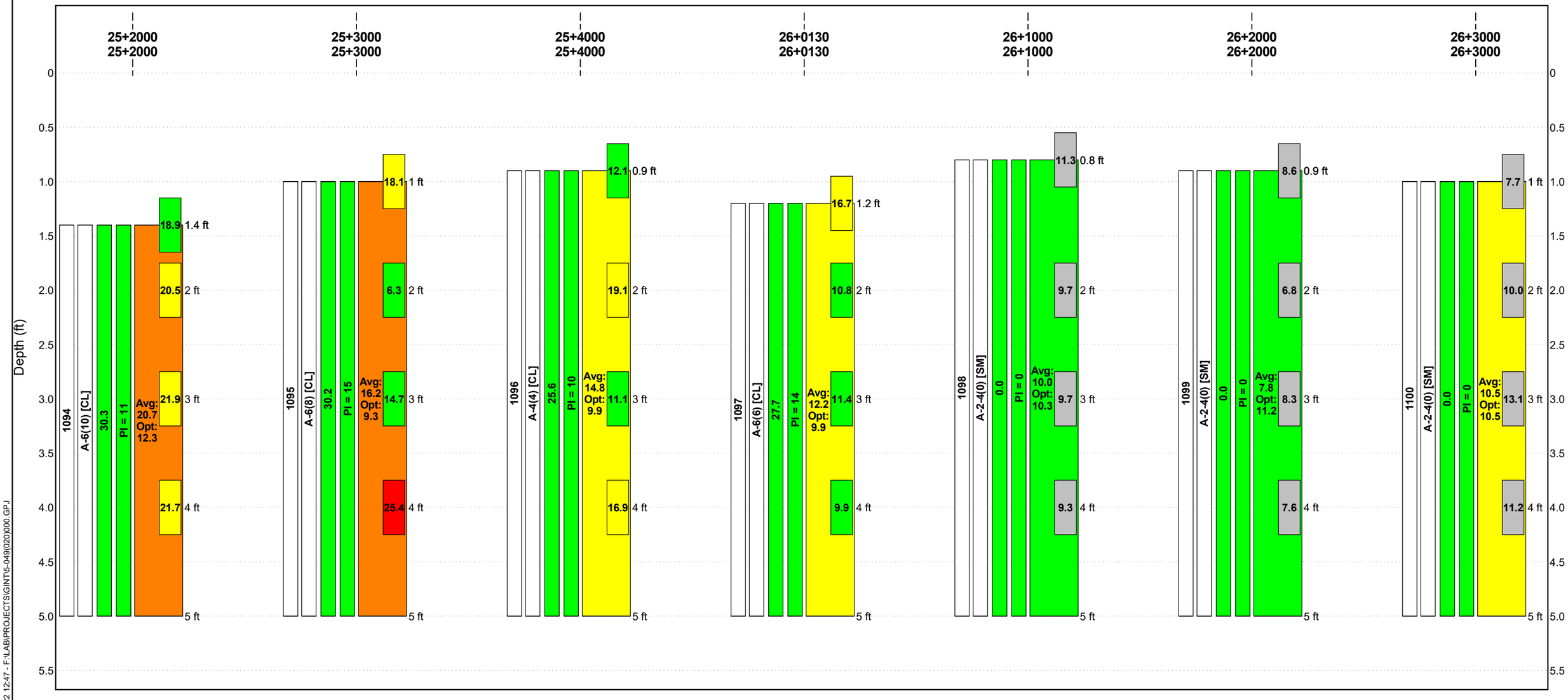


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NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

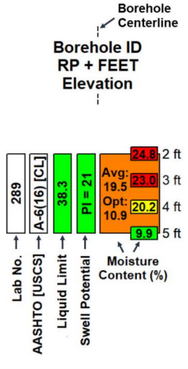
PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County

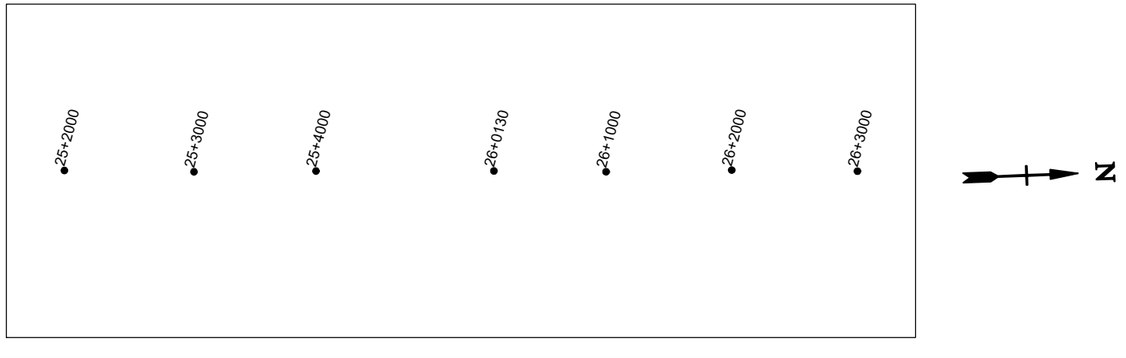


Boreholes Equally Spaced (0 to 2000 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt

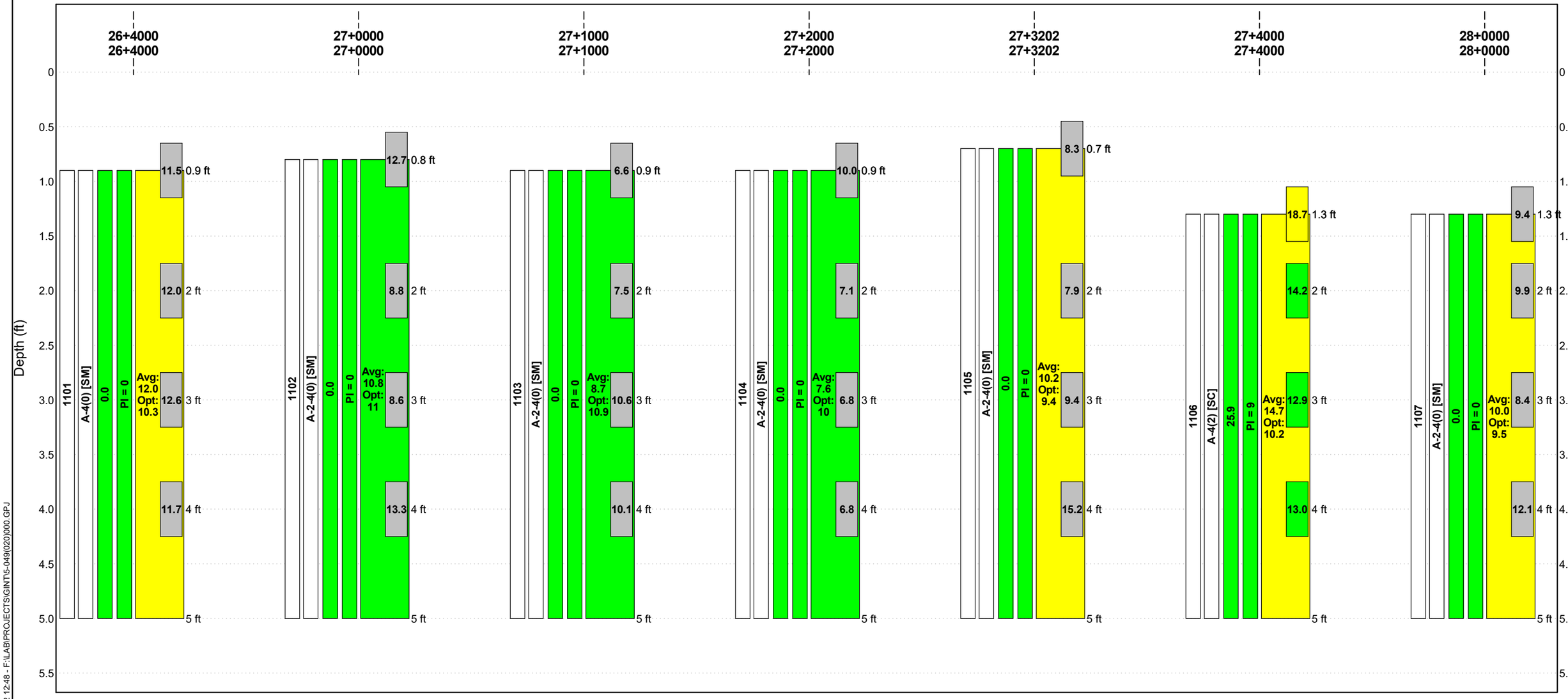


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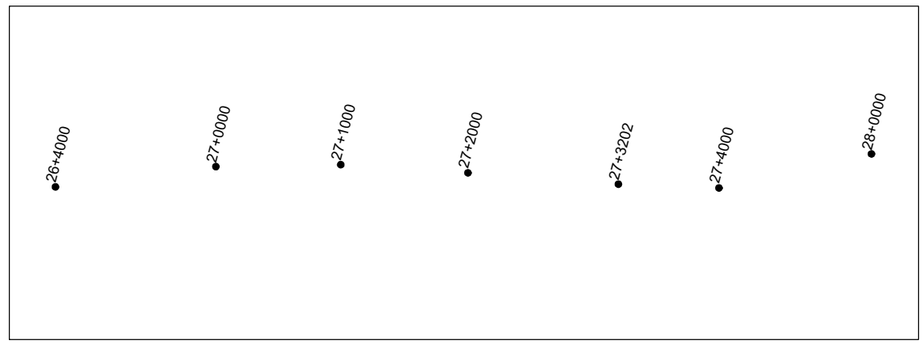
NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **PCN** 23274

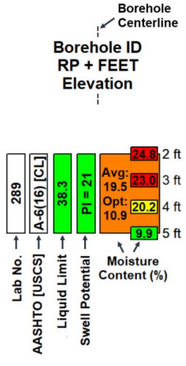
LOCATION Sioux & Grant County



Boreholes Equally Spaced (0 to 2000 ft)



LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt

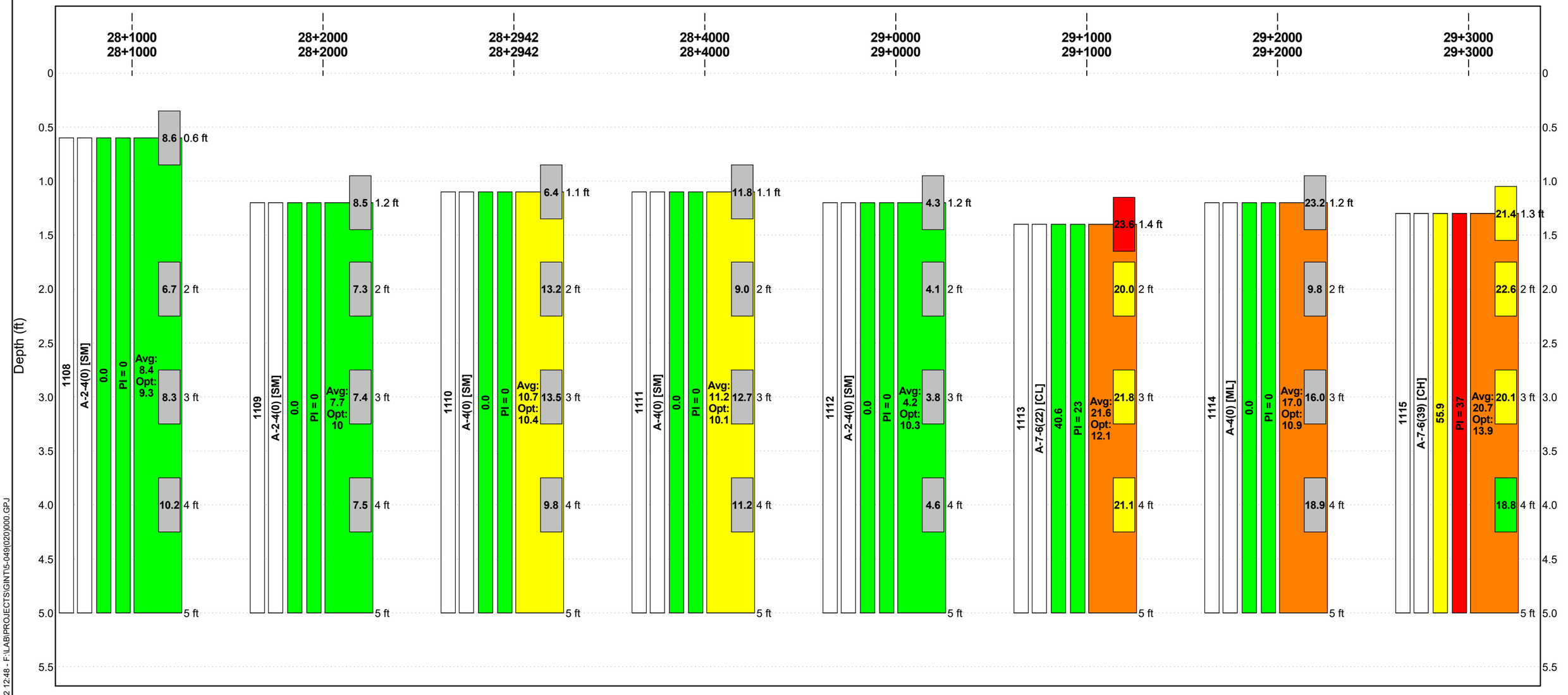
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NDDOT North Dakota Department of Transportation

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

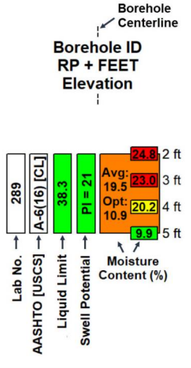
PROJECT NUMBER X-5-049(020)000 **PCN** 23274

LOCATION Sioux & Grant County

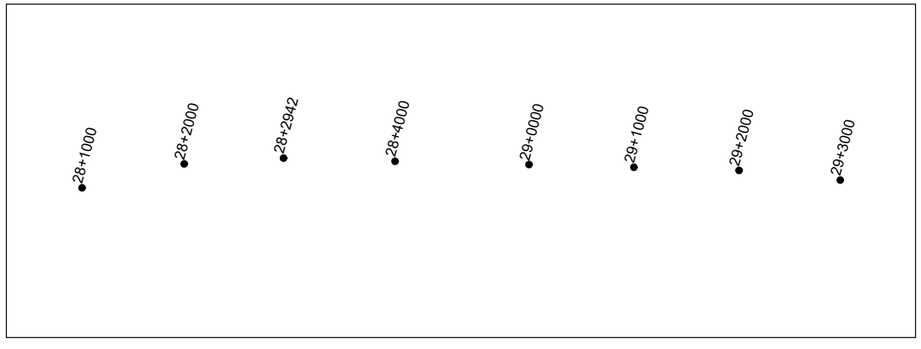


Boreholes Equally Spaced (0 to 2400 ft)

LEGEND



Liquid Limit	LL<50	50<=LL<60	LL>=60	
Swell Potential	Low	Marginal	High	
Moisture Content	Below PL	0-5% Over PL	>5% Over PL	Non-Plastic
Avg. In-Place Moisture Content	MC < Opt	0<=MC<6% Over Opt	6<=MC<10% Over Opt	10<=MC<16% Over Opt	MC>16% Over Opt



NDDOT_LINEARCOLORFENCE_DEPTH - 20171219.GDT - 10/12/22 12:48 - F:\LAB\PROJECTS\GINT\5-049(020)000.GPJ

APPENDIX E

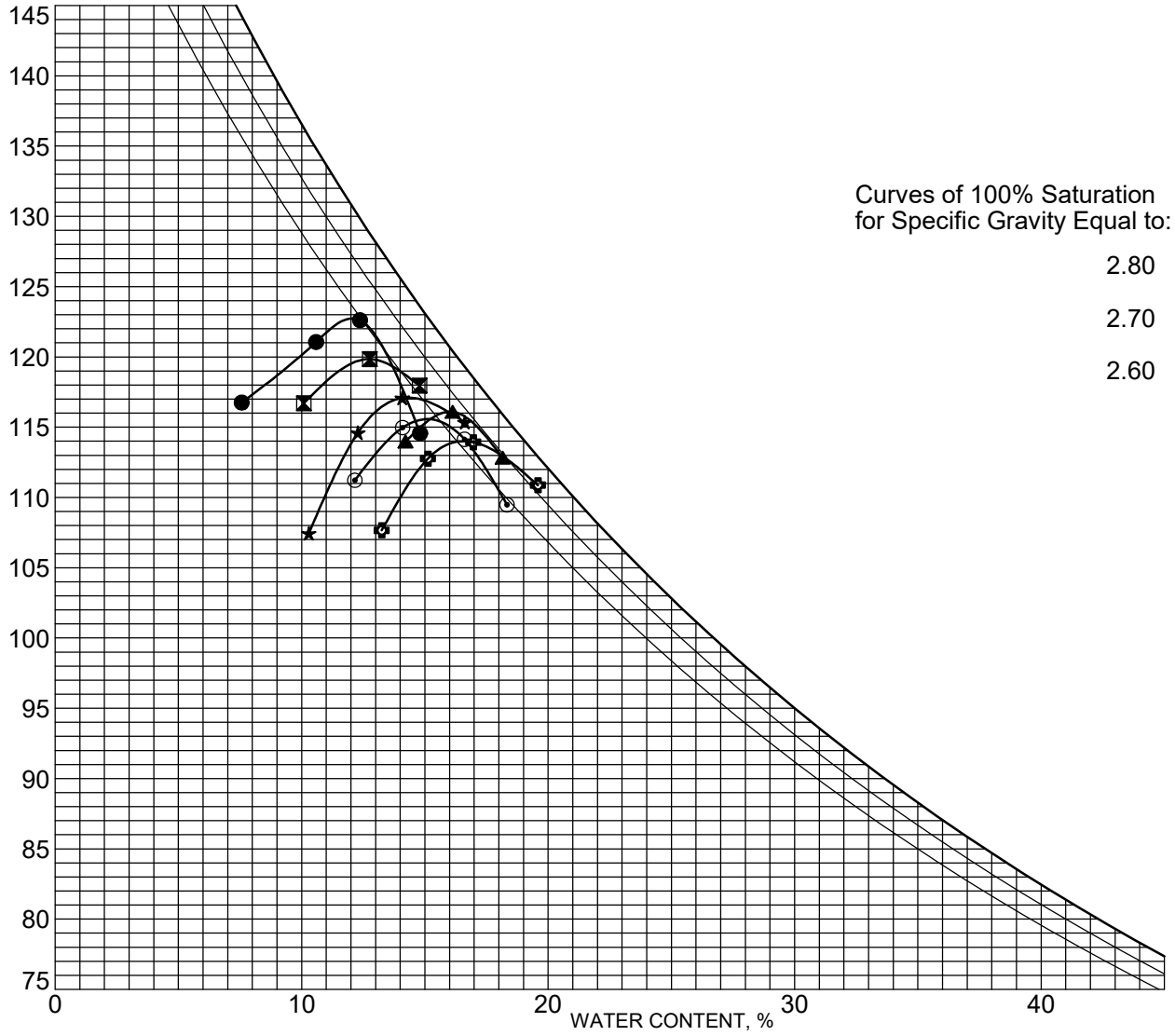
LAB RESULTS

MOISTURE-DENSITY RELATIONSHIP

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	0+0000	1.2	A-2-4 (0)	CLAYEY SAND(SC)
⊠	0+1000	1.0	A-6 (8)	SANDY LEAN CLAY(CL)
▲	0+2000	1.0	A-7-6 (30)	FAT CLAY(CH)
★	0+3000	1.0	A-7-6 (28)	FAT CLAY with SAND(CH)
⊙	0+4000	1.0	A-7-6 (15)	SANDY LEAN CLAY(CL)
✿	1+0100	1.0	A-7-6 (32)	FAT CLAY with SAND(CH)

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	0+0000	1.2	AASHTO T-180 Method A	27	19	8	122.7 PCF	12.1 %
⊠	0+1000	1.0	AASHTO T-180 Method A	36	16	20	119.8 PCF	12.8 %
▲	0+2000	1.0	AASHTO T-180 Method A	53	22	31	116.1 PCF	16.0 %
★	0+3000	1.0	AASHTO T-180 Method A	54	20	34	117.1 PCF	14.3 %
⊙	0+4000	1.0	AASHTO T-180 Method A	46	18	28	115.6 PCF	15.2 %
✿	1+0100	1.0	AASHTO T-180 Method A	62	24	38	114.0 PCF	16.6 %

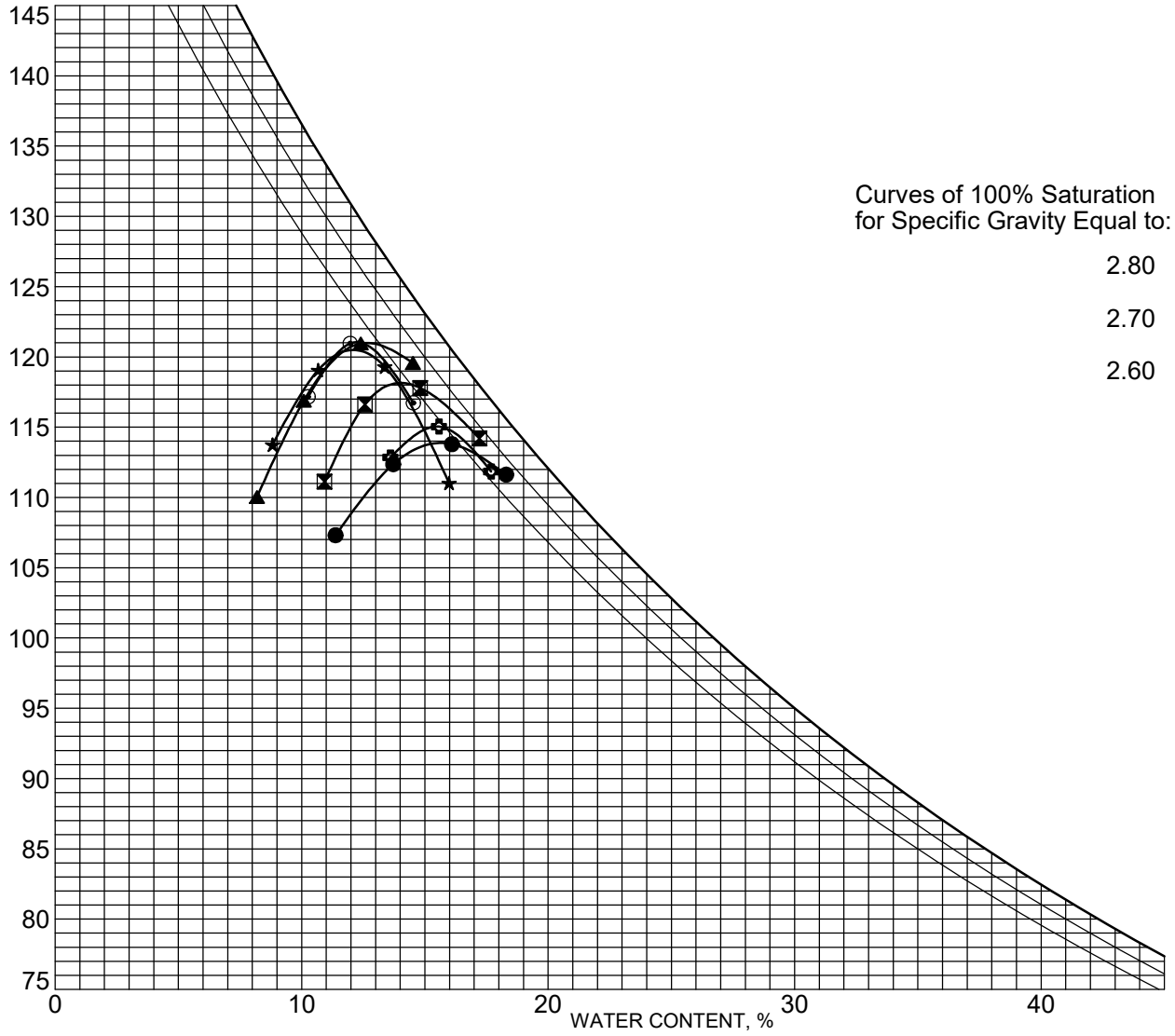
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MOISTURE-DENSITY RELATIONSHIP

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	1+1000	1.0	A-7-6 (23)	FAT CLAY with SAND(CH)
⊠	1+2000	1.0	A-7-6 (19)	SANDY LEAN CLAY(CL)
▲	1+3000	1.0	A-6 (7)	SANDY LEAN CLAY(CL)
★	1+4000	1.0	A-6 (4)	SANDY LEAN CLAY(CL)
⊙	1+4000	7.0	A-2-4 (0)	SILTY, CLAYEY SAND(SC-SM)
✿	2+0000	1.0	A-6 (13)	LEAN CLAY with SAND(CL)

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	1+1000	1.0	AASHTO T-180 Method A	52	21	31	113.9 PCF	15.6 %
⊠	1+2000	1.0	AASHTO T-180 Method A	48	19	29	118.1 PCF	14.0 %
▲	1+3000	1.0	AASHTO T-180 Method A	38	17	21	121.0 PCF	12.6 %
★	1+4000	1.0	AASHTO T-180 Method A	30	16	14	120.5 PCF	12.1 %
⊙	1+4000	7.0	AASHTO T-180 Method A	27	21	6	121.0 PCF	12.2 %
✿	2+0000	1.0	AASHTO T-180 Method A	40	19	21	115.0 PCF	15.5 %

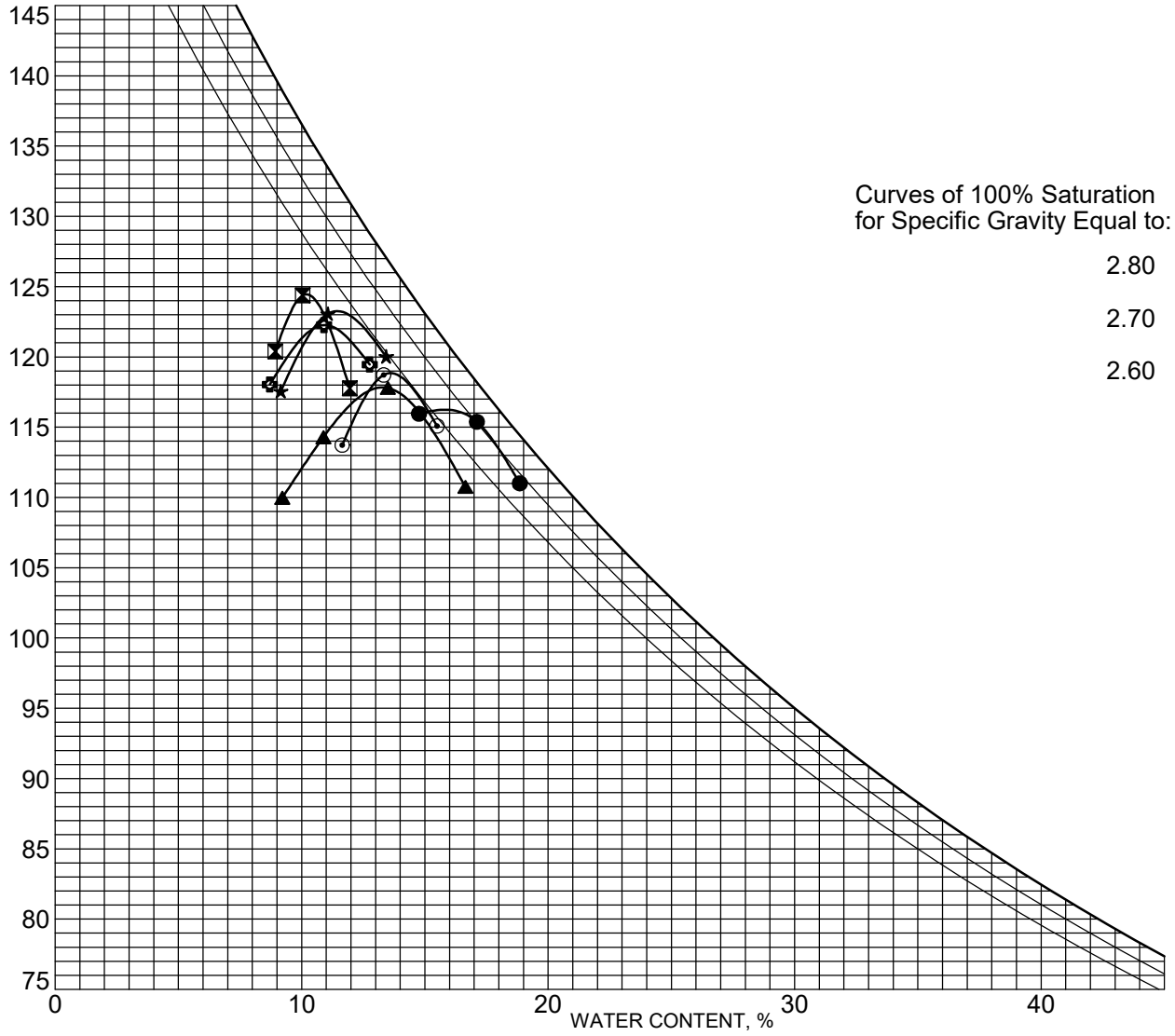
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NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	2+0000	8.0	A-7-6 (27)	LEAN CLAY(CL)
⊠	2+1000	1.0	A-4 (0)	SILTY, CLAYEY SAND(SC-SM)
▲	2+1000	6.0	A-2-4 (0)	SILTY SAND(SM)
★	2+2000	1.0	A-4 (1)	CLAYEY SAND(SC)
⊙	2+2000	5.0	A-2-4 (0)	CLAYEY SAND(SC)
✪	2+3000	1.0	A-4 (0)	SILTY SAND(SM)

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	2+0000	8.0	AASHTO T-180 Method A	48	20	28	116.2 PCF	15.9 %
⊠	2+1000	1.0	AASHTO T-180 Method A	24	17	7	124.4 PCF	10.1 %
▲	2+1000	6.0	AASHTO T-180 Method A	NP	NP	NP	117.8 PCF	13.2 %
★	2+2000	1.0	AASHTO T-180 Method A	25	16	9	123.3 PCF	11.4 %
⊙	2+2000	5.0	AASHTO T-180 Method A	33	23	10	118.8 PCF	13.6 %
✪	2+3000	1.0	AASHTO T-180 Method A	21	19	2	122.3 PCF	10.9 %

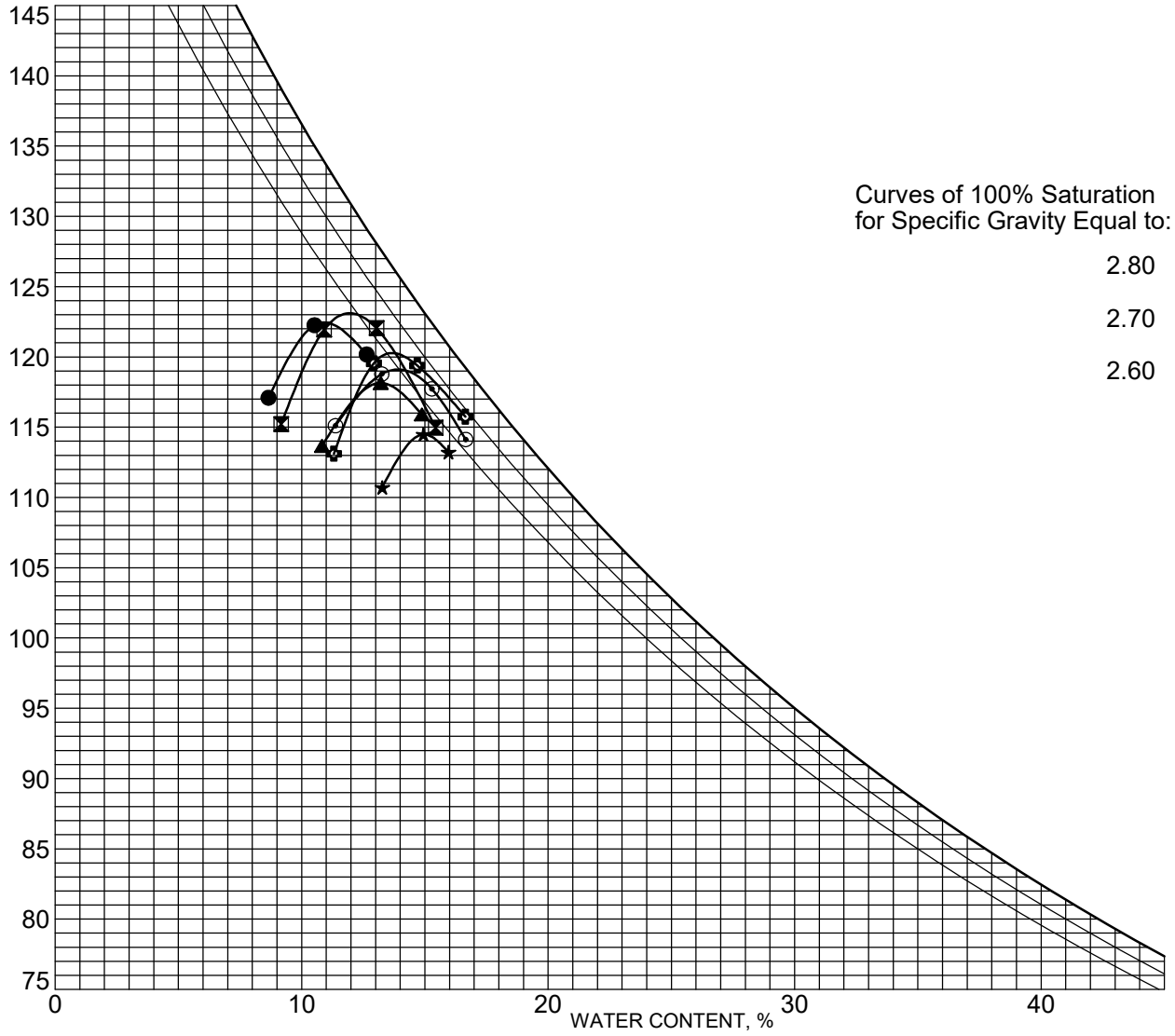
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MOISTURE-DENSITY RELATIONSHIP

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	2+3000	6.0	A-2-4 (0)	SILTY SAND(SM)
⊠	2+4000	1.0	A-2-4 (0)	SILTY SAND(SM)
▲	3+0000	1.0	A-6 (1)	CLAYEY SAND(SC)
★	3+1000	1.0	A-7-6 (28)	FAT CLAY with SAND(CH)
⊙	3+2000	1.0	A-7-6 (20)	LEAN CLAY with SAND(CL)
✿	3+3000	1.0	A-7-6 (19)	LEAN CLAY with SAND(CL)

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	2+3000	6.0	AASHTO T-180 Method A	NP	NP	NP	122.4 PCF	11.0 %
⊠	2+4000	1.0	AASHTO T-180 Method A	27	22	5	123.1 PCF	11.9 %
▲	3+0000	1.0	AASHTO T-180 Method A	33	20	13	118.1 PCF	13.2 %
★	3+1000	1.0	AASHTO T-180 Method A	53	21	32	114.5 PCF	14.9 %
⊙	3+2000	1.0	AASHTO T-180 Method A	44	19	25	119.1 PCF	13.9 %
✿	3+3000	1.0	AASHTO T-180 Method A	46	19	27	120.3 PCF	13.7 %

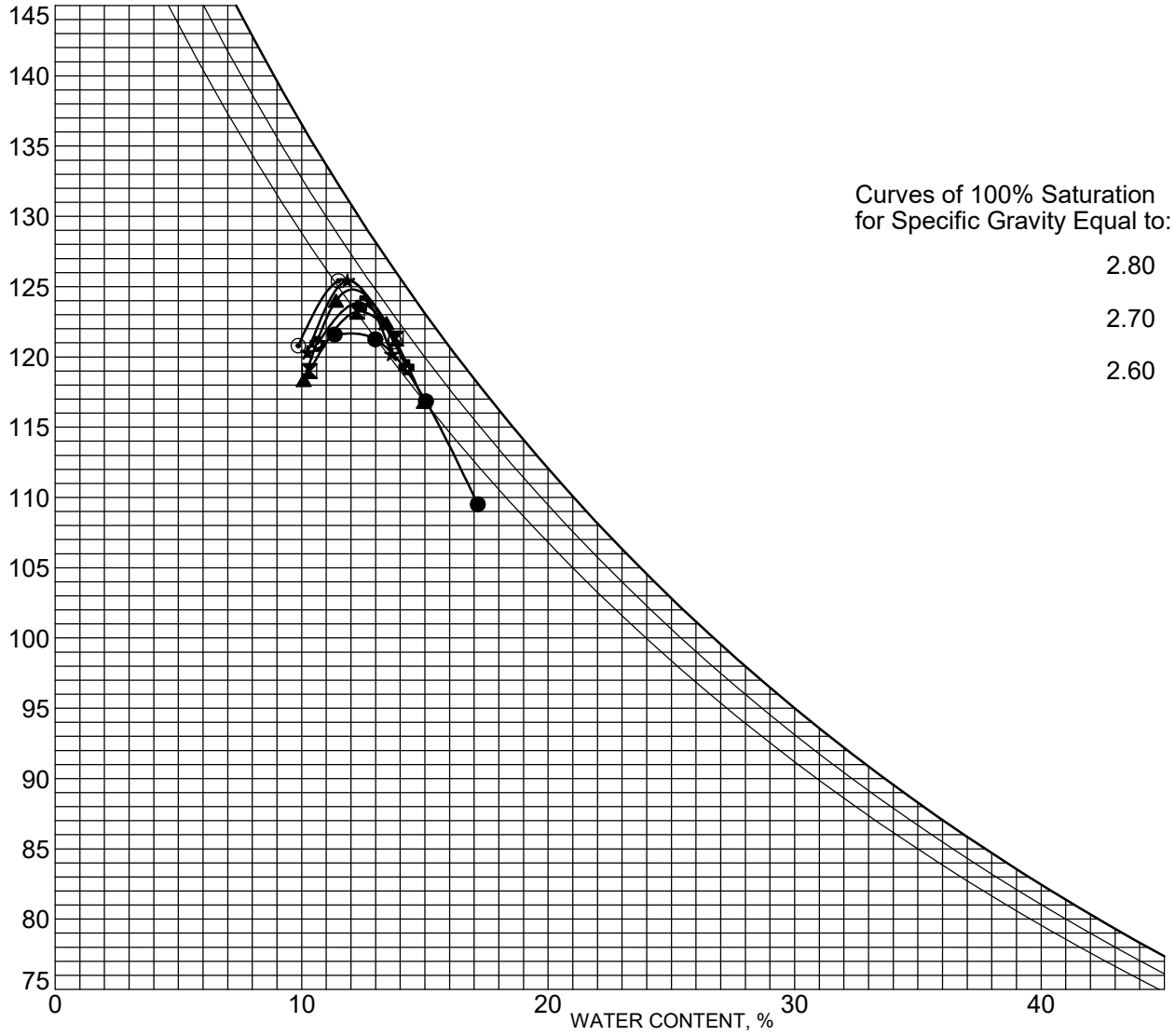
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NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	3+4000	1.0	A-7-6 (5)	CLAYEY SAND(SC)
⊠	4+0000	1.0	A-6 (3)	CLAYEY SAND(SC)
▲	4+0900	1.1	A-6 (2)	CLAYEY SAND(SC)
★	4+2000	1.1	A-2-6 (1)	CLAYEY SAND(SC)
⊙	4+3000	1.0	A-6 (3)	CLAYEY SAND(SC)
✪	4+4200	1.1	A-6 (3)	CLAYEY SAND(SC)

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	3+4000	1.0	AASHTO T-180 Method A	41	17	24	121.7 PCF	11.9 %
⊠	4+0000	1.0	AASHTO T-180 Method A	37	18	19	123.2 PCF	12.3 %
▲	4+0900	1.1	AASHTO T-180 Method A	33	18	15	124.8 PCF	12.0 %
★	4+2000	1.1	AASHTO T-180 Method A	29	16	13	125.4 PCF	11.9 %
⊙	4+3000	1.0	AASHTO T-180 Method A	34	17	17	125.5 PCF	11.7 %
✪	4+4200	1.1	AASHTO T-180 Method A	31	17	14	123.9 PCF	12.3 %

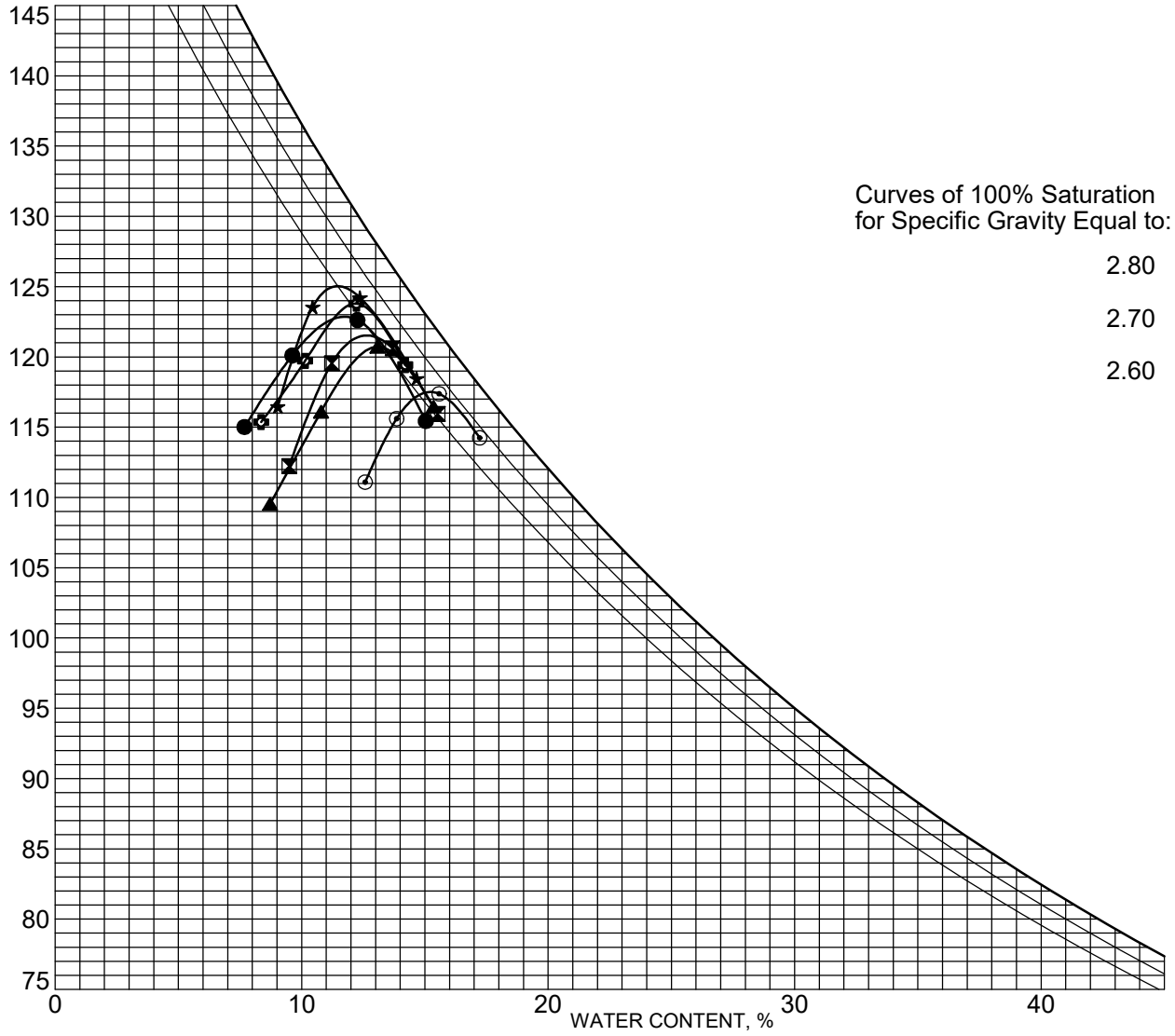
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NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	**5+0000**	**1.1**	**A-6 (1)**	**CLAYEY SAND(SC)**
⊠	**5+0500**	**1.0**	**A-6 (7)**	**CLAYEY SAND(SC)**
▲	**5+1000**	**1.2**	**A-6 (4)**	**CLAYEY SAND(SC)**
★	**5+1500**	**1.2**	**A-6 (5)**	**CLAYEY SAND(SC)**
⊙	**5+2000**	**1.2**	**A-7-6 (26)**	**FAT CLAY with SAND(CH)**
✪	**5+2000**	**6.0**	**A-4 (0)**	**SILTY, CLAYEY SAND(SC-SM)**

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	**5+0000**	**1.1**	**AASHTO T-180 Method A**	**28**	**17**	**11**	**122.9 PCF**	**11.7 %**
⊠	**5+0500**	**1.0**	**AASHTO T-180 Method A**	**40**	**17**	**23**	**121.5 PCF**	**12.7 %**
▲	**5+1000**	**1.2**	**AASHTO T-180 Method A**	**35**	**18**	**17**	**120.7 PCF**	**13.1 %**
★	**5+1500**	**1.2**	**AASHTO T-180 Method A**	**35**	**17**	**18**	**125.0 PCF**	**11.5 %**
⊙	**5+2000**	**1.2**	**AASHTO T-180 Method A**	**55**	**21**	**34**	**117.5 PCF**	**15.2 %**
✪	**5+2000**	**6.0**	**AASHTO T-180 Method A**	**27**	**20**	**7**	**123.8 PCF**	**12.2 %**

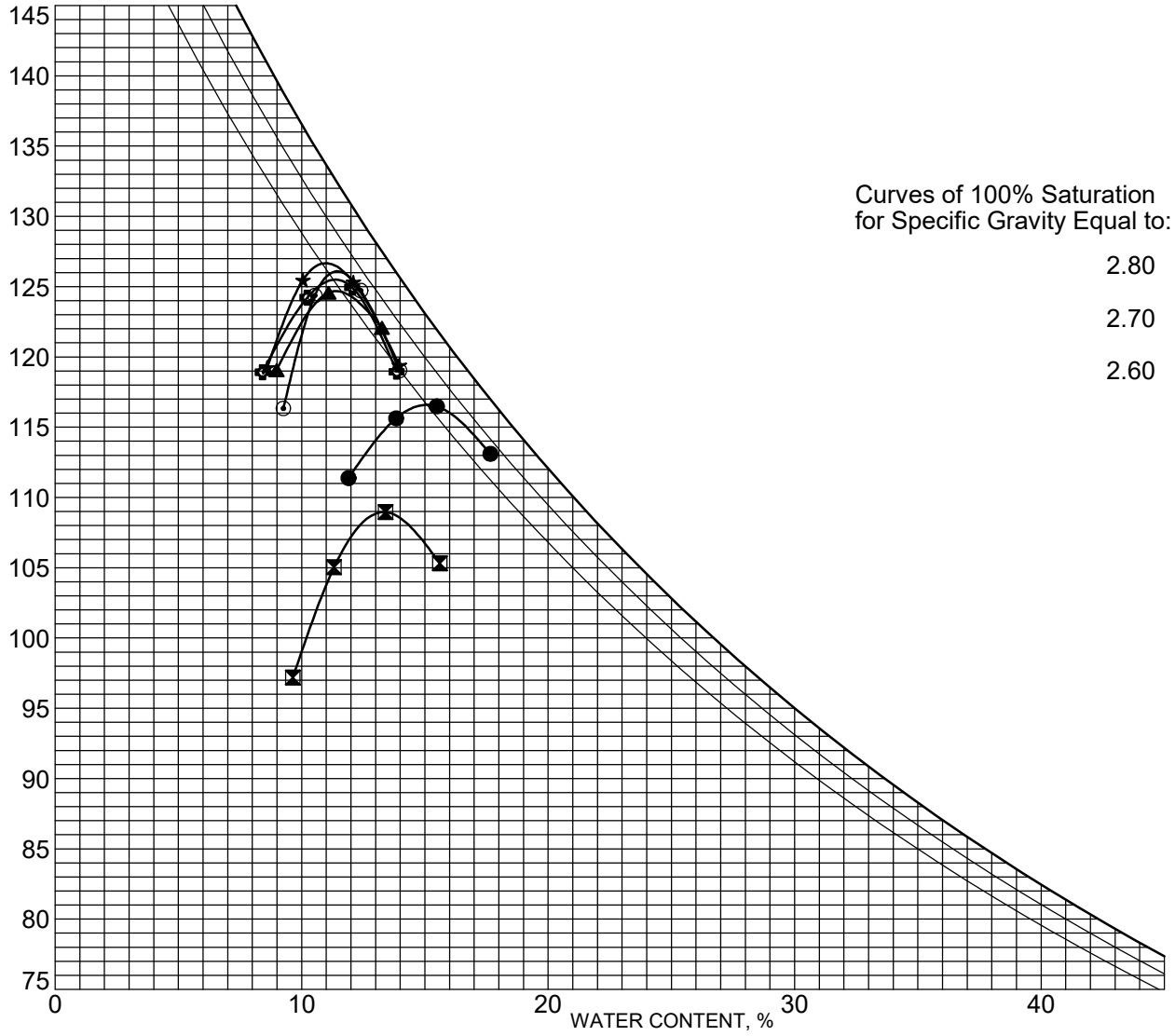
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NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	5+2200	1.1	A-7-6 (21)	LEAN CLAY with SAND(CL)
⊠	5+2200	6.0	A-6 (5)	CLAYEY SAND(SC)
▲	5+3000	1.1	A-6 (3)	CLAYEY SAND(SC)
★	5+4000	1.1	A-6 (2)	CLAYEY SAND(SC)
⊙	6+0000	1.2	A-6 (1)	CLAYEY SAND(SC)
✿	6+1000	1.2	A-2-6 (0)	CLAYEY SAND(SC)

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	5+2200	1.1	AASHTO T-180 Method A	49	19	30	116.6 PCF	15.0 %
⊠	5+2200	6.0	AASHTO T-180 Method A	35	18	17	109.0 PCF	13.3 %
▲	5+3000	1.1	AASHTO T-180 Method A	30	17	13	124.7 PCF	11.4 %
★	5+4000	1.1	AASHTO T-180 Method A	29	17	12	126.7 PCF	11.0 %
⊙	6+0000	1.2	AASHTO T-180 Method A	30	18	12	126.1 PCF	11.4 %
✿	6+1000	1.2	AASHTO T-180 Method A	29	18	11	125.5 PCF	11.4 %

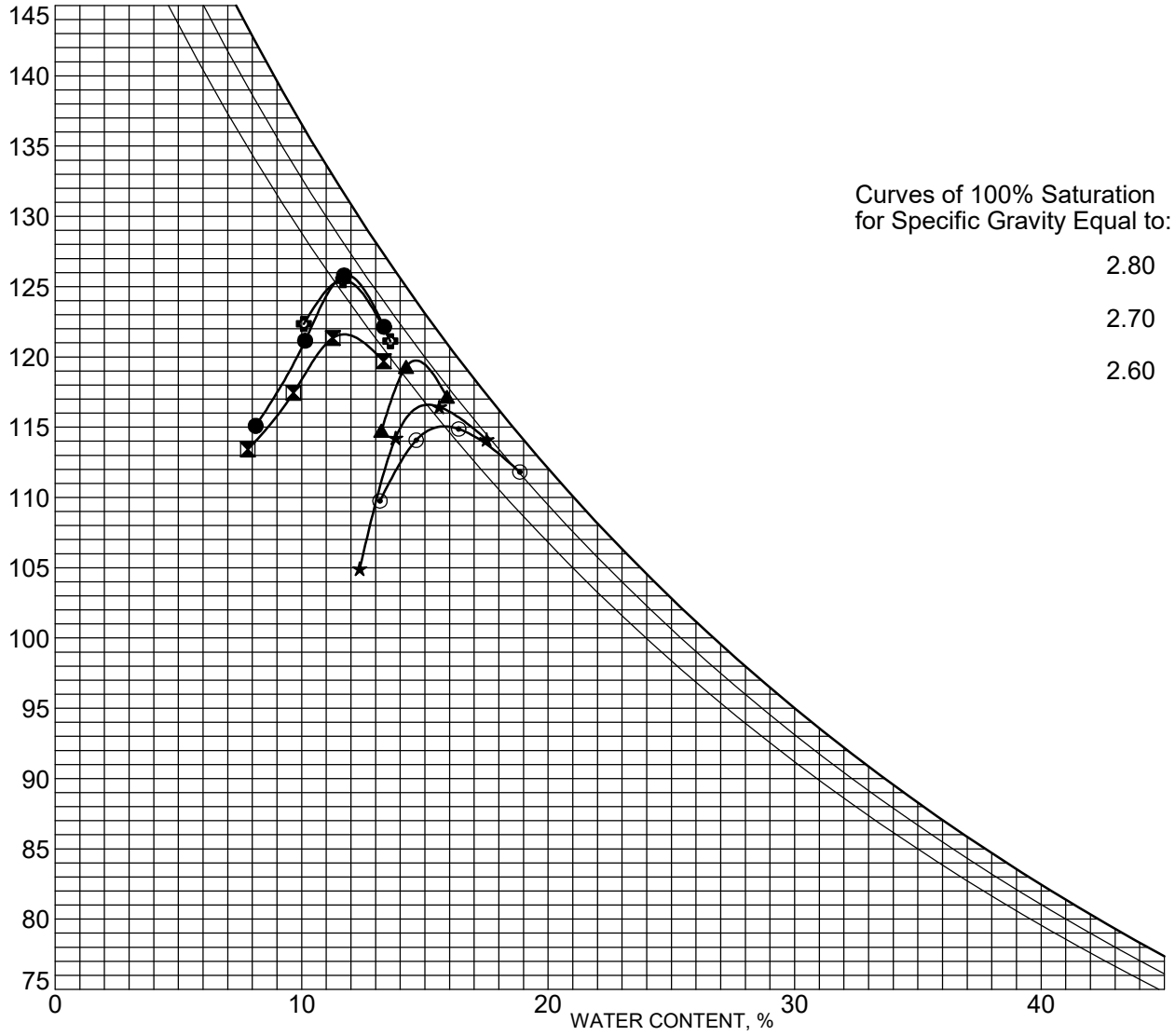
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MOISTURE-DENSITY RELATIONSHIP

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	6+2000	1.0	A-4 (0)	CLAYEY SAND(SC)
⊠	6+3000	1.0	A-2-4 (0)	SILTY SAND(SM)
▲	6+4000	0.9	A-7-6 (18)	LEAN CLAY with SAND(CL)
★	7+0000	1.0	A-7-6 (30)	FAT CLAY(CH)
⊙	7+1000	1.1	A-7-6 (17)	SANDY FAT CLAY(CH)
✿	7+2000	0.9	A-6 (7)	SANDY LEAN CLAY(CL)

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	6+2000	1.0	AASHTO T-180 Method A	29	20	9	125.8 PCF	11.8 %
⊠	6+3000	1.0	AASHTO T-180 Method A	NP	NP	NP	121.6 PCF	11.7 %
▲	6+4000	0.9	AASHTO T-180 Method A	44	17	27	119.7 PCF	14.7 %
★	7+0000	1.0	AASHTO T-180 Method A	54	21	33	116.6 PCF	15.1 %
⊙	7+1000	1.1	AASHTO T-180 Method A	52	22	30	115.1 PCF	15.8 %
✿	7+2000	0.9	AASHTO T-180 Method A	32	16	16	125.5 PCF	11.7 %

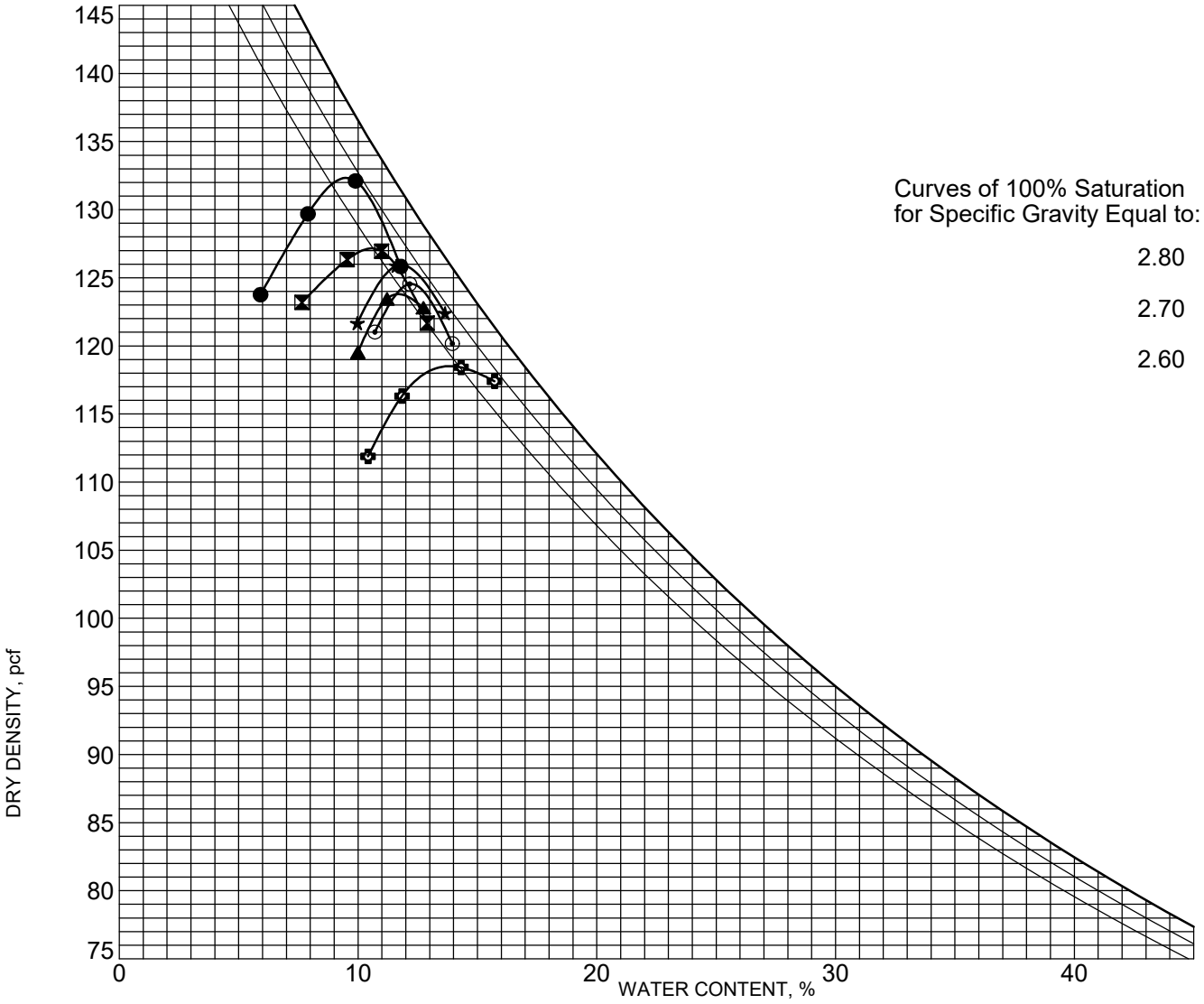
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MOISTURE-DENSITY RELATIONSHIP

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NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	7+3000	1.1	A-2-4 (0)	SILTY SAND with GRAVEL(SM)
⊠	7+4000	0.9	A-6 (2)	CLAYEY SAND(SC)
▲	8+0000	1.1	A-6 (7)	SANDY LEAN CLAY(CL)
★	8+1000	1.1	A-6 (3)	CLAYEY SAND with GRAVEL(SC)
⊙	8+2000	1.3	A-6 (4)	CLAYEY SAND(SC)
✿	8+3000	1.2	A-7-6 (11)	SANDY LEAN CLAY(CL)

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	7+3000	1.1	AASHTO T-180 Method A	21	18	3	132.3 PCF	9.5 %
⊠	7+4000	0.9	AASHTO T-180 Method A	27	15	12	127.2 PCF	10.6 %
▲	8+0000	1.1	AASHTO T-180 Method A	36	16	20	123.8 PCF	11.7 %
★	8+1000	1.1	AASHTO T-180 Method A	34	17	17	125.9 PCF	11.8 %
⊙	8+2000	1.3	AASHTO T-180 Method A	32	17	15	124.6 PCF	12.3 %
✿	8+3000	1.2	AASHTO T-180 Method A	44	17	27	118.5 PCF	13.8 %

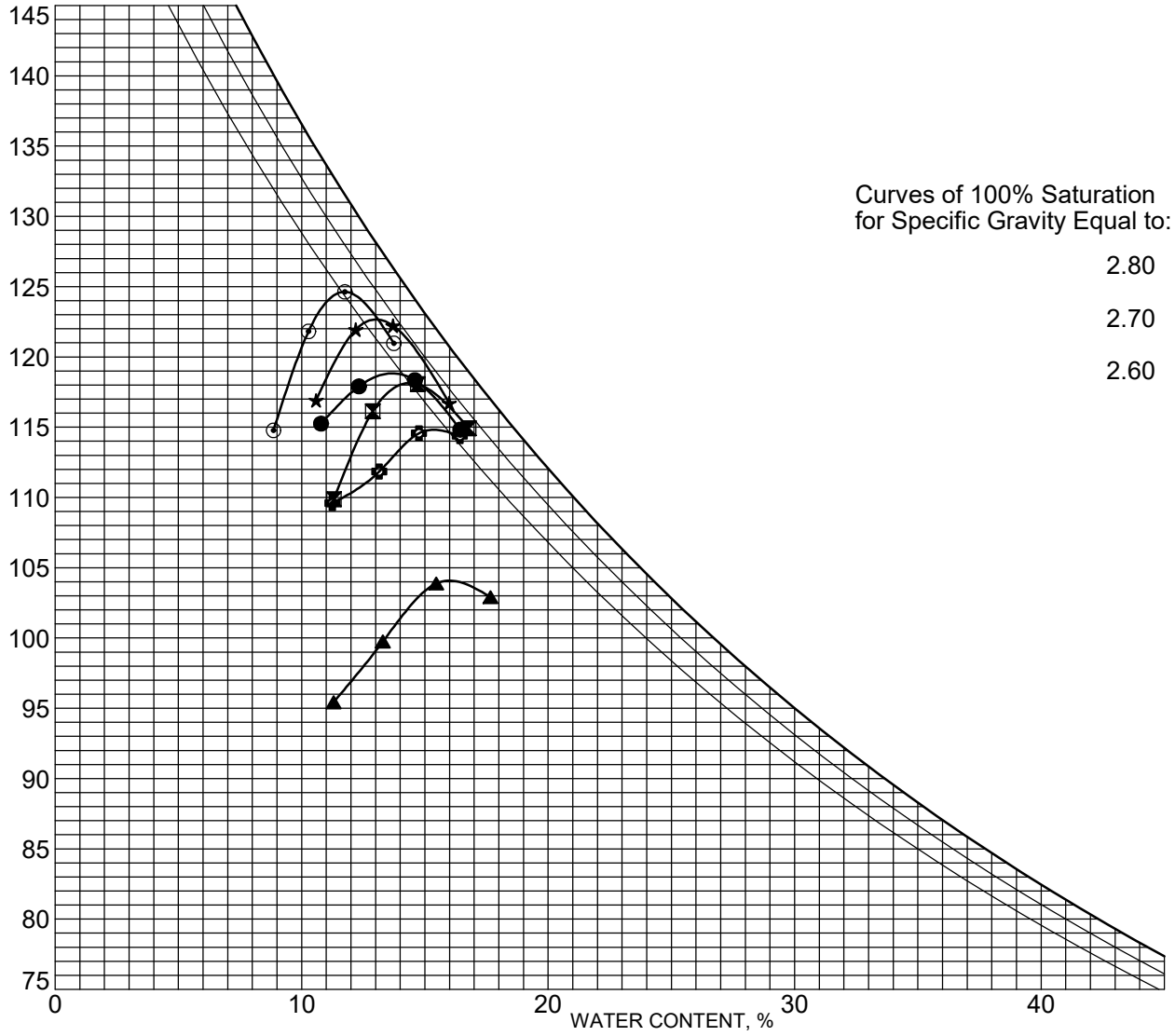
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NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	8+4000	1.2	A-7-6 (6)	CLAYEY SAND(SC)
⊠	9+0000	1.3	A-7-6 (5)	CLAYEY SAND(SC)
▲	9+1000	1.0	A-7-6 (18)	SANDY LEAN CLAY(CL)
★	9+2000	1.1	A-6 (4)	CLAYEY SAND(SC)
⊙	9+3000	1.0	A-6 (5)	CLAYEY SAND(SC)
✿	9+4000	1.0	A-6 (10)	LEAN CLAY with SAND(CL)

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	8+4000	1.2	AASHTO T-180 Method A	41	18	23	118.8 PCF	13.6 %
⊠	9+0000	1.3	AASHTO T-180 Method A	43	21	22	118.1 PCF	14.4 %
▲	9+1000	1.0	AASHTO T-180 Method A	48	17	31	104.1 PCF	16.0 %
★	9+2000	1.1	AASHTO T-180 Method A	37	18	19	122.7 PCF	13.0 %
⊙	9+3000	1.0	AASHTO T-180 Method A	34	16	18	124.6 PCF	11.8 %
✿	9+4000	1.0	AASHTO T-180 Method A	33	17	16	114.8 PCF	15.4 %

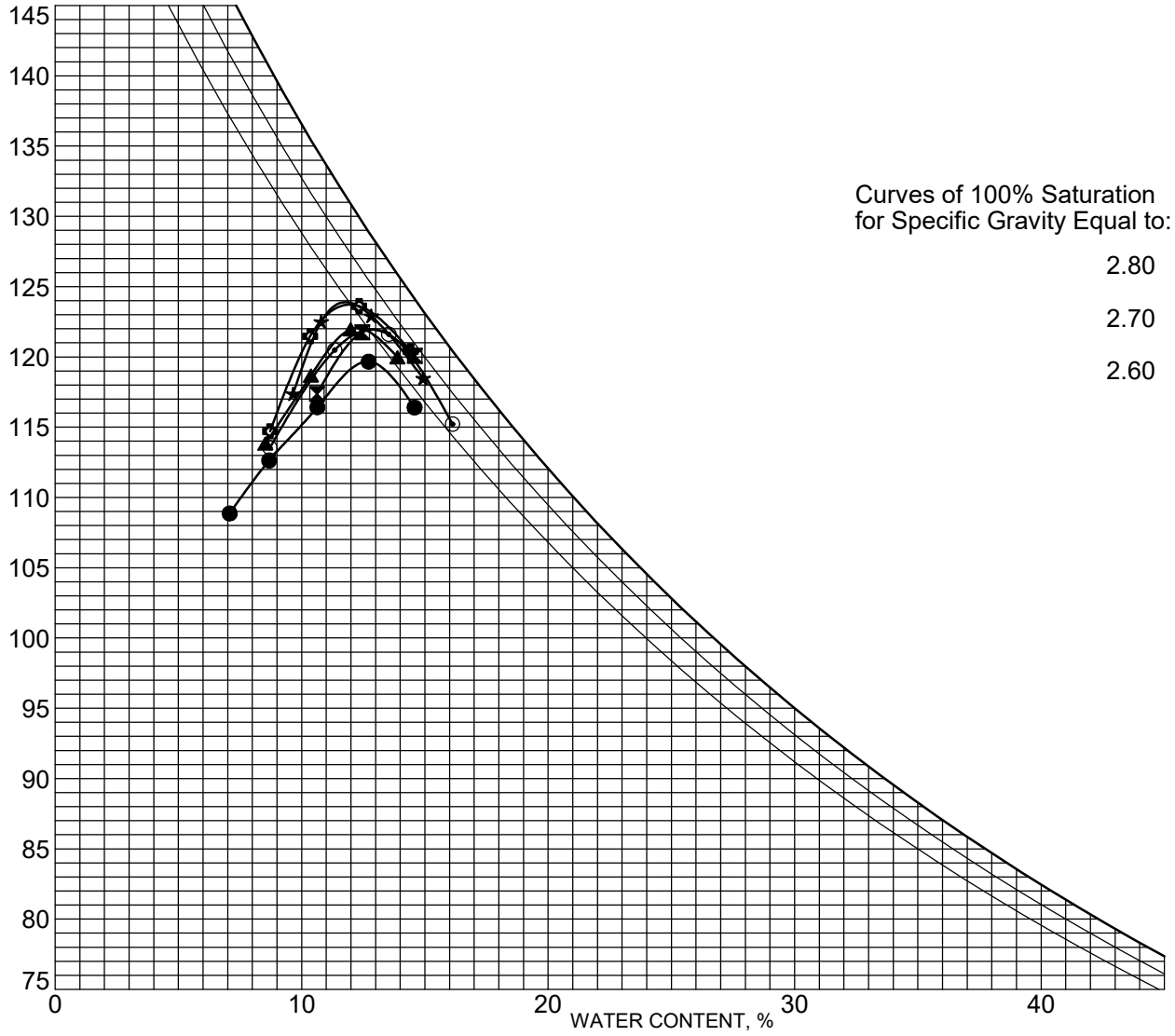
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MOISTURE-DENSITY RELATIONSHIP

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	**10+0000**	**1.1**	**A-2-4 (0)**	**SILTY SAND(SM)**
⊠	**10+1000**	**1.1**	**A-2-4 (0)**	**CLAYEY SAND(SC)**
▲	**10+2000**	**1.1**	**A-2-4 (0)**	**SILTY, CLAYEY SAND(SC-SM)**
★	**10+3000**	**1.3**	**A-6 (8)**	**SANDY LEAN CLAY(CL)**
⊙	**10+4000**	**1.2**	**A-6 (1)**	**CLAYEY SAND(SC)**
✿	**11+0000**	**1.1**	**A-6 (9)**	**SANDY LEAN CLAY(CL)**

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	**10+0000**	**1.1**	**AASHTO T-180 Method A**	**NP**	**NP**	**NP**	**119.7 PCF**	**12.7 %**
⊠	**10+1000**	**1.1**	**AASHTO T-180 Method A**	**30**	**20**	**10**	**121.9 PCF**	**12.9 %**
▲	**10+2000**	**1.1**	**AASHTO T-180 Method A**	**28**	**21**	**7**	**122.0 PCF**	**12.3 %**
★	**10+3000**	**1.3**	**AASHTO T-180 Method A**	**39**	**16**	**23**	**123.9 PCF**	**11.8 %**
⊙	**10+4000**	**1.2**	**AASHTO T-180 Method A**	**32**	**19**	**13**	**122.0 PCF**	**12.8 %**
✿	**11+0000**	**1.1**	**AASHTO T-180 Method A**	**36**	**17**	**19**	**123.7 PCF**	**11.9 %**

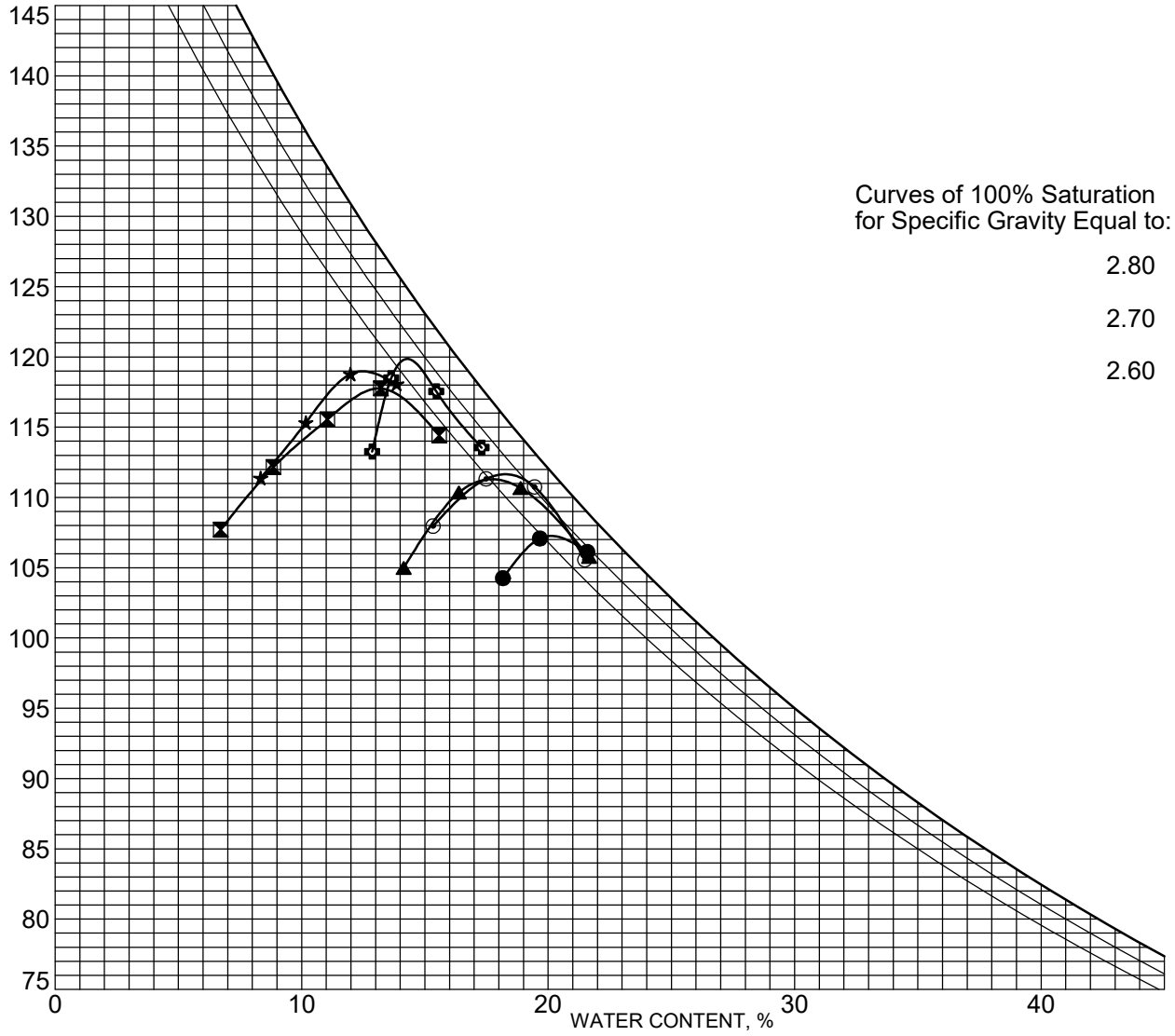
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MOISTURE-DENSITY RELATIONSHIP

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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



	BOREHOLE	DEPTH	AASHTO Classification	USCS Description
●	11+1000	1.0	A-7-6 (48)	FAT CLAY(CH)
⊠	11+1000	7.0	A-2-4 (0)	SILTY SAND(SM)
▲	11+1200	1.2	A-7-6 (40)	FAT CLAY(CH)
★	11+1200	7.0	A-2-4 (0)	SILTY SAND(SM)
⊙	11+1450	1.1	A-7-6 (32)	FAT CLAY(CH)
✿	11+2000	1.1	A-6 (11)	SANDY LEAN CLAY(CL)

	BOREHOLE	DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	11+1000	1.0	AASHTO T-180 Method A	68	23	45	107.3 PCF	20.2 %
⊠	11+1000	7.0	AASHTO T-180 Method A	NP	NP	NP	117.8 PCF	13.1 %
▲	11+1200	1.2	AASHTO T-180 Method A	58	20	38	111.3 PCF	17.7 %
★	11+1200	7.0	AASHTO T-180 Method A	NP	NP	NP	119.0 PCF	12.5 %
⊙	11+1450	1.1	AASHTO T-180 Method A	54	19	35	111.7 PCF	18.2 %
✿	11+2000	1.1	AASHTO T-180 Method A	40	17	23	119.9 PCF	14.3 %

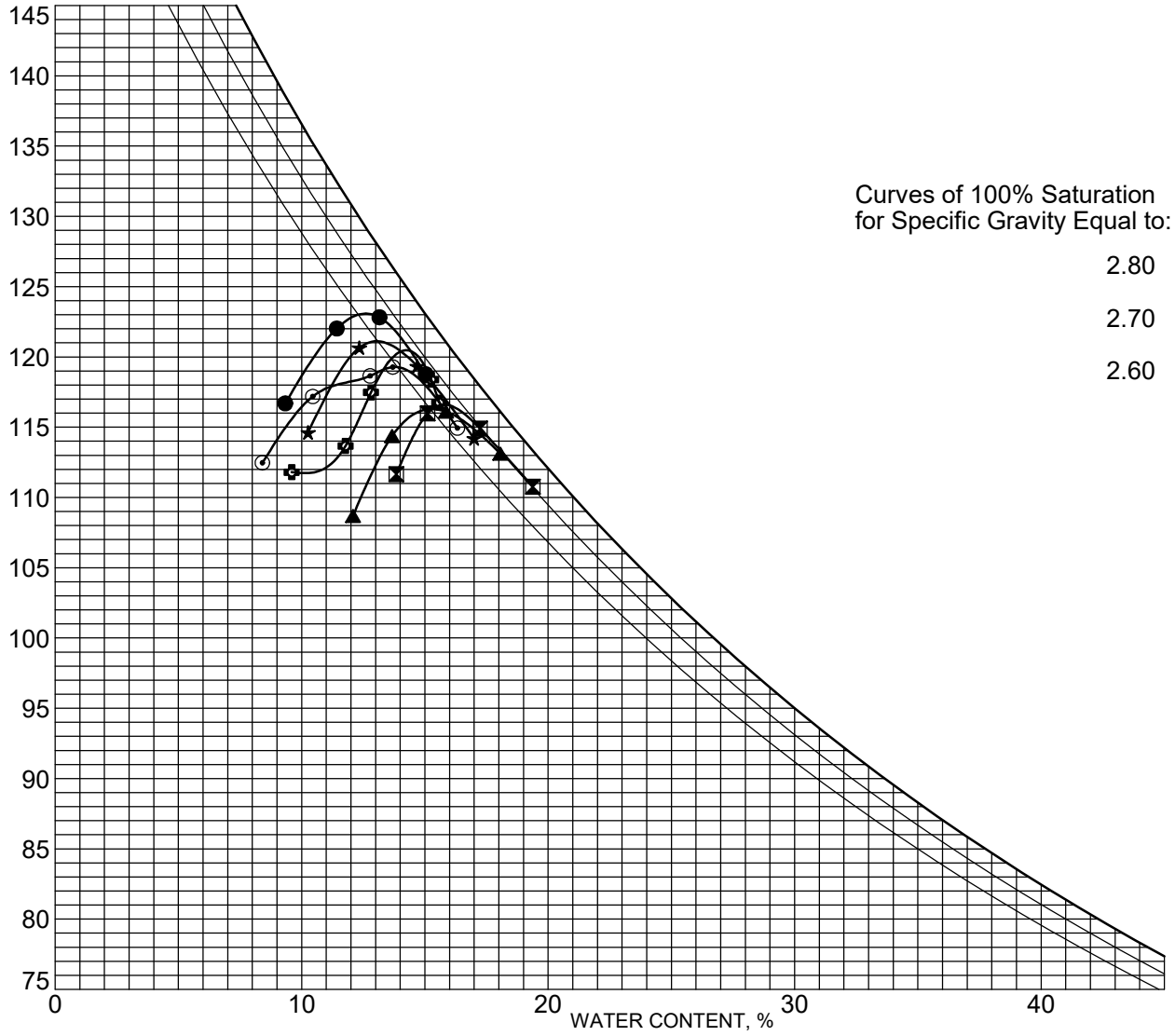
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MOISTURE-DENSITY RELATIONSHIP

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	**11+3000**	**1.1**	**A-6 (5)**	**CLAYEY SAND(SC)**
⊠	**11+4000**	**1.1**	**A-7-6 (42)**	**FAT CLAY(CH)**
▲	**12+0000**	**1.1**	**A-7-6 (34)**	**FAT CLAY(CH)**
★	**12+1000**	**1.1**	**A-7-6 (21)**	**LEAN CLAY with SAND(CL)**
⊙	**12+2000**	**1.2**	**A-7-6 (18)**	**LEAN CLAY with SAND(CL)**
✿	**12+3000**	**1.0**	**A-7-6 (22)**	**LEAN CLAY with SAND(CL)**

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	**11+3000**	**1.1**	**AASHTO T-180 Method A**	**38**	**16**	**22**	**123.1 PCF**	**12.6 %**
⊠	**11+4000**	**1.1**	**AASHTO T-180 Method A**	**60**	**20**	**40**	**116.6 PCF**	**15.8 %**
▲	**12+0000**	**1.1**	**AASHTO T-180 Method A**	**56**	**20**	**36**	**116.3 PCF**	**15.3 %**
★	**12+1000**	**1.1**	**AASHTO T-180 Method A**	**44**	**16**	**28**	**121.1 PCF**	**13.1 %**
⊙	**12+2000**	**1.2**	**AASHTO T-180 Method A**	**43**	**16**	**27**	**119.3 PCF**	**13.8 %**
✿	**12+3000**	**1.0**	**AASHTO T-180 Method A**	**46**	**18**	**28**	**120.5 PCF**	**14.2 %**

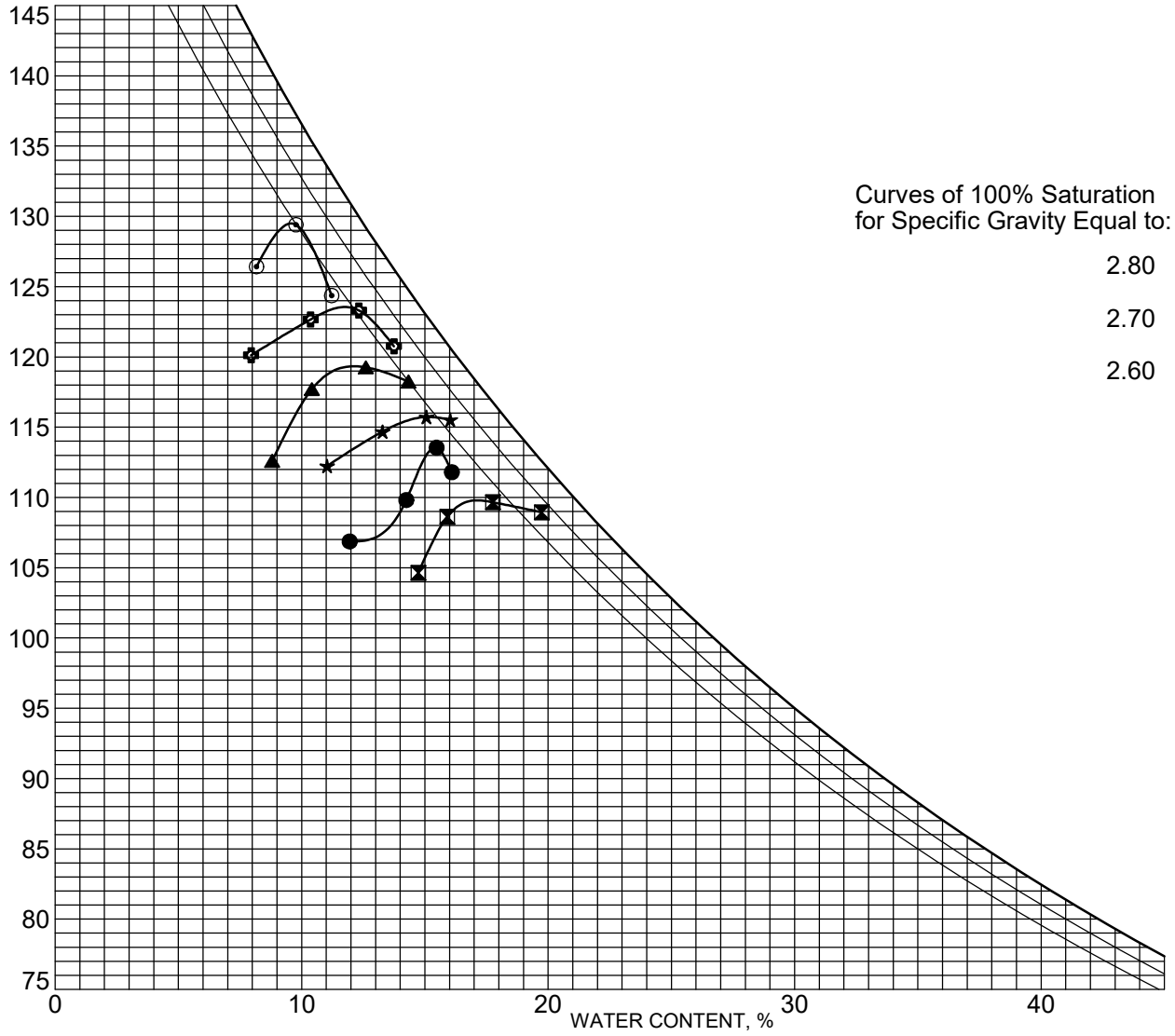
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NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	12+4000	1.0	A-4 (4)	LEAN CLAY(CL)
⊠	13+0000	1.3	A-7-6 (42)	FAT CLAY(CH)
▲	13+1000	1.2	A-6 (12)	SANDY LEAN CLAY(CL)
★	13+2000	1.3	A-7-6 (21)	LEAN CLAY with SAND(CL)
⊙	13+3000	1.2	A-6 (2)	CLAYEY SAND(SC)
✿	13+4000	1.4	A-6 (14)	LEAN CLAY with SAND(CL)

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	12+4000	1.0	AASHTO T-180 Method A	20	12	8	113.6 PCF	15.4 %
⊠	13+0000	1.3	AASHTO T-180 Method A	62	21	41	109.8 PCF	17.1 %
▲	13+1000	1.2	AASHTO T-180 Method A	38	17	21	119.3 PCF	12.1 %
★	13+2000	1.3	AASHTO T-180 Method A	47	19	28	115.7 PCF	15.1 %
⊙	13+3000	1.2	AASHTO T-180 Method A	25	14	11	129.5 PCF	9.6 %
✿	13+4000	1.4	AASHTO T-180 Method A	34	15	19	123.5 PCF	11.7 %

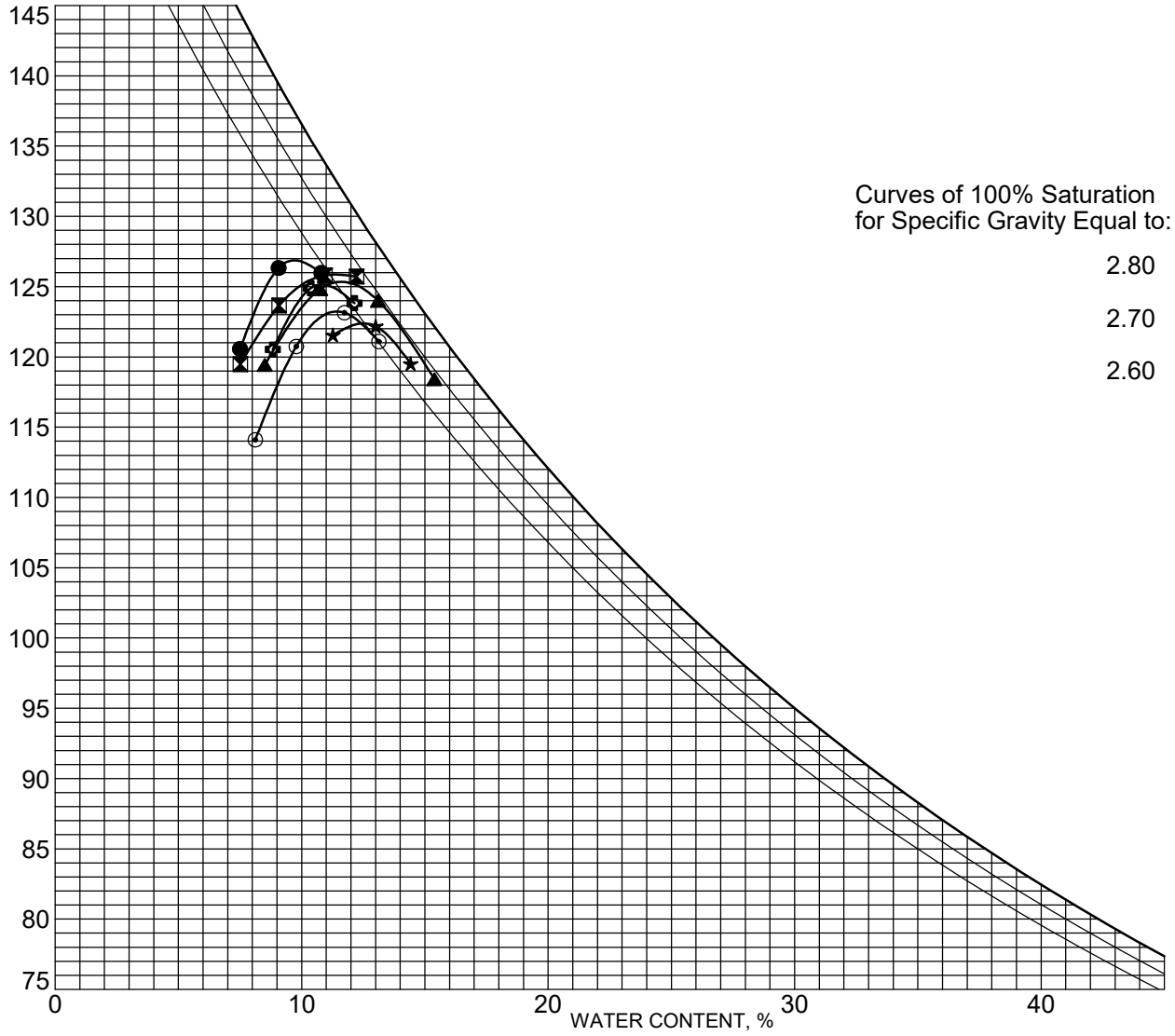
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NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	14+0000	1.2	A-4 (1)	CLAYEY SAND(SC)
⊠	14+1000	1.5	A-6 (3)	SANDY LEAN CLAY(CL)
▲	14+2000	1.5	A-7-6 (20)	LEAN CLAY(CL)
★	14+3000	1.3	A-7-6 (27)	LEAN CLAY(CL)
⊙	14+4000	1.2	A-6 (6)	SANDY LEAN CLAY(CL)
✿	15+0000	1.1	A-6 (5)	SANDY LEAN CLAY(CL)

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	14+0000	1.2	AASHTO T-180 Method A	23	15	8	126.9 PCF	9.7 %
⊠	14+1000	1.5	AASHTO T-180 Method A	25	13	12	125.9 PCF	11.4 %
▲	14+2000	1.5	AASHTO T-180 Method A	41	17	24	125.3 PCF	11.6 %
★	14+3000	1.3	AASHTO T-180 Method A	43	17	26	122.4 PCF	12.5 %
⊙	14+4000	1.2	AASHTO T-180 Method A	30	16	14	123.2 PCF	11.4 %
✿	15+0000	1.1	AASHTO T-180 Method A	30	16	14	125.2 PCF	10.8 %

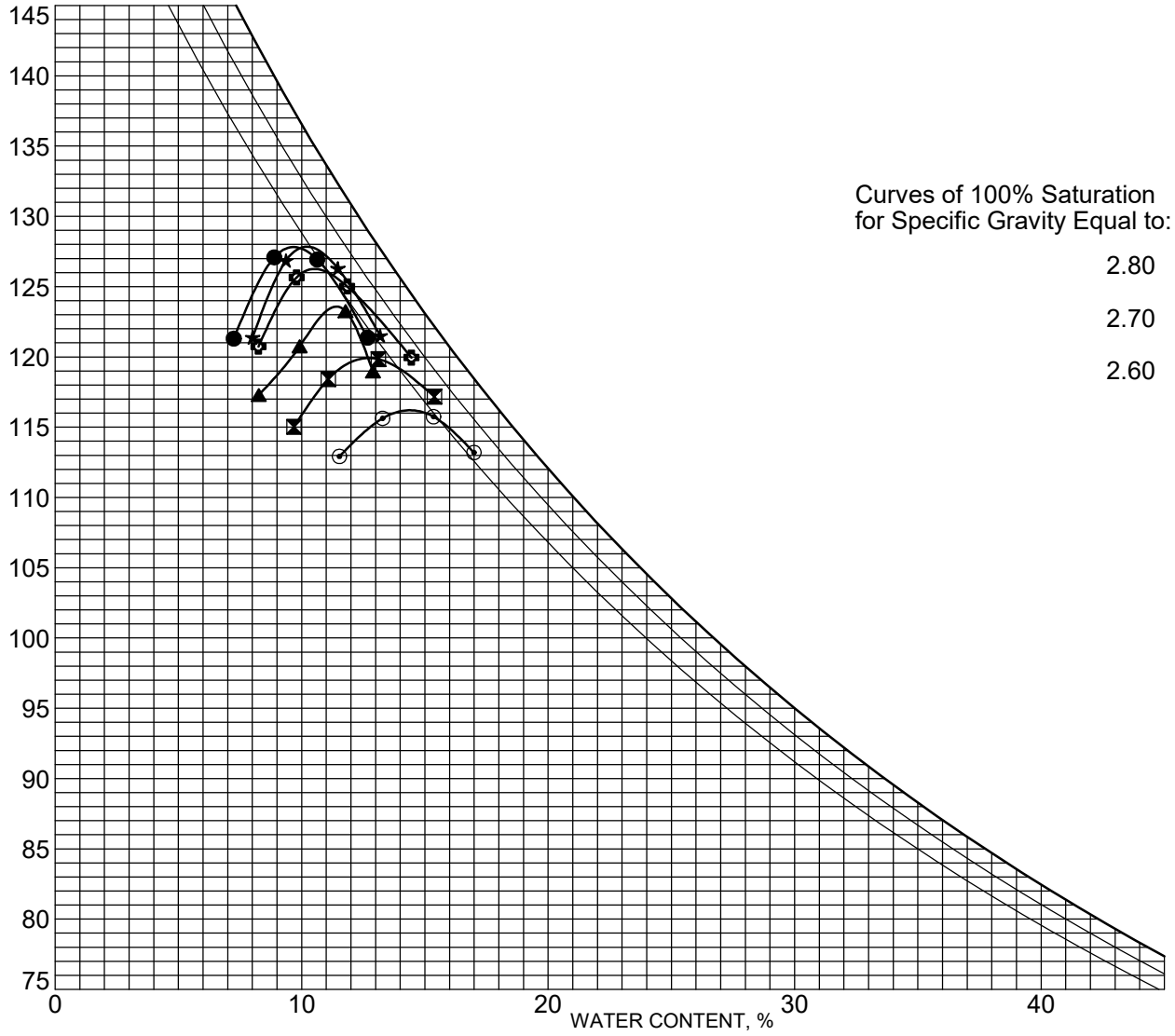
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	**15+1000**	**1.3**	**A-4 (1)**	**SANDY SILTY CLAY(CL-ML)**
⊠	**15+1925**	**1.1**	**A-6 (18)**	**LEAN CLAY(CL)**
▲	**15+1925**	**7.0**	**A-4 (0)**	**SILT(ML)**
★	**15+2450**	**1.1**	**A-6 (9)**	**LEAN CLAY with SAND(CL)**
⊙	**15+2450**	**6.0**	**A-7-6 (24)**	**LEAN CLAY(CL)**
✿	**15+2625**	**1.0**	**A-6 (12)**	**LEAN CLAY with SAND(CL)**

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	**15+1000**	**1.3**	**AASHTO T-180 Method A**	**24**	**17**	**7**	**127.8 PCF**	**9.7 %**
⊠	**15+1925**	**1.1**	**AASHTO T-180 Method A**	**40**	**19**	**21**	**119.9 PCF**	**12.7 %**
▲	**15+1925**	**7.0**	**AASHTO T-180 Method A**	**NP**	**NP**	**NP**	**123.6 PCF**	**11.4 %**
★	**15+2450**	**1.1**	**AASHTO T-180 Method A**	**30**	**16**	**14**	**127.8 PCF**	**10.2 %**
⊙	**15+2450**	**6.0**	**AASHTO T-180 Method A**	**47**	**20**	**27**	**116.2 PCF**	**14.4 %**
✿	**15+2625**	**1.0**	**AASHTO T-180 Method A**	**35**	**16**	**19**	**126.3 PCF**	**10.5 %**

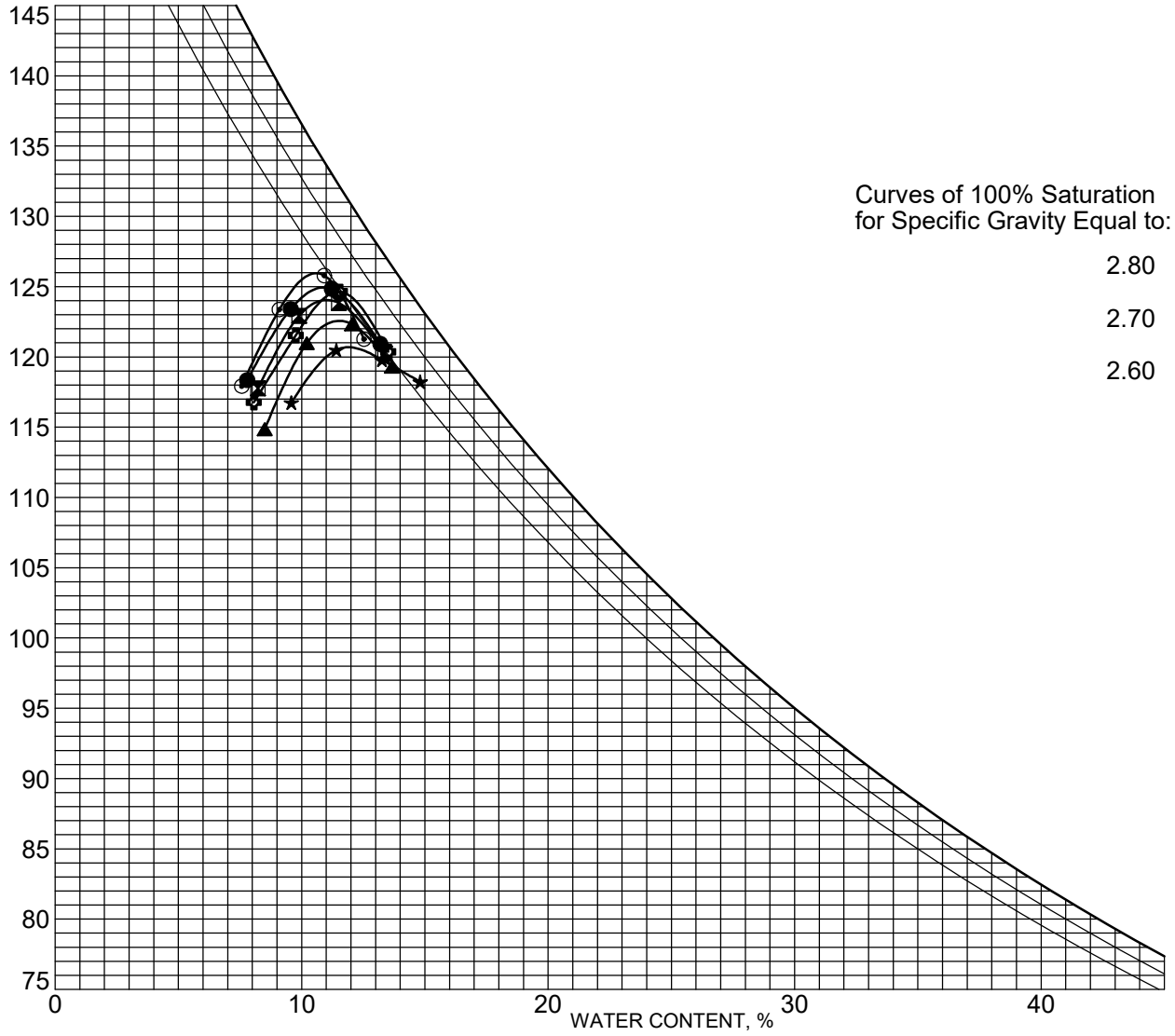
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	**15+2625**	**5.0**	**A-6 (2)**	**CLAYEY SAND(SC)**
⊠	**15+3000**	**1.0**	**A-6 (6)**	**SANDY LEAN CLAY(CL)**
▲	**15+4000**	**1.1**	**A-6 (6)**	**SANDY LEAN CLAY(CL)**
★	**16+0000**	**1.1**	**A-6 (15)**	**LEAN CLAY with SAND(CL)**
⊙	**16+1000**	**1.2**	**A-4 (0)**	**CLAYEY SAND(SC)**
✿	**16+2000**	**1.1**	**A-4 (0)**	**CLAYEY SAND(SC)**

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	**15+2625**	**5.0**	**AASHTO T-180 Method A**	**27**	**16**	**11**	**124.9 PCF**	**10.9 %**
⊠	**15+3000**	**1.0**	**AASHTO T-180 Method A**	**31**	**16**	**15**	**124.0 PCF**	**11.0 %**
▲	**15+4000**	**1.1**	**AASHTO T-180 Method A**	**30**	**16**	**14**	**122.6 PCF**	**11.6 %**
★	**16+0000**	**1.1**	**AASHTO T-180 Method A**	**40**	**17**	**23**	**120.7 PCF**	**11.9 %**
⊙	**16+1000**	**1.2**	**AASHTO T-180 Method A**	**24**	**16**	**8**	**125.9 PCF**	**10.6 %**
✿	**16+2000**	**1.1**	**AASHTO T-180 Method A**	**27**	**19**	**8**	**124.6 PCF**	**11.5 %**

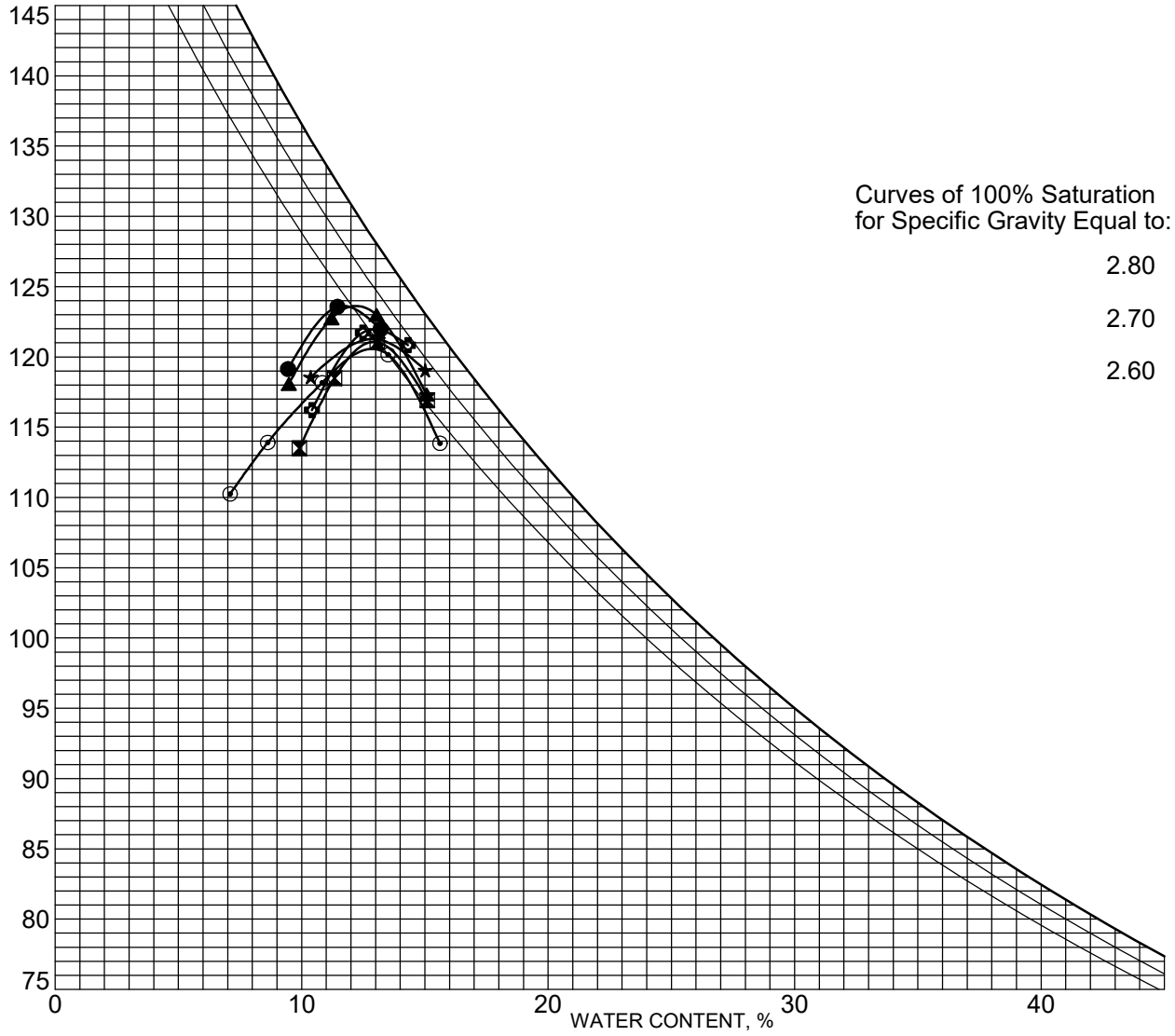
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300 AIRPORT ROAD
BISMARCK, ND 58504

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PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	16+3000	1.1	A-6 (2)	CLAYEY SAND(SC)
⊠	16+4000	1.1	A-2-4 (0)	SILTY SAND(SM)
▲	17+0000	1.1	A-4 (0)	CLAYEY SAND(SC)
★	17+1000	1.2	A-7-6 (13)	SANDY LEAN CLAY(CL)
⊙	17+2000	1.1	A-2-4 (0)	SILTY SAND(SM)
✪	17+3000	0.8	A-7-6 (21)	FAT CLAY with SAND(CH)

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	16+3000	1.1	AASHTO T-180 Method A	31	19	12	123.6 PCF	11.7 %
⊠	16+4000	1.1	AASHTO T-180 Method A	NP	NP	NP	121.1 PCF	13.0 %
▲	17+0000	1.1	AASHTO T-180 Method A	30	21	9	123.6 PCF	12.2 %
★	17+1000	1.2	AASHTO T-180 Method A	42	19	23	121.3 PCF	12.9 %
⊙	17+2000	1.1	AASHTO T-180 Method A	NP	NP	NP	120.6 PCF	12.8 %
✪	17+3000	0.8	AASHTO T-180 Method A	50	21	29	121.9 PCF	13.0 %

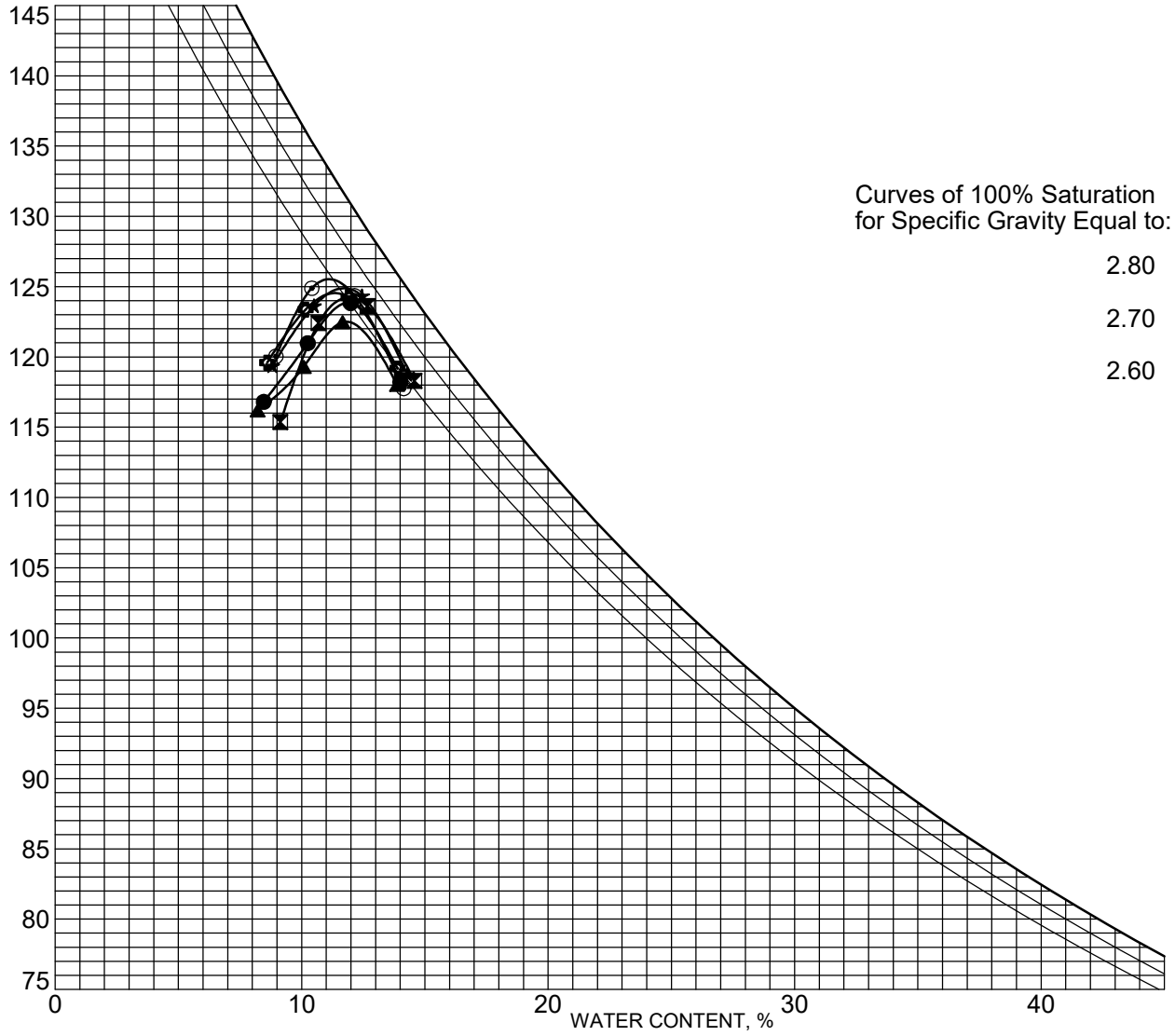
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300 AIRPORT ROAD
BISMARCK, ND 58504

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PCN 23274



	BOREHOLE	DEPTH	AASHTO Classification	USCS Description
●	17+4000	1.1	A-2-4 (0)	SILTY SAND(SM)
⊠	18+0000	1.0	A-6 (2)	CLAYEY SAND(SC)
▲	18+1000	1.0	A-2-4 (0)	SILTY SAND(SM)
★	18+2000	0.9	A-4 (0)	SILTY SAND(SM)
⊙	18+3000	1.1	A-4 (0)	CLAYEY SAND(SC)
✪	18+4000	1.1	A-4 (0)	SILTY SAND(SM)

	BOREHOLE	DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	17+4000	1.1	AASHTO T-180 Method A	NP	NP	NP	123.8 PCF	11.9 %
⊠	18+0000	1.0	AASHTO T-180 Method A	33	22	11	124.2 PCF	11.9 %
▲	18+1000	1.0	AASHTO T-180 Method A	NP	NP	NP	122.5 PCF	11.8 %
★	18+2000	0.9	AASHTO T-180 Method A	NP	NP	NP	124.9 PCF	11.7 %
⊙	18+3000	1.1	AASHTO T-180 Method A	28	20	8	125.5 PCF	11.1 %
✪	18+4000	1.1	AASHTO T-180 Method A	21	19	2	124.5 PCF	11.3 %

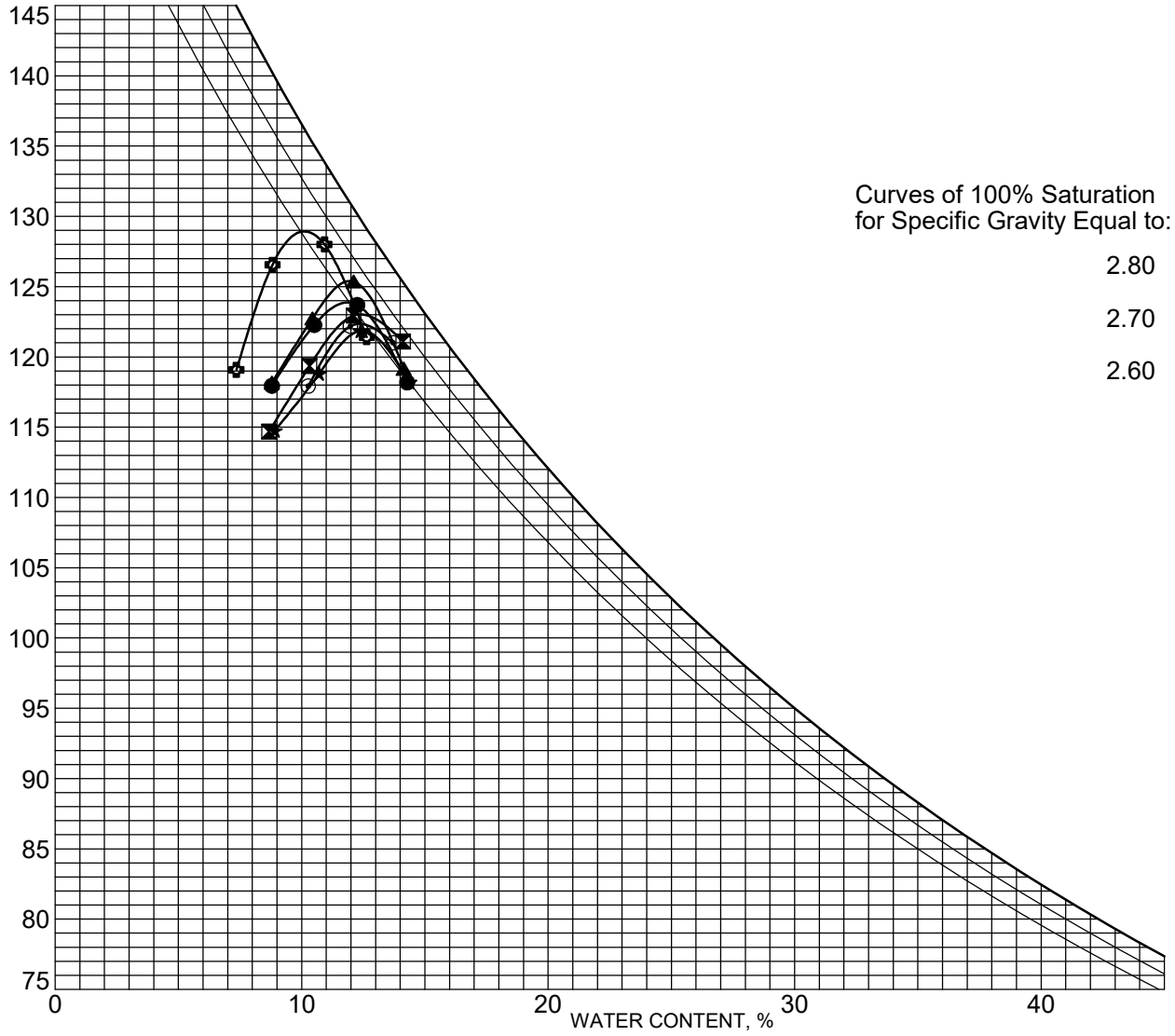
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PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	19+0000	1.1	A-4 (0)	CLAYEY SAND(SC)
⊠	19+1000	1.2	A-2-4 (0)	SILTY SAND(SM)
▲	19+2000	1.1	A-2-4 (0)	SILTY, CLAYEY SAND(SC-SM)
★	19+3000	1.1	A-4 (1)	CLAYEY SAND(SC)
⊙	19+4000	1.2	A-7-6 (24)	LEAN CLAY(CL)
✿	20+0000	1.2	A-4 (2)	SANDY LEAN CLAY(CL)

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	19+0000	1.1	AASHTO T-180 Method A	28	20	8	123.9 PCF	11.9 %
⊠	19+1000	1.2	AASHTO T-180 Method A	38	31	7	123.0 PCF	12.4 %
▲	19+2000	1.1	AASHTO T-180 Method A	26	20	6	125.4 PCF	11.9 %
★	19+3000	1.1	AASHTO T-180 Method A	31	21	10	121.9 PCF	12.5 %
⊙	19+4000	1.2	AASHTO T-180 Method A	43	19	24	122.3 PCF	12.3 %
✿	20+0000	1.2	AASHTO T-180 Method A	25	16	9	128.9 PCF	10.1 %

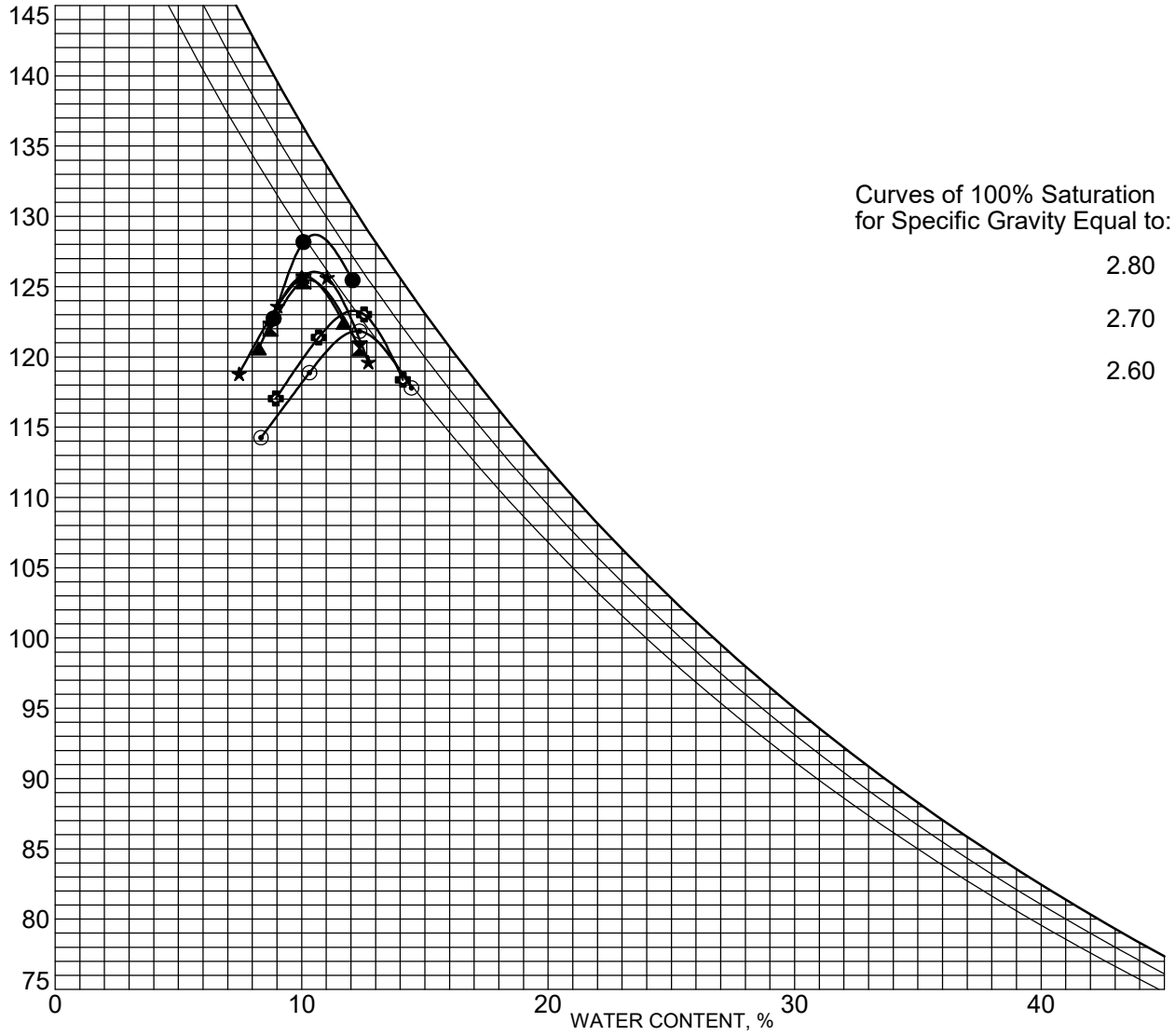
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BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	20+1000	1.1	A-6 (5)	SANDY LEAN CLAY(CL)
⊠	20+2000	1.2	A-2-4 (0)	SILTY SAND(SM)
▲	20+3000	1.2	A-2-4 (0)	SILTY SAND(SM)
★	20+4000	1.0	A-2-4 (0)	SILTY SAND(SM)
⊙	21+0000	1.1	A-2-4 (0)	SILTY SAND(SM)
✪	21+1000	1.1	A-2-4 (0)	SILTY, CLAYEY SAND(SC-SM)

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	20+1000	1.1	AASHTO T-180 Method A	31	14	17	128.7 PCF	10.6 %
⊠	20+2000	1.2	AASHTO T-180 Method A	NP	NP	NP	125.5 PCF	10.3 %
▲	20+3000	1.2	AASHTO T-180 Method A	20	17	3	125.7 PCF	10.1 %
★	20+4000	1.0	AASHTO T-180 Method A	NP	NP	NP	126.0 PCF	10.5 %
⊙	21+0000	1.1	AASHTO T-180 Method A	NP	NP	NP	121.8 PCF	12.2 %
✪	21+1000	1.1	AASHTO T-180 Method A	28	21	7	123.3 PCF	12.1 %

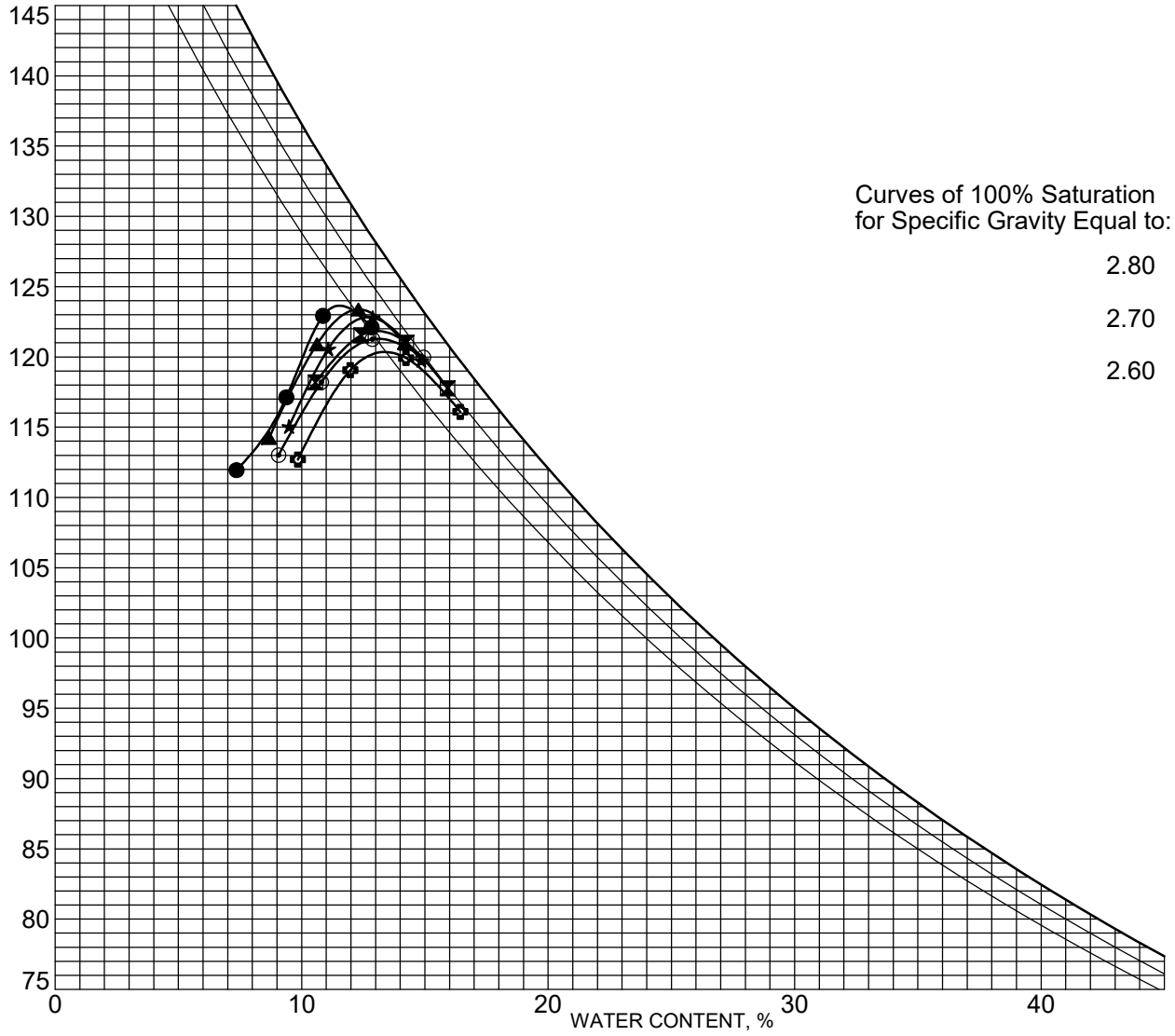
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300 AIRPORT ROAD
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PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	21+2000	0.9	A-6 (5)	CLAYEY SAND(SC)
⊠	21+3000	1.1	A-6 (11)	LEAN CLAY(CL)
▲	21+4000	1.3	A-7-6 (21)	LEAN CLAY with SAND(CL)
★	22+0000	1.3	A-7-6 (23)	LEAN CLAY(CL)
⊙	22+1000	1.6	A-7-6 (33)	FAT CLAY(CH)
✿	22+2000	1.3	A-7-6 (22)	LEAN CLAY with SAND(CL)

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	21+2000	0.9	AASHTO T-180 Method A	33	16	17	123.6 PCF	11.5 %
⊠	21+3000	1.1	AASHTO T-180 Method A	34	23	12	121.8 PCF	13.1 %
▲	21+4000	1.3	AASHTO T-180 Method A	44	17	27	123.4 PCF	12.3 %
★	22+0000	1.3	AASHTO T-180 Method A	44	18	26	122.8 PCF	12.7 %
⊙	22+1000	1.6	AASHTO T-180 Method A	51	18	33	121.3 PCF	13.1 %
✿	22+2000	1.3	AASHTO T-180 Method A	46	19	27	120.3 PCF	13.4 %

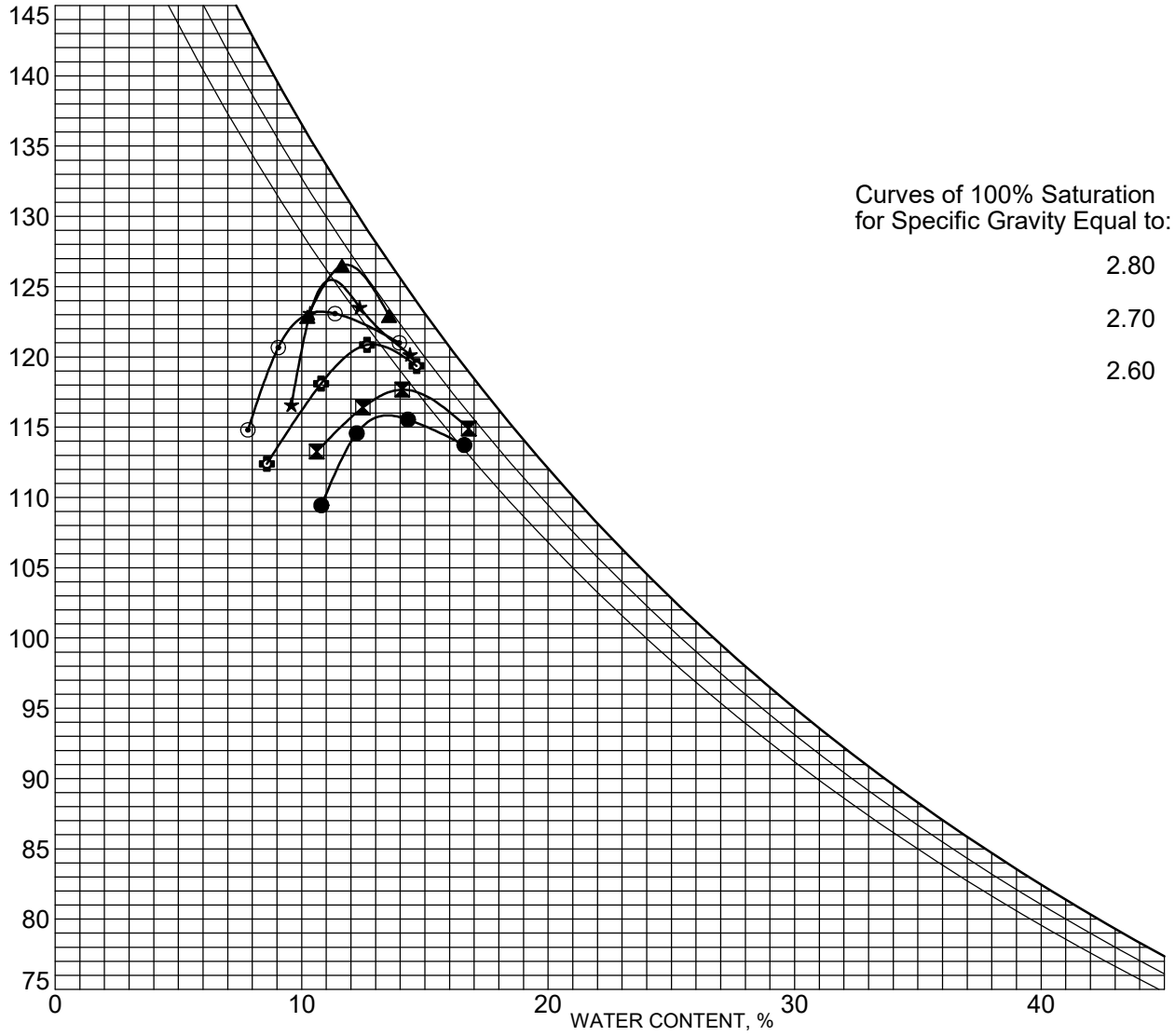
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MOISTURE-DENSITY RELATIONSHIP

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	22+3000	1.2	A-7-6 (32)	FAT CLAY(CH)
⊠	22+4000	1.2	A-7-6 (36)	FAT CLAY(CH)
▲	23+0000	1.3	A-6 (17)	LEAN CLAY(CL)
★	23+1000	1.1	A-7-6 (24)	LEAN CLAY with SAND(CL)
⊙	23+2000	1.2	A-7-6 (25)	LEAN CLAY(CL)
✿	23+3000	1.1	A-7-6 (25)	LEAN CLAY with SAND(CL)

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	22+3000	1.2	AASHTO T-180 Method A	53	19	34	115.8 PCF	13.4 %
⊠	22+4000	1.2	AASHTO T-180 Method A	56	21	35	117.7 PCF	14.1 %
▲	23+0000	1.3	AASHTO T-180 Method A	35	18	17	126.6 PCF	11.8 %
★	23+1000	1.1	AASHTO T-180 Method A	46	17	29	125.5 PCF	11.2 %
⊙	23+2000	1.2	AASHTO T-180 Method A	46	17	29	123.2 PCF	10.7 %
✿	23+3000	1.1	AASHTO T-180 Method A	48	17	31	120.9 PCF	12.9 %

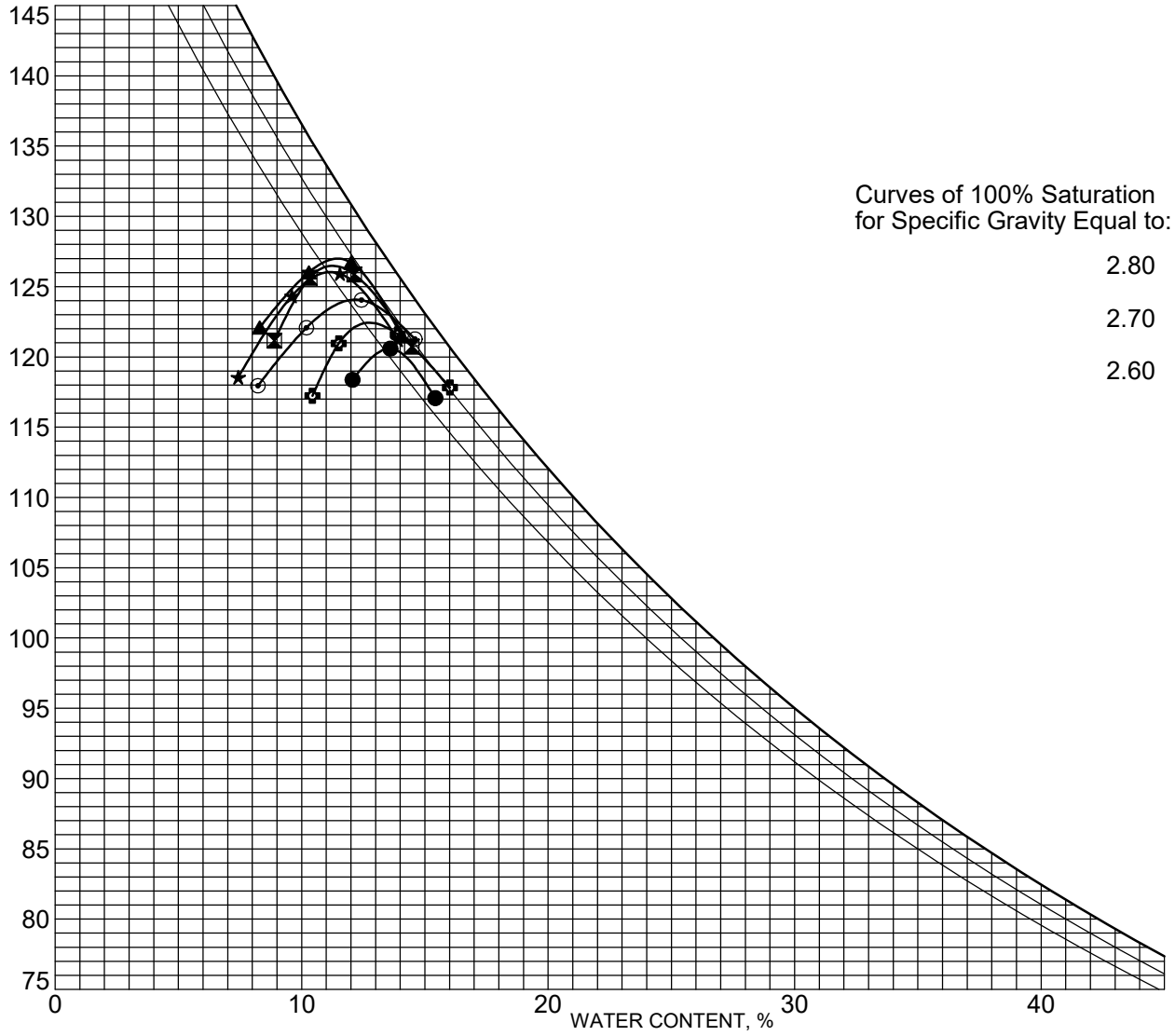
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	**23+4000**	**1.2**	**A-6 (14)**	**LEAN CLAY with SAND(CL)**
⊠	**23+5088**	**1.2**	**A-6 (19)**	**LEAN CLAY(CL)**
▲	**24+1000**	**1.3**	**A-6 (14)**	**LEAN CLAY with SAND(CL)**
★	**24+2000**	**1.4**	**A-6 (20)**	**LEAN CLAY with SAND(CL)**
⊙	**24+3000**	**1.8**	**A-6 (17)**	**LEAN CLAY with SAND(CL)**
✿	**24+4000**	**1.7**	**A-7-6 (23)**	**LEAN CLAY(CL)**

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	**23+4000**	**1.2**	**AASHTO T-180 Method A**	**38**	**16**	**22**	**120.6 PCF**	**13.6 %**
⊠	**23+5088**	**1.2**	**AASHTO T-180 Method A**	**38**	**16**	**22**	**126.5 PCF**	**11.3 %**
▲	**24+1000**	**1.3**	**AASHTO T-180 Method A**	**35**	**17**	**18**	**127.0 PCF**	**11.5 %**
★	**24+2000**	**1.4**	**AASHTO T-180 Method A**	**40**	**14**	**26**	**126.0 PCF**	**11.1 %**
⊙	**24+3000**	**1.8**	**AASHTO T-180 Method A**	**39**	**18**	**21**	**124.1 PCF**	**12.2 %**
✿	**24+4000**	**1.7**	**AASHTO T-180 Method A**	**44**	**18**	**26**	**122.4 PCF**	**12.8 %**

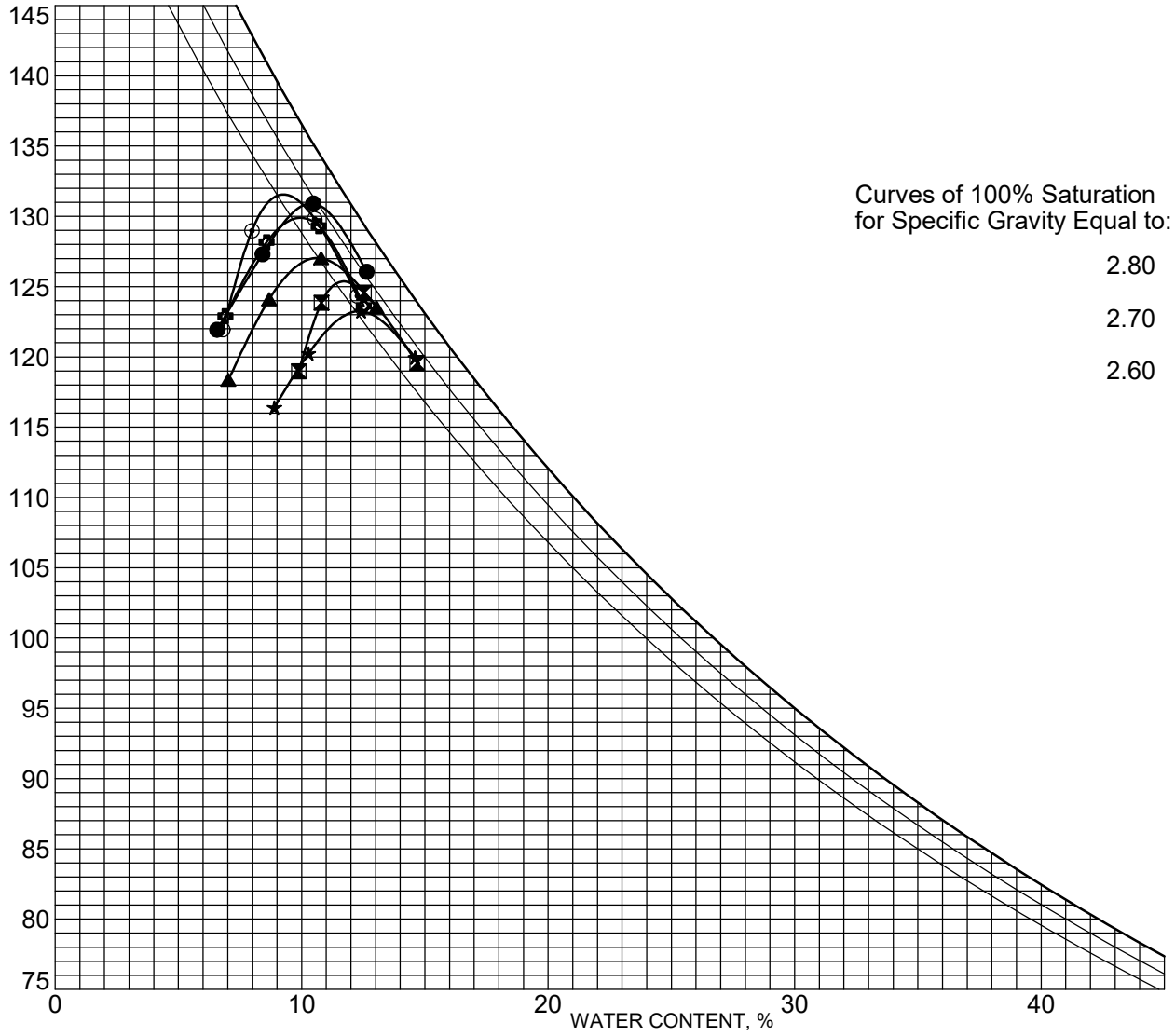
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BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	**24+4000**	**7.0**	**A-6 (8)**	**SANDY LEAN CLAY(CL)**
⊠	**25+0000**	**1.3**	**A-6 (15)**	**LEAN CLAY(CL)**
▲	**25+1000**	**1.3**	**A-6 (8)**	**LEAN CLAY with SAND(CL)**
★	**25+2000**	**1.4**	**A-6 (10)**	**LEAN CLAY(CL)**
⊙	**25+3000**	**1.0**	**A-6 (8)**	**SANDY LEAN CLAY(CL)**
✿	**25+4000**	**0.9**	**A-4 (4)**	**SANDY LEAN CLAY(CL)**

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	**24+4000**	**7.0**	**AASHTO T-180 Method A**	**35**	**15**	**20**	**130.9 PCF**	**10.4 %**
⊠	**25+0000**	**1.3**	**AASHTO T-180 Method A**	**35**	**17**	**18**	**125.4 PCF**	**11.7 %**
▲	**25+1000**	**1.3**	**AASHTO T-180 Method A**	**31**	**19**	**12**	**127.0 PCF**	**10.7 %**
★	**25+2000**	**1.4**	**AASHTO T-180 Method A**	**30**	**19**	**11**	**123.3 PCF**	**12.3 %**
⊙	**25+3000**	**1.0**	**AASHTO T-180 Method A**	**30**	**15**	**15**	**131.6 PCF**	**9.3 %**
✿	**25+4000**	**0.9**	**AASHTO T-180 Method A**	**26**	**16**	**10**	**129.9 PCF**	**9.9 %**

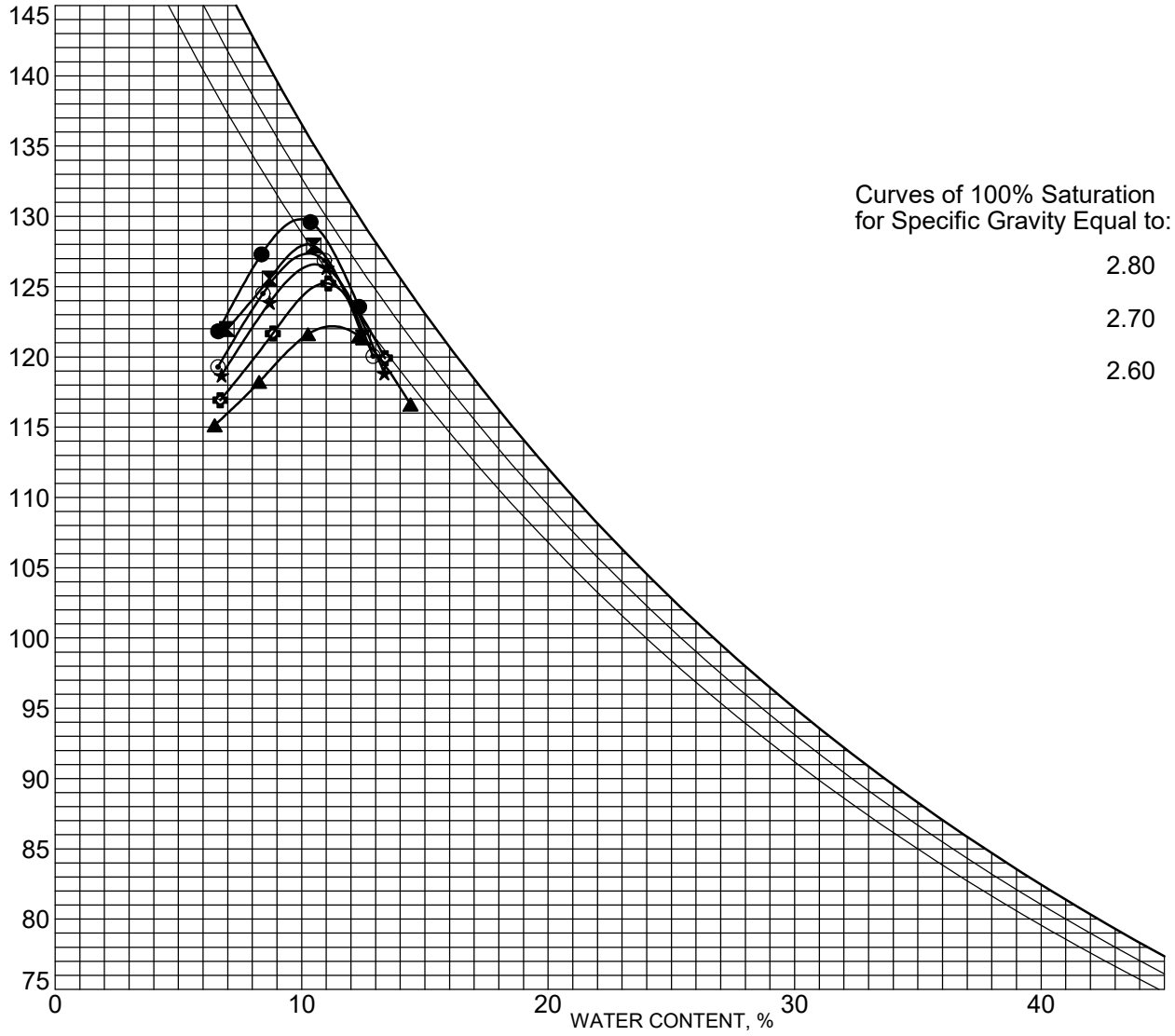
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300 AIRPORT ROAD
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PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	**26+0130**	**1.2**	**A-6 (6)**	**SANDY LEAN CLAY(CL)**
⊠	**26+1000**	**0.8**	**A-2-4 (0)**	**SILTY SAND(SM)**
▲	**26+2000**	**0.9**	**A-2-4 (0)**	**SILTY SAND(SM)**
★	**26+3000**	**1.0**	**A-2-4 (0)**	**SILTY SAND(SM)**
⊙	**26+4000**	**0.9**	**A-4 (0)**	**SILTY SAND(SM)**
✿	**27+0000**	**0.8**	**A-2-4 (0)**	**SILTY SAND(SM)**

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	**26+0130**	**1.2**	**AASHTO T-180 Method A**	**28**	**14**	**14**	**129.8 PCF**	**9.9 %**
⊠	**26+1000**	**0.8**	**AASHTO T-180 Method A**	**NP**	**NP**	**NP**	**128.0 PCF**	**10.3 %**
▲	**26+2000**	**0.9**	**AASHTO T-180 Method A**	**NP**	**NP**	**NP**	**122.2 PCF**	**11.2 %**
★	**26+3000**	**1.0**	**AASHTO T-180 Method A**	**NP**	**NP**	**NP**	**126.6 PCF**	**10.5 %**
⊙	**26+4000**	**0.9**	**AASHTO T-180 Method A**	**NP**	**NP**	**NP**	**127.4 PCF**	**10.3 %**
✿	**27+0000**	**0.8**	**AASHTO T-180 Method A**	**NP**	**NP**	**NP**	**125.2 PCF**	**11.0 %**

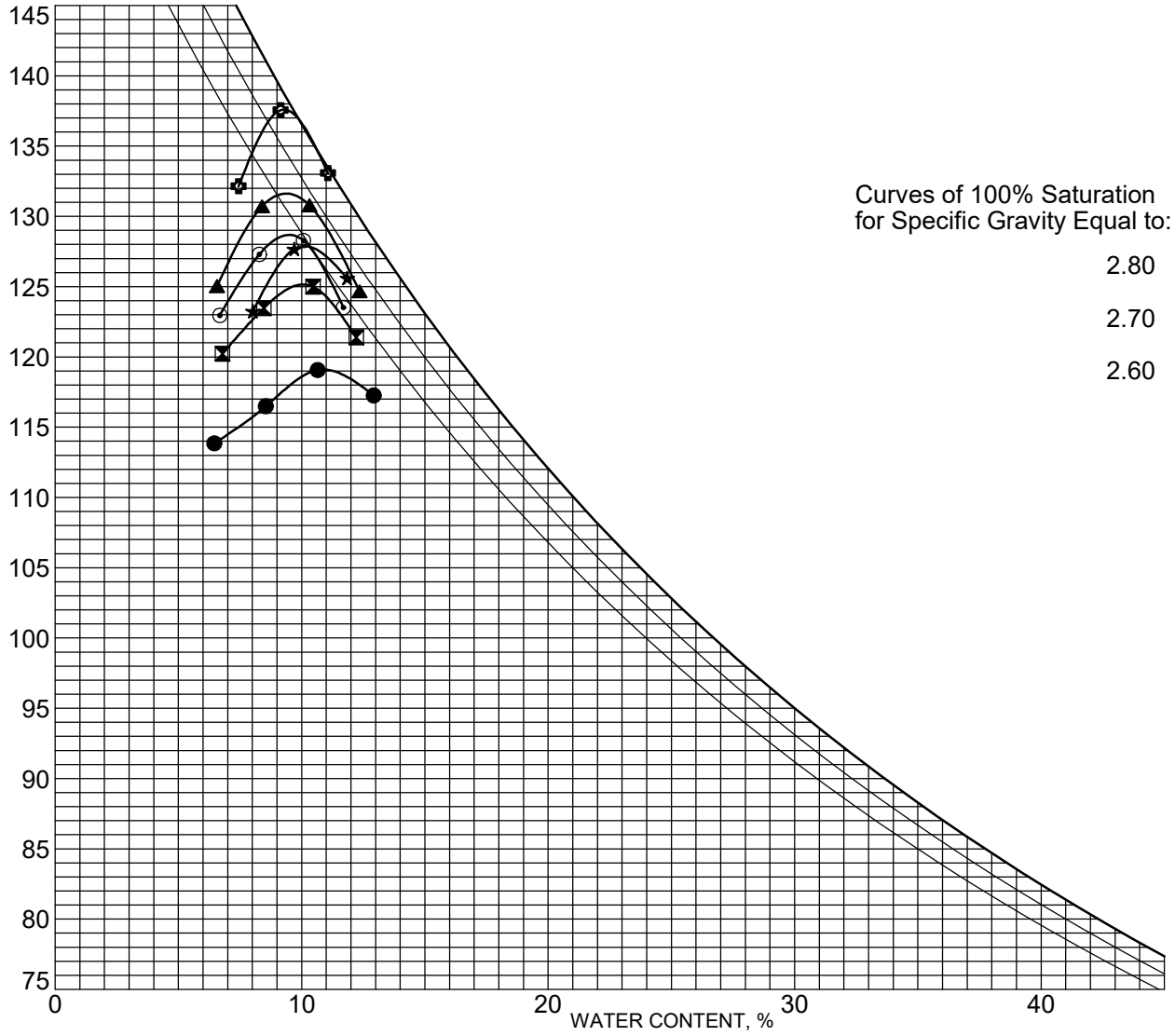
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BISMARCK, ND 58504

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PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	27+1000	0.9	A-2-4 (0)	SILTY SAND(SM)
⊠	27+2000	0.9	A-2-4 (0)	SILTY SAND(SM)
▲	27+3202	0.7	A-2-4 (0)	SILTY SAND(SM)
★	27+4000	1.3	A-4 (2)	CLAYEY SAND(SC)
⊙	28+0000	1.3	A-2-4 (0)	SILTY SAND(SM)
✿	28+1000	0.6	A-2-4 (0)	SILTY SAND(SM)

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	27+1000	0.9	AASHTO T-180 Method A	NP	NP	NP	119.1 PCF	10.9 %
⊠	27+2000	0.9	AASHTO T-180 Method A	NP	NP	NP	125.2 PCF	10.0 %
▲	27+3202	0.7	AASHTO T-180 Method A	NP	NP	NP	131.6 PCF	9.4 %
★	27+4000	1.3	AASHTO T-180 Method A	26	17	9	127.9 PCF	10.2 %
⊙	28+0000	1.3	AASHTO T-180 Method A	NP	NP	NP	128.7 PCF	9.5 %
✿	28+1000	0.6	AASHTO T-180 Method A	NP	NP	NP	137.6 PCF	9.3 %

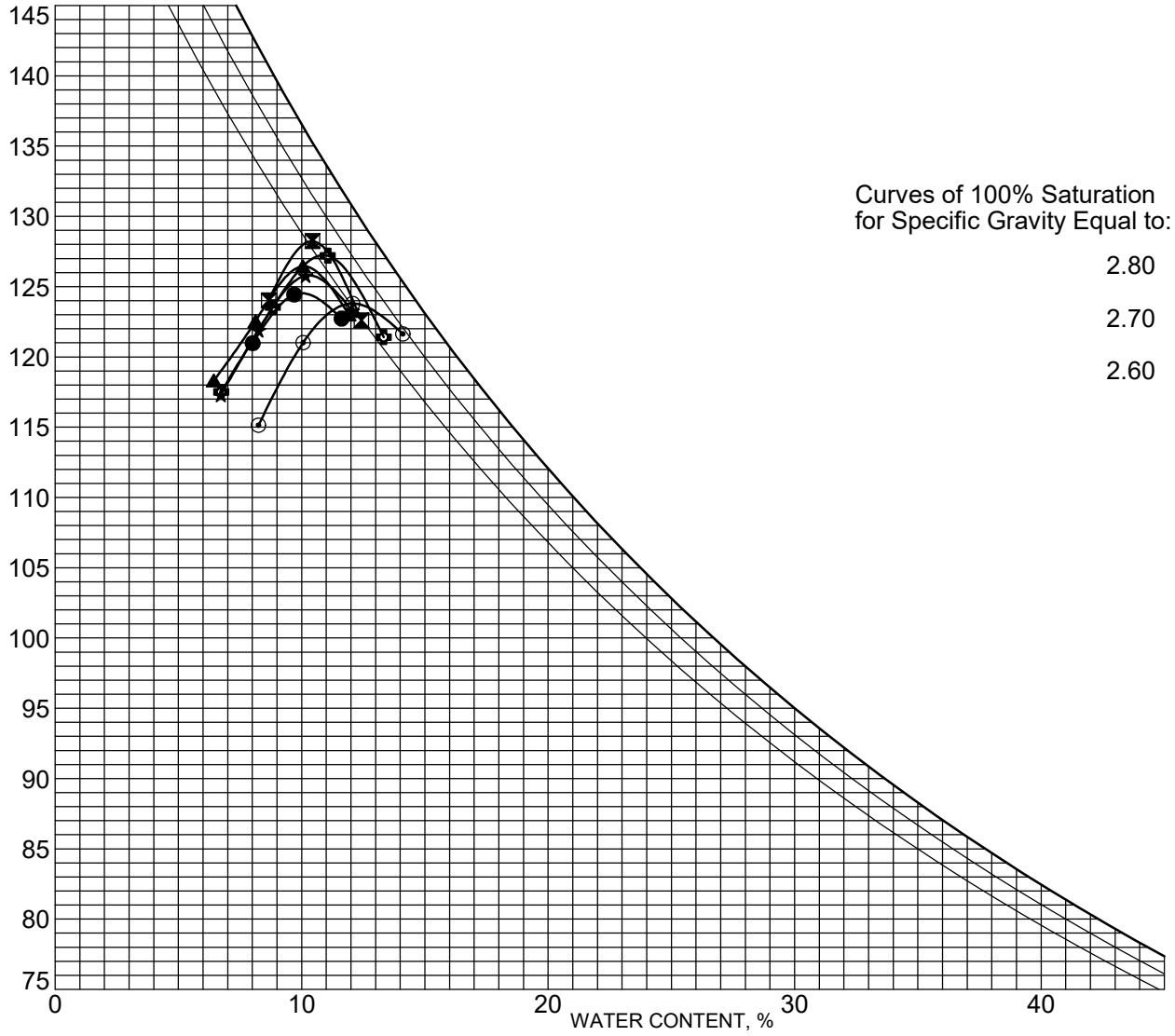
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PCN 23274



BOREHOLE		DEPTH	AASHTO Classification	USCS Description
●	**28+2000**	**1.2**	**A-2-4 (0)**	**SILTY SAND(SM)**
⊠	**28+2942**	**1.1**	**A-4 (0)**	**SILTY SAND(SM)**
▲	**28+4000**	**1.1**	**A-4 (0)**	**SILTY SAND(SM)**
★	**29+0000**	**1.2**	**A-2-4 (0)**	**SILTY SAND(SM)**
⊙	**29+1000**	**1.4**	**A-7-6 (22)**	**LEAN CLAY(CL)**
✿	**29+2000**	**1.2**	**A-4 (0)**	**SILT(ML)**

BOREHOLE		DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
●	**28+2000**	**1.2**	**AASHTO T-180 Method A**	**NP**	**NP**	**NP**	**124.5 PCF**	**10.0 %**
⊠	**28+2942**	**1.1**	**AASHTO T-180 Method A**	**NP**	**NP**	**NP**	**128.2 PCF**	**10.4 %**
▲	**28+4000**	**1.1**	**AASHTO T-180 Method A**	**NP**	**NP**	**NP**	**126.4 PCF**	**10.1 %**
★	**29+0000**	**1.2**	**AASHTO T-180 Method A**	**NP**	**NP**	**NP**	**125.8 PCF**	**10.3 %**
⊙	**29+1000**	**1.4**	**AASHTO T-180 Method A**	**41**	**17**	**24**	**123.8 PCF**	**12.1 %**
✿	**29+2000**	**1.2**	**AASHTO T-180 Method A**	**NP**	**NP**	**NP**	**127.2 PCF**	**10.9 %**

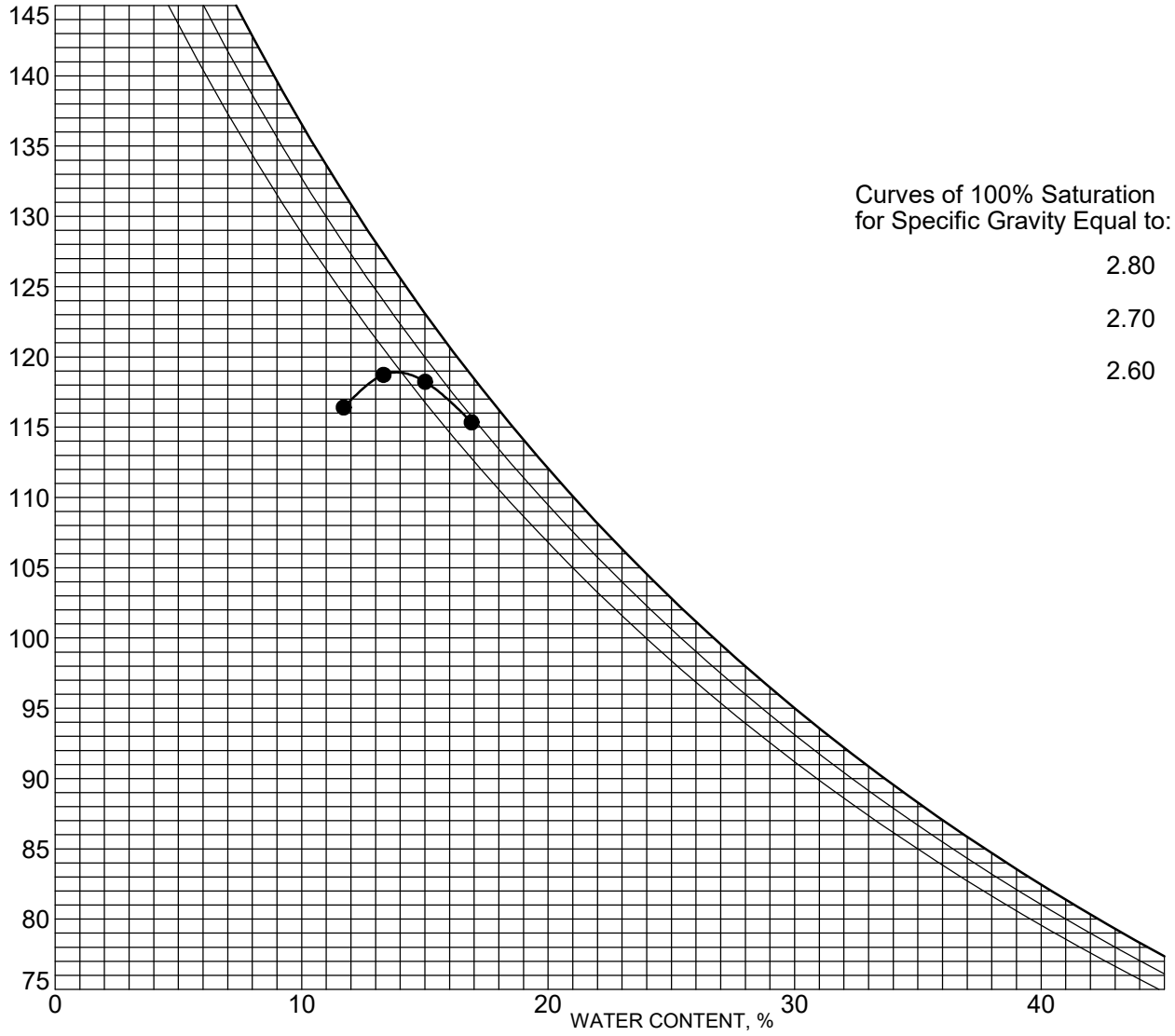
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300 AIRPORT ROAD
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PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



BOREHOLE	DEPTH	AASHTO Classification	USCS Description
● **29+3000**	**1.3**	**A-7-6 (39)**	**FAT CLAY(CH)**

BOREHOLE	DEPTH	Test Method	LL	PL	PI	Max DD	Optimum WC
● **29+3000**	**1.3**	**AASHTO T-180 Method A**	**56**	**19**	**37**	**118.9 PCF**	**13.9 %**

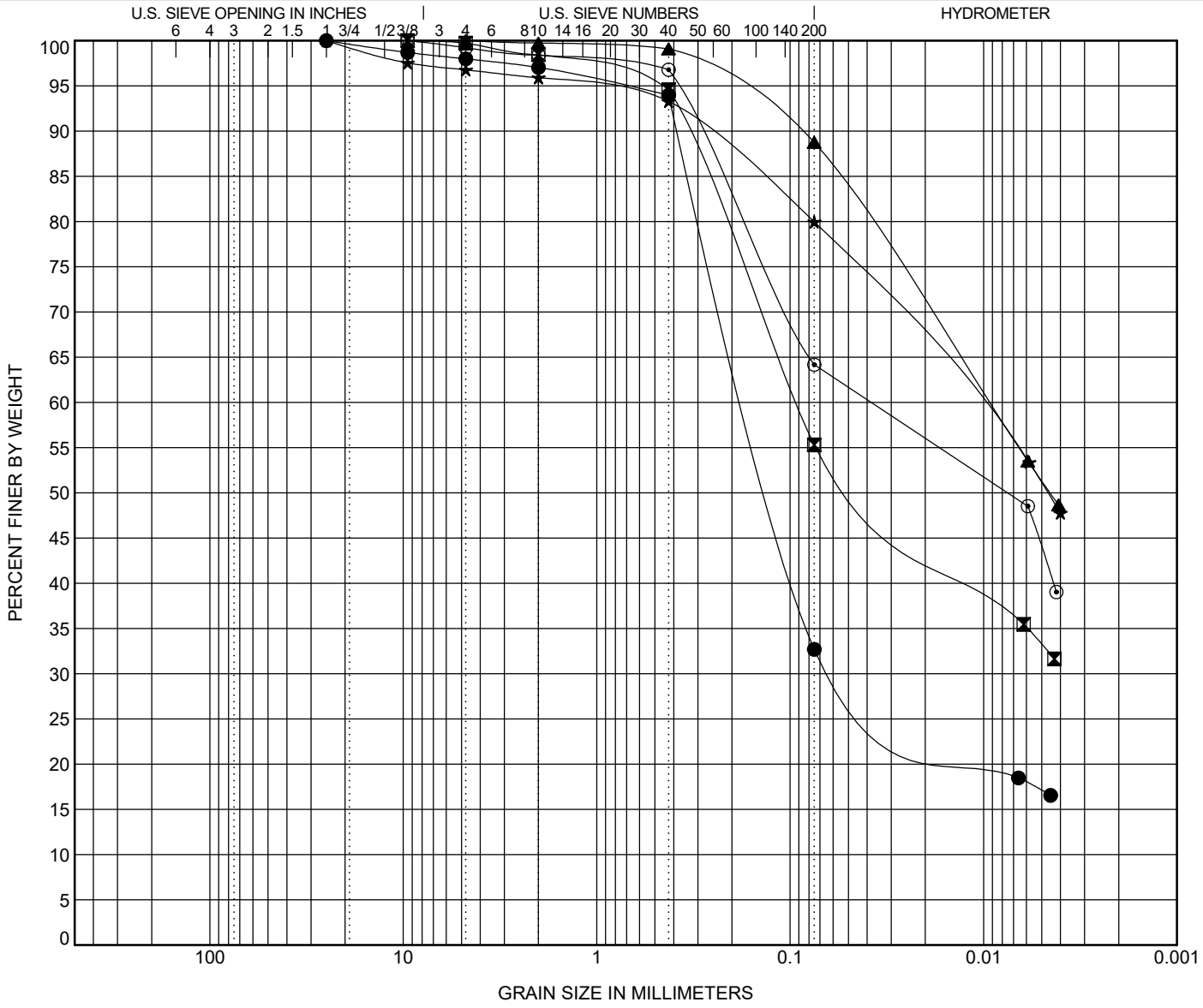
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NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
●	0+0000	1.2	A-2-4 (0)	SC	27	19	8		
⊠	0+1000	1.0	A-6 (8)	CL	36	16	20		
▲	0+2000	1.0	A-7-6 (30)	CH	53	22	31		
★	0+3000	1.0	A-7-6 (28)	CH	54	20	34		
⊙	0+4000	1.0	A-7-6 (15)	CL	46	18	28		

	BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
●	0+0000	1.2	25	0.122	0.047		2.0	65.3	32.7	
⊠	0+1000	1.0	9.5	0.039			0.3	44.4	55.3	
▲	0+2000	1.0	4.75	0.005			0.0	11.2	88.8	
★	0+3000	1.0	25	0.005			3.2	16.8	80.0	
⊙	0+4000	1.0	9.5	0.008			0.8	35.0	64.2	

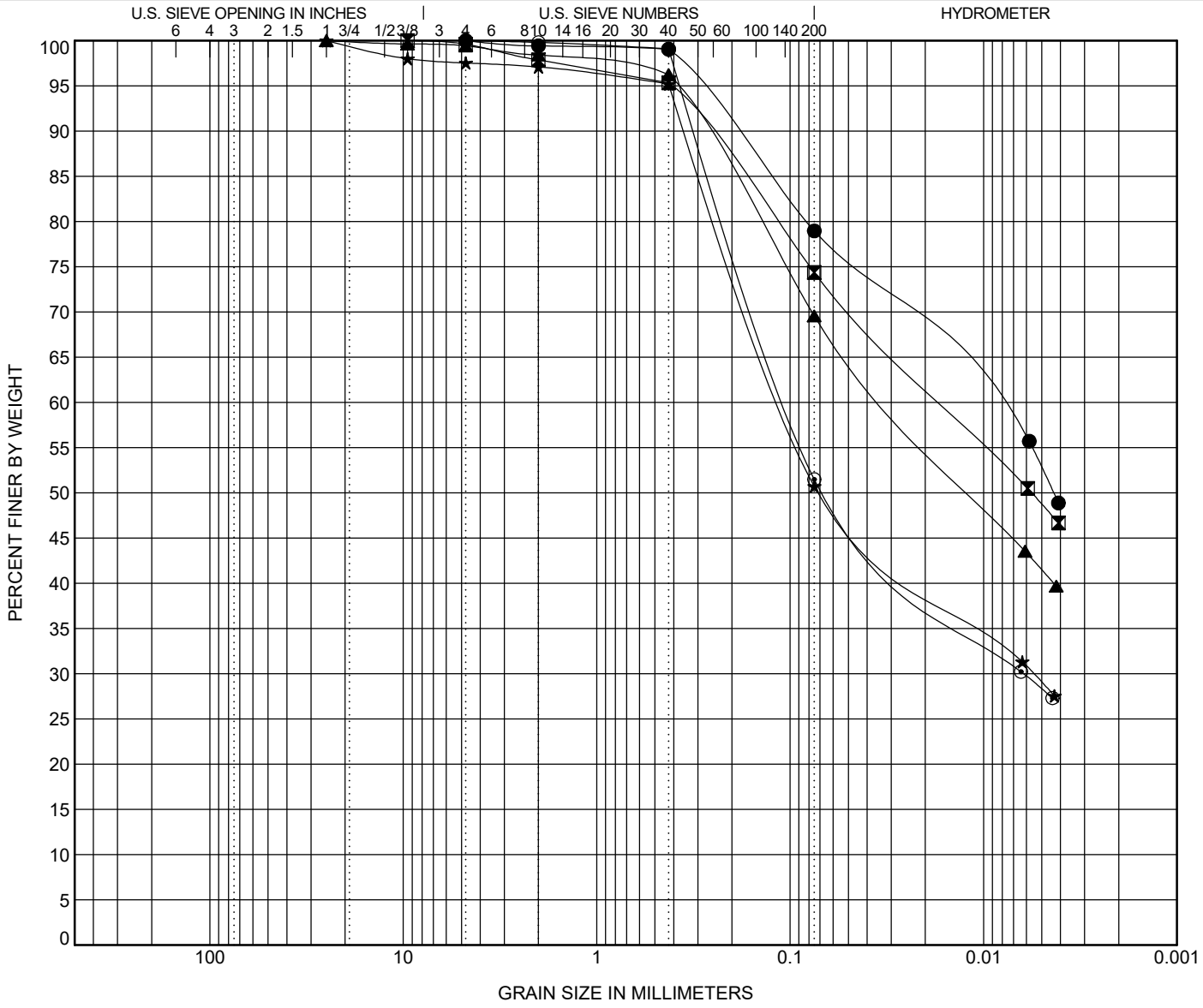
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BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
●	1+0100	1.0	A-7-6 (32)	CH	62	24	38		
⊠	1+1000	1.0	A-7-6 (23)	CH	52	21	31		
▲	1+2000	1.0	A-7-6 (19)	CL	48	19	29		
★	1+3000	1.0	A-6 (7)	CL	38	17	21		
⊙	1+4000	1.0	A-6 (4)	CL	30	16	14		

	BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
●	1+0100	1.0	4.75	0.004			0.0	21.0	79.0	
⊠	1+1000	1.0	9.5	0.006			0.4	25.2	74.4	
▲	1+2000	1.0	25	0.011			0.6	29.9	69.6	
★	1+3000	1.0	25	0.068	0.006		2.5	46.8	50.7	
⊙	1+4000	1.0	4.75	0.063	0.006		0.0	48.5	51.5	

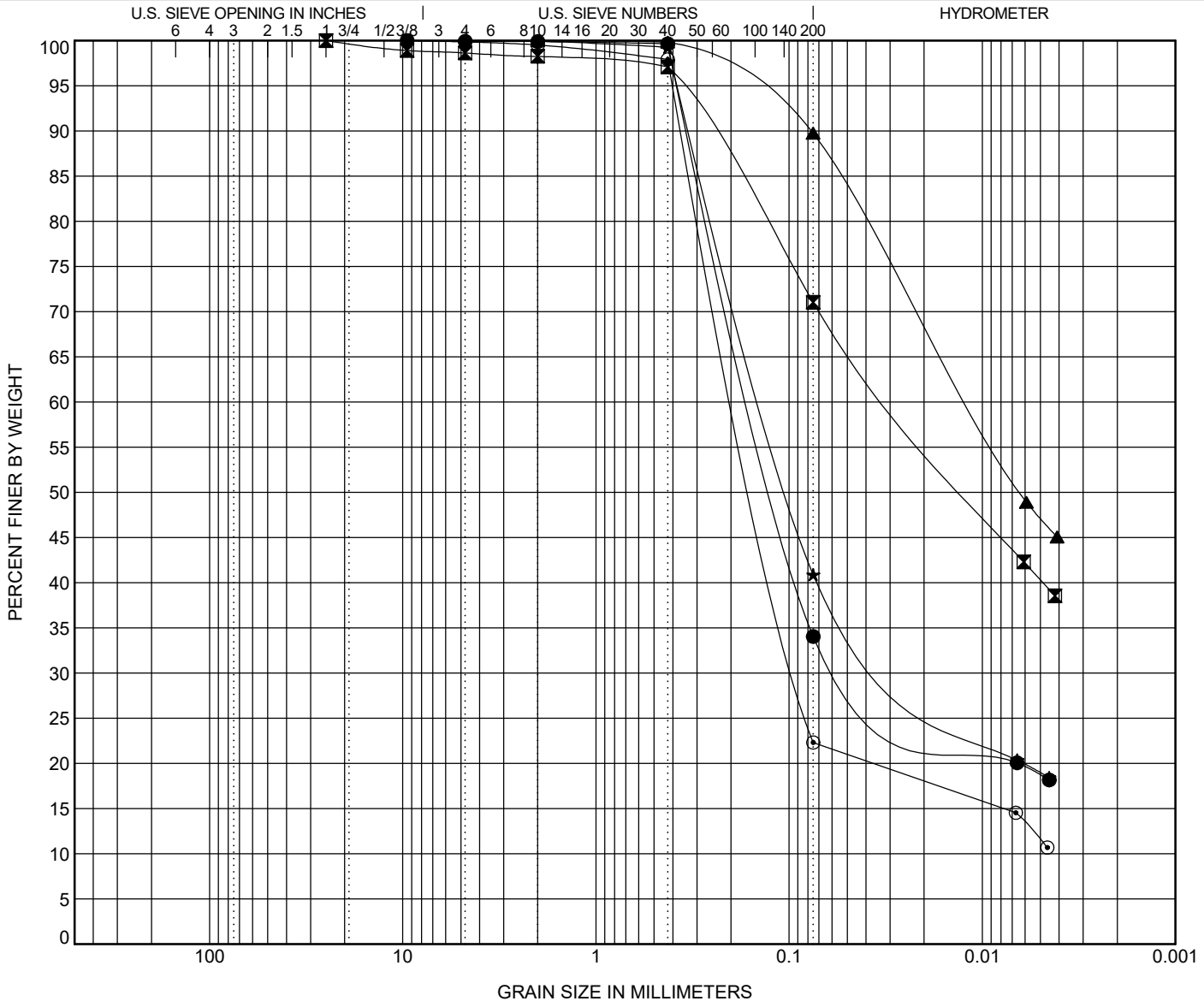
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BISMARCK, ND 58504

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PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
●	1+4000	7.0	A-2-4 (0)	SC-SM	27	21	6		
⊠	2+0000	1.0	A-6 (13)	CL	40	19	21		
▲	2+0000	8.0	A-7-6 (27)	CL	48	20	28		
★	2+1000	1.0	A-4 (0)	SC-SM	24	17	7		
⊙	2+1000	6.0	A-2-4 (0)	SM	NP	NP	NP		

	BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
●	1+4000	7.0	9.5	0.114	0.037		0.1	65.9	34.0	
⊠	2+0000	1.0	25	0.012			1.4	27.6	71.0	
▲	2+0000	8.0	2	0.006			0.0	10.2	89.8	
★	2+1000	1.0	4.75	0.098	0.021		0.0	59.1	40.9	
⊙	2+1000	6.0	9.5	0.142	0.089	0.008	0.1	77.5	22.3	

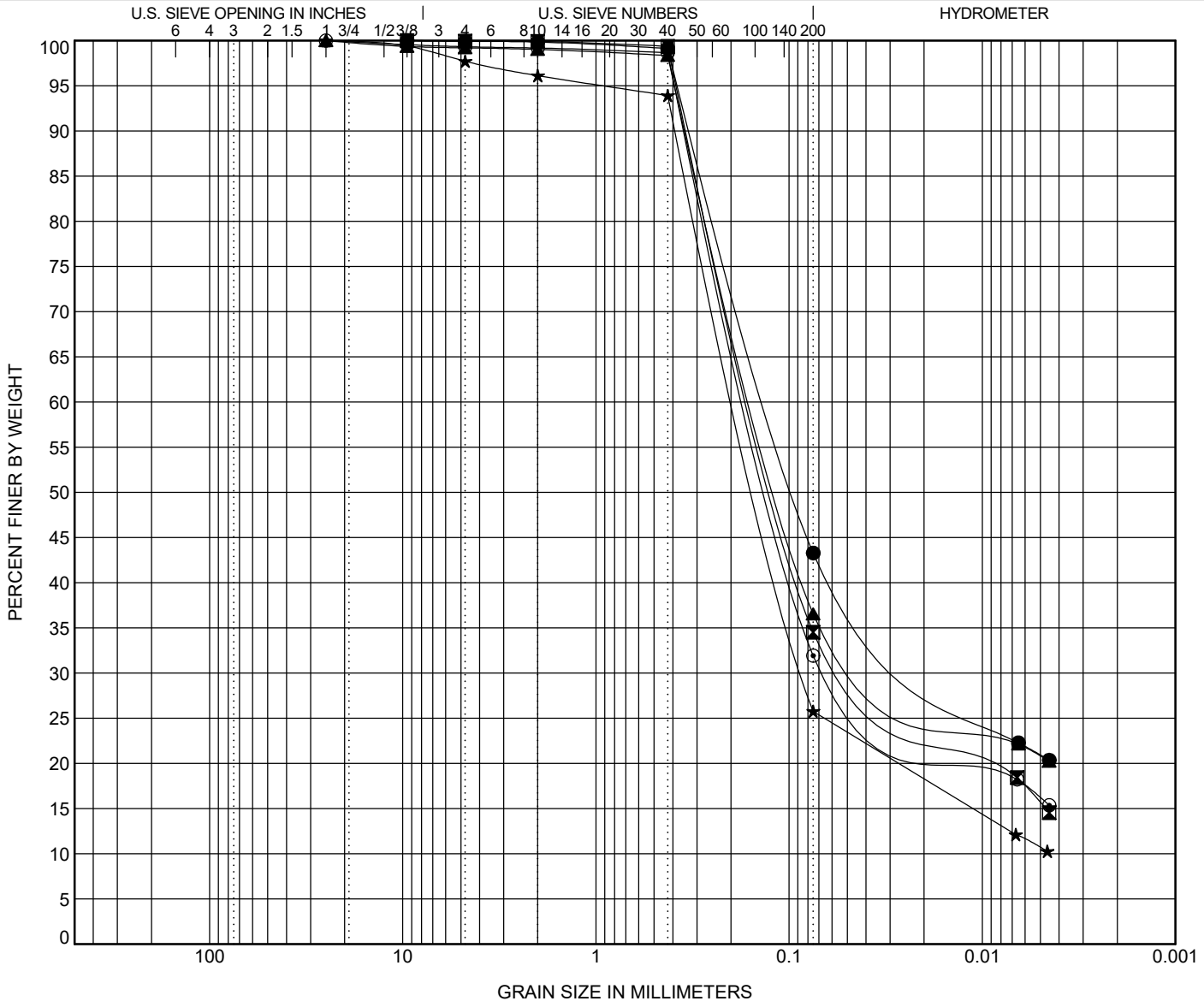
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PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
● 2+2000	1.0	A-4 (1)	SC	25	16	9		
⊠ 2+2000	5.0	A-2-4 (0)	SC	33	23	10		
▲ 2+3000	1.0	A-4 (0)	SM	21	19	2		
★ 2+3000	6.0	A-2-4 (0)	SM	NP	NP	NP		
⊙ 2+4000	1.0	A-2-4 (0)	SM	27	22	5		

BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
● 2+2000	1.0	9.5	0.092	0.016		0.1	56.6	43.3	
⊠ 2+2000	5.0	9.5	0.113	0.038	0.005	0.0	65.4	34.5	
▲ 2+3000	1.0	25	0.109	0.025		0.8	62.6	36.6	
★ 2+3000	6.0	25	0.139	0.084	0.011	2.3	72.0	25.8	
⊙ 2+4000	1.0	25	0.12	0.053		0.7	67.4	31.9	

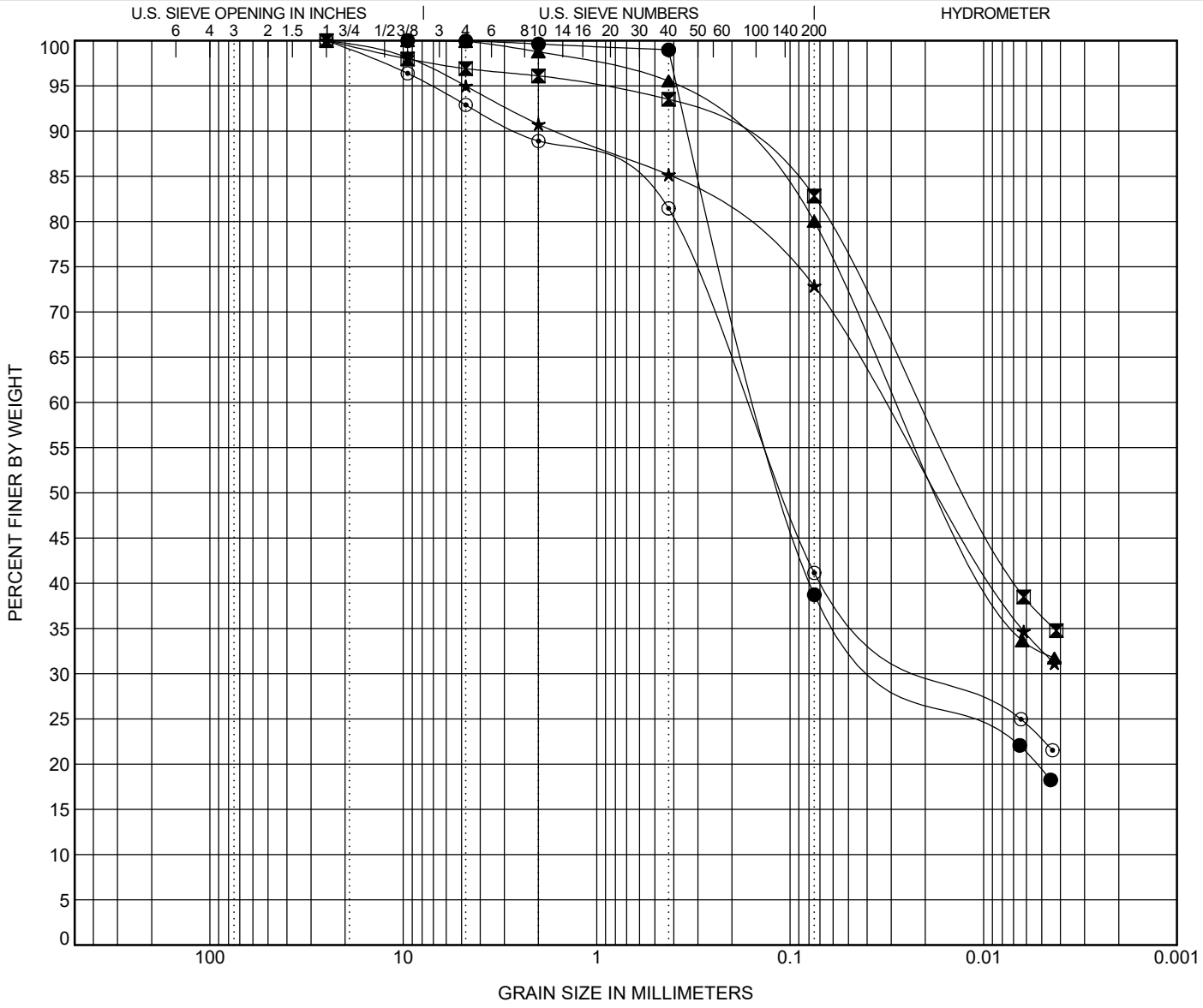
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NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
● 3+0000	1.0	A-6 (1)	SC	33	20	13		
⊠ 3+1000	1.0	A-7-6 (28)	CH	53	21	32		
▲ 3+2000	1.0	A-7-6 (20)	CL	44	19	25		
★ 3+3000	1.0	A-7-6 (19)	CL	46	19	27		
⊙ 3+4000	1.0	A-7-6 (5)	SC	41	17	24		

BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
● 3+0000	1.0	9.5	0.104	0.021		0.0	61.2	38.7	
⊠ 3+1000	1.0	25	0.012			3.1	14.1	82.8	
▲ 3+2000	1.0	9.5	0.015			0.1	19.9	80.0	
★ 3+3000	1.0	25	0.017			5.0	22.1	72.9	
⊙ 3+4000	1.0	25	0.11	0.014		7.1	51.7	41.1	

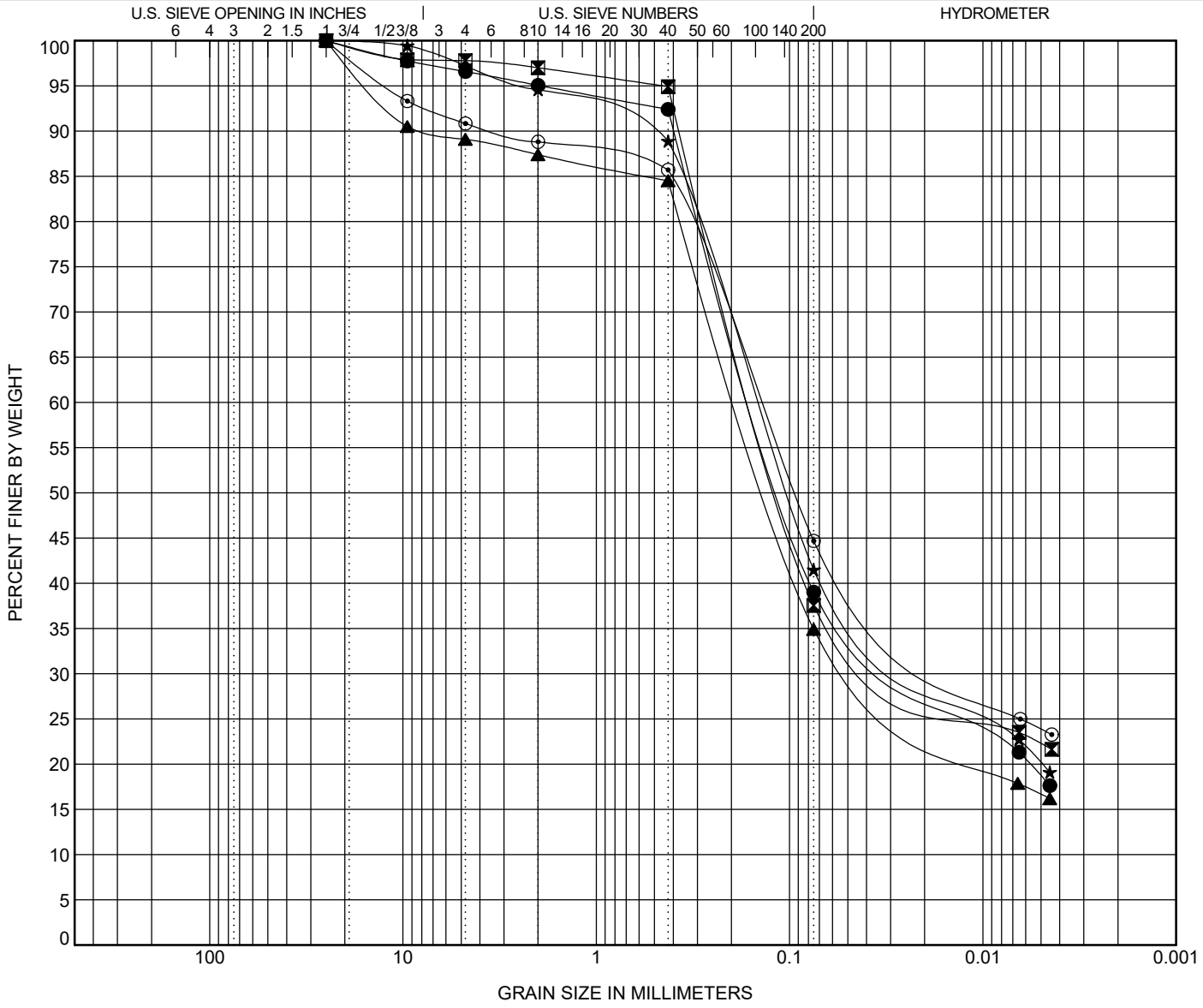
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NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
●	4+0000	1.0	A-6 (3)	SC	37	18	19		
⊠	4+0900	1.1	A-6 (2)	SC	33	18	15		
▲	4+2000	1.1	A-2-6 (1)	SC	29	16	13		
★	4+3000	1.0	A-6 (3)	SC	34	17	17		
⊙	4+4200	1.1	A-6 (3)	SC	31	17	14		

	BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
●	4+0000	1.0	25	0.107	0.022		3.4	57.6	39.0	
⊠	4+0900	1.1	25	0.109	0.02		2.2	60.3	37.5	
▲	4+2000	1.1	25	0.127	0.037		10.9	54.2	34.9	
★	4+3000	1.0	25	0.102	0.017		2.8	55.7	41.5	
⊙	4+4200	1.1	25	0.094	0.012		9.2	46.2	44.7	

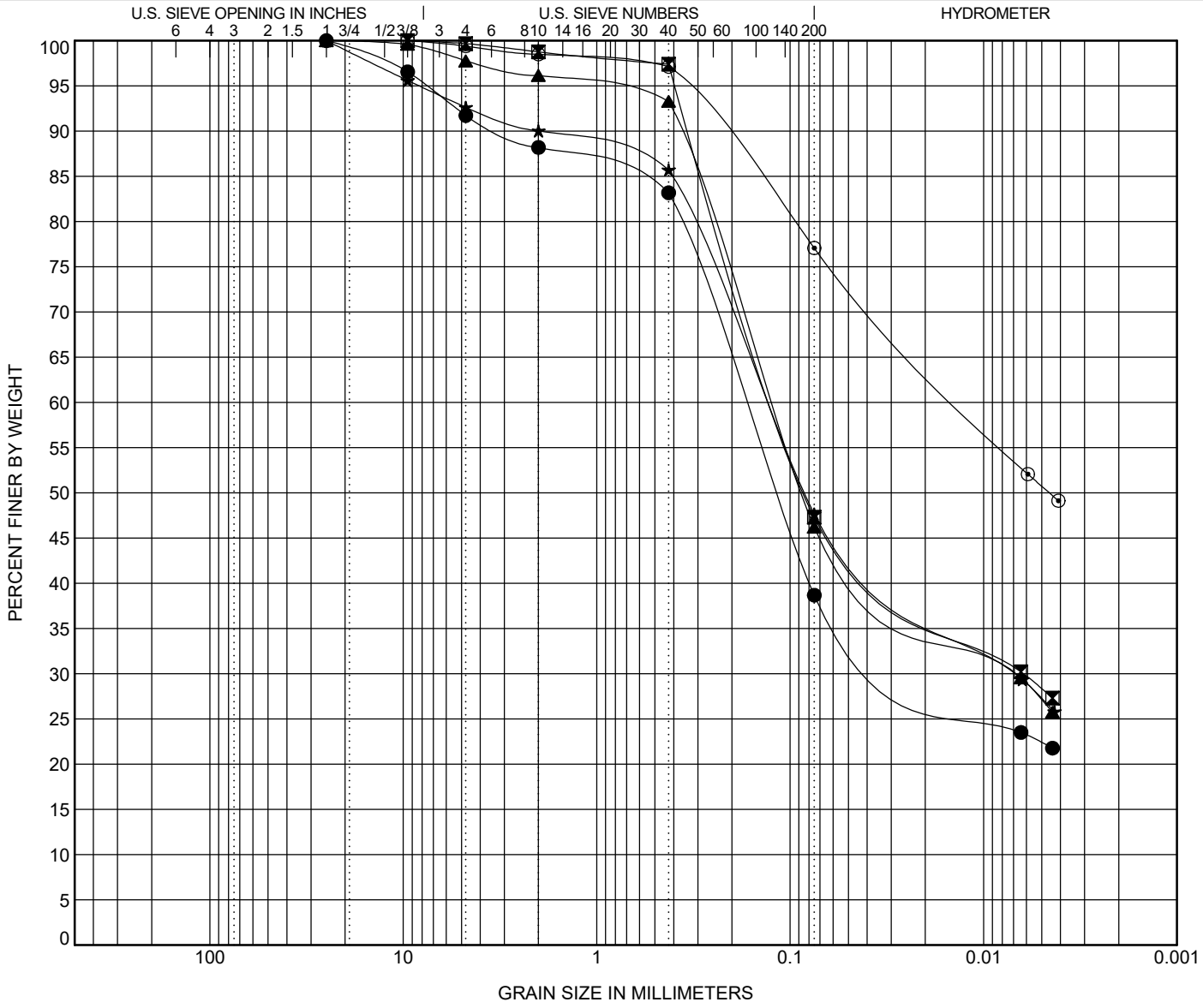
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
● 5+0000	1.1	A-6 (1)	SC	28	17	11		
⊠ 5+0500	1.0	A-6 (7)	SC	40	17	23		
▲ 5+1000	1.2	A-6 (4)	SC	35	18	17		
★ 5+1500	1.2	A-6 (5)	SC	35	17	18		
⊙ 5+2000	1.2	A-7-6 (26)	CH	55	21	34		

BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
● 5+0000	1.1	25	0.117	0.018		8.3	53.0	38.7	
⊠ 5+0500	1.0	9.5	0.082	0.006		0.3	52.4	47.3	
▲ 5+1000	1.2	25	0.086	0.007		2.2	51.6	46.2	
★ 5+1500	1.2	25	0.083	0.007		7.4	45.0	47.7	
⊙ 5+2000	1.2	9.5	0.005			0.6	22.3	77.1	

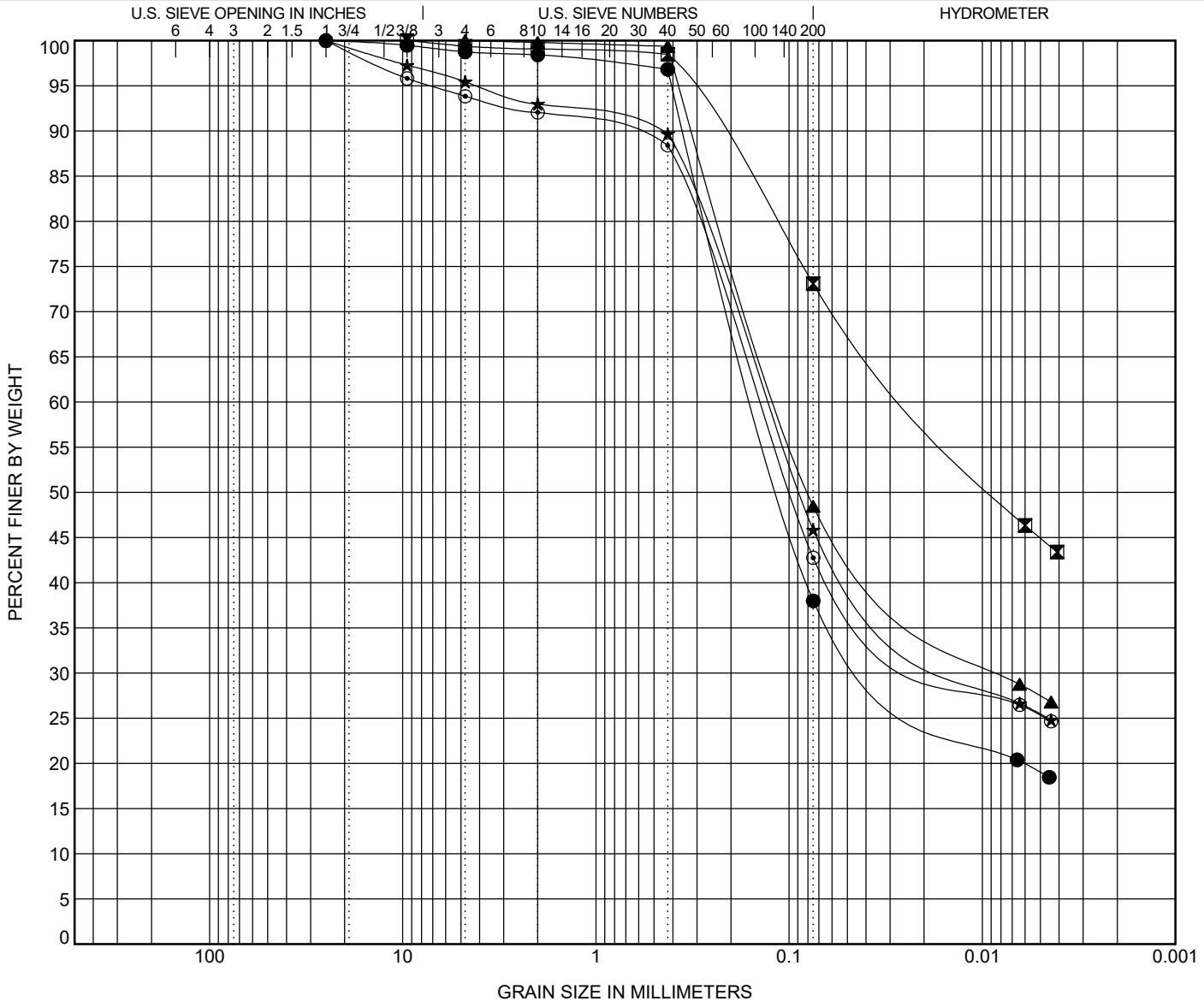
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
●	5+2000	6.0	A-4 (0)	SC-SM	27	20	7		
⊠	5+2200	1.1	A-7-6 (21)	CL	49	19	30		
▲	5+2200	6.0	A-6 (5)	SC	35	18	17		
★	5+3000	1.1	A-6 (3)	SC	30	17	13		
⊙	5+4000	1.1	A-6 (2)	SC	29	17	12		

	BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
●	5+2000	6.0	25	0.107	0.025		1.2	60.8	38.0	
⊠	5+2200	1.1	9.5	0.008			0.6	26.3	73.1	
▲	5+2200	6.0	4.75	0.079	0.007		0.0	51.5	48.5	
★	5+3000	1.1	25	0.088	0.01		4.5	49.6	45.9	
⊙	5+4000	1.1	25	0.099	0.011		6.2	51.1	42.8	

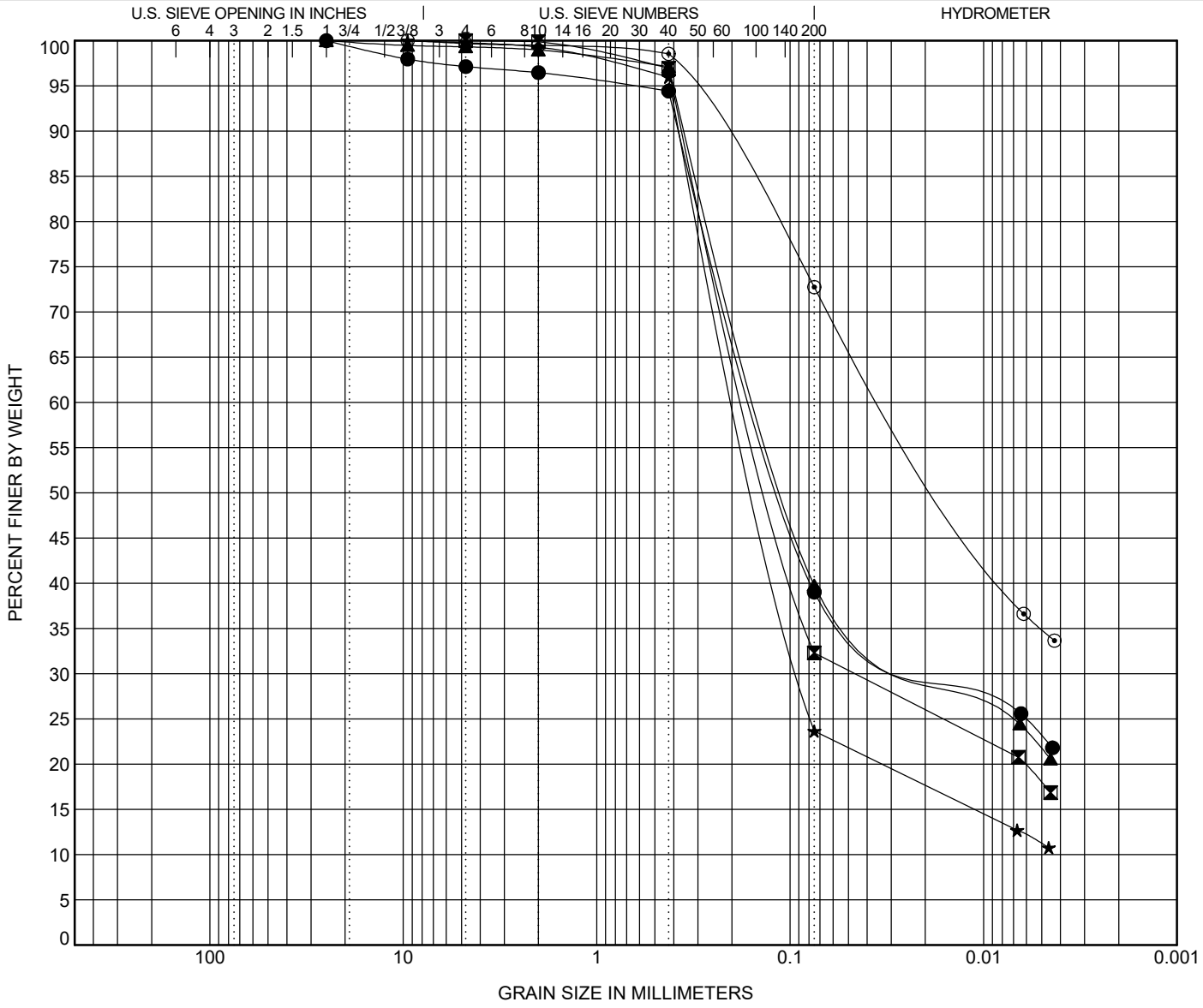
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
●	6+0000	1.2	A-6 (1)	SC	30	18	12		
⊠	6+1000	1.2	A-2-6 (0)	SC	29	18	11		
▲	6+2000	1.0	A-4 (0)	SC	29	20	9		
★	6+3000	1.0	A-2-4 (0)	SM	NP	NP	NP		
⊙	6+4000	0.9	A-7-6 (18)	CL	44	17	27		

	BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
●	6+0000	1.2	25	0.106	0.014		2.9	58.1	39.0	
⊠	6+1000	1.2	4.75	0.121	0.046		0.0	67.7	32.3	
▲	6+2000	1.0	25	0.102	0.016		0.7	59.5	39.8	
★	6+3000	1.0	9.5	0.141	0.087	0.011	0.2	76.1	23.7	
⊙	6+4000	0.9	9.5	0.016			0.3	26.9	72.8	

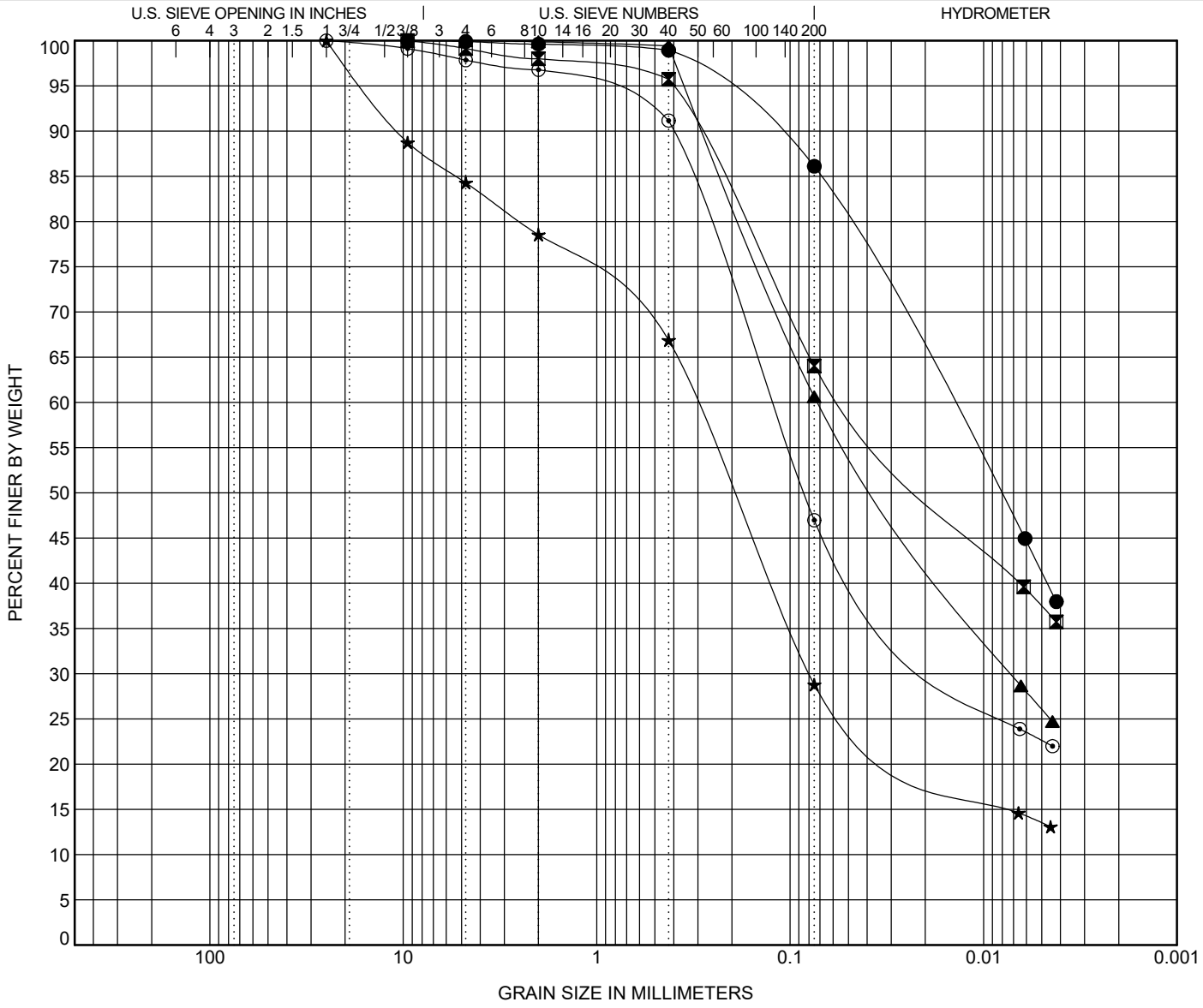
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BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
● 7+0000	1.0	A-7-6 (30)	CH	54	21	33		
⊠ 7+1000	1.1	A-7-6 (17)	CH	52	22	30		
▲ 7+2000	0.9	A-6 (7)	CL	32	16	16		
★ 7+3000	1.1	A-2-4 (0)	SM	21	18	3		
⊙ 7+4000	0.9	A-6 (2)	SC	27	15	12		

BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
● 7+0000	1.0	9.5	0.008			0.1	13.8	86.1	
⊠ 7+1000	1.1	9.5	0.018			0.9	35.1	64.0	
▲ 7+2000	0.9	4.75	0.033	0.007		0.0	39.4	60.6	
★ 7+3000	1.1	25	0.197	0.079	0.007	15.7	55.5	28.8	
⊙ 7+4000	0.9	25	0.084	0.012		2.2	50.9	47.0	

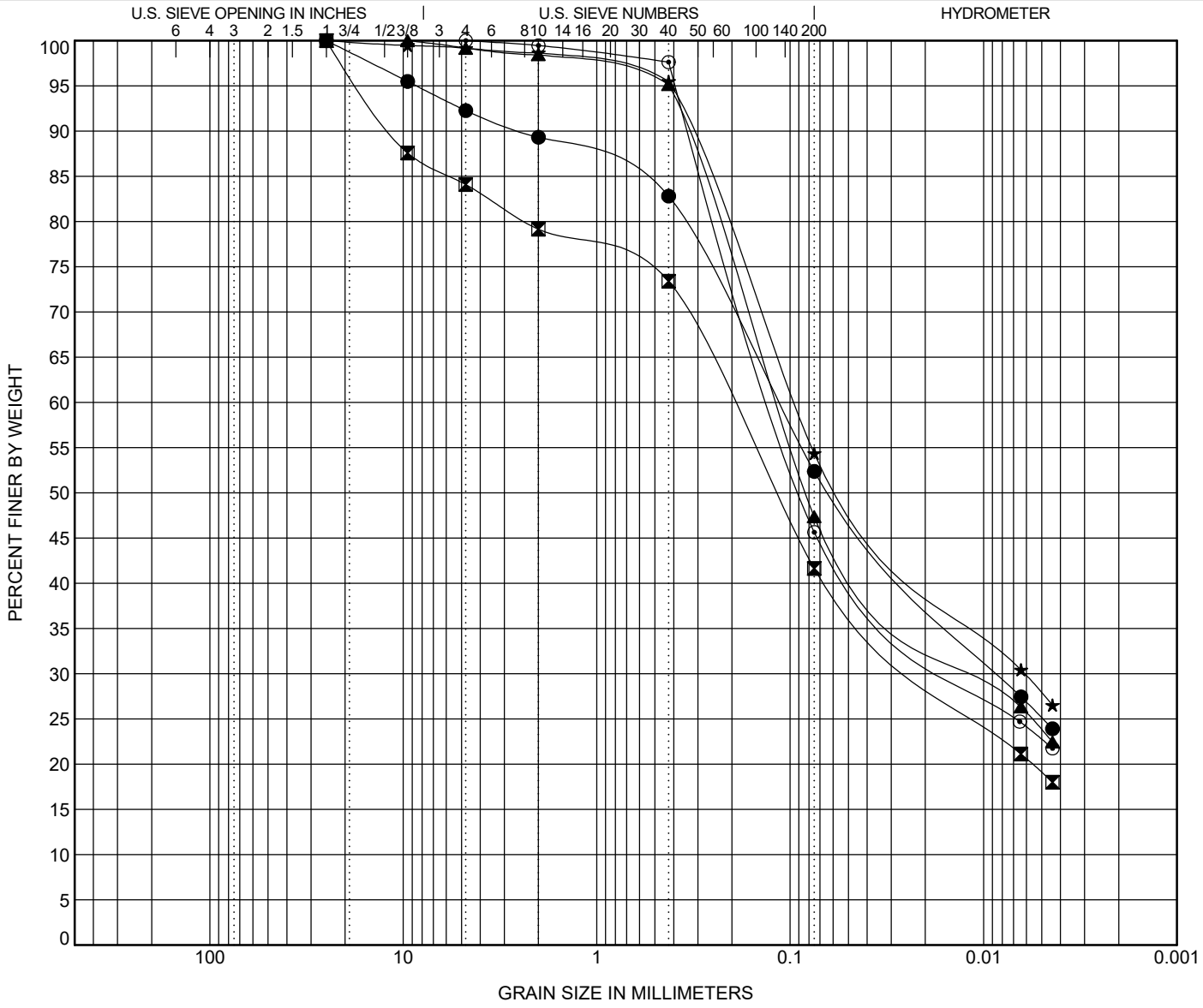
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
●	8+0000	1.1	A-6 (7)	CL	36	16	20		
⊠	8+1000	1.1	A-6 (3)	SC	34	17	17		
▲	8+2000	1.3	A-6 (4)	SC	32	17	15		
★	8+3000	1.2	A-7-6 (11)	CL	44	17	27		
⊙	8+4000	1.2	A-7-6 (6)	SC	41	18	23		

	BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
●	8+0000	1.1	25	0.059	0.008		7.7	39.9	52.4	
⊠	8+1000	1.1	25	0.118	0.019		15.9	42.5	41.6	
▲	8+2000	1.3	9.5	0.083	0.01		0.8	51.8	47.3	
★	8+3000	1.2	25	0.048	0.006		0.8	44.8	54.4	
⊙	8+4000	1.2	4.75	0.087	0.012		0.0	54.4	45.6	

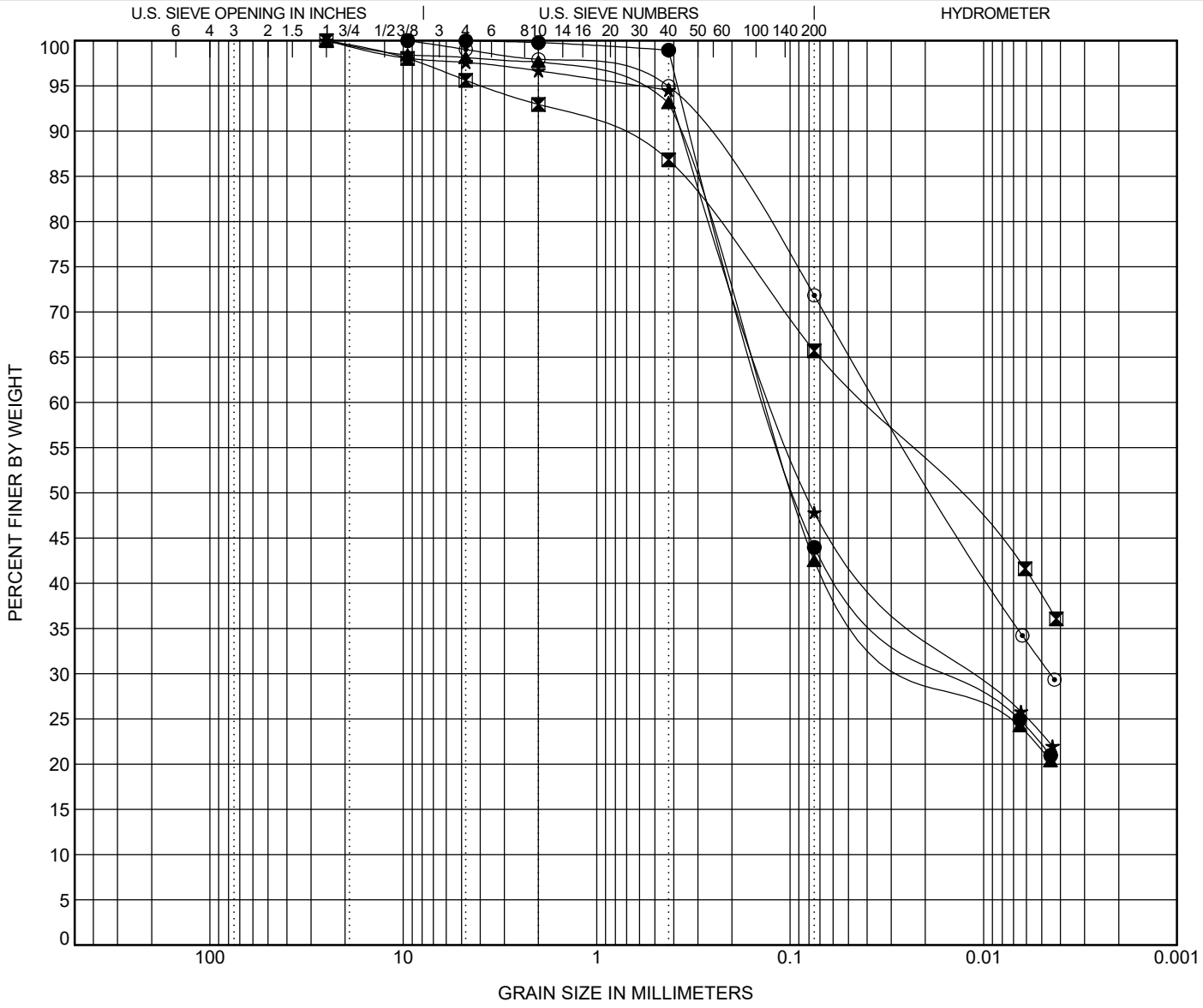
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
● 9+0000	1.3	A-7-6 (5)	SC	43	21	22		
⊠ 9+1000	1.0	A-7-6 (18)	CL	48	17	31		
▲ 9+2000	1.1	A-6 (4)	SC	37	18	19		
★ 9+3000	1.0	A-6 (5)	SC	34	16	18		
⊙ 9+4000	1.0	A-6 (10)	CL	33	17	16		

BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
● 9+0000	1.3	9.5	0.091	0.012		0.0	56.0	44.0	
⊠ 9+1000	1.0	25	0.015			4.4	29.9	65.7	
▲ 9+2000	1.1	25	0.097	0.014		1.9	55.6	42.5	
★ 9+3000	1.0	25	0.081	0.01		2.4	49.8	47.8	
⊙ 9+4000	1.0	9.5	0.018	0.005		1.0	27.2	71.8	

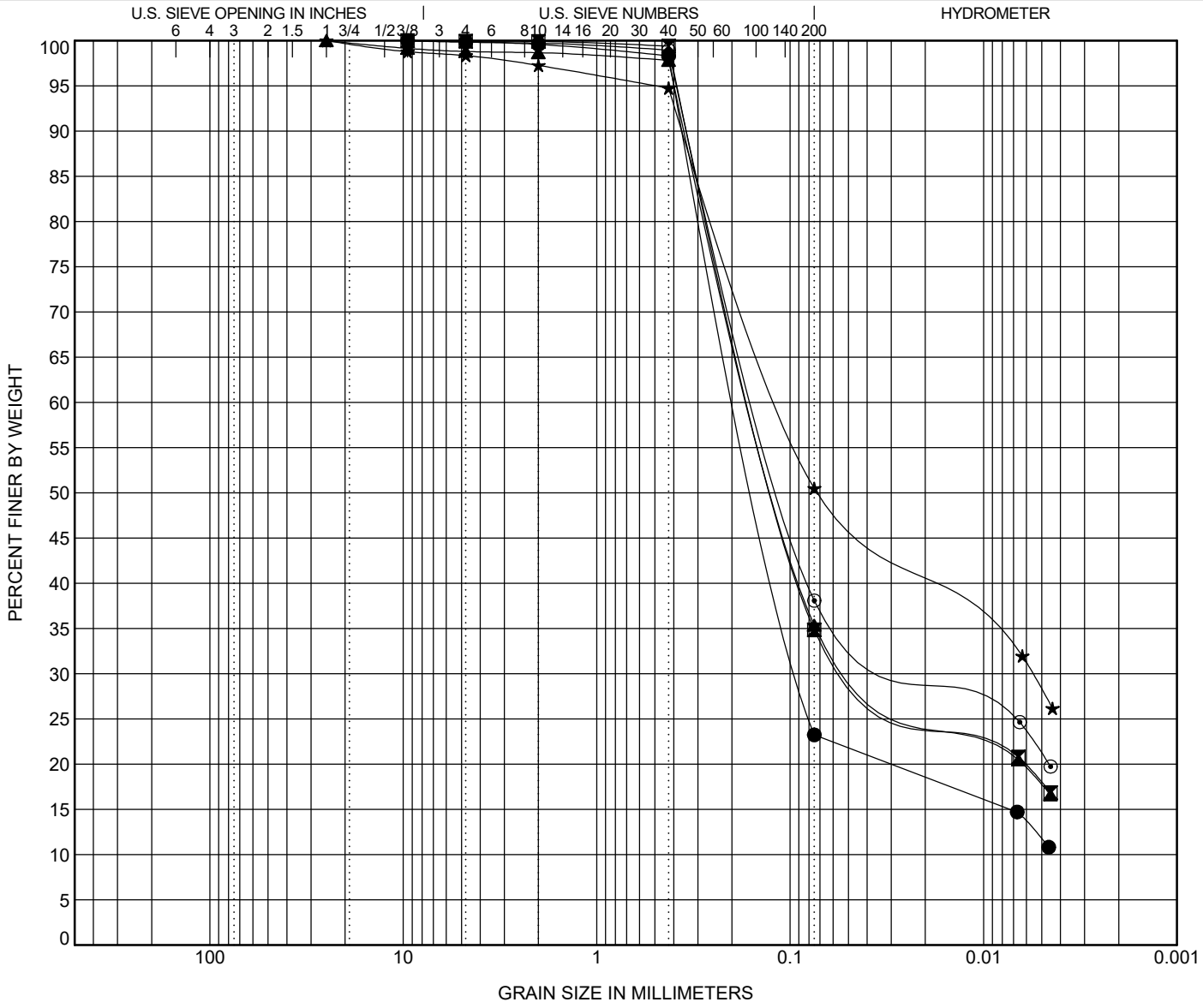
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
● 10+0000	1.1	A-2-4 (0)	SM	NP	NP	NP		
⊠ 10+1000	1.1	A-2-4 (0)	SC	30	20	10		
▲ 10+2000	1.1	A-2-4 (0)	SC-SM	28	21	7		
★ 10+3000	1.3	A-6 (8)	CL	39	16	23		
⊙ 10+4000	1.2	A-6 (1)	SC	32	19	13		

BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
● 10+0000	1.1	9.5	0.139	0.088	0.007	0.1	76.6	23.2	
⊠ 10+1000	1.1	9.5	0.113	0.032		0.1	65.1	34.9	
▲ 10+2000	1.1	25	0.113	0.031		1.2	63.4	35.4	
★ 10+3000	1.3	25	0.07	0.006		1.7	47.8	50.5	
⊙ 10+4000	1.2	9.5	0.105	0.017		0.2	61.7	38.1	

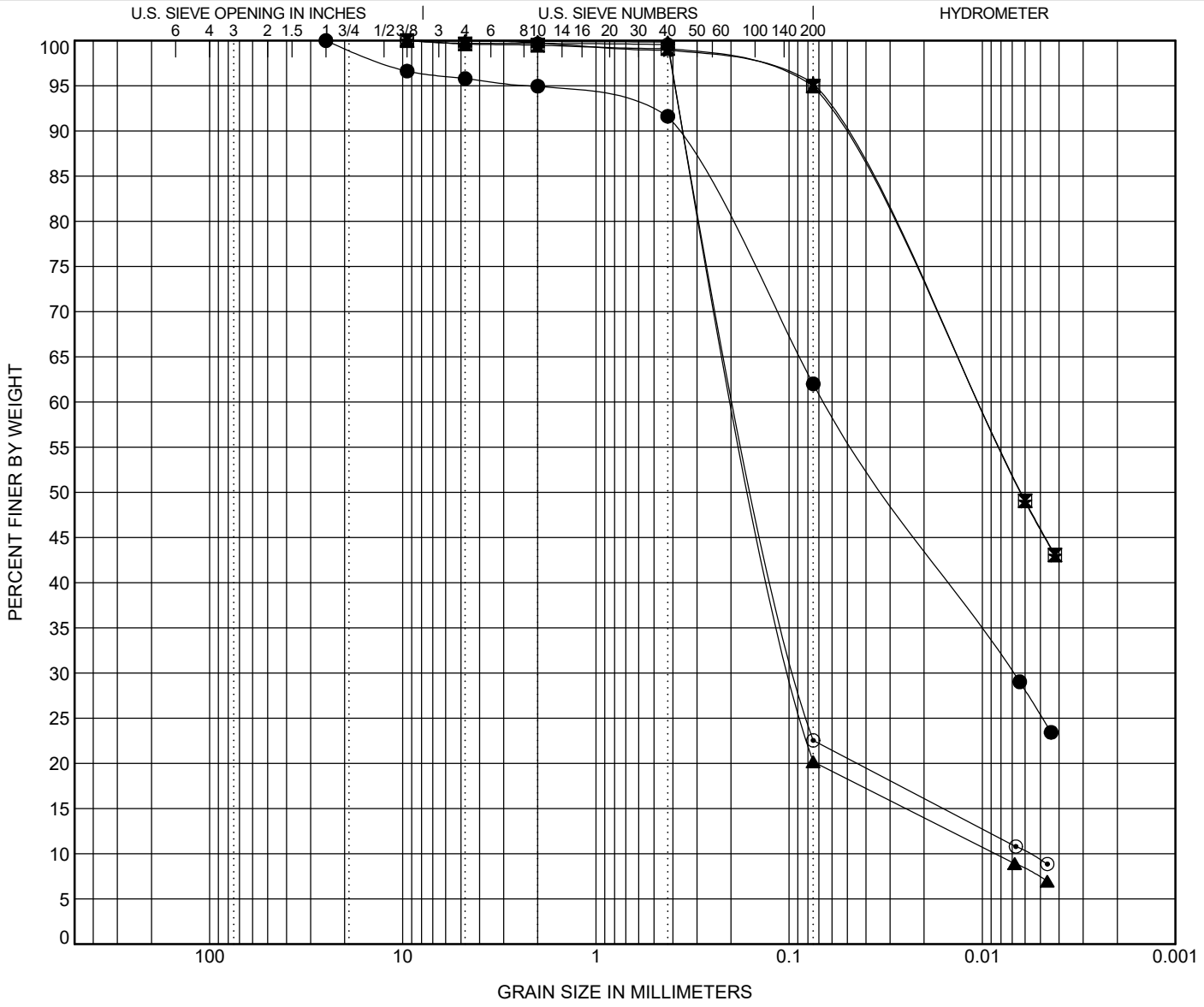
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BISMARCK, ND 58504

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PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
●	11+0000	1.1	A-6 (9)	CL	36	17	19		
⊠	11+1000	1.0	A-7-6 (48)	CH	68	23	45		
▲	11+1000	7.0	A-2-4 (0)	SM	NP	NP	NP	5.64	20.82
★	11+1200	1.2	A-7-6 (40)	CH	58	20	38		
⊙	11+1200	7.0	A-2-4 (0)	SM	NP	NP	NP	7.87	30.39

	BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
●	11+0000	1.1	25	0.031	0.007		4.2	33.8	62.0	
⊠	11+1000	1.0	9.5	0.006			0.4	4.6	95.0	
▲	11+1000	7.0	9.5	0.144	0.093	0.025	0.0	79.8	20.2	
★	11+1200	1.2	9.5	0.006			0.0	4.7	95.3	
⊙	11+1200	7.0	9.5	0.139	0.089	0.016	0.3	77.1	22.5	

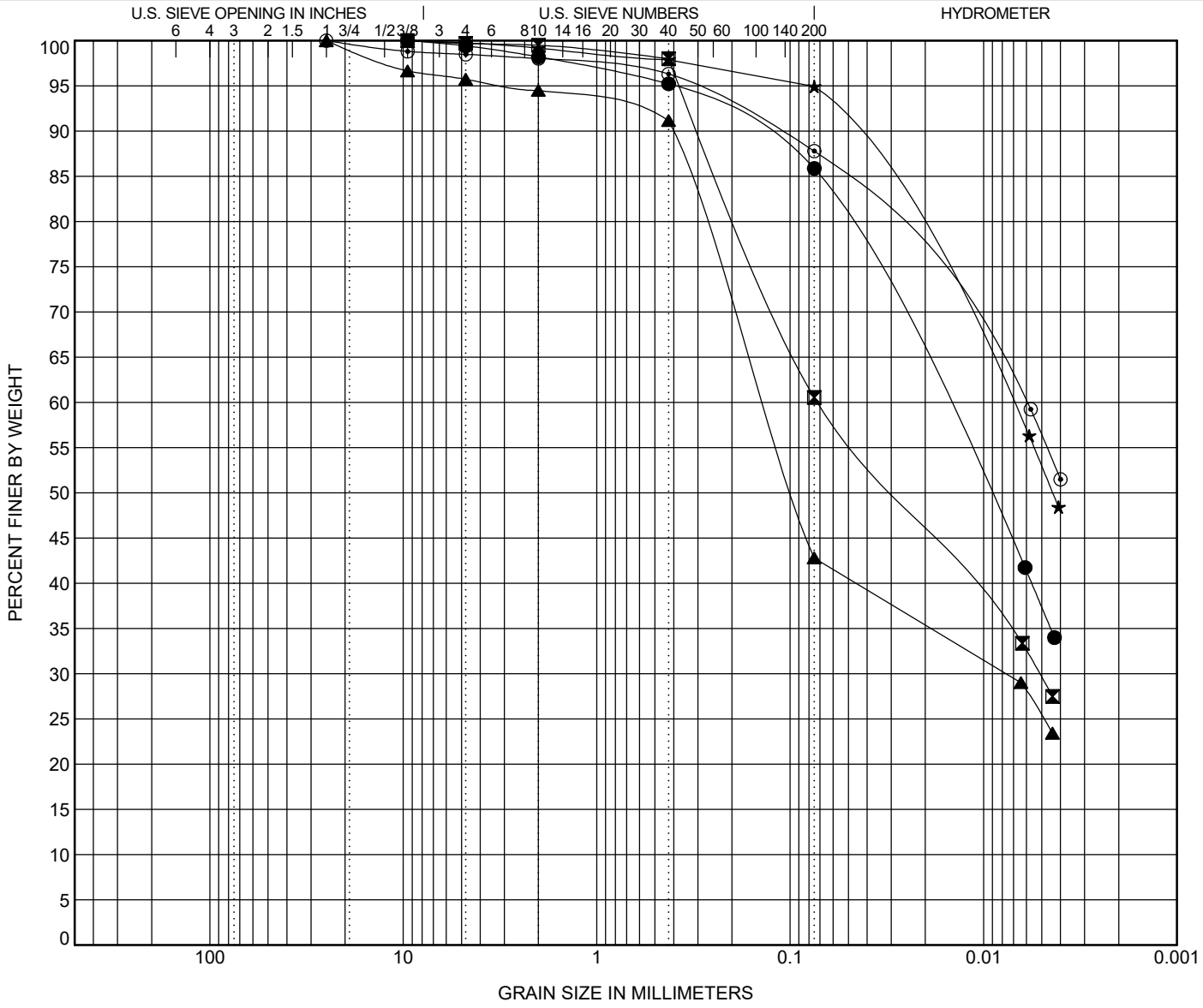
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PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
● 11+1450	1.1	A-7-6 (32)	CH	54	19	35		
⊠ 11+2000	1.1	A-6 (11)	CL	40	17	23		
▲ 11+3000	1.1	A-6 (5)	SC	38	16	22		
★ 11+4000	1.1	A-7-6 (42)	CH	60	20	40		
⊙ 12+0000	1.1	A-7-6 (34)	CH	56	20	36		

BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
● 11+1450	1.1	9.5	0.01			0.6	13.5	85.9	
⊠ 11+2000	1.1	9.5	0.029	0.005		0.3	39.2	60.5	
▲ 11+3000	1.1	25	0.097	0.008		4.3	52.9	42.8	
★ 11+4000	1.1	9.5	0.004			0.3	4.8	94.9	
⊙ 12+0000	1.1	25				1.5	10.7	87.8	

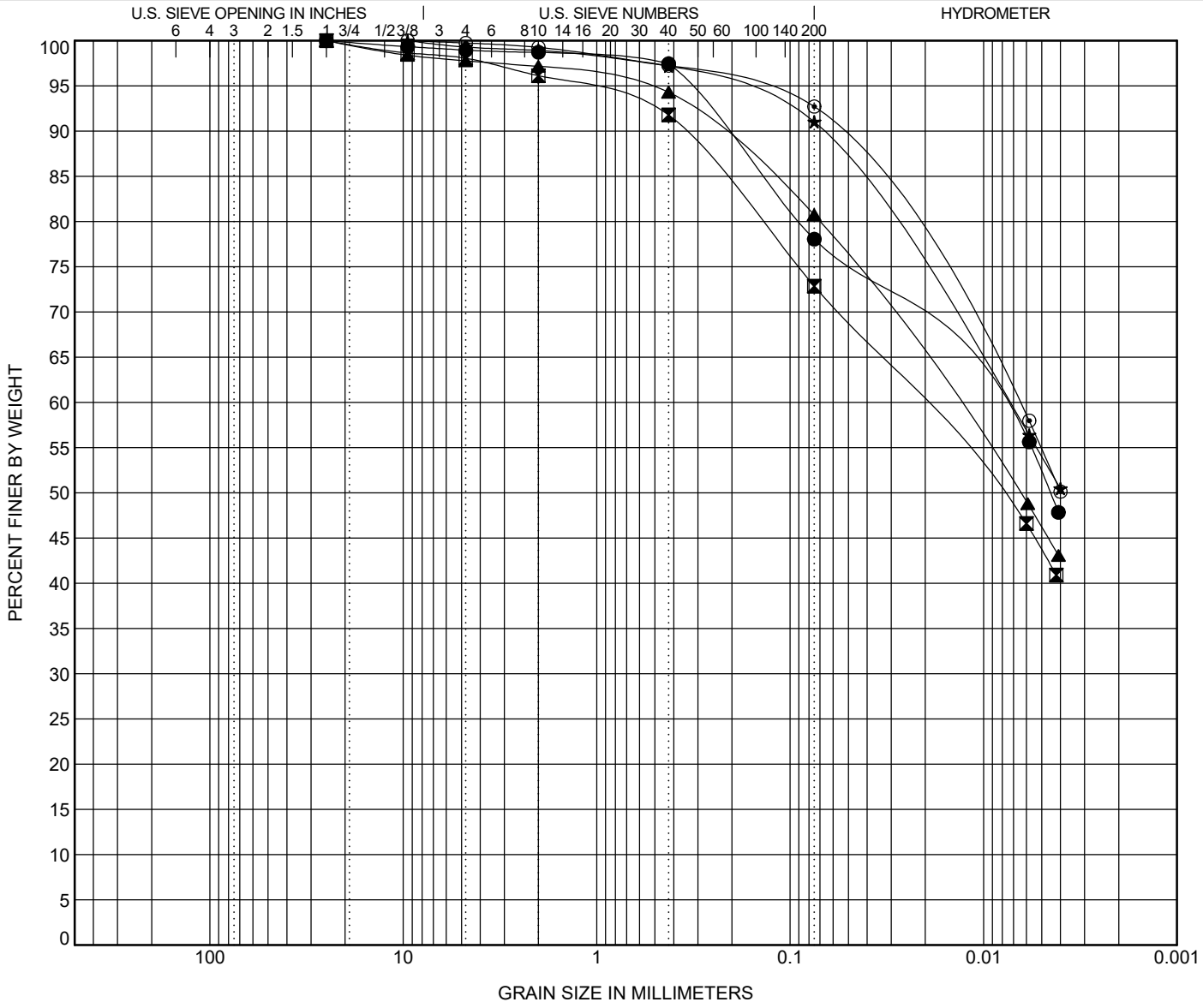
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
● 12+1000	1.1	A-7-6 (21)	CL	44	16	28		
⊠ 12+2000	1.2	A-7-6 (18)	CL	43	16	27		
▲ 12+3000	1.0	A-7-6 (22)	CL	46	18	28		
★ 12+4000	1.0	A-4 (4)	CL	20	12	8		
⊙ 13+0000	1.3	A-7-6 (42)	CH	62	21	41		

BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
● 12+1000	1.1	25	0.005			1.1	20.9	78.1	
⊠ 12+2000	1.2	25	0.008			1.9	25.2	72.9	
▲ 12+3000	1.0	25	0.006			2.2	17.0	80.7	
★ 12+4000	1.0	9.5				0.7	8.3	91.0	
⊙ 13+0000	1.3	9.5				0.3	7.0	92.7	

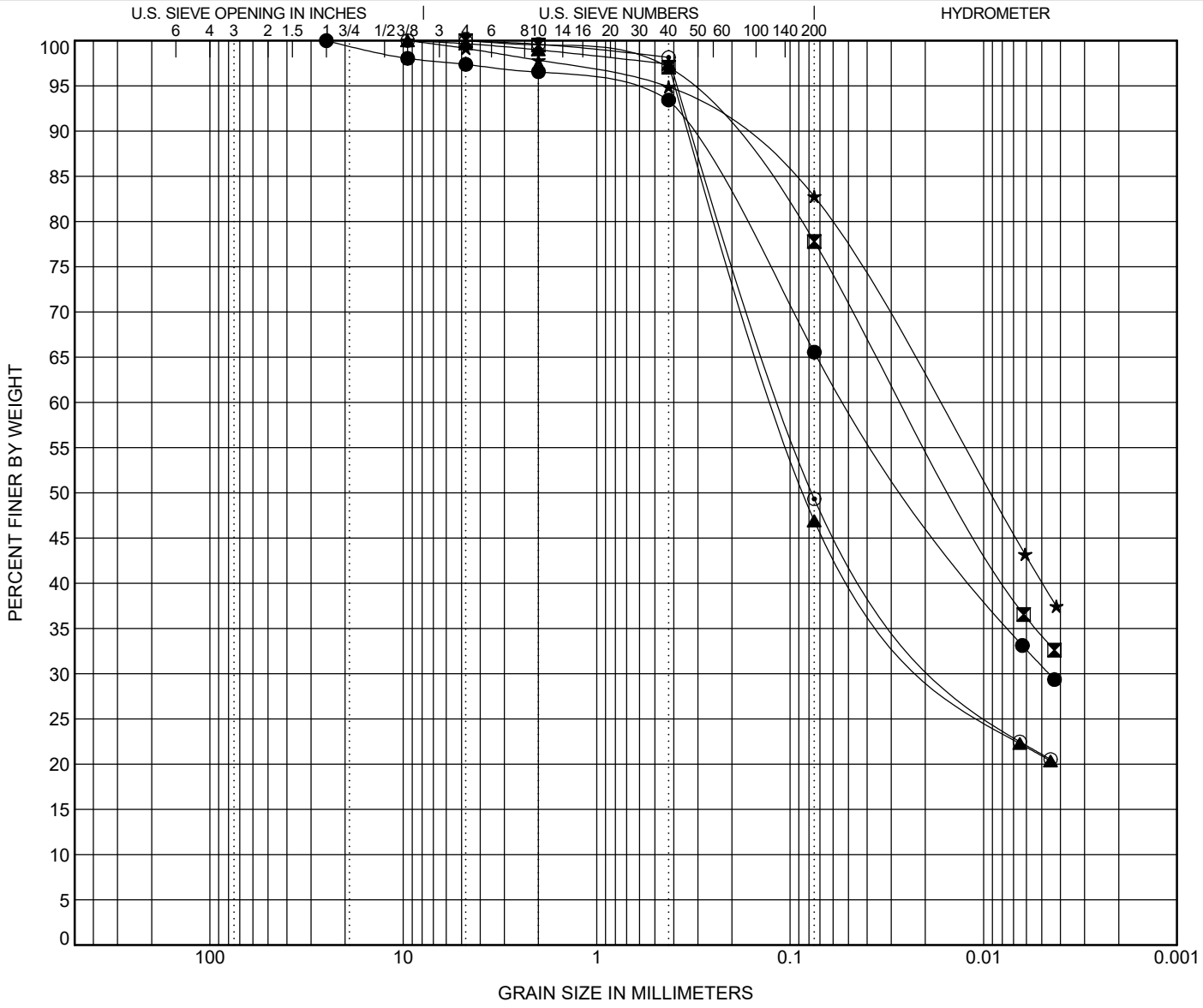
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NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
●	13+1000	1.2	A-6 (12)	CL	38	17	21		
⊠	13+2000	1.3	A-7-6 (21)	CL	47	19	28		
▲	13+3000	1.2	A-6 (2)	SC	25	14	11		
★	13+4000	1.4	A-6 (14)	CL	34	15	19		
⊙	14+0000	1.2	A-4 (1)	SC	23	15	8		

	BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
●	13+1000	1.2	25	0.023	0.005		2.6	31.8	65.6	
⊠	13+2000	1.3	4.75	0.014			0.0	22.2	77.8	
▲	13+3000	1.2	9.5	0.083	0.014		0.3	52.8	46.9	
★	13+4000	1.4	9.5	0.009			0.9	16.4	82.8	
⊙	14+0000	1.2	9.5	0.077	0.013		0.1	50.6	49.3	

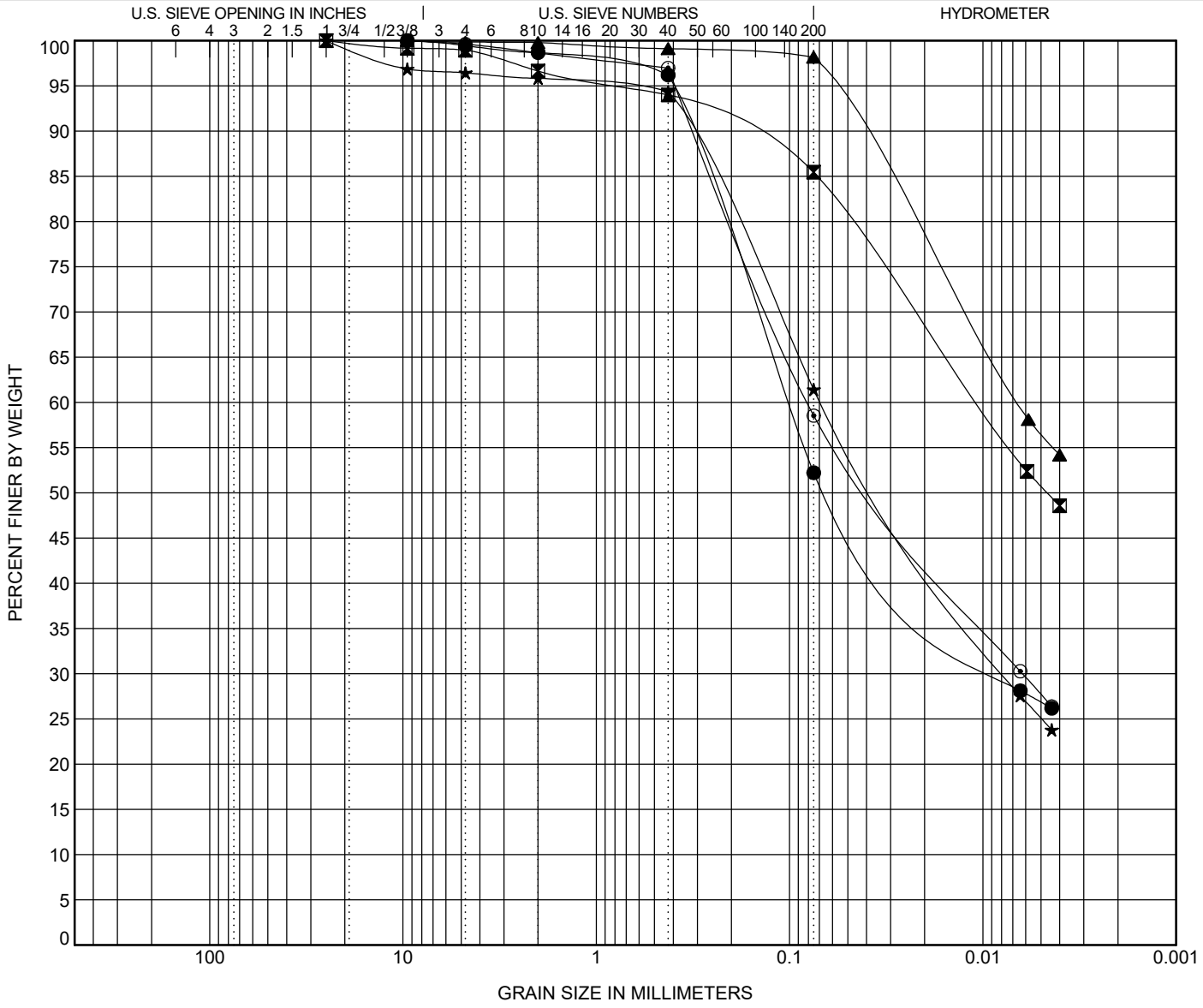
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
●	14+1000	1.5	A-6 (3)	CL	25	13	12		
⊠	14+2000	1.5	A-7-6 (20)	CL	41	17	24		
▲	14+3000	1.3	A-7-6 (27)	CL	43	17	26		
★	14+4000	1.2	A-6 (6)	CL	30	16	14		
⊙	15+0000	1.1	A-6 (5)	CL	30	16	14		

	BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
●	14+1000	1.5	9.5	0.06	0.008		0.6	47.2	52.2	
⊠	14+2000	1.5	25	0.005			1.0	13.5	85.5	
▲	14+3000	1.3	9.5				0.2	1.7	98.2	
★	14+4000	1.2	25	0.033	0.008		3.6	35.0	61.4	
⊙	15+0000	1.1	9.5	0.036	0.006		0.4	41.1	58.5	

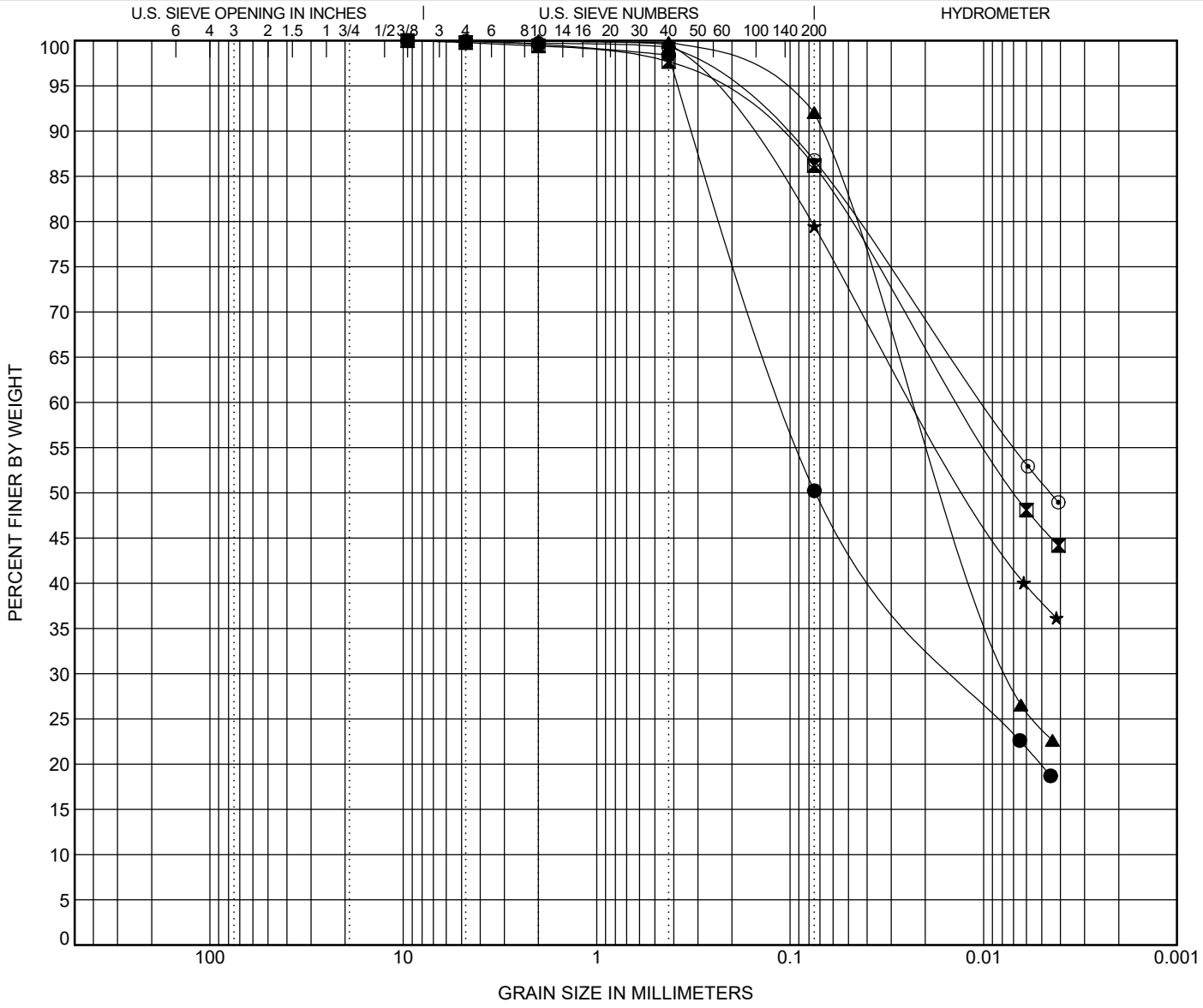
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
●	15+1000	1.3	A-4 (1)	CL-ML	24	17	7		
⊠	15+1925	1.1	A-6 (18)	CL	40	19	21		
▲	15+1925	7.0	A-4 (0)	ML	NP	NP	NP		
★	15+2450	1.1	A-6 (9)	CL	30	16	14		
⊙	15+2450	6.0	A-7-6 (24)	CL	47	20	27		

	BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
●	15+1000	1.3	9.5	0.073	0.012		0.1	49.7	50.2	
⊠	15+1925	1.1	9.5	0.007			0.2	13.6	86.2	
▲	15+1925	7.0	4.75	0.015	0.007		0.0	8.0	92.0	
★	15+2450	1.1	4.75	0.012			0.0	20.5	79.5	
⊙	15+2450	6.0	9.5	0.005			0.0	13.2	86.8	

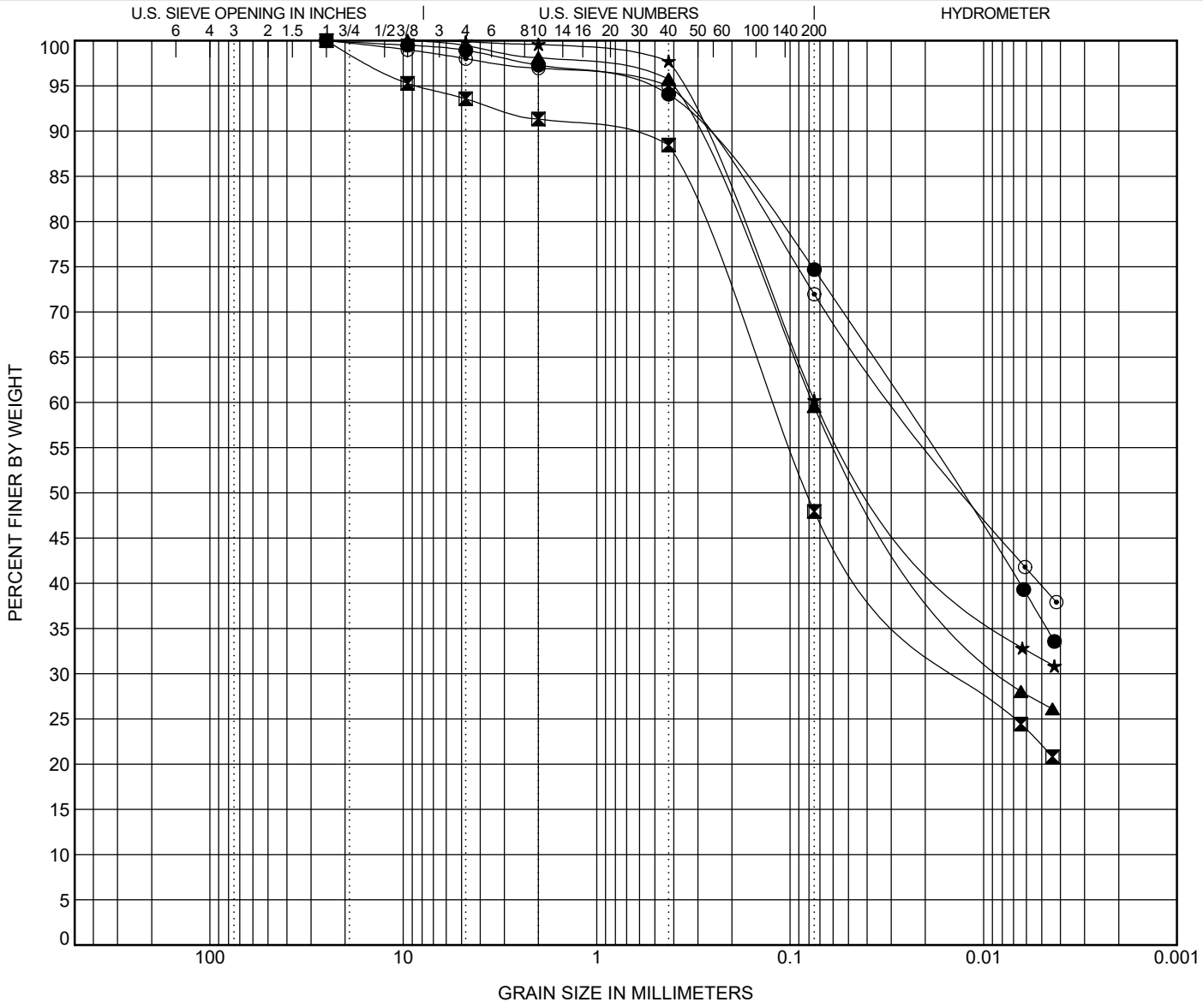
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BISMARCK, ND 58504

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PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
●	15+2625	1.0	A-6 (12)	CL	35	16	19		
⊠	15+2625	5.0	A-6 (2)	SC	27	16	11		
▲	15+3000	1.0	A-6 (6)	CL	31	16	15		
★	15+4000	1.1	A-6 (6)	CL	30	16	14		
⊙	16+0000	1.1	A-6 (15)	CL	40	17	23		

	BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
●	15+2625	1.0	25	0.013			1.1	24.3	74.7	
⊠	15+2625	5.0	25	0.082	0.011		6.4	45.6	47.9	
▲	15+3000	1.0	9.5	0.036	0.007		0.5	39.9	59.5	
★	15+4000	1.1	9.5	0.03			0.1	39.6	60.3	
⊙	16+0000	1.1	25	0.012			2.0	26.0	72.0	

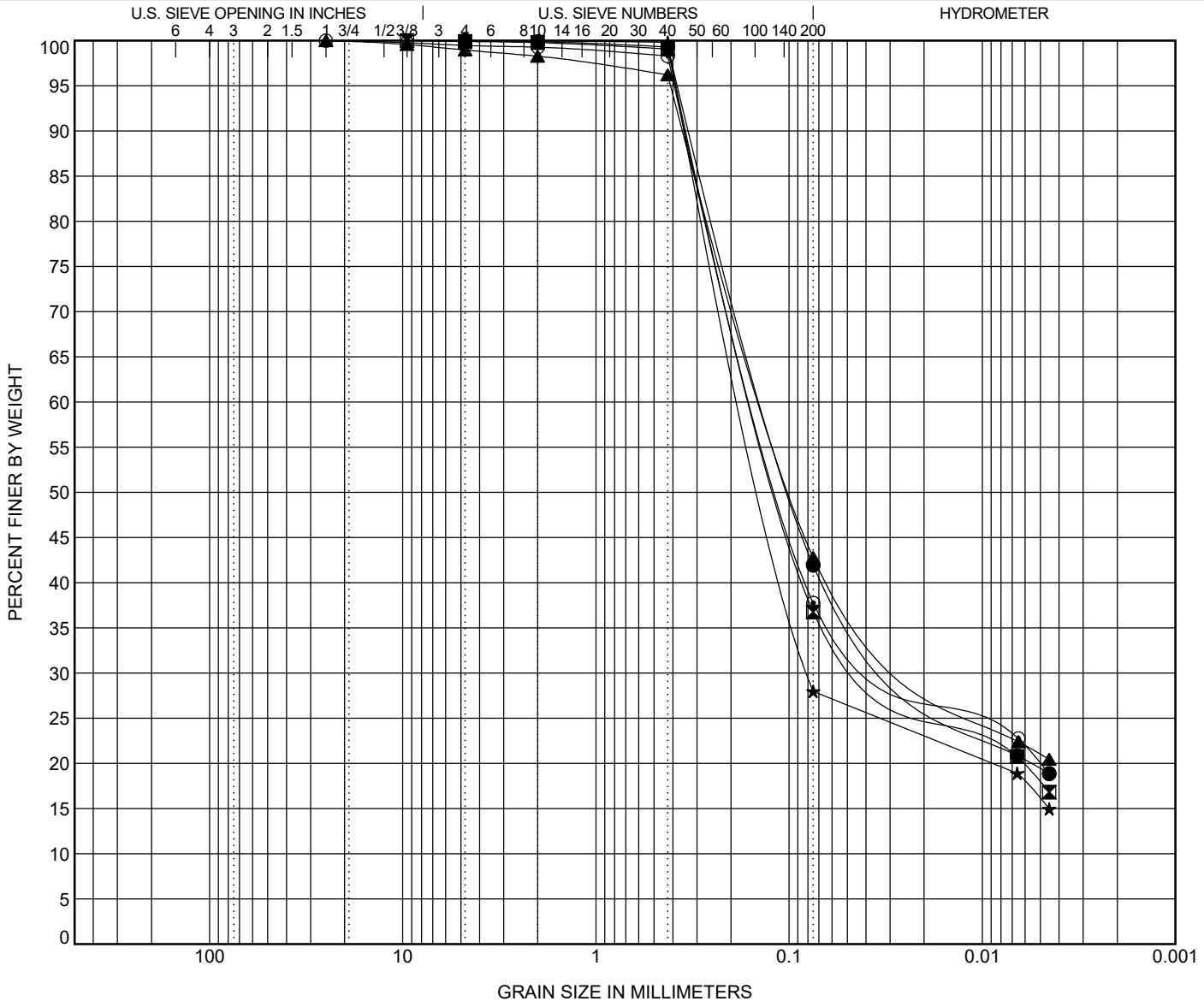
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
●	16+1000	1.2	A-4 (0)	SC	24	16	8		
⊠	16+2000	1.1	A-4 (0)	SC	27	19	8		
▲	16+3000	1.1	A-6 (2)	SC	31	19	12		
★	16+4000	1.1	A-2-4 (0)	SM	NP	NP	NP		
⊙	17+0000	1.1	A-4 (0)	SC	30	21	9		

	BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
●	16+1000	1.2	4.75	0.096	0.019		0.0	58.1	41.9	
⊠	16+2000	1.1	9.5	0.108	0.027		0.1	63.2	36.7	
▲	16+3000	1.1	25	0.095	0.016		1.0	56.2	42.8	
★	16+4000	1.1	2	0.128	0.079	0.005	0.0	72.0	28.0	
⊙	17+0000	1.1	25	0.106	0.021		0.5	61.7	37.8	

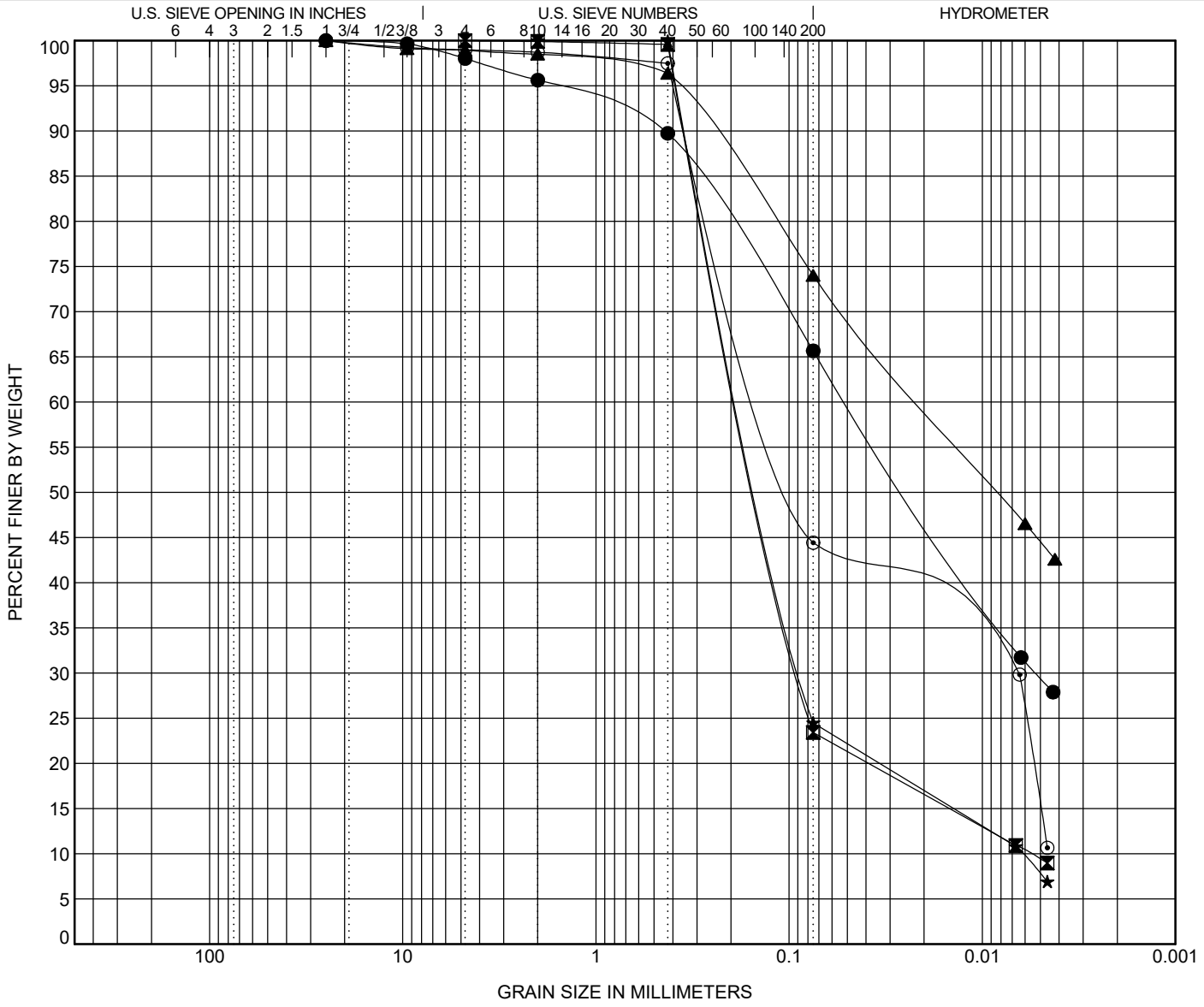
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PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
●	17+1000	1.2	A-7-6 (13)	CL	42	19	23		
⊠	17+2000	1.1	A-2-4 (0)	SM	NP	NP	NP	7.83	30.72
▲	17+3000	0.8	A-7-6 (21)	CH	50	21	29		
★	17+4000	1.1	A-2-4 (0)	SM	NP	NP	NP	6.89	27.37
⊙	18+0000	1.0	A-6 (2)	SC	33	22	11		

	BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
●	17+1000	1.2	25	0.024	0.005		2.0	32.4	65.7	
⊠	17+2000	1.1	4.75	0.137	0.087	0.015	0.0	76.6	23.4	
▲	17+3000	0.8	25	0.008			1.1	24.9	74.0	
★	17+4000	1.1	2	0.135	0.085	0.014	0.0	75.5	24.5	
⊙	18+0000	1.0	25	0.09	0.007	0.005	1.0	54.6	44.4	

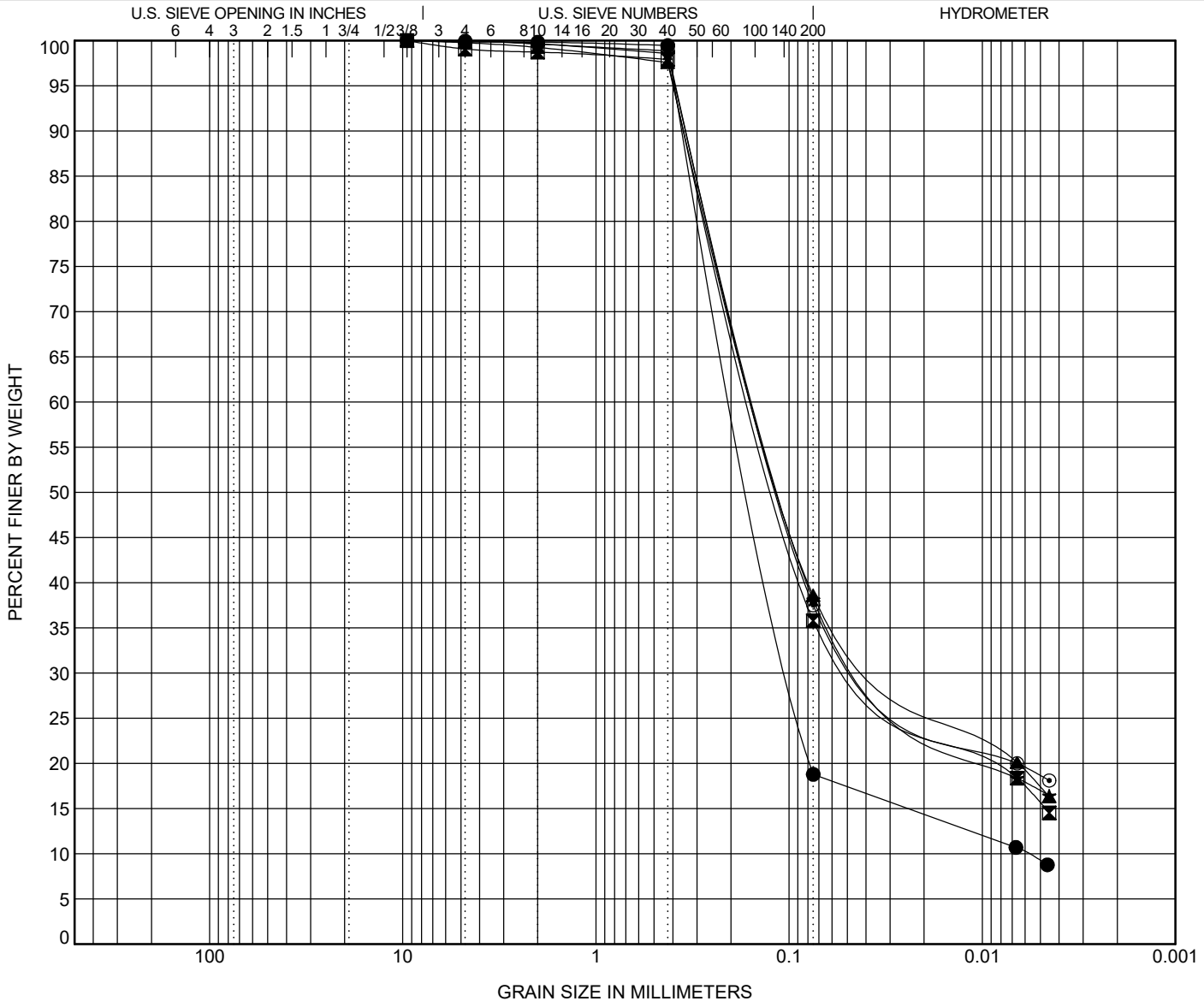
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
●	18+1000	1.0	A-2-4 (0)	SM	NP	NP	NP	8.56	31.12
⊠	18+2000	0.9	A-4 (0)	SM	NP	NP	NP		
▲	18+3000	1.1	A-4 (0)	SC	28	20	8		
★	18+4000	1.1	A-4 (0)	SM	21	19	2		
⊙	19+0000	1.1	A-4 (0)	SC	28	20	8		

	BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
●	18+1000	1.0	9.5	0.147	0.095	0.024	0.2	81.1	18.8	
⊠	18+2000	0.9	9.5	0.112	0.033	0.005	0.9	63.3	35.8	
▲	18+3000	1.1	9.5	0.105	0.024		0.2	61.2	38.6	
★	18+4000	1.1	4.75	0.106	0.028		0.0	61.9	38.1	
⊙	19+0000	1.1	9.5	0.107	0.026		0.0	62.5	37.5	

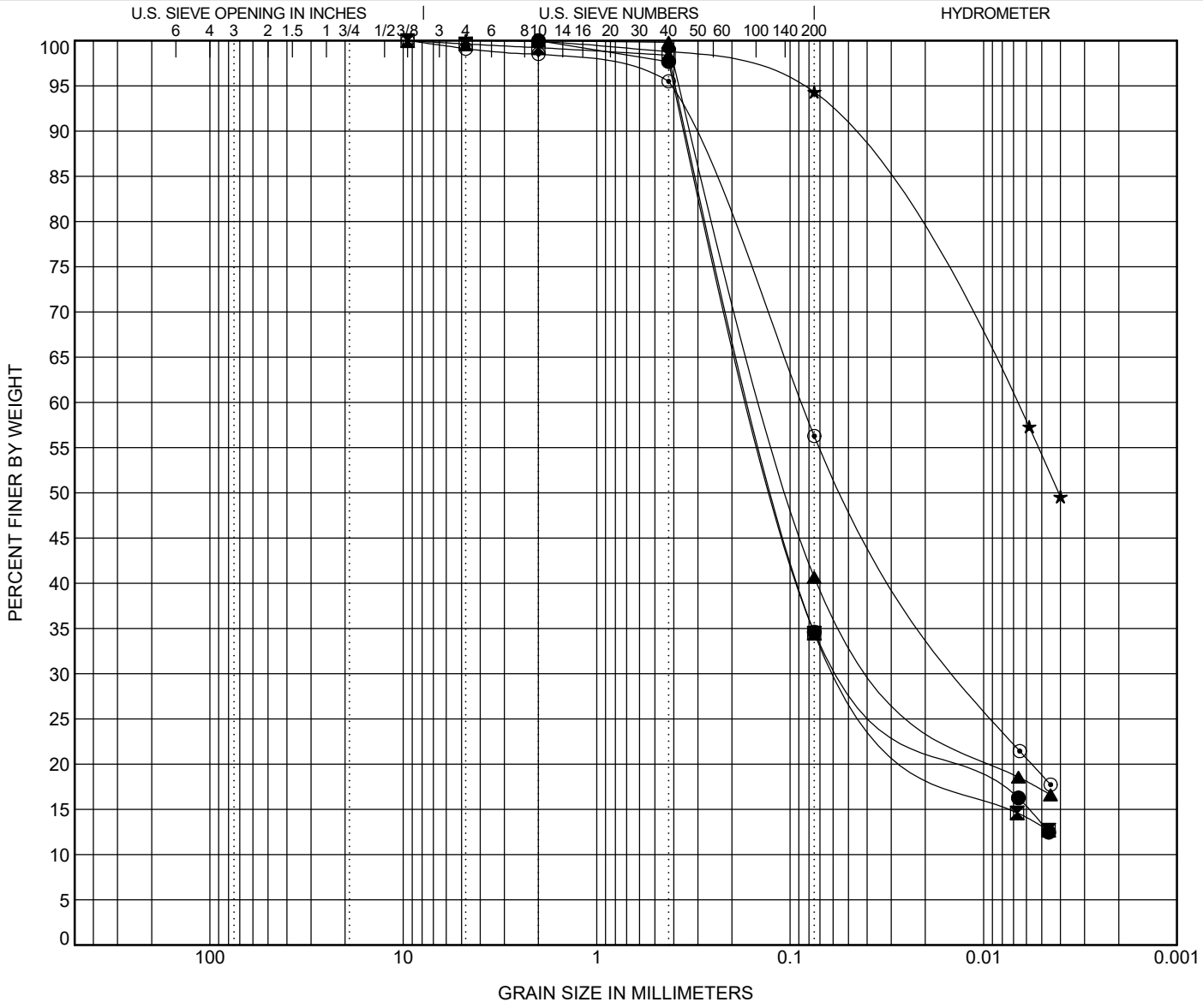
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
● 19+1000	1.2	A-2-4 (0)	SM	38	31	7		
⊠ 19+2000	1.1	A-2-4 (0)	SC-SM	26	20	6		
▲ 19+3000	1.1	A-4 (1)	SC	31	21	10		
★ 19+4000	1.2	A-7-6 (24)	CL	43	19	24		
⊙ 20+0000	1.2	A-4 (2)	CL	25	16	9		

BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
● 19+1000	1.2	2	0.115	0.041	0.006	0.0	65.4	34.6	
⊠ 19+2000	1.1	9.5	0.114	0.043	0.007	0.4	65.1	34.5	
▲ 19+3000	1.1	2	0.099	0.023		0.0	59.3	40.7	
★ 19+4000	1.2	4.75	0.004			0.0	5.7	94.3	
⊙ 20+0000	1.2	9.5	0.048	0.012		0.9	42.8	56.3	

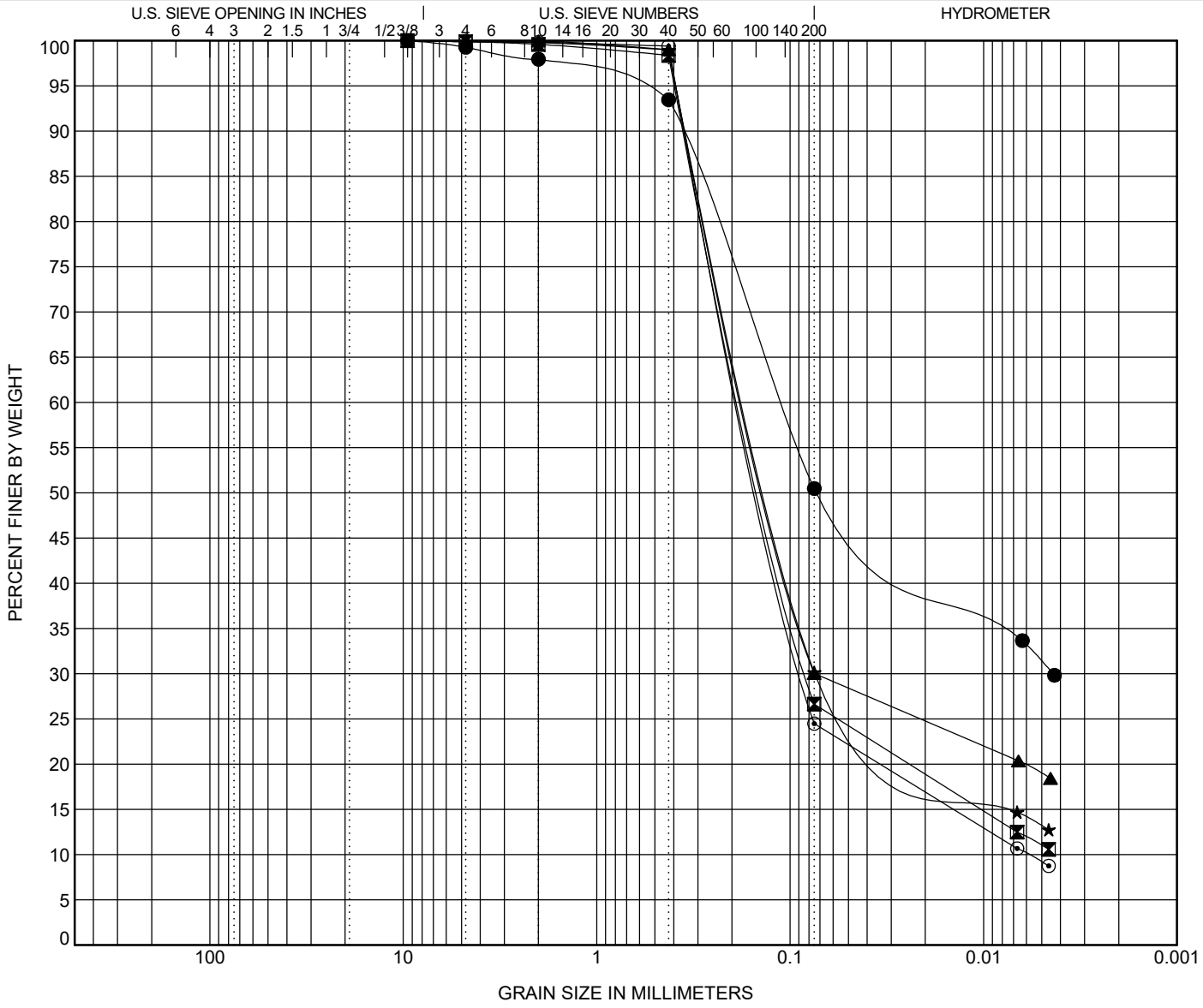
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
●	20+1000	1.1	A-6 (5)	CL	31	14	17		
⊠	20+2000	1.2	A-2-4 (0)	SM	NP	NP	NP		
▲	20+3000	1.2	A-2-4 (0)	SM	20	17	3		
★	20+4000	1.0	A-2-4 (0)	SM	NP	NP	NP		
⊙	21+0000	1.1	A-2-4 (0)	SM	NP	NP	NP	7.24	29.06

	BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
●	20+1000	1.1	9.5	0.07	0.004		0.7	48.8	50.5	
⊠	20+2000	1.2	9.5	0.132	0.081	0.01	0.1	73.3	26.6	
▲	20+3000	1.2	4.75	0.124	0.074		0.0	70.0	30.0	
★	20+4000	1.0	9.5	0.124	0.073	0.007	0.1	69.7	30.2	
⊙	21+0000	1.1	9.5	0.135	0.085	0.014	0.0	75.5	24.5	

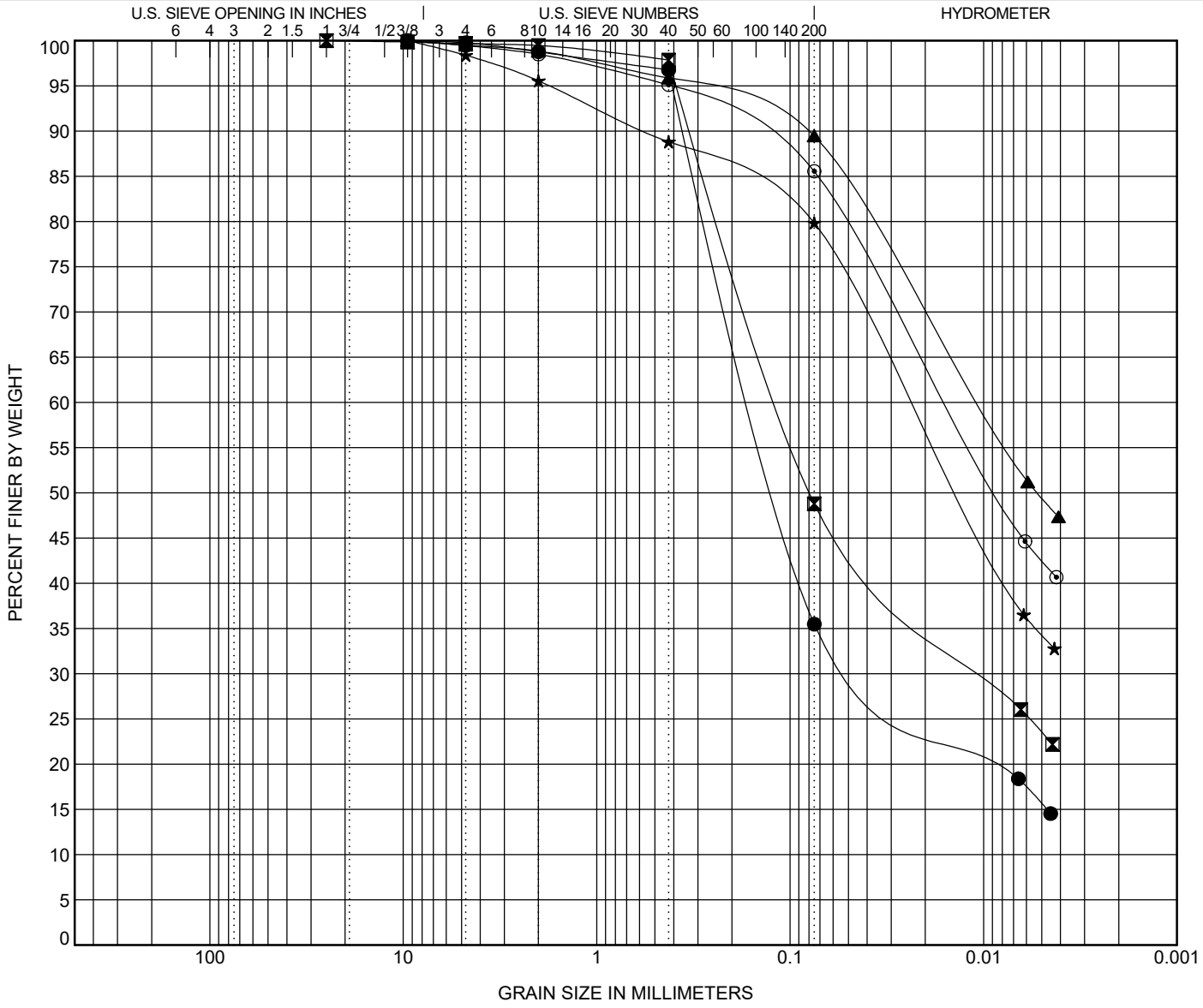
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
●	21+1000	1.1	A-2-4 (0)	SC-SM	28	21	7		
⊠	21+2000	0.9	A-6 (5)	SC	33	16	17		
▲	21+3000	1.1	A-6 (11)	CL	34	23	12		
★	21+4000	1.3	A-7-6 (21)	CL	44	17	27		
⊙	22+0000	1.3	A-7-6 (23)	CL	44	18	26		

	BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
●	21+1000	1.1	9.5	0.113	0.034	0.005	0.2	64.3	35.5	
⊠	21+2000	0.9	25	0.078	0.01		0.3	50.9	48.8	
▲	21+3000	1.1	9.5	0.005			0.5	10.0	89.5	
★	21+4000	1.3	9.5	0.013			1.6	18.5	79.9	
⊙	22+0000	1.3	9.5	0.008			0.6	13.9	85.6	

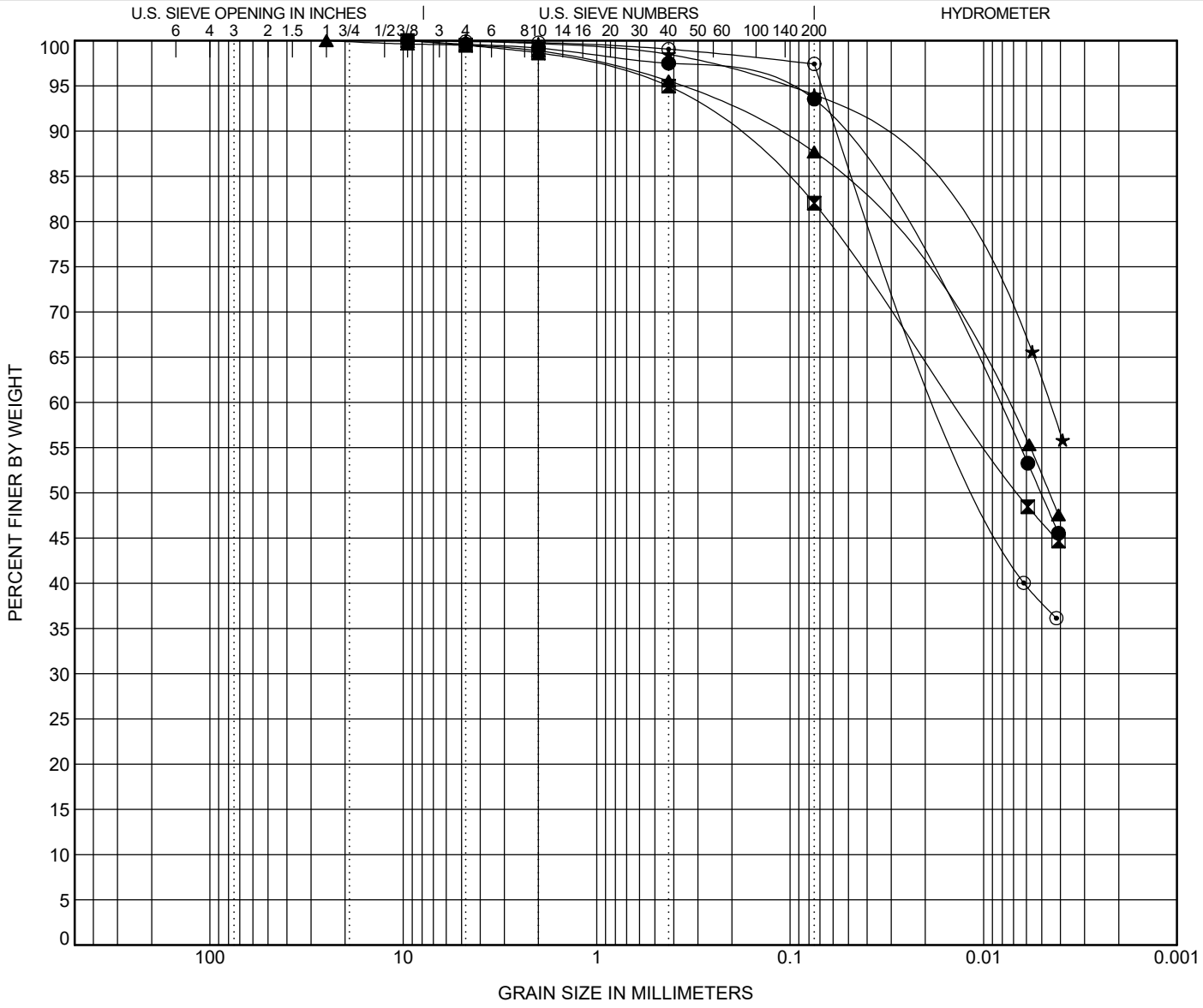
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
● 22+1000	1.6	A-7-6 (33)	CH	51	18	33		
⊠ 22+2000	1.3	A-7-6 (22)	CL	46	19	27		
▲ 22+3000	1.2	A-7-6 (32)	CH	53	19	34		
★ 22+4000	1.2	A-7-6 (36)	CH	56	21	35		
⊙ 23+0000	1.3	A-6 (17)	CL	35	18	17		

BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
● 22+1000	1.6	9.5	0.005			0.4	6.1	93.5	
⊠ 22+2000	1.3	9.5	0.007			0.5	17.4	82.0	
▲ 22+3000	1.2	25	0.005			0.5	11.8	87.7	
★ 22+4000	1.2	4.75				0.0	6.0	94.0	
⊙ 23+0000	1.3	9.5	0.01			0.1	2.5	97.4	

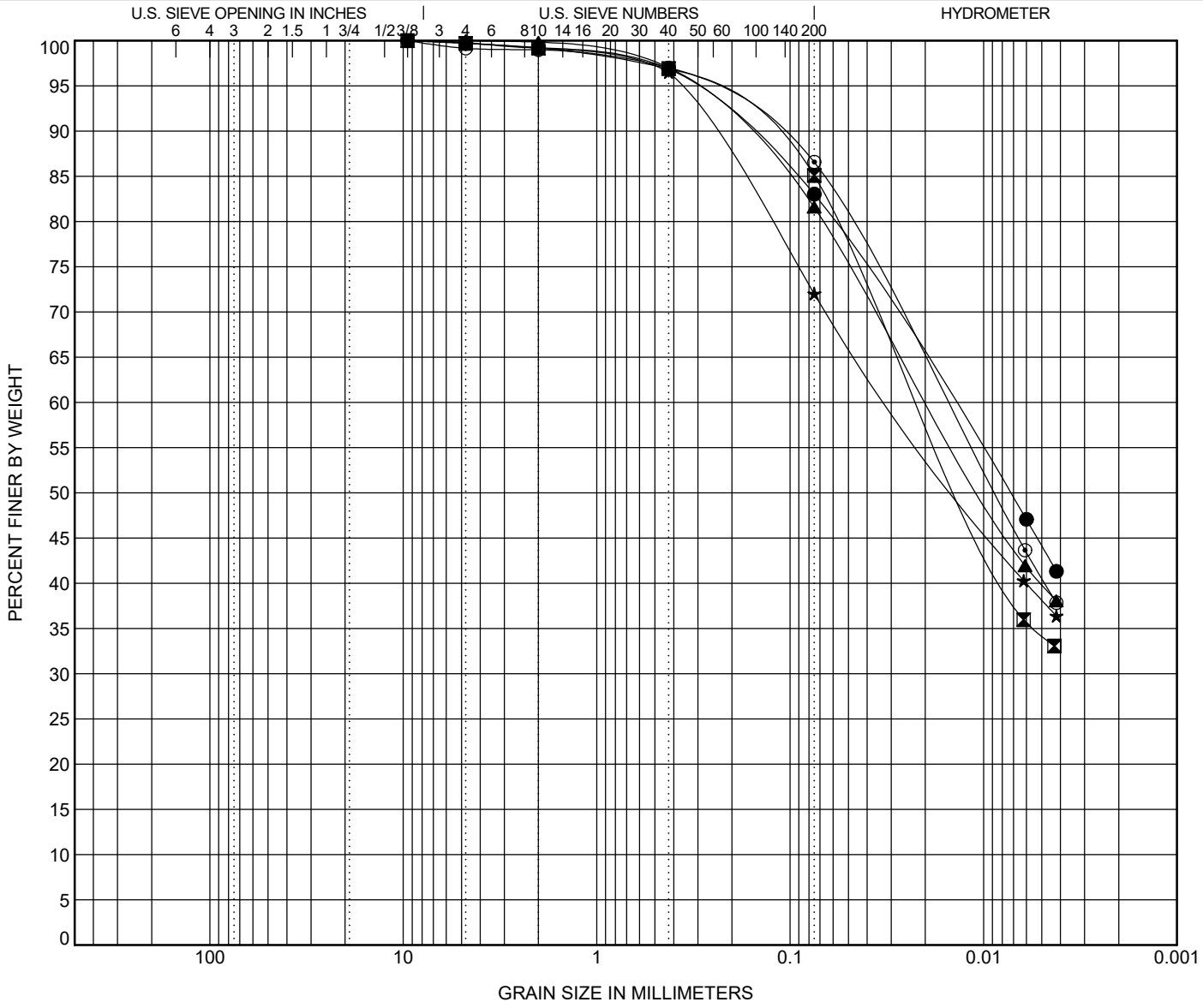
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BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
● 23+1000	1.1	A-7-6 (24)	CL	46	17	29		
⊠ 23+2000	1.2	A-7-6 (25)	CL	46	17	29		
▲ 23+3000	1.1	A-7-6 (25)	CL	48	17	31		
★ 23+4000	1.2	A-6 (14)	CL	38	16	22		
⊙ 23+5088	1.2	A-6 (19)	CL	38	16	22		

BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
● 23+1000	1.1	9.5	0.007			0.3	16.7	83.0	
⊠ 23+2000	1.2	9.5	0.013			0.3	14.6	85.1	
▲ 23+3000	1.1	4.75	0.01			0.0	18.4	81.6	
★ 23+4000	1.2	9.5	0.013			0.2	27.8	72.0	
⊙ 23+5088	1.2	9.5	0.009			0.8	12.6	86.6	

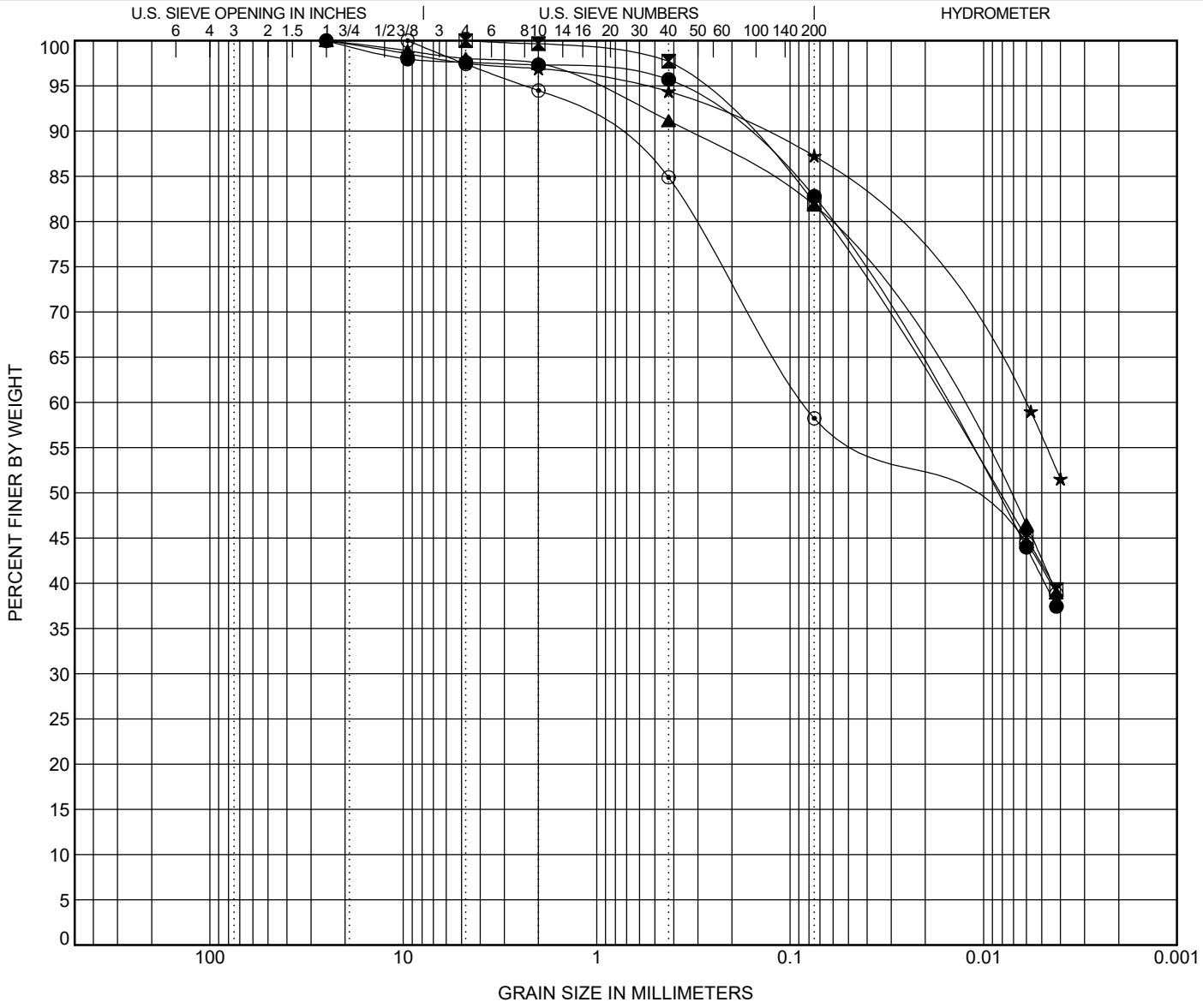
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NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
● 24+1000	1.3	A-6 (14)	CL	35	17	18		
⊠ 24+2000	1.4	A-6 (20)	CL	40	14	26		
▲ 24+3000	1.8	A-6 (17)	CL	39	18	21		
★ 24+4000	1.7	A-7-6 (23)	CL	44	18	26		
⊙ 24+4000	7.0	A-6 (8)	CL	35	15	20		

BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
● 24+1000	1.3	25	0.009			2.4	14.8	82.8	
⊠ 24+2000	1.4	4.75	0.008			0.0	17.9	82.1	
▲ 24+3000	1.8	25	0.008			2.0	16.2	81.8	
★ 24+4000	1.7	25				2.5	10.2	87.3	
⊙ 24+4000	7.0	9.5	0.016			2.6	39.2	58.2	

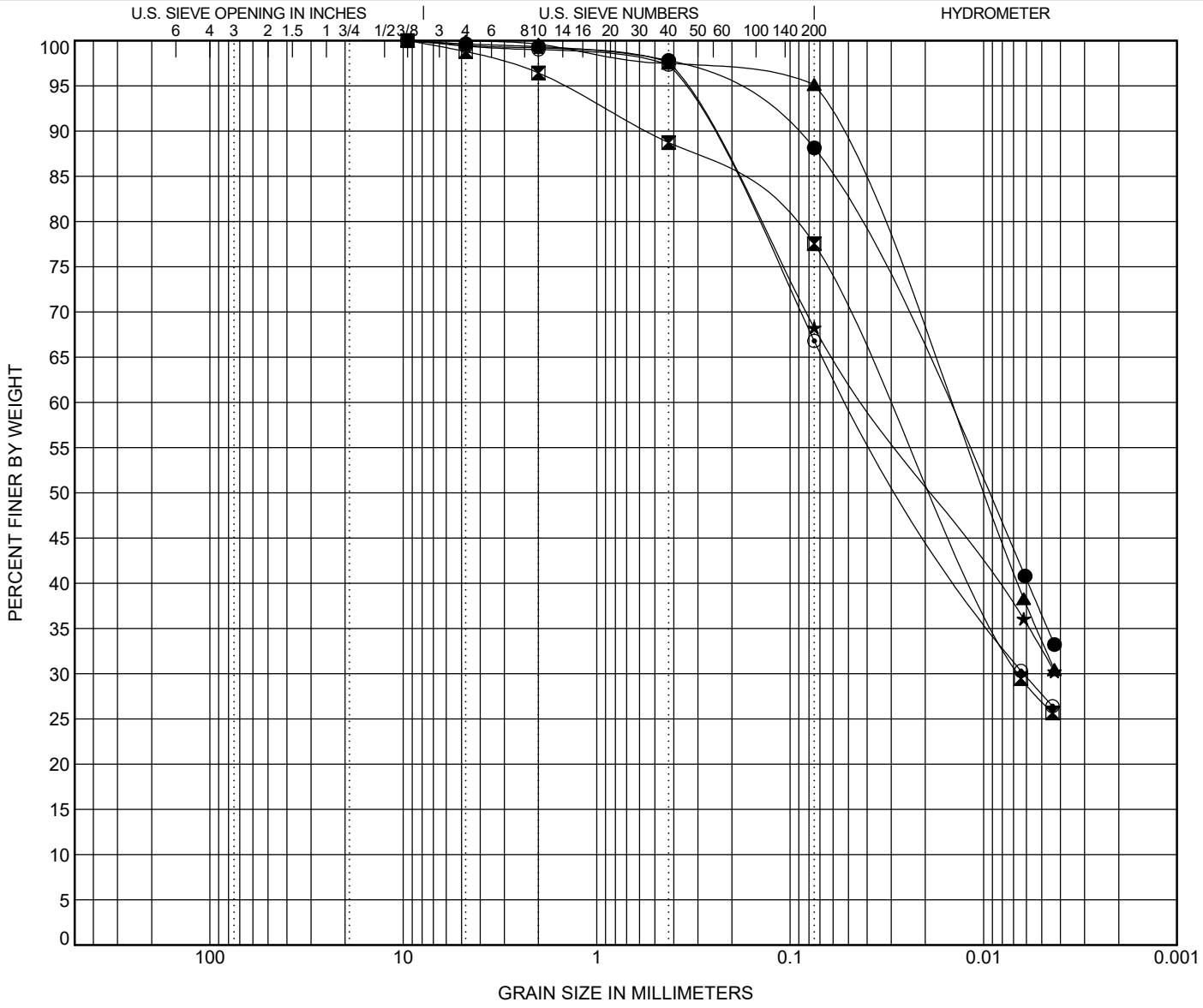
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
● 25+0000	1.3	A-6 (15)	CL	35	17	18		
⊠ 25+1000	1.3	A-6 (8)	CL	31	19	12		
▲ 25+2000	1.4	A-6 (10)	CL	30	19	11		
★ 25+3000	1.0	A-6 (8)	CL	30	15	15		
⊙ 25+4000	0.9	A-4 (4)	CL	26	16	10		

BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
● 25+0000	1.3	9.5	0.01			0.4	11.5	88.1	
⊠ 25+1000	1.3	9.5	0.018	0.007		1.2	21.3	77.5	
▲ 25+2000	1.4	9.5	0.01			0.0	4.8	95.1	
★ 25+3000	1.0	9.5	0.018			0.5	31.2	68.3	
⊙ 25+4000	0.9	9.5	0.024	0.006		0.6	32.6	66.8	

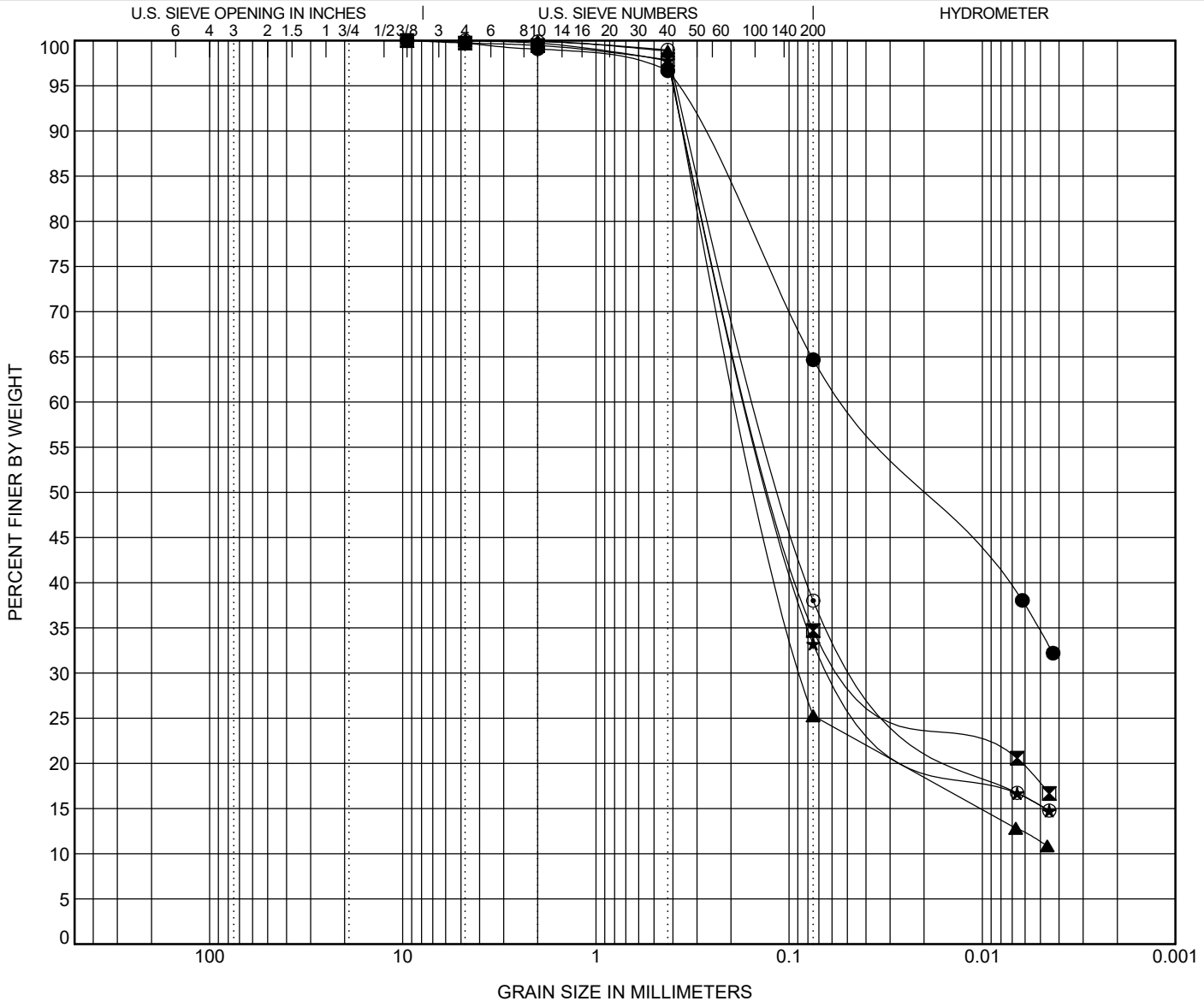
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
●	26+0130	1.2	A-6 (6)	CL	28	14	14		
⊠	26+1000	0.8	A-2-4 (0)	SM	NP	NP	NP		
▲	26+2000	0.9	A-2-4 (0)	SM	NP	NP	NP		
★	26+3000	1.0	A-2-4 (0)	SM	NP	NP	NP		
⊙	26+4000	0.9	A-4 (0)	SM	NP	NP	NP		

	BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
●	26+0130	1.2	9.5	0.019			0.3	35.1	64.7	
⊠	26+1000	0.8	9.5	0.114	0.033		0.3	65.0	34.7	
▲	26+2000	0.9	4.75	0.134	0.084	0.01	0.0	74.7	25.3	
★	26+3000	1.0	9.5	0.118	0.047	0.005	0.1	66.7	33.2	
⊙	26+4000	0.9	4.75	0.105	0.03	0.005	0.0	62.0	38.0	

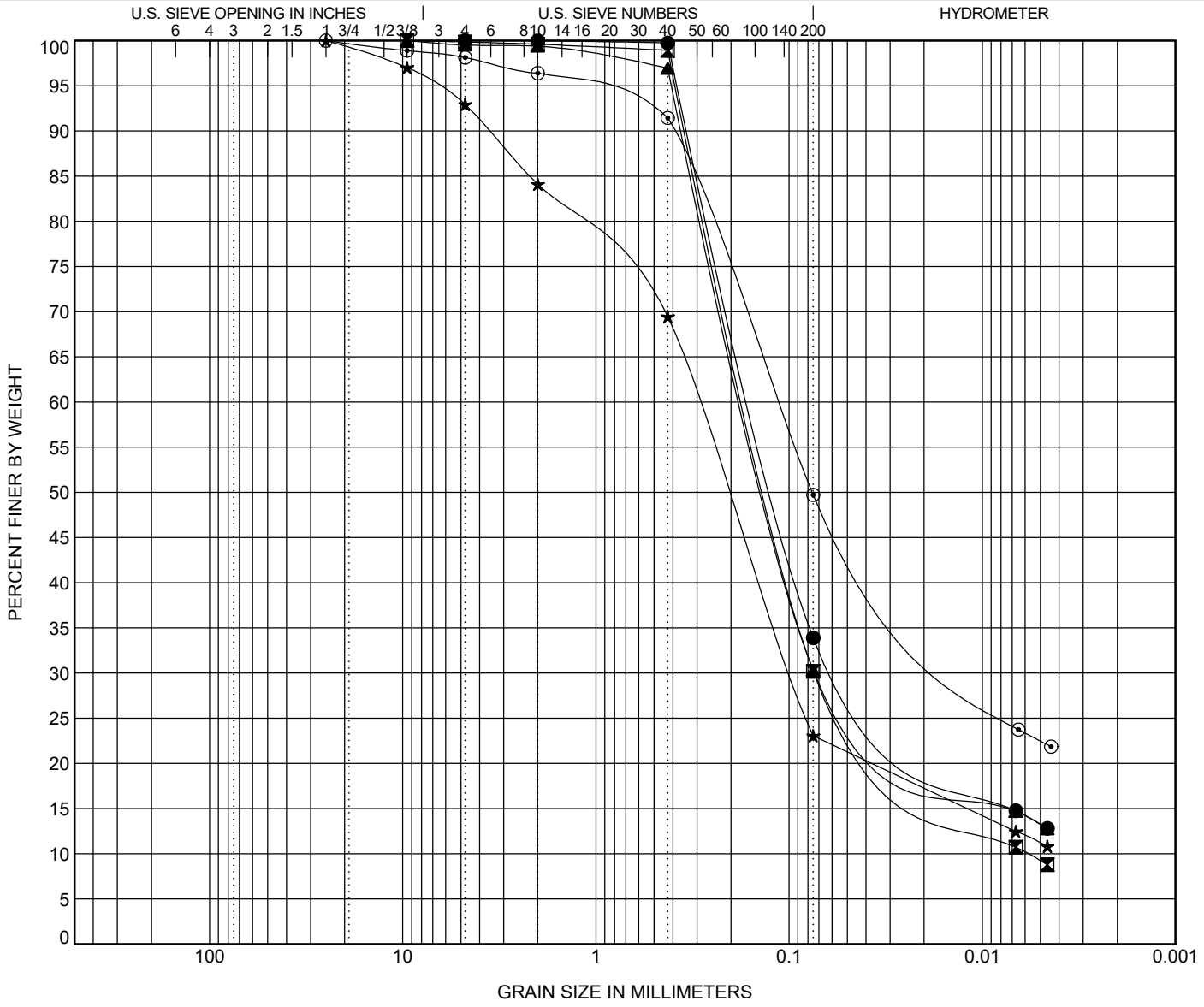
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
●	27+0000	0.8	A-2-4 (0)	SM	NP	NP	NP		
⊠	27+1000	0.9	A-2-4 (0)	SM	NP	NP	NP	5.79	27.34
▲	27+2000	0.9	A-2-4 (0)	SM	NP	NP	NP		
★	27+3202	0.7	A-2-4 (0)	SM	NP	NP	NP		
⊙	27+4000	1.3	A-4 (2)	SC	26	17	9		

	BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
●	27+0000	0.8	4.75	0.115	0.046	0.007	0.0	66.1	33.9	
⊠	27+1000	0.9	9.5	0.124	0.073	0.011	0.2	69.7	30.2	
▲	27+2000	0.9	9.5	0.125	0.071	0.007	0.5	69.2	30.3	
★	27+3202	0.7	25	0.205	0.097	0.012	7.1	69.9	23.1	
⊙	27+4000	1.3	25	0.076	0.012		1.9	48.4	49.7	

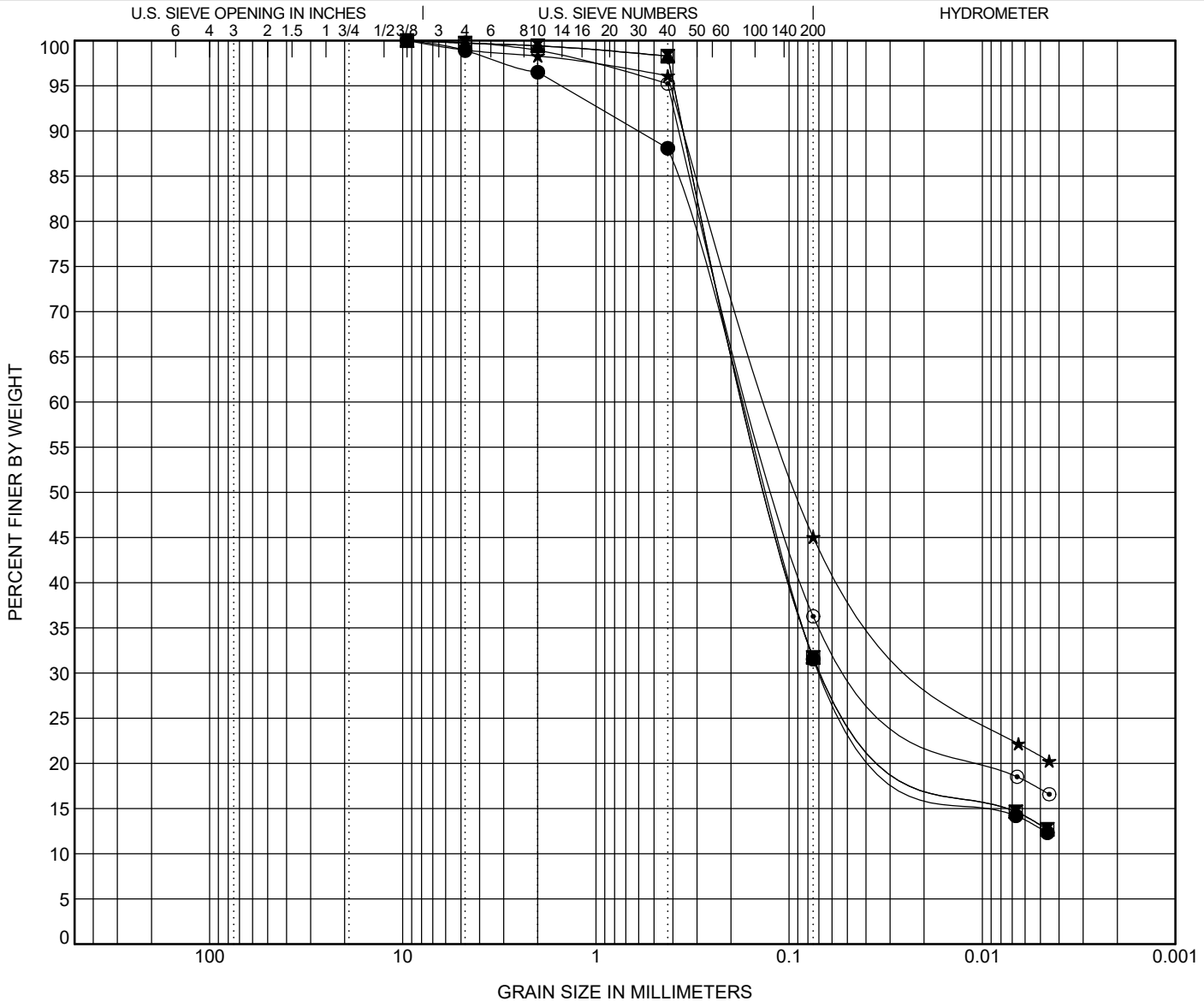
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
●	28+0000	1.3	A-2-4 (0)	SM	NP	NP	NP		
⊠	28+1000	0.6	A-2-4 (0)	SM	NP	NP	NP		
▲	28+2000	1.2	A-2-4 (0)	SM	NP	NP	NP		
★	28+2942	1.1	A-4 (0)	SM	NP	NP	NP		
⊙	28+4000	1.1	A-4 (0)	SM	NP	NP	NP		

	BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
●	28+0000	1.3	9.5	0.132	0.061	0.007	1.1	67.4	31.5	
⊠	28+1000	0.6	9.5	0.121	0.059	0.007	0.3	68.0	31.7	
▲	28+2000	1.2	9.5	0.121	0.059	0.007	0.3	68.0	31.7	
★	28+2942	1.1	9.5	0.089	0.015		1.0	53.9	45.0	
⊙	28+4000	1.1	9.5	0.112	0.032		0.2	63.5	36.3	

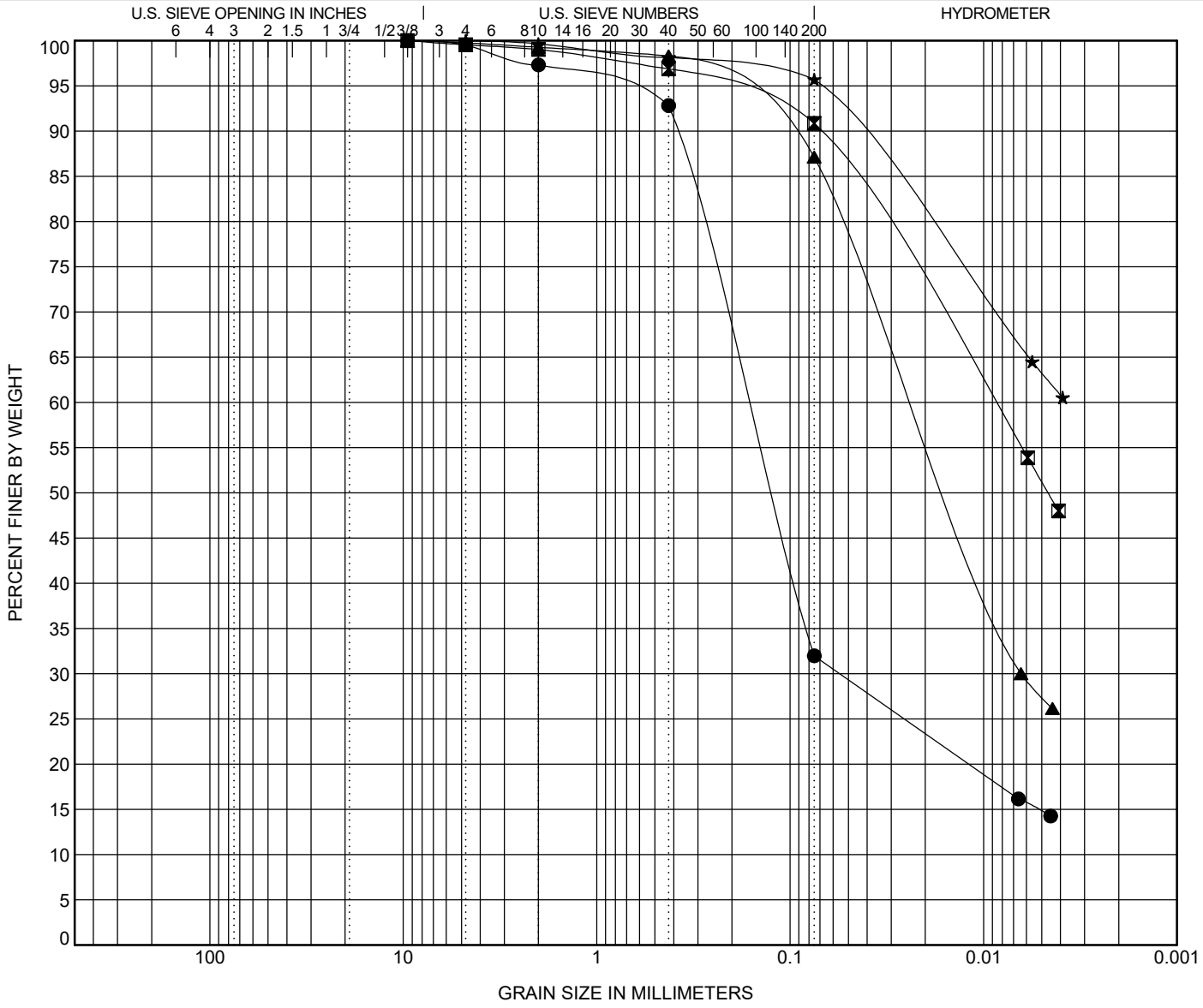
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300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	AASHTO Classification	USCS Classification	LL	PL	PI	Cc	Cu
●	29+0000	1.2	A-2-4 (0)	SM	NP	NP	NP		
⊠	29+1000	1.4	A-7-6 (22)	CL	41	17	24		
▲	29+2000	1.2	A-4 (0)	ML	NP	NP	NP		
★	29+3000	1.3	A-7-6 (39)	CH	56	19	37		

	BOREHOLE	DEPTH	D100	D50	D30	D15	%Gravel	%Sand	%Silt	%Clay
●	29+0000	1.2	9.5	0.125	0.055	0.005	0.5	67.6	32.0	
⊠	29+1000	1.4	9.5	0.005			0.5	8.7	90.9	
▲	29+2000	1.2	9.5	0.015	0.006		0.2	12.6	87.1	
★	29+3000	1.3	4.75				0.0	4.3	95.7	

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SUMMARY OF LABORATORY RESULTS

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
0+0000	1.2	27	19	8	25	33	A-2-4 (0)	SC	20.6	16.6			
0+0000	2.0								21.2	16.6			
0+0000	3.0								9.5	16.6			
0+0000	4.0								14.1	16.6			
0+0000	5.0								14.8	16.6			
0+0000	6.0								17.4	16.6			
0+0000	7.0								16.8	16.6			
0+0000	8.0								17.1	16.6			
0+0000	9.0								17.8	16.6			
0+0000	10.0									16.6			
0+1000	1.0	36	16	20	9.5	55	A-6 (8)	CL	13.8	17.3			
0+1000	2.0								17.1	17.3			
0+1000	3.0								23.4	17.3			
0+1000	4.0								17.9	17.3			
0+1000	5.0								18.4	17.3			
0+1000	6.0								11.7	17.3			
0+1000	7.0								14.4	17.3			
0+1000	8.0								19.9	17.3			
0+1000	9.0								19.2	17.3			
0+1000	10.0									17.3			
0+2000	1.0	53	22	31	4.75	89	A-7-6 (30)	CH	17.3	25.1			
0+2000	2.0								17.7	25.1			
0+2000	3.0								23.8	25.1			
0+2000	4.0								28.2	25.1			
0+2000	5.0								29.6	25.1			
0+2000	6.0								27.3	25.1			
0+2000	7.0								26.6	25.1			
0+2000	8.0								26.5	25.1			
0+2000	9.0								28.7	25.1			
0+2000	10.0									25.1			
0+3000	1.0	54	20	34	25	80	A-7-6 (28)	CH	17.7	22.9			
0+3000	2.0								21.1	22.9			
0+3000	3.0								19.4	22.9			
0+3000	4.0								20.4	22.9			
0+3000	5.0								20.7	22.9			
0+3000	6.0								26.7	22.9			
0+3000	7.0								28.7	22.9			
0+3000	8.0								27.2	22.9			
0+3000	9.0								24.4	22.9			
0+3000	10.0									22.9			
0+4000	1.0	46	18	28	9.5	64	A-7-6 (15)	CL	20.9	18.6			
0+4000	2.0								24.0	18.6			
0+4000	3.0								24.5	18.6			

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SUMMARY OF LABORATORY RESULTS

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
0+4000	4.0								24.3	18.6			
0+4000	5.0								18.1	18.6			
0+4000	6.0								14.3	18.6			
0+4000	7.0								14.1	18.6			
0+4000	8.0								13.7	18.6			
0+4000	9.0								13.9	18.6			
0+4000	10.0									18.6			
1+0100	1.0	62	24	38	4.75	79	A-7-6 (32)	CH	27.4	25.2			
1+0100	2.0								28.5	25.2			
1+0100	3.0								25.1	25.2			
1+0100	4.0								24.6	25.2			
1+0100	5.0								27.3	25.2			
1+0100	6.0								27.4	25.2			
1+0100	7.0								22.6	25.2			
1+0100	8.0								22.0	25.2			
1+0100	9.0								21.9	25.2			
1+0100	10.0									25.2			
1+1000	1.0	52	21	31	9.5	74	A-7-6 (23)	CH	27.2	25.3			
1+1000	2.0								23.4	25.3			
1+1000	3.0								26.0	25.3			
1+1000	4.0								24.0	25.3			
1+1000	5.0								23.6	25.3			
1+1000	6.0								21.4	25.3			
1+1000	7.0								27.9	25.3			
1+1000	8.0								27.3	25.3			
1+1000	9.0								26.7	25.3			
1+1000	10.0									25.3			
1+2000	1.0	48	19	29	25	70	A-7-6 (19)	CL	28.1	22.6			
1+2000	2.0								21.8	22.6			
1+2000	3.0								27.9	22.6			
1+2000	4.0								22.8	22.6			
1+2000	5.0								23.8	22.6			
1+2000	6.0								21.0	22.6			
1+2000	7.0								21.0	22.6			
1+2000	8.0								15.5	22.6			
1+2000	9.0								21.2	22.6			
1+2000	10.0									22.6			
1+3000	1.0	38	17	21	25	51	A-6 (7)	CL	23.3	19.5			
1+3000	2.0								17.1	19.5			
1+3000	3.0								17.0	19.5			
1+3000	4.0								21.2	19.5			
1+3000	5.0								21.1	19.5			
1+3000	6.0								24.5	19.5			

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300 AIRPORT ROAD
BISMARCK, ND 58504

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
1+3000	7.0								18.7	19.5			
1+3000	8.0								15.0	19.5			
1+3000	9.0								17.8	19.5			
1+3000	10.0									19.5			
1+4000	1.0	30	16	14	4.75	51	A-6 (4)	CL	16.4	15.4			
1+4000	2.0								15.3	15.4			
1+4000	3.0								14.2	15.4			
1+4000	4.0								16.7	15.4			
1+4000	5.0								17.1	15.4			
1+4000	6.0								12.6	15.4			
1+4000	7.0	27	21	6	9.5	34	A-2-4 (0)	SC-SM	14.9	16.0			
1+4000	8.0								16.7	16.0			
1+4000	9.0								16.5	16.0			
1+4000	10.0									16.0			
2+0000	1.0	40	19	21	25	71	A-6 (13)	CL	21.3	24.5			
2+0000	2.0								21.8	24.5			
2+0000	3.0								26.5	24.5			
2+0000	4.0								26.1	24.5			
2+0000	5.0								27.2	24.5			
2+0000	6.0								26.5	24.5			
2+0000	7.0								26.8	24.5			
2+0000	8.0	48	20	28	2	90	A-7-6 (27)	CL	20.1	24.5			
2+0000	9.0								16.0	16.0			
2+0000	10.0									16.0			
2+1000	1.0	24	17	7	4.75	41	A-4 (0)	SC-SM	10.3	14.2			
2+1000	2.0								13.7	14.2			
2+1000	3.0								16.0	14.2			
2+1000	4.0								15.3	14.2			
2+1000	5.0								16.0	14.2			
2+1000	6.0	NP	NP	NP	9.5	22	A-2-4 (0)	SM	16.9	20.9			
2+1000	7.0								20.9	20.9			
2+1000	8.0								25.7	20.9			
2+1000	9.0								20.0	20.9			
2+1000	10.0									20.9			
2+2000	1.0	25	16	9	9.5	43	A-4 (1)	SC	13.4	13.5			
2+2000	2.0								14.4	13.5			
2+2000	3.0								13.3	13.5			
2+2000	4.0								12.7	13.5			
2+2000	5.0	33	23	10	9.5	35	A-2-4 (0)	SC	13.5	19.0			
2+2000	6.0								18.7	19.0			
2+2000	7.0								21.8	19.0			
2+2000	8.0								18.3	19.0			
2+2000	9.0								22.9	19.0			

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NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
300 AIRPORT ROAD
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SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
2+2000	10.0									19.0			
2+3000	1.0	21	19	2	25	37	A-4 (0)	SM	11.6	12.7			
2+3000	2.0								10.8	12.7			
2+3000	3.0								13.6	12.7			
2+3000	4.0								15.2	12.7			
2+3000	5.0								12.2	12.7			
2+3000	6.0	NP	NP	NP	25	26	A-2-4 (0)	SM	13.5	12.4			
2+3000	7.0								12.1	12.4			
2+3000	8.0								12.0	12.4			
2+3000	9.0								12.0	12.4			
2+3000	10.0									12.4			
2+4000	1.0	27	22	5	25	32	A-2-4 (0)	SM	11.7	14.3			
2+4000	2.0								12.0	14.3			
2+4000	3.0								6.9	14.3			
2+4000	4.0								7.3	14.3			
2+4000	5.0								11.4	14.3			
2+4000	6.0								19.5	14.3			
2+4000	7.0								19.7	14.3			
2+4000	8.0								20.8	14.3			
2+4000	9.0								19.2	14.3			
2+4000	10.0									14.3			
3+0000	1.0	33	20	13	9.5	39	A-6 (1)	SC	21.2	17.8			
3+0000	2.0								24.3	17.8			
3+0000	3.0								21.5	17.8			
3+0000	4.0								22.5	17.8			
3+0000	5.0								16.8	17.8			
3+0000	6.0								13.7	17.8			
3+0000	7.0								13.9	17.8			
3+0000	8.0								14.8	17.8			
3+0000	9.0								11.8	17.8			
3+0000	10.0									17.8			
3+1000	1.0	53	21	32	25	83	A-7-6 (28)	CH	18.8	23.8			
3+1000	2.0								23.3	23.8			
3+1000	3.0								23.9	23.8			
3+1000	4.0								18.6	23.8			
3+1000	5.0								14.4	23.8			
3+1000	6.0								27.7	23.8			
3+1000	7.0								29.9	23.8			
3+1000	8.0								28.4	23.8			
3+1000	9.0								28.7	23.8			
3+1000	10.0									23.8			
3+2000	1.0	44	19	25	9.5	80	A-7-6 (20)	CL	25.0	21.7			
3+2000	2.0								21.5	21.7			

LAB SUMMARY - 20171219.GDT - 10/12/22 13:56 - F:\LAB\PROJECTS\GINT\5-049(020)000.GPJ

SUMMARY OF LABORATORY RESULTS

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
3+2000	3.0								22.0	21.7			
3+2000	4.0								18.4	21.7			
3+2000	5.0									21.7			
3+3000	1.0	46	19	27	25	73	A-7-6 (19)	CL	24.6	23.5			
3+3000	2.0								22.9	23.5			
3+3000	3.0								24.3	23.5			
3+3000	4.0								22.4	23.5			
3+3000	5.0									23.5			
3+4000	1.0	41	17	24	25	41	A-7-6 (5)	SC	18.3	19.0			
3+4000	2.0								22.2	19.0			
3+4000	3.0								19.8	19.0			
3+4000	4.0								15.9	19.0			
3+4000	5.0									19.0			
4+0000	1.0	37	18	19	25	39	A-6 (3)	SC	25.0	19.9			
4+0000	2.0								19.6	19.9			
4+0000	3.0								18.8	19.9			
4+0000	4.0								16.0	19.9			
4+0000	5.0									19.9			
4+0900	1.1	33	18	15	25	38	A-6 (2)	SC	14.2	15.3			
4+0900	2.0								14.9	15.3			
4+0900	3.0								14.5	15.3			
4+0900	4.0								17.7	15.3			
4+0900	5.0									15.3			
4+2000	1.1	29	16	13	25	35	A-2-6 (1)	SC	14.7	14.0			
4+2000	2.0								14.3	14.0			
4+2000	3.0								12.1	14.0			
4+2000	4.0								14.9	14.0			
4+2000	5.0									14.0			
4+3000	1.0	34	17	17	25	41	A-6 (3)	SC	14.6	15.7			
4+3000	2.0								17.5	15.7			
4+3000	3.0								15.1	15.7			
4+3000	4.0								15.7	15.7			
4+3000	5.0									15.7			
4+4200	1.1	31	17	14	25	45	A-6 (3)	SC	13.0	14.2			
4+4200	2.0								14.2	14.2			
4+4200	3.0								14.4	14.2			
4+4200	4.0								15.4	14.2			
4+4200	5.0									14.2			
5+0000	1.1	28	17	11	25	39	A-6 (1)	SC	15.8	14.3			
5+0000	2.0								14.0	14.3			
5+0000	3.0								14.3	14.3			
5+0000	4.0								13.2	14.3			
5+0000	5.0									14.3			

LAB SUMMARY - 20171219.GDT - 10/12/22 13:56 - F:\LAB\PROJECTS\GINT\5-049(020)000.GPJ

NDDOT North Dakota Department of Transportation
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
300 AIRPORT ROAD
BISMARCK, ND 58504

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
5+0500	1.0	40	17	23	9.5	47	A-6 (7)	SC	12.3	16.9			
5+0500	2.0								6.6	16.9			
5+0500	3.0								5.2	16.9			
5+0500	4.0								14.0	16.9			
5+0500	5.0								22.9	16.9			
5+0500	6.0								21.5	16.9			
5+0500	7.0								23.7	16.9			
5+0500	8.0								22.1	16.9			
5+0500	9.0								23.6	16.9			
5+0500	10.0									16.9			
5+1000	1.2	35	18	17	25	46	A-6 (4)	SC	13.5	18.2			
5+1000	2.0								15.8	18.2			
5+1000	3.0								13.8	18.2			
5+1000	4.0								14.4	18.2			
5+1000	5.0								16.6	18.2			
5+1000	6.0								22.2	18.2			
5+1000	7.0								23.0	18.2			
5+1000	8.0								23.1	18.2			
5+1000	9.0								21.5	18.2			
5+1000	10.0									18.2			
5+1500	1.2	35	17	18	25	48	A-6 (5)	SC	22.3	15.4			
5+1500	2.0								10.4	15.4			
5+1500	3.0								15.0	15.4			
5+1500	4.0								15.5	15.4			
5+1500	5.0								16.7	15.4			
5+1500	6.0								13.4	15.4			
5+1500	7.0								16.1	15.4			
5+1500	8.0								13.8	15.4			
5+1500	9.0								15.3	15.4			
5+1500	10.0									15.4			
5+2000	1.2	55	21	34	9.5	77	A-7-6 (26)	CH	19.6	19.7			
5+2000	2.0								21.6	19.7			
5+2000	3.0								20.8	19.7			
5+2000	4.0								24.2	19.7			
5+2000	5.0								12.3	19.7			
5+2000	6.0	27	20	7	25	38	A-4 (0)	SC-SM	10.4	11.5			
5+2000	7.0								11.8	11.5			
5+2000	8.0								12.3	11.5			
5+2000	9.0								11.7	11.5			
5+2000	10.0									11.5			
5+2200	1.1	49	19	30	9.5	73	A-7-6 (21)	CL	17.2	19.4			
5+2200	2.0								18.1	19.4			
5+2200	3.0								18.8	19.4			

LAB SUMMARY - 20171219.GDT - 10/12/22 13:56 - F:\LAB\PROJECTS\GINT\5-049(020)000.GPJ

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
5+2200	4.0								21.3	19.4			
5+2200	5.0								21.5	19.4			
5+2200	6.0	35	18	17	4.75	48	A-6 (5)	SC	18.9	16.5			
5+2200	7.0								18.0	16.5			
5+2200	8.0								20.7	16.5			
5+2200	9.0								8.2	16.5			
5+2200	10.0									16.5			
5+3000	1.1	30	17	13	25	46	A-6 (3)	SC	24.2	15.8			
5+3000	2.0								13.0	15.8			
5+3000	3.0								12.0	15.8			
5+3000	4.0								13.9	15.8			
5+3000	5.0									15.8			
5+4000	1.1	29	17	12	25	43	A-6 (2)	SC	20.5	15.2			
5+4000	2.0								12.6	15.2			
5+4000	3.0								13.6	15.2			
5+4000	4.0								14.1	15.2			
5+4000	5.0									15.2			
6+0000	1.2	30	18	12	25	39	A-6 (1)	SC	12.9	16.7			
6+0000	2.0								20.1	16.7			
6+0000	3.0								15.9	16.7			
6+0000	4.0								17.9	16.7			
6+0000	5.0									16.7			
6+1000	1.2	29	18	11	4.75	32	A-2-6 (0)	SC	9.7	13.3			
6+1000	2.0								12.5	13.3			
6+1000	3.0								18.1	13.3			
6+1000	4.0								13.0	13.3			
6+1000	5.0									13.3			
6+2000	1.0	29	20	9	25	40	A-4 (0)	SC	30.1	21.4			
6+2000	2.0								14.5	21.4			
6+2000	3.0								17.0	21.4			
6+2000	4.0								24.1	21.4			
6+2000	5.0									21.4			
6+3000	1.0	NP	NP	NP	9.5	24	A-2-4 (0)	SM	19.4	11.2			
6+3000	2.0								9.6	11.2			
6+3000	3.0								8.8	11.2			
6+3000	4.0								7.1	11.2			
6+3000	5.0									11.2			
6+4000	0.9	44	17	27	9.5	73	A-7-6 (18)	CL	15.0	23.2			
6+4000	2.0								25.9	23.2			
6+4000	3.0								27.6	23.2			
6+4000	4.0								24.2	23.2			
6+4000	5.0									23.2			
7+0000	1.0	54	21	33	9.5	86	A-7-6 (30)	CH	25.4	27.7			

NDDOT North Dakota Department of Transportation
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
300 AIRPORT ROAD
BISMARCK, ND 58504

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
7+0000	2.0								28.6	27.7			
7+0000	3.0								28.4	27.7			
7+0000	4.0								28.3	27.7			
7+0000	5.0									27.7			
7+1000	1.1	52	22	30	9.5	64	A-7-6 (17)	CH	33.3	29.4			
7+1000	2.0								28.4	29.4			
7+1000	3.0								28.3	29.4			
7+1000	4.0								27.6	29.4			
7+1000	5.0									29.4			
7+2000	0.9	32	16	16	4.75	61	A-6 (7)	CL	20.4	19.2			
7+2000	2.0								17.5	19.2			
7+2000	3.0								21.2	19.2			
7+2000	4.0								17.8	19.2			
7+2000	5.0									19.2			
7+3000	1.1	21	18	3	25	29	A-2-4 (0)	SM	12.1	10.1			
7+3000	2.0								7.6	10.1			
7+3000	3.0								10.8	10.1			
7+3000	4.0								10.0	10.1			
7+3000	5.0									10.1			
7+4000	0.9	27	15	12	25	47	A-6 (2)	SC	7.4	11.0			
7+4000	2.0								12.0	11.0			
7+4000	3.0								12.8	11.0			
7+4000	4.0								11.7	11.0			
7+4000	5.0									11.0			
8+0000	1.1	36	16	20	25	52	A-6 (7)	CL	19.3	16.8			
8+0000	2.0								19.3	16.8			
8+0000	3.0								15.4	16.8			
8+0000	4.0								13.2	16.8			
8+0000	5.0									16.8			
8+1000	1.1	34	17	17	25	42	A-6 (3)	SC	10.3	15.3			
8+1000	2.0								16.8	15.3			
8+1000	3.0								15.4	15.3			
8+1000	4.0								18.6	15.3			
8+1000	5.0									15.3			
8+2000	1.3	32	17	15	9.5	47	A-6 (4)	SC	10.2	13.3			
8+2000	2.0								13.2	13.3			
8+2000	3.0								17.2	13.3			
8+2000	4.0								12.6	13.3			
8+2000	5.0									13.3			
8+3000	1.2	44	17	27	25	54	A-7-6 (11)	CL	16.7	22.5			
8+3000	2.0								26.7	22.5			
8+3000	3.0								23.6	22.5			
8+3000	4.0								23.0	22.5			

LAB SUMMARY - 20171219.GDT - 10/12/22 13:56 - F:\LAB\PROJECTS\GINT\5-049(020)000.GPJ

SUMMARY OF LABORATORY RESULTS

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
8+3000	5.0									22.5			
8+4000	1.2	41	18	23	4.75	46	A-7-6 (6)	SC	26.1	24.0			
8+4000	2.0								21.7	24.0			
8+4000	3.0								24.8	24.0			
8+4000	4.0								23.2	24.0			
8+4000	5.0									24.0			
9+0000	1.3	43	21	22	9.5	44	A-7-6 (5)	SC	21.7	24.1			
9+0000	2.0								26.2	24.1			
9+0000	3.0								25.6	24.1			
9+0000	4.0								22.7	24.1			
9+0000	5.0									24.1			
9+1000	1.0	48	17	31	25	66	A-7-6 (18)	CL	29.1	27.4			
9+1000	2.0								28.7	27.4			
9+1000	3.0								29.0	27.4			
9+1000	4.0								22.9	27.4			
9+1000	5.0									27.4			
9+2000	1.1	37	18	19	25	42	A-6 (4)	SC	20.7	18.6			
9+2000	2.0								19.6	18.6			
9+2000	3.0								21.1	18.6			
9+2000	4.0								13.0	18.6			
9+2000	5.0									18.6			
9+3000	1.0	34	16	18	25	48	A-6 (5)	SC	19.2	19.5			
9+3000	2.0								15.2	19.5			
9+3000	3.0								21.6	19.5			
9+3000	4.0								22.1	19.5			
9+3000	5.0									19.5			
9+4000	1.0	33	17	16	9.5	72	A-6 (10)	CL	29.1	28.8			
9+4000	2.0								31.9	28.8			
9+4000	3.0								29.1	28.8			
9+4000	4.0								25.3	28.8			
9+4000	5.0									28.8			
10+0000	1.1	NP	NP	NP	9.5	23	A-2-4 (0)	SM	16.9	13.1			
10+0000	2.0								11.4	13.1			
10+0000	3.0								10.9	13.1			
10+0000	4.0								13.1	13.1			
10+0000	5.0									13.1			
10+1000	1.1	30	20	10	9.5	35	A-2-4 (0)	SC	15.9	16.0			
10+1000	2.0								16.7	16.0			
10+1000	3.0								15.5	16.0			
10+1000	4.0								15.7	16.0			
10+1000	5.0									16.0			
10+2000	1.1	28	21	7	25	35	A-2-4 (0)	SC-SM	12.5	14.6			
10+2000	2.0								14.9	14.6			

NDDOT North Dakota Department of Transportation

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
300 AIRPORT ROAD
BISMARCK, ND 58504

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
10+2000	3.0								16.1	14.6			
10+2000	4.0								14.8	14.6			
10+2000	5.0									14.6			
10+3000	1.3	39	16	23	25	51	A-6 (8)	CL	11.8	18.5			
10+3000	2.0								15.3	18.5			
10+3000	3.0								22.4	18.5			
10+3000	4.0								24.4	18.5			
10+3000	5.0									18.5			
10+4000	1.2	32	19	13	9.5	38	A-6 (1)	SC	14.1	17.1			
10+4000	2.0								17.9	17.1			
10+4000	3.0								19.9	17.1			
10+4000	4.0								16.6	17.1			
10+4000	5.0									17.1			
11+0000	1.1	36	17	19	25	62	A-6 (9)	CL	30.5	25.8			
11+0000	2.0								23.5	25.8			
11+0000	3.0								25.1	25.8			
11+0000	4.0								24.2	25.8			
11+0000	5.0									25.8			
11+1000	1.0	68	23	45	9.5	95	A-7-6 (48)	CH	30.7	22.8			
11+1000	2.0								30.0	22.8			
11+1000	3.0								29.8	22.8			
11+1000	4.0								30.3	22.8			
11+1000	5.0								9.4	22.8			
11+1000	6.0								6.8	22.8			
11+1000	7.0	NP	NP	NP	9.5	20	A-2-4 (0)	SM	7.3	7.1			
11+1000	8.0								7.0	7.1			
11+1000	9.0								7.0	7.1			
11+1000	10.0									7.1			
11+1200	1.2	58	20	38	9.5	95	A-7-6 (40)	CH	18.2	23.1			
11+1200	2.0								29.7	23.1			
11+1200	3.0								30.4	23.1			
11+1200	4.0								30.1	23.1			
11+1200	5.0								21.6	23.1			
11+1200	6.0								8.4	23.1			
11+1200	7.0	NP	NP	NP	9.5	23	A-2-4 (0)	SM	7.4	7.5			
11+1200	8.0								7.4	7.5			
11+1200	9.0								7.7	7.5			
11+1200	10.0									7.5			
11+1450	1.1	54	19	35	9.5	86	A-7-6 (32)	CH	32.4	30.0			
11+1450	2.0								32.1	30.0			
11+1450	3.0								30.8	30.0			
11+1450	4.0								31.9	30.0			
11+1450	5.0								32.3	30.0			

LAB SUMMARY - 20171219.GDT - 10/12/22 13:56 - F:\LAB\PROJECTS\GINT\5-049(020)000.GPJ

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
11+1450	6.0								27.7	30.0			
11+1450	7.0								28.2	30.0			
11+1450	8.0								29.3	30.0			
11+1450	9.0								25.2	30.0			
11+1450	10.0									30.0			
11+2000	1.1	40	17	23	9.5	61	A-6 (11)	CL	24.4	24.7			
11+2000	2.0								17.6	24.7			
11+2000	3.0								23.0	24.7			
11+2000	4.0								23.5	24.7			
11+2000	5.0								17.8	24.7			
11+2000	6.0								27.6	24.7			
11+2000	7.0								29.0	24.7			
11+2000	8.0								29.5	24.7			
11+2000	9.0								29.5	24.7			
11+2000	10.0									24.7			
11+3000	1.1	38	16	22	25	43	A-6 (5)	SC	40.7	25.2			
11+3000	2.0								20.6	25.2			
11+3000	3.0								19.7	25.2			
11+3000	4.0								19.7	25.2			
11+3000	5.0									25.2			
11+4000	1.1	60	20	40	9.5	95	A-7-6 (42)	CH	30.5	25.7			
11+4000	2.0								24.6	25.7			
11+4000	3.0								23.5	25.7			
11+4000	4.0								24.1	25.7			
11+4000	5.0									25.7			
12+0000	1.1	56	20	36	25	88	A-7-6 (34)	CH	26.9	27.0			
12+0000	2.0								27.4	27.0			
12+0000	3.0								25.3	27.0			
12+0000	4.0								28.2	27.0			
12+0000	5.0									27.0			
12+1000	1.1	44	16	28	25	78	A-7-6 (21)	CL	18.0	22.2			
12+1000	2.0								25.0	22.2			
12+1000	3.0								22.5	22.2			
12+1000	4.0								23.3	22.2			
12+1000	5.0									22.2			
12+2000	1.2	43	16	27	25	73	A-7-6 (18)	CL	23.6	19.1			
12+2000	2.0								20.5	19.1			
12+2000	3.0								15.0	19.1			
12+2000	4.0								17.4	19.1			
12+2000	5.0									19.1			
12+3000	1.0	46	18	28	25	81	A-7-6 (22)	CL	23.6	22.7			
12+3000	2.0								21.8	22.7			
12+3000	3.0								21.9	22.7			

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
12+3000	4.0								23.4	22.7			
12+3000	5.0									22.7			
12+4000	1.0	20	12	8	9.5	91	A-4 (4)	CL	27.7	27.9			
12+4000	2.0								27.4	27.9			
12+4000	3.0								26.7	27.9			
12+4000	4.0								30.0	27.9			
12+4000	5.0									27.9			
13+0000	1.3	62	21	41	9.5	93	A-7-6 (42)	CH	28.8	29.2			
13+0000	2.0								28.6	29.2			
13+0000	3.0								29.6	29.2			
13+0000	4.0								29.9	29.2			
13+0000	5.0									29.2			
13+1000	1.2	38	17	21	25	66	A-6 (12)	CL	22.3	19.5			
13+1000	2.0								24.8	19.5			
13+1000	3.0								15.8	19.5			
13+1000	4.0								15.2	19.5			
13+1000	5.0									19.5			
13+2000	1.3	47	19	28	4.75	78	A-7-6 (21)	CL	24.2	22.7			
13+2000	2.0								21.3	22.7			
13+2000	3.0								24.0	22.7			
13+2000	4.0								21.4	22.7			
13+2000	5.0									22.7			
13+3000	1.2	25	14	11	9.5	47	A-6 (2)	SC	28.1	18.1			
13+3000	2.0								11.2	18.1			
13+3000	3.0								11.8	18.1			
13+3000	4.0								21.2	18.1			
13+3000	5.0									18.1			
13+4000	1.4	34	15	19	9.5	83	A-6 (14)	CL	18.7	17.4			
13+4000	2.0								17.2	17.4			
13+4000	3.0								18.1	17.4			
13+4000	4.0								15.6	17.4			
13+4000	5.0									17.4			
14+0000	1.2	23	15	8	9.5	49	A-4 (1)	SC	16.7	11.8			
14+0000	2.0								9.7	11.8			
14+0000	3.0								10.5	11.8			
14+0000	4.0								10.4	11.8			
14+0000	5.0									11.8			
14+1000	1.5	25	13	12	9.5	52	A-6 (3)	CL	17.1	13.4			
14+1000	2.0								11.5	13.4			
14+1000	3.0								11.8	13.4			
14+1000	4.0								13.4	13.4			
14+1000	5.0									13.4			
14+2000	1.5	41	17	24	25	85	A-7-6 (20)	CL	17.7	19.6			

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
14+2000	2.0								21.4	19.6			
14+2000	3.0								19.4	19.6			
14+2000	4.0								20.0	19.6			
14+2000	5.0									19.6			
14+3000	1.3	43	17	26	9.5	98	A-7-6 (27)	CL	13.5	17.4			
14+3000	2.0								17.9	17.4			
14+3000	3.0								19.2	17.4			
14+3000	4.0								18.9	17.4			
14+3000	5.0									17.4			
14+4000	1.2	30	16	14	25	61	A-6 (6)	CL	14.3	16.6			
14+4000	2.0								17.9	16.6			
14+4000	3.0								18.2	16.6			
14+4000	4.0								16.0	16.6			
14+4000	5.0									16.6			
15+0000	1.1	30	16	14	9.5	59	A-6 (5)	CL	10.3	18.4			
15+0000	2.0								13.6	18.4			
15+0000	3.0								15.1	18.4			
15+0000	4.0								34.7	18.4			
15+0000	5.0									18.4			
15+1000	1.3	24	17	7	9.5	50	A-4 (1)	CL-ML	14.8	11.4			
15+1000	2.0								11.3	11.4			
15+1000	3.0								11.2	11.4			
15+1000	4.0								10.9	11.4			
15+1000	5.0								12.5	11.4			
15+1000	6.0								11.0	11.4			
15+1000	7.0								8.7	11.4			
15+1000	8.0								10.5	11.4			
15+1000	9.0								12.1	11.4			
15+1000	10.0									11.4			
15+1925	1.1	40	19	21	9.5	86	A-6 (18)	CL	14.5	17.3			
15+1925	2.0								18.0	17.3			
15+1925	3.0								20.3	17.3			
15+1925	4.0								20.8	17.3			
15+1925	5.0								17.6	17.3			
15+1925	6.0								12.4	17.3			
15+1925	7.0	NP	NP	NP	4.75	92	A-4 (0)	ML	13.9	13.6			
15+1925	8.0								13.3	13.6			
15+1925	9.0								13.4	13.6			
15+1925	10.0									13.6			
15+2450	1.1	30	16	14	4.75	79	A-6 (9)	CL	17.8	18.2			
15+2450	2.0								15.1	18.2			
15+2450	3.0								17.1	18.2			
15+2450	4.0								17.4	18.2			

SUMMARY OF LABORATORY RESULTS

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
15+2450	5.0								23.6	18.2			
15+2450	6.0	47	20	27	9.5	87	A-7-6 (24)	CL	23.5	21.0			
15+2450	7.0								21.2	21.0			
15+2450	8.0								19.8	21.0			
15+2450	9.0								19.5	21.0			
15+2450	10.0									21.0			
15+2625	1.0	35	16	19	25	75	A-6 (12)	CL	17.5	17.3			
15+2625	2.0								19.4	17.3			
15+2625	3.0								18.0	17.3			
15+2625	4.0								14.5	17.3			
15+2625	5.0	27	16	11	25	48	A-6 (2)	SC	17.2	11.7			
15+2625	6.0								15.4	11.7			
15+2625	7.0								4.7	11.7			
15+2625	8.0								8.6	11.7			
15+2625	9.0								12.5	11.7			
15+2625	10.0									11.7			
15+3000	1.0	31	16	15	9.5	60	A-6 (6)	CL	25.8	18.0			
15+3000	2.0								17.4	18.0			
15+3000	3.0								20.9	18.0			
15+3000	4.0								17.4	18.0			
15+3000	5.0								15.8	18.0			
15+3000	6.0								18.2	18.0			
15+3000	7.0								14.4	18.0			
15+3000	8.0								11.8	18.0			
15+3000	9.0								19.9	18.0			
15+3000	10.0									18.0			
15+4000	1.1	30	16	14	9.5	60	A-6 (6)	CL	16.3	20.2			
15+4000	2.0								20.9	20.2			
15+4000	3.0								19.6	20.2			
15+4000	4.0								24.0	20.2			
15+4000	5.0									20.2			
16+0000	1.1	40	17	23	25	72	A-6 (15)	CL	17.4	18.4			
16+0000	2.0								20.2	18.4			
16+0000	3.0								17.3	18.4			
16+0000	4.0								18.7	18.4			
16+0000	5.0									18.4			
16+1000	1.2	24	16	8	4.75	42	A-4 (0)	SC	12.3	13.0			
16+1000	2.0								11.7	13.0			
16+1000	3.0								13.7	13.0			
16+1000	4.0								14.2	13.0			
16+1000	5.0									13.0			
16+2000	1.1	27	19	8	9.5	37	A-4 (0)	SC	16.9	14.9			
16+2000	2.0								11.1	14.9			

LAB SUMMARY - 20171219.GDT - 10/12/22 13:56 - F:\LAB\PROJECTS\GINT\5-049(020)000.GPJ

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
16+2000	3.0								15.2	14.9			
16+2000	4.0								16.2	14.9			
16+2000	5.0									14.9			
16+3000	1.1	31	19	12	25	43	A-6 (2)	SC	9.2	11.3			
16+3000	2.0								11.8	11.3			
16+3000	3.0								10.0	11.3			
16+3000	4.0								14.3	11.3			
16+3000	5.0									11.3			
16+4000	1.1	NP	NP	NP	2	28	A-2-4 (0)	SM	13.9	13.1			
16+4000	2.0								15.6	13.1			
16+4000	3.0								11.4	13.1			
16+4000	4.0								11.6	13.1			
16+4000	5.0									13.1			
17+0000	1.1	30	21	9	25	38	A-4 (0)	SC	18.4	14.4			
17+0000	2.0								15.3	14.4			
17+0000	3.0								12.6	14.4			
17+0000	4.0								11.2	14.4			
17+0000	5.0									14.4			
17+1000	1.2	42	19	23	25	66	A-7-6 (13)	CL	28.9	24.8			
17+1000	2.0								21.9	24.8			
17+1000	3.0								23.2	24.8			
17+1000	4.0								25.1	24.8			
17+1000	5.0									24.8			
17+2000	1.1	NP	NP	NP	4.75	23	A-2-4 (0)	SM	16.3	14.9			
17+2000	2.0								11.7	14.9			
17+2000	3.0								18.4	14.9			
17+2000	4.0								13.1	14.9			
17+2000	5.0									14.9			
17+3000	0.8	50	21	29	25	74	A-7-6 (21)	CH	32.1	20.7			
17+3000	2.0								24.7	20.7			
17+3000	3.0								12.6	20.7			
17+3000	4.0								13.4	20.7			
17+3000	5.0									20.7			
17+4000	1.1	NP	NP	NP	2	24	A-2-4 (0)	SM	11.8	11.6			
17+4000	2.0								11.7	11.6			
17+4000	3.0								12.2	11.6			
17+4000	4.0								10.8	11.6			
17+4000	5.0									11.6			
18+0000	1.0	33	22	11	25	44	A-6 (2)	SC	13.8	18.1			
18+0000	2.0								27.9	18.1			
18+0000	3.0								18.3	18.1			
18+0000	4.0								12.5	18.1			
18+0000	5.0									18.1			

LAB SUMMARY - 20171219.GDT - 10/12/22 13:56 - F:\LAB\PROJECTS\GINT\5-049(020)000.GPJ

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
18+1000	1.0	NP	NP	NP	9.5	19	A-2-4 (0)	SM	19.8	11.2			
18+1000	2.0								8.3	11.2			
18+1000	3.0								8.1	11.2			
18+1000	4.0								8.5	11.2			
18+1000	5.0									11.2			
18+2000	0.9	NP	NP	NP	9.5	36	A-4 (0)	SM	15.3	15.4			
18+2000	2.0								12.8	15.4			
18+2000	3.0								17.1	15.4			
18+2000	4.0								16.5	15.4			
18+2000	5.0									15.4			
18+3000	1.1	28	20	8	9.5	39	A-4 (0)	SC	12.3	14.4			
18+3000	2.0								12.2	14.4			
18+3000	3.0								14.6	14.4			
18+3000	4.0								18.4	14.4			
18+3000	5.0									14.4			
18+4000	1.1	21	19	2	4.75	38	A-4 (0)	SM	13.0	12.1			
18+4000	2.0								12.1	12.1			
18+4000	3.0								11.0	12.1			
18+4000	4.0								12.4	12.1			
18+4000	5.0									12.1			
19+0000	1.1	28	20	8	9.5	38	A-4 (0)	SC	12.5	11.9			
19+0000	2.0								14.0	11.9			
19+0000	3.0								11.2	11.9			
19+0000	4.0								9.8	11.9			
19+0000	5.0									11.9			
19+1000	1.2	38	31	7	2	35	A-2-4 (0)	SM	11.2	13.5			
19+1000	2.0								18.3	13.5			
19+1000	3.0								13.7	13.5			
19+1000	4.0								10.6	13.5			
19+1000	5.0									13.5			
19+2000	1.1	26	20	6	9.5	34	A-2-4 (0)	SC-SM	12.6	13.5			
19+2000	2.0								13.5	13.5			
19+2000	3.0								14.4	13.5			
19+2000	4.0								13.5	13.5			
19+2000	5.0									13.5			
19+3000	1.1	31	21	10	2	41	A-4 (1)	SC	14.4	13.8			
19+3000	2.0								11.6	13.8			
19+3000	3.0								12.9	13.8			
19+3000	4.0								16.4	13.8			
19+3000	5.0									13.8			
19+4000	1.2	43	19	24	4.75	94	A-7-6 (24)	CL	17.2	18.8			
19+4000	2.0								12.6	18.8			
19+4000	3.0								22.6	18.8			

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
19+4000	4.0								22.7	18.8			
19+4000	5.0									18.8			
20+0000	1.2	25	16	9	9.5	56	A-4 (2)	CL	16.4	14.1			
20+0000	2.0								13.2	14.1			
20+0000	3.0								14.4	14.1			
20+0000	4.0								12.3	14.1			
20+0000	5.0									14.1			
20+1000	1.1	31	14	17	9.5	50	A-6 (5)	CL	19.3	20.1			
20+1000	2.0								20.2	20.1			
20+1000	3.0								21.0	20.1			
20+1000	4.0								19.8	20.1			
20+1000	5.0									20.1			
20+2000	1.2	NP	NP	NP	9.5	27	A-2-4 (0)	SM	11.1	12.4			
20+2000	2.0								14.1	12.4			
20+2000	3.0								12.8	12.4			
20+2000	4.0								11.6	12.4			
20+2000	5.0									12.4			
20+3000	1.2	20	17	3	4.75	30	A-2-4 (0)	SM	11.6	13.4			
20+3000	2.0								14.4	13.4			
20+3000	3.0								13.0	13.4			
20+3000	4.0								14.7	13.4			
20+3000	5.0									13.4			
20+4000	1.0	NP	NP	NP	9.5	30	A-2-4 (0)	SM	9.0	9.4			
20+4000	2.0								9.9	9.4			
20+4000	3.0								9.9	9.4			
20+4000	4.0								8.8	9.4			
20+4000	5.0									9.4			
21+0000	1.1	NP	NP	NP	9.5	24	A-2-4 (0)	SM	11.7	11.5			
21+0000	2.0								9.2	11.5			
21+0000	3.0								12.9	11.5			
21+0000	4.0								12.2	11.5			
21+0000	5.0									11.5			
21+1000	1.1	28	21	7	9.5	35	A-2-4 (0)	SC-SM	13.3	13.1			
21+1000	2.0								13.8	13.1			
21+1000	3.0								12.6	13.1			
21+1000	4.0								12.7	13.1			
21+1000	5.0									13.1			
21+2000	0.9	33	16	17	25	49	A-6 (5)	SC	19.4	17.9			
21+2000	2.0								16.6	17.9			
21+2000	3.0								19.6	17.9			
21+2000	4.0								16.1	17.9			
21+2000	5.0									17.9			
21+3000	1.1	34	23	12	9.5	89	A-6 (11)	CL	23.8	25.0			

LAB SUMMARY - 20171219.GDT - 10/12/22 13:56 - F:\LAB\PROJECTS\GINT\5-049(020)000.GPJ

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
21+3000	2.0								23.2	25.0			
21+3000	3.0								27.6	25.0			
21+3000	4.0								25.3	25.0			
21+3000	5.0									25.0			
21+4000	1.3	44	17	27	9.5	80	A-7-6 (21)	CL	7.5	22.0			
21+4000	2.0								27.0	22.0			
21+4000	3.0								29.8	22.0			
21+4000	4.0								23.9	22.0			
21+4000	5.0									22.0			
22+0000	1.3	44	18	26	9.5	86	A-7-6 (23)	CL	21.9	21.4			
22+0000	2.0								20.4	21.4			
22+0000	3.0								22.2	21.4			
22+0000	4.0								21.1	21.4			
22+0000	5.0									21.4			
22+1000	1.6	51	18	33	9.5	94	A-7-6 (33)	CH	15.2	20.7			
22+1000	2.0								20.2	20.7			
22+1000	3.0								24.1	20.7			
22+1000	4.0								23.3	20.7			
22+1000	5.0									20.7			
22+2000	1.3	46	19	27	9.5	82	A-7-6 (22)	CL	23.9	23.5			
22+2000	2.0								26.6	23.5			
22+2000	3.0								21.2	23.5			
22+2000	4.0								22.5	23.5			
22+2000	5.0									23.5			
22+3000	1.2	53	19	34	25	88	A-7-6 (32)	CH	26.4	26.7			
22+3000	2.0								28.5	26.7			
22+3000	3.0								26.6	26.7			
22+3000	4.0								25.1	26.7			
22+3000	5.0									26.7			
22+4000	1.2	56	21	35	4.75	94	A-7-6 (36)	CH	22.7	22.9			
22+4000	2.0								24.6	22.9			
22+4000	3.0								22.5	22.9			
22+4000	4.0								21.8	22.9			
22+4000	5.0									22.9			
23+0000	1.3	35	18	17	9.5	97	A-6 (17)	CL	18.7	19.3			
23+0000	2.0								19.3	19.3			
23+0000	3.0								19.5	19.3			
23+0000	4.0								19.7	19.3			
23+0000	5.0									19.3			
23+1000	1.1	46	17	29	9.5	83	A-7-6 (24)	CL	20.9	20.1			
23+1000	2.0								29.2	20.1			
23+1000	3.0								14.2	20.1			
23+1000	4.0								16.1	20.1			

NDDOT North Dakota Department of Transportation
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
300 AIRPORT ROAD
BISMARCK, ND 58504

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
23+1000	5.0									20.1			
23+2000	1.2	46	17	29	9.5	85	A-7-6 (25)	CL	20.5	22.4			
23+2000	2.0								22.9	22.4			
23+2000	3.0								22.7	22.4			
23+2000	4.0								23.5	22.4			
23+2000	5.0									22.4			
23+3000	1.1	48	17	31	4.75	82	A-7-6 (25)	CL	21.0	19.0			
23+3000	2.0								19.8	19.0			
23+3000	3.0								17.0	19.0			
23+3000	4.0								18.3	19.0			
23+3000	5.0									19.0			
23+4000	1.2	38	16	22	9.5	72	A-6 (14)	CL	23.0	23.1			
23+4000	2.0								24.8	23.1			
23+4000	3.0								23.7	23.1			
23+4000	4.0								20.9	23.1			
23+4000	5.0									23.1			
23+5088	1.2	38	16	22	9.5	87	A-6 (19)	CL	19.7	20.6			
23+5088	2.0								19.8	20.6			
23+5088	3.0								17.0	20.6			
23+5088	4.0								18.9	20.6			
23+5088	5.0								20.3	20.6			
23+5088	6.0								21.1	20.6			
23+5088	7.0								24.0	20.6			
23+5088	8.0								21.1	20.6			
23+5088	9.0								23.9	20.6			
23+5088	10.0									20.6			
24+1000	1.3	35	17	18	25	83	A-6 (14)	CL	17.0	18.6			
24+1000	2.0								16.9	18.6			
24+1000	3.0								21.2	18.6			
24+1000	4.0								21.6	18.6			
24+1000	5.0								18.9	18.6			
24+1000	6.0								19.2	18.6			
24+1000	7.0								19.6	18.6			
24+1000	8.0								16.5	18.6			
24+1000	9.0								16.7	18.6			
24+1000	10.0									18.6			
24+2000	1.4	40	14	26	4.75	82	A-6 (20)	CL	19.7	20.8			
24+2000	2.0								19.7	20.8			
24+2000	3.0								22.1	20.8			
24+2000	4.0								25.4	20.8			
24+2000	5.0								21.0	20.8			
24+2000	6.0								18.9	20.8			
24+2000	7.0								19.9	20.8			

LAB SUMMARY - 20171219.GDT - 10/12/22 13:56 - F:\LAB\PROJECTS\GINT\5-049(020)000.GPJ

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
24+2000	8.0								19.1	20.8			
24+2000	9.0								21.3	20.8			
24+2000	10.0									20.8			
24+3000	1.8	39	18	21	25	82	A-6 (17)	CL	8.3	19.0			
24+3000	2.0								22.6	19.0			
24+3000	3.0								19.6	19.0			
24+3000	4.0								21.2	19.0			
24+3000	5.0								20.5	19.0			
24+3000	6.0								19.9	19.0			
24+3000	7.0								18.9	19.0			
24+3000	8.0								20.7	19.0			
24+3000	9.0								19.7	19.0			
24+3000	10.0									19.0			
24+4000	1.7	44	18	26	25	87	A-7-6 (23)	CL	16.7	19.3			
24+4000	2.0								21.2	19.3			
24+4000	3.0								23.3	19.3			
24+4000	4.0								17.5	19.3			
24+4000	5.0								19.0	19.3			
24+4000	6.0								17.9	19.3			
24+4000	7.0	35	15	20	9.5	58	A-6 (8)	CL	18.9	18.9			
24+4000	8.0								18.3	18.9			
24+4000	9.0								19.3	18.9			
24+4000	10.0									18.9			
25+0000	1.3	35	17	18	9.5	88	A-6 (15)	CL	20.0	21.3			
25+0000	2.0								23.3	21.3			
25+0000	3.0								19.1	21.3			
25+0000	4.0								22.4	21.3			
25+0000	5.0								21.4	21.3			
25+0000	6.0								18.3	21.3			
25+0000	7.0								22.1	21.3			
25+0000	8.0								24.1	21.3			
25+0000	9.0								21.1	21.3			
25+0000	10.0									21.3			
25+1000	1.3	31	19	12	9.5	78	A-6 (8)	CL	19.9	18.4			
25+1000	2.0								14.4	18.4			
25+1000	3.0								12.0	18.4			
25+1000	4.0								21.3	18.4			
25+1000	5.0								19.5	18.4			
25+1000	6.0								20.7	18.4			
25+1000	7.0								18.8	18.4			
25+1000	8.0								19.6	18.4			
25+1000	9.0								18.9	18.4			
25+1000	10.0									18.4			

LAB SUMMARY - 20171219.GDT - 10/12/22 13:56 - F:\LAB\PROJECTS\GINT\5-049(020)000.GPJ

NDDOT North Dakota Department of Transportation
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
300 AIRPORT ROAD
BISMARCK, ND 58504

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
25+2000	1.4	30	19	11	9.5	95	A-6 (10)	CL	18.9	20.7			
25+2000	2.0								20.5	20.7			
25+2000	3.0								21.9	20.7			
25+2000	4.0								21.7	20.7			
25+2000	5.0									20.7			
25+3000	1.0	30	15	15	9.5	68	A-6 (8)	CL	18.1	16.2			
25+3000	2.0								6.3	16.2			
25+3000	3.0								14.7	16.2			
25+3000	4.0								25.4	16.2			
25+3000	5.0									16.2			
25+4000	0.9	26	16	10	9.5	67	A-4 (4)	CL	12.1	14.8			
25+4000	2.0								19.1	14.8			
25+4000	3.0								11.1	14.8			
25+4000	4.0								16.9	14.8			
25+4000	5.0									14.8			
26+0130	1.2	28	14	14	9.5	65	A-6 (6)	CL	16.7	12.2			
26+0130	2.0								10.8	12.2			
26+0130	3.0								11.4	12.2			
26+0130	4.0								9.9	12.2			
26+0130	5.0									12.2			
26+1000	0.8	NP	NP	NP	9.5	35	A-2-4 (0)	SM	11.3	10.0			
26+1000	2.0								9.7	10.0			
26+1000	3.0								9.7	10.0			
26+1000	4.0								9.3	10.0			
26+1000	5.0									10.0			
26+2000	0.9	NP	NP	NP	4.75	25	A-2-4 (0)	SM	8.6	7.8			
26+2000	2.0								6.8	7.8			
26+2000	3.0								8.3	7.8			
26+2000	4.0								7.6	7.8			
26+2000	5.0									7.8			
26+3000	1.0	NP	NP	NP	9.5	33	A-2-4 (0)	SM	7.7	10.5			
26+3000	2.0								10.0	10.5			
26+3000	3.0								13.1	10.5			
26+3000	4.0								11.2	10.5			
26+3000	5.0									10.5			
26+4000	0.9	NP	NP	NP	4.75	38	A-4 (0)	SM	11.5	12.0			
26+4000	2.0								12.0	12.0			
26+4000	3.0								12.6	12.0			
26+4000	4.0								11.7	12.0			
26+4000	5.0									12.0			
27+0000	0.8	NP	NP	NP	4.75	34	A-2-4 (0)	SM	12.7	10.8			
27+0000	2.0								8.8	10.8			
27+0000	3.0								8.6	10.8			

LAB SUMMARY - 20171219.GDT - 10/12/22 13:56 - F:\LAB\PROJECTS\GINT\5-049(020)000.GPJ

SUMMARY OF LABORATORY RESULTS

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
27+0000	4.0								13.3	10.8			
27+0000	5.0									10.8			
27+1000	0.9	NP	NP	NP	9.5	30	A-2-4 (0)	SM	6.6	8.7			
27+1000	2.0								7.5	8.7			
27+1000	3.0								10.6	8.7			
27+1000	4.0								10.1	8.7			
27+1000	5.0									8.7			
27+2000	0.9	NP	NP	NP	9.5	30	A-2-4 (0)	SM	10.0	7.6			
27+2000	2.0								7.1	7.6			
27+2000	3.0								6.8	7.6			
27+2000	4.0								6.8	7.6			
27+2000	5.0									7.6			
27+3202	0.7	NP	NP	NP	25	23	A-2-4 (0)	SM	8.3	10.2			
27+3202	2.0								7.9	10.2			
27+3202	3.0								9.4	10.2			
27+3202	4.0								15.2	10.2			
27+3202	5.0									10.2			
27+4000	1.3	26	17	9	25	50	A-4 (2)	SC	18.7	14.7			
27+4000	2.0								14.2	14.7			
27+4000	3.0								12.9	14.7			
27+4000	4.0								13.0	14.7			
27+4000	5.0									14.7			
28+0000	1.3	NP	NP	NP	9.5	32	A-2-4 (0)	SM	9.4	10.0			
28+0000	2.0								9.9	10.0			
28+0000	3.0								8.4	10.0			
28+0000	4.0								12.1	10.0			
28+0000	5.0									10.0			
28+1000	0.6	NP	NP	NP	9.5	32	A-2-4 (0)	SM	8.6	8.4			
28+1000	2.0								6.7	8.4			
28+1000	3.0								8.3	8.4			
28+1000	4.0								10.2	8.4			
28+1000	5.0									8.4			
28+2000	1.2	NP	NP	NP	9.5	32	A-2-4 (0)	SM	8.5	7.7			
28+2000	2.0								7.3	7.7			
28+2000	3.0								7.4	7.7			
28+2000	4.0								7.5	7.7			
28+2000	5.0									7.7			
28+2942	1.1	NP	NP	NP	9.5	45	A-4 (0)	SM	6.4	10.7			
28+2942	2.0								13.2	10.7			
28+2942	3.0								13.5	10.7			
28+2942	4.0								9.8	10.7			
28+2942	5.0									10.7			
28+4000	1.1	NP	NP	NP	9.5	36	A-4 (0)	SM	11.8	11.2			

LAB SUMMARY - 20171219.GDT - 10/12/22 13:56 - F:\LAB\PROJECTS\GINT\5-049(020)000.GPJ

SUMMARY OF LABORATORY RESULTS

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

PROJECT NUMBER X-5-049(020)000 **LOCATION** Sioux & Grant County

PCN 23274

Borehole	Depth	Liquid Limit	Plastic Limit	Plasticity Index	Maximum Size (mm)	%<#200 Sieve	AASHTO Classification	USCS Class-ification	Water Content (%)	Avg. Water Content (%)	Dry Density (pcf)	Satur-ation (%)	Void Ratio
28+4000	2.0								9.0	11.2			
28+4000	3.0								12.7	11.2			
28+4000	4.0								11.2	11.2			
28+4000	5.0									11.2			
29+0000	1.2	NP	NP	NP	9.5	32	A-2-4 (0)	SM	4.3	4.2			
29+0000	2.0								4.1	4.2			
29+0000	3.0								3.8	4.2			
29+0000	4.0								4.6	4.2			
29+0000	5.0									4.2			
29+1000	1.4	41	17	24	9.5	91	A-7-6 (22)	CL	23.6	21.6			
29+1000	2.0								20.0	21.6			
29+1000	3.0								21.8	21.6			
29+1000	4.0								21.1	21.6			
29+1000	5.0									21.6			
29+2000	1.2	NP	NP	NP	9.5	87	A-4 (0)	ML	23.2	17.0			
29+2000	2.0								9.8	17.0			
29+2000	3.0								16.0	17.0			
29+2000	4.0								18.9	17.0			
29+2000	5.0									17.0			
29+3000	1.3	56	19	37	4.75	96	A-7-6 (39)	CH	21.4	20.7			
29+3000	2.0								22.6	20.7			
29+3000	3.0								20.1	20.7			
29+3000	4.0								18.8	20.7			
29+3000	5.0									20.7			

LAB SUMMARY - 20171219.GDT - 10/12/22 13:56 - F:\LAB\PROJECTS\GINT\5-049(020)000.GPJ