TO: Roger Weigel
Design Division

ATTN: Aaron Murra
Design Division - DOTSC

FROM: Ron Horner
Materials and Research Engineer
Jordan Nehls
Geotechnical Section

PROJECT: IM-6-029(107)117
Grinding and PCC Reconstruction

PCN: 18694

LOCATION: Interstate 29 – Buxton N to S of ND 15 - NB

LENGTH: 11.6 Miles

DATE: March 8, 2013

SUBJECT: Linear Soils Report and Recommendation

Attached is the Linear Soils Report and Recommendation for the above referenced project. If there are any changes made to the project after the report is issued that may require alteration to this recommendation or if you have any questions please contact Jordan Nehls at 328-6907 or jnehls@nd.gov or Jeff Jirava at 328-6908 or jjirava@nd.gov.

IM-6-029(107)117

Interstate 29 – Buxton N to S of ND 15 - NB

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 Jeff Jirava, Registration number PE-5950 on 3/8/13 and the original document is stored at the North Dakota Department of Transportation.

REGISTERED PROFESSIONAL ENGINEER
JEFF
JIRAVA
PE - 5950
DATE 3/8/13
NORTH DAKOTA

Jeff Jirava, P.E.

8 MARCH 2013
Date

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Linear Soils Report and Recommendation

Project: IM-6-029(107)117

PCN: 18694

Scope: Grinding and PCC Reconstruction

Location: Interstate 29 – Buxton N to S of ND 15 - NB

Length: 11.6 Miles

Project Limits: R.P. 117.822 to R.P. 129.425

Date: March 8, 2013

Introduction

This report will provide recommendations for the major rehabilitation of the roadway. The major rehabilitation project includes grinding and PCC reconstruction.

113 borings were conducted to develop this recommendation. The borings were spaced approximately 500 feet apart throughout the entire project and extended to depths of up to 5.0 feet below the existing pavement surface. The soil borings were performed from 9/24/2012 to 9/25/2012 using a 6 inch solid flight auger. A total of 117 samples were taken from the borings. The project location map is shown in Figure 1.

Figure 1 – Project Location Map

Existing Roadway Section

The roadway from R.P. 117.822 to R.P. 119.245 was graded in 1968. The original pavement and base were removed and replaced in 1992. According to the construction history there is currently recycled PCC on top of an aggregate and recycled bituminous base. This is the area where the proposed grinding will be performed. Table 1 shows the construction history through this section of the roadway.

The roadway from R.P. 119.245 to R.P. 129.425 was graded in 1969. The next year continuously reinforced PCC was placed on top of a plant mix bituminous base. In 1996 a hot bituminous pavement overlay was performed. Along with this work there have been multiple chip seals, a drive slope flattening, concrete pavement repair, and microsurfacing on the roadway. This is the area where the proposed reconstruction will be performed. Table 2 shows the construction history through this section of the roadway.

Table 1 – Construction History – R.P. 117.822 to R.P. 119.245

Construction History – R.P. 117.822 to R.P. 119.245					
Year	**Construction Type**	**Depth (in)**	**LHS Width (ft)**	**Roadway Width (ft)**	**RHS Width (ft)**
1968	Grade	-	-	53.0	-
1992	Aggregate Base	5.0	-	52.0	-
1992	Recycled Bituminous Base	5.0	-	39.0	-
1992	Recycled PCC	10.0	4.0	24.0	10.0

Table 2 – Construction History – R.P. 119.245 to R.P. 129.425

Construction History – R.P. 119.245 to R.P. 129.425					
Year	**Construction Type**	**Depth (in)**	**LHS Width (ft)**	**Roadway Width (ft)**	**RHS Width (ft)**
1969	Grade	-	-	48.0	-
1970	Plant Mix Bit Base	2.0	-	28.0	-
1970	Continuously Reinforced PCC	8.0	-	24.0	-
1970	Plant Mix Bit Base	8.0	4.6	-	11.6
1970	Hot Bit Pavement	2.0	3.0	-	10.0
1970	District Sand Seal	-	3.0	-	10.0
1985	Contract Sand Seal	-	-	-	10.0
1996	Hot Bit Pavement	3.4	-	-	10.0
1996	Hot Bit Pavement	4.1	3.0	24.0	-
1996	Drive Slope Flattening	-	-	-	-
1996	Concrete Pavement Repair	-	-	-	-
2000	Chip Seal	-	3.0	24.0	10.0
2008	Micro-Surfacing	-		24.0	-

Existing Pavement Section

The borings were conducted on the shoulder of the roadway because they are asphalt shoulders and this allowed the drill crew to drill under traffic. Therefore, the pavement and base thicknesses for the existing roadway were not measured. The existing pavement section can be found in the existing typical sections and/or the construction history.

Existing Roadway Condition

Distress Data

Table 3 - 2009 Distress Data

Reference Point	"D" Cracking (0-18)	Corner Breaks (0-99)	Longitudinal Cracking (0-9)	Transverse Cracking (0-9)	Faulting (0-12)	Bituminous Patching (0-18)
118.000	0	0	0	0	0	0
119.000	0	0	0	0	0	0
Average	**0**	**0**	**0**	**0**	**0**	**0**

Reference Point	Alligator Cracking (0-18)	Longitudinal Cracking (0-9)	Transverse Cracking (0-9)	Block Cracking (0-9)	Bituminous Patching (0-18)	Rutting (0-12)
120.000	0	4	4	0	6	4
121.000	0	4	7	0	6	4
122.000	0	4	4	0	6	4
123.000	0	4	7	0	6	4
124.000	0	4	4	0	6	4
125.000	0	4	4	0	6	4
126.000	0	4	4	0	6	4
127.000	2	4	7	0	6	4
128.000	2	4	7	0	6	4
129.000	2	4	7	0	6	4
Average	**1**	**4**	**6**	**0**	**6**	**4**

Ride Data

Table 4 – 2009 Ride Data

Reference Point	Distress Score		Rut (inches)		International Roughness Index (inches/mile)	
	Excellent	≥ 98	Excellent	< 0.25	Excellent	< 61
	Good	88 – 97	Good	0.25 – 0.375	Good	61 – 99
	Fair	77 – 87	Fair	0.376 – 0.50	Fair	100 – 145
	Poor	≤ 76	Poor	> 0.50	Poor	>145
118.000	97		0.06*		79.00	
119.000	97		0.12*		65.00	
120.000	87		0.21		57.00	
121.000	84		0.20		58.00	
122.000	87		0.19		58.00	
123.000	84		0.20		65.00	
124.000	87		0.22		57.00	
125.000	87		0.21		56.00	
126.000	87		0.21		54.00	
127.000	82		0.23		57.00	
128.000	82		0.23		58.00	
129.000	82		0.14		62.00	

*Average Faulting

Maintenance Review

On 9/24/2012, Jamie Naumann, Drill Crew Chief, met with Wayne Worden, Grand Forks South Maintenance Section, to discuss any maintenance areas within the project limits. Wayne indicated that there were not any specific areas of concern. During the maintenance review the soils drill crew noted that there was transverse cracking spaced approximately 40 feet apart throughout the entire project limits. It was noted that the roadway was most recently crack sealed in 2010. The pavement evaluation log can be found in Appendix C.

Summary of Soil Analysis

Soil Descriptions

The analysis of the project yielded several different soil types present. The samples collected were classified as AASHTO A-2-4, A-4, A-6, or A-7-6. The sample distribution is shown on the following figure.

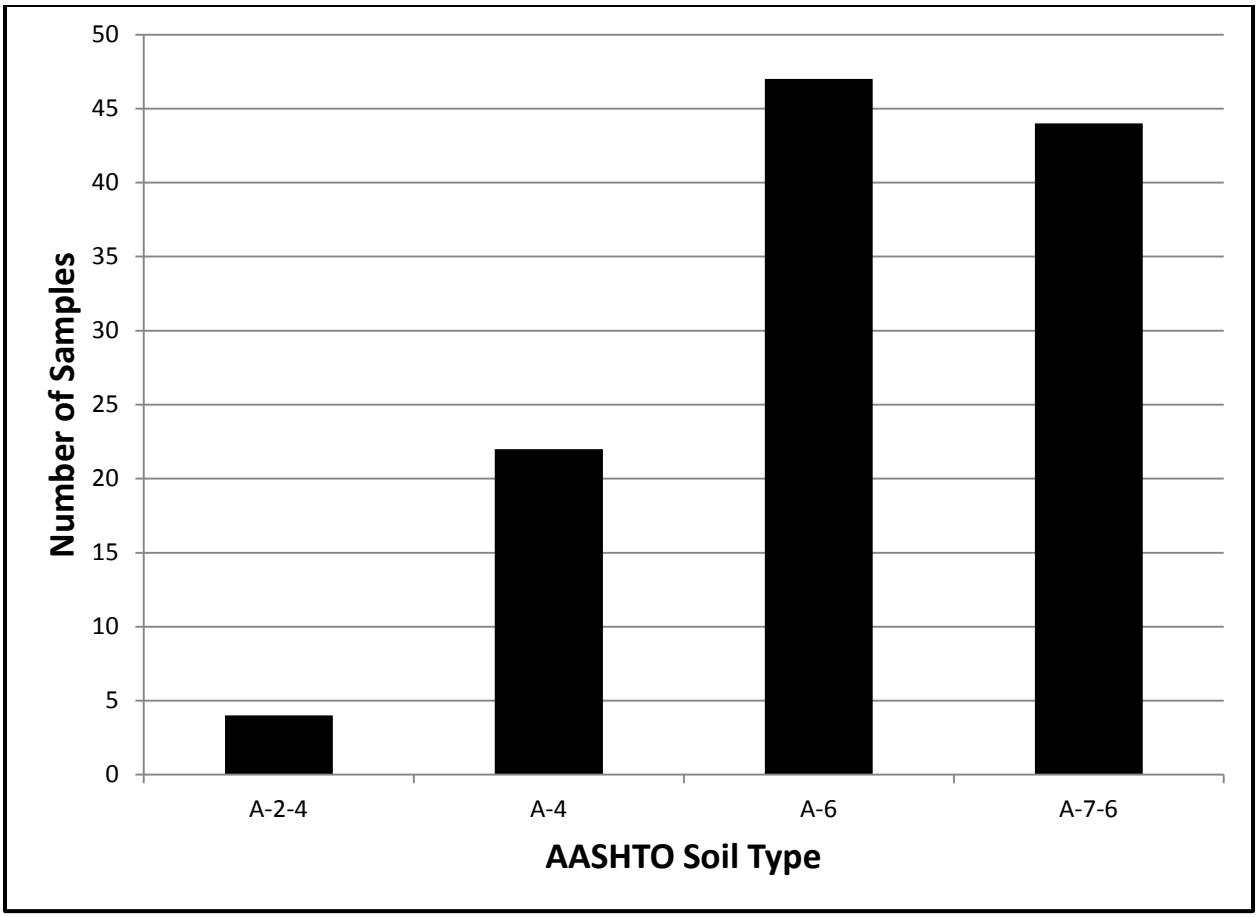

Figure 2 – Soil Sample Distribution

Granular Materials:
The **A-2-4** soils consist primarily of granular materials containing 35 percent or less passing the No. 200 sieve. This includes such materials as gravel and coarse sand with silt contents or plasticity indexes in excess of the limitations of Group A-1. These soils function well as subgrade material.

Silt-Clay Soils:
The **A-4** soils typically contain nonplastic silts. These may have an affinity for water and may swell unless they are properly compacted and drained.

The **A-6** soils typically consist of plastic clays. They usually have high volume change between wet and dry states. These soils have dry strength but lose much of this strength upon absorbing water. The A-6 soils will compress when wet and shrink and swell with changes in moisture content. They do not drain readily and may absorb water by capillarity with resulting loss in strength. These soils can also be highly frost susceptible although they will perform well when moisture is kept near the optimum value.

The **A-7-6** soils possess many of the A-6 characteristics except that they have high liquid limits and may be elastic as well as subject to extremely high volume change. The plasticity index in these soils is high in relation to liquid limit.

Moisture

The moisture contents provided in this report and summarized below have been obtained from samples taken between 9/24/2012 to 9/25/2012.

Table 5 - Summary of In-Place and Optimum Moisture Contents

Quantity	AASHTO Classification	In-Place Moisture Range (%)	In-Place Moisture Average (%)	T-99 Optimum Moisture Average (%)	Difference Between Average In-Place and T-99 Optimum Moistures (%)
4	A-2-4	9.6-21.6	13.40	11.60	1.90
22	A-4	10.7-22.6	14.60	13.20	1.40
47	A-6	10.6-24.5	16.50	15.60	0.90
44	A-7-6	18.1-28.8	22.80	21.00	1.80

Table 6 - Summary of In-Place versus Optimum Moisture Contents

In-Place Moisture vs. Optimum Moisture						
Quantity	**AASHTO Classification**	**Below Optimum**	**Optimum to Moderate** (0 to 6% over optimum)	**Moderate to High** (6 to 10% over optimum)	**High** (10 to 16% over optimum)	**Very High** (> 16% over optimum)
4	A-2-4	50%	25%	25%	-	-
22	A-4	32%	55%	14%	-	-
47	A-6	45%	51%	4%	-	-
44	A-7-6	16%	80%	5%	-	-

Atterberg Limits

Table 7 - Summary of Atterberg Limits

AASHTO Classification	Liquid Limit Range (%)	Liquid Limit Average (%)	Plastic Limit Range (%)	Plastic Limit Average (%)	Plasticity Index Range (%)	Plasticity Index Average (%)
A-2-4	0-19	9	NP-17	8	NP-3	1
A-4	0-36	25	NP-30	18	NP-10	7
A-6	25-40	33	14-22	18	11-22	16
A-7-6	41-60	50	4-29	22	21-37	28

Swell Potential

The swell potential, which is based on the Plasticity Index (PI), is shown in the following table.

Table 8 - Swell Potential

Low (Plasticity Index < 25)	**Marginal** (25 ≤ Plasticity Index ≤ 35)	**High** (Plasticity Index > 35)
73%	26%	2%

Frost Susceptibility

Seventeen samples were classified as an F4 soil. The F4 designation indicates that under the right conditions these soils have a higher probability of heaving during freeze/thaw cycles.

Group Index

All of the samples were classified as A-2-4, A-4, A-6, or A-7-6 soils. The Group Indexes from the samples ranged from a low of 0 to a high of 40 with an average of 15. A group index of 20 or greater indicates a “very poor” subgrade material.

Design Recommendations

The analysis of the soils shows that the moisture contents were low and were, on average, 1.5% above the T-99 optimum moisture contents. None of the 117 samples had moisture contents 10% or more above optimum but seventeen of the samples were classified as F4 soil. On average the samples had a low group index and low swell potential, however, some of the samples had a group index over 20 and a marginal swell potential which correlates to very poor subgrade material. However the existing soils classified as poor subgrade material have performed satisfactorily throughout the life of the roadway.

A majority of the pavement surface is showing fatigue in the form of depressed transverse cracking spaced approximately forty feet apart. The roadway was most recently crack sealed in 2010. There were not any specific maintenance areas noted within the project limits.

Due to the existing soil characteristics, satisfactory performance of the existing subgrade, lack of maintenance areas, and the scope of work it is not recommended to perform any subcut within the project limits. However, the Geotechnical Section does recommend 1000 feet of discretionary subcut to be used in areas that the Project Engineer may deem necessary. It is also recommended by the Geotechnical Section to perform 12 inches of subgrade preparation in the reconstruction area from R.P. 119.245 to R.P. 129.425 with exception of any discretionary subcut areas.

All embankments shall be constructed in accordance with Section 203.02G – AASHTO T-99 of the Standard Specifications.

Design Information

Discretionary Subcut:
This subcut quantity shall be calculated based on 1000 feet in length and 18” in depth and adhere to the guidelines stated below.

Remarks:
Subcut 18” below the top of the proposed grade. Place reinforcement fabric (R1) at the bottom of all subcut excavations and backfill with Class 3 or Class 5 aggregate. Place 12” of aggregate on the fabric prior to compacting. Do not scarify the bottom of the subcut.

Subgrade Preparation:
This subgrade preparation quantity shall be calculated based on 10.18 miles in length and 12” in depth and adhere to the guidelines stated below.

Remarks:
Subgrade preparation shall be performed in compliance with Standard Specification 230.02B.5, “Subgrade Preparation Type C (12 inch)”. Maximum dry density and optimum moisture should be determined in accordance with AASHTO T-99.

Plan Notes

203-360 COMPACTION AND DENSITY CONTROL: Compaction and density controls shall be in accordance with Section 203.02 G of the Standard Specifications AASHTO T-99.

The recommendations in this report are based on the grinding and PCC reconstruction options. If the scope of work, vertical profile or horizontal alignment is changed, in either the conceptual phase or the design phase, Materials and Research must be notified as soon as possible to ensure that there is adequate geotechnical information addressing these areas.

APPENDIX A

SUMMARY OF SOIL ANALYSIS

Project No.: IM-6-029(107)117
PCN: 18694

Color Key					
Group Index:	GI≤20	GI>20			
Swell Potential:	Low	Marginal	High		
Moisture Content:	Below PL	0-5% Over PL	>5% Over PL		
Ave. In-Place: Moisture Content	MC < PL	0 ≤ MC < 6% Over PL	6 ≤ MC < 10% Over PL	10 ≤ MC < 16% Over PL	MC >16% Over PL

Lab No.	STA	Offset	Depth of Sample (ft)	Plastic Limit (PL)	AASHTO Class	Group Index	Optimum Moisture	Swell Potential (PI)	Ave. In-Place Moisture	Moisture Content @ Depth									Frost Class
										2 ft	3 ft	4 ft	5 ft	6 ft	7 ft	8 ft	9 ft	10 ft	
1089	119+1323	Rt 16 NB	1-5	17.5	A-4(2)	2	13.3	8	14.1	16.9	13.3	13.6	12.6						F4
1090	119+1500	Rt 16 NB	1-5	18.6	A-4(3)	3	13.9	9	15.0	13.5	14.4	15.1	16.7						F4
1091	119+2000	Rt 16 NB	1-4.5	16.6	A-4(1)	1	13.6	7	14.5	15.2	15.9	12.6	8.8						F3
1092	119+2500	Rt 16 NB	0.9-4.8	17.3	A-4(1)	1	13.3	7	10.7	10.2	9.9	11.8	9.5						F4
1093	119+3000	Rt 16 NB	1-4.5	16.7	A-4(2)	2	13.2	8	12.6	12.7	11.7	13.4	17.0						F4
1094	119+3500	Rt 16 NB	0.9-5	16.4	A-4(2)	2	13.0	9	12.4	12.8	12.0	11.8	13.1						F4
1095	119+4000	Rt 25 NB	1.3-3.5	18.1	A-6(4)	4	14.1	12	13.9	12.5	15.2								F4
1096	119+4000	Rt 25 NB	3.5-5	19.1	A-6(10)	10	16.2	13	17.9			17.9	17.9						F3
1097	119+4500	Rt 18 NB	1-4	18.0	A-4(2)	2	13.2	9	13.1	13.1	13.0	13.1	14.3						F4
1098	119+5000	Rt 18 NB	1-3.5	16.4	A-4(1)	1	14.0	10	13.2	13.1	13.3								F3
1099	119+5000	Rt 18 NB	3.5-5	21.8	A-6(6)	6	17.2	13	24.2			24.3	24.1						F3
1100	120+0000	Rt 18 NB	1-5	15.7	A-6(6)	6	13.8	15	14.4	14.3	13.7	14.2	15.4						F3
1101	120+0500	Rt 18 NB	1.1-4	17.8	A-4(3)	3	12.9	10	13.0	14.1	13.4	11.5	11.5						F4
1102	120+1000	Rt 18 NB	1-3.7	15.5	A-4(0)	0	11.6	6	11.9	10.9	12.9	5.0	11.7						F3
1103	120+1500	Rt 27 NB	1-4	17.0	A-4(1)	1	12.5	8	12.8	12.1	13.8	12.5	16.5						F3
1104	120+2000	Rt 21 NB	1-5	17.1	A-6(4)	4	13.3	12	13.8	15.4	13.6	13.8	12.3						F4
1105	120+2500	Rt 21 NB	1-5	16.7	A-4(2)	2	12.2	10	11.8	12.3	11.8	11.6	11.6						F4
1106	120+3000	Rt 18 NB	1.1-5	16.5	A-4(0)	0	11.6	7	12.1	13.6	9.7	10.2	14.8						F3
1107	120+3500	Rt 18 NB	0.9-5	17.1	A-6(3)	3	12.7	11	11.7	11.8	16.1	7.0	11.5						F4
1108	120+4000	Rt 18 NB	0.9-4	17.7	A-4(2)	2	12.2	10	11.4	13.5	8.4	12.1	7.7						F3

Project No.: IM-6-029(107)117
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Color Key

Group Index:	GI≤20	GI>20			
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Lab No.	STA	Offset	Depth of Sample (ft)	Plastic Limit (PL)	AASHTO Class	Group Index	Optimum Moisture	Swell Potential (PI)	Ave. In-Place Moisture	Moisture Content @ Depth									Frost Class
										2 ft	3 ft	4 ft	5 ft	6 ft	7 ft	8 ft	9 ft	10 ft	
1109	120+4500	Rt 18 NB	1-5	16.2	A-6(7)	7	12.6	14	14.8	18.9	14.6	11.3	14.6						F3
1110	120+5000	Rt 18 NB	0.9-5	19.9	A-6(6)	6	14.2	13	15.2	13.7	15.9	14.6	16.8						F3
1111	121+0000	Rt 18 NB	1-5	18.0	A-6(4)	4	13.1	12	14.6	14.6	13.6	13.9	16.2						F3
1112	121+0500	Rt 18 NB	0.8-5	17.1	A-6(8)	8	13.9	16	15.7	13.3	14.6	17.9	16.8						F3
1113	121+1000	Rt 18 NB	0.9-4	18.1	A-6(8)	8	14.7	16	13.6	9.5	16.4	15.1	21.6						F3
1114	121+1500	Rt 18 NB	0.8-5	17.0	A-6(4)	4	12.5	12	15.5	6.0	16.1	8.7	31.6						F3
1115	121+2000	Rt 18 NB	1-5	16.7	A-6(5)	5	14.1	15	16.2	12.6	15.8	17.6	19.0						F3
1116	121+2500	Rt 18 NB	0.8-5	16.8	A-6(5)	5	14.0	14	14.2	14.7	15.2	13.7	13.1						F3
1117	121+3000	Rt 18 NB	0.8-5	16.7	A-6(6)	6	14.4	14	14.4	13.9	16.2	13.3	14.4						F3
1118	121+3500	Rt 18 NB	1-5	15.1	A-6(4)	4	13.7	13	14.2	13.6	10.6	17.1	15.3						F3
1119	121+4000	Rt 18 NB	0.8-3.5	0.0	A-2-4(0)	0	11.8	0	11.5	15.5	7.6								F3
1120	121+4000	Rt 18 NB	3.5-5	16.6	A-6(8)	8	14.9	16	14.9			16.2	13.6						F3
1121	121+4500	Rt 18 NB	0.8-5	15.8	A-6(5)	5	13.8	13	12.9	5.1	14.9	14.8	16.9						F3
1122	121+5000	Rt 18 NB	1.1-4.5	16.6	A-4(2)	2	13.8	10	14.1	13.4	16.1	12.9	8.4						F4
1123	122+0000	Rt 17 NB	0.9-4.3	16.5	A-6(7)	7	15.4	15	17.6	20.0	19.3	13.5	8.8						F3
1124	122+0500	Rt 17 NB	0.9-5	25.9	A-4(6)	6	18.4	10	18.7	16.5	17.6	19.6	21.2						F4
1125	122+1000	Rt 17 NB	0.9-5	20.3	A-6(12)	12	17.6	18	23.0	11.7	17.9	24.2	38.3						F3
1126	122+1500	Rt 17 NB	0.9-5	15.1	A-2-4(0)	0	10.9	3	11.1	7.2	9.5	4.9	22.7						F3
1127	122+2000	Rt 17 NB	0.8-4.8	16.6	A-2-4(0)	0	10.9	2	9.6	13.1	9.3	6.4	13.0						F3
1128	122+2500	Rt 17 NB	0.8-5	13.9	A-4(0)	0	11.0	8	12.0	7.5	9.7	13.7	17.3						F3

Project No.: IM-6-029(107)117
PCN: 18694

Color Key					
Group Index:	GI≤20	GI>20			
Swell Potential:	Low	Marginal	High		
Moisture Content:	Below PL	0-5% Over PL	>5% Over PL		
Ave. In-Place: Moisture Content	MC < PL	0 ≤ MC < 6% Over PL	6 ≤ MC < 10% Over PL	10 ≤ MC < 16% Over PL	MC >16% Over PL

Lab No.	STA	Offset	Depth of Sample (ft)	Plastic Limit (PL)	AASHTO Class	Group Index	Optimum Moisture	Swell Potential (PI)	Ave. In-Place Moisture	Moisture Content @ Depth									Frost Class
										2 ft	3 ft	4 ft	5 ft	6 ft	7 ft	8 ft	9 ft	10 ft	
1129	122+3000	Rt 17 NB	0.9-5	13.8	A-6(1)	1	11.8	11	10.6	9.7	13.5	10.8	8.6						F3
1130	122+3500	Rt 17 NB	0.9-3.5	16.3	A-6(6)	6	13.6	13	13.6	11.8	15.4								F3
1131	122+3500	Rt 17 NB	3.5-5	16.2	A-6(3)	3	14.6	12	13.7			14.9	12.6						F4
1132	122+4000	Rt 26 NB	1-5	15.2	A-6(3)	3	13.5	12	15.7	17.4	19.6	10.4	15.6						F3
1133	122+4500	Rt 15 NB	1-5	17.1	A-6(6)	6	13.8	14	12.9	9.2	11.4	19.7	11.5						F3
1134	122+5000	Rt 15 NB	1.2-5	19.3	A-4(1)	1	13.4	7	20.1	8.4	17.7	27.9	26.5						F4
1135	123+0000	Rt 15 NB	0.8-5	0.0	A-2-4(0)	0	12.6	0	21.6	20.1	16.6	25.6	23.8						F3
1136	123+0500	Rt 15 NB	0.8-5	18.3	A-4(0)	0	15.1	4	18.2	20.3	19.1	16.7	16.7						F3
1137	123+1000	Rt 40 NB	1.3-5	0.0	A-4(0)	0	11.7	0	18.7	16.4	17.8	21.4	19.3						F3
1138	123+1500	Rt 25 NB	1-5	24.6	A-4(0)	0	12.3	6	17.7	18.9	20.3	13.7	18.1						F3
1139	123+2000	Rt 16 NB	1.1-5	29.5	A-4(0)	0	14.7	1	22.6	18.2	24.7	25.0	22.7						F4
1140	123+2500	Rt 16 NB	0.7-5	17.2	A-6(3)	3	14.5	11	20.1	19.1	19.7	19.8	21.9						F4
1141	123+3000	Rt 16 NB	0.9-5	18.3	A-6(10)	10	15.0	15	24.5	21.6	21.4	22.0	33.1						F3
1142	123+3500	Rt 16 NB	0.9-5	18.4	A-6(9)	9	15.6	15	19.1	17.3	15.3	21.8	22.1						F3
1143	123+4000	Rt 16 NB	0.8-5	17.6	A-6(9)	9	14.8	16	17.8	17.7	15.4	14.2	23.9						F3
1144	123+4500	Rt 16 NB	0.8-5	18.0	A-6(10)	10	15.7	16	17.7	15.3	17.2	19.4	19.0						F3
1145	123+5000	Rt 16 NB	0.9-5	18.0	A-6(10)	10	16.0	16	16.7	15.0	15.1	18.0	18.6						F3
1146	124+0000	Rt 16 NB	0.9-5	18.8	A-6(10)	10	16.1	16	15.2	13.5	16.7	14.8	15.7						F3
1147	124+0500	Rt 11 NB	0.5-5	19.1	A-6(8)	8	15.3	14	16.9	16.9	14.7	20.3	15.8						F3
1148	124+1000	Rt 16 NB	1.1-5	19.1	A-6(16)	16	18.2	20	15.5	12.1	15.0	15.6	19.2						F3

Project No.: IM-6-029(107)117
PCN: 18694

Color Key

Group Index:	GI≤20	GI>20			
Swell Potential:	Low	Marginal	High		
Moisture Content:	Below PL	0-5% Over PL	>5% Over PL		
Ave. In-Place: Moisture Content	MC < PL	0 ≤ MC < 6% Over PL	6 ≤ MC < 10% Over PL	10 ≤ MC < 16% Over PL	MC >16% Over PL

Lab No.	STA	Offset	Depth of Sample (ft)	Plastic Limit (PL)	AASHTO Class	Group Index	Optimum Moisture	Swell Potential (PI)	Ave. In-Place Moisture	Moisture Content @ Depth									Frost Class
										2 ft	3 ft	4 ft	5 ft	6 ft	7 ft	8 ft	9 ft	10 ft	
1149	124+1500	Rt 16 NB	0.9-5	27.1	A-7-6(22)	22	19.5	22	20.5	15.7	18.0	26.1	22.0						F3
1150	124+2000	Rt 16 NB	0.9-5	19.2	A-6(15)	15	17.1	18	18.9	18.0	17.3	20.6	19.6						F3
1151	124+2500	Rt 16 NB	0.9-5	23.5	A-7-6(20)	20	18.2	22	19.4	17.5	18.3	20.7	21.0						F3
1152	124+3000	Rt 16 NB	0.8-5	20.2	A-7-6(18)	18	18.5	21	18.9	17.9	17.9	20.4	19.5						F3
1153	124+3500	Rt 16 NB	0.9-5	23.0	A-7-6(28)	28	21.8	28	28.8	25.6	21.0	35.0	33.6						F3
1154	124+4000	Rt 16 NB	0.9-5	20.7	A-7-6(27)	27	22.1	28	22.5	16.5	25.5	21.4	26.6						F3
1155	124+4500	Rt 16 NB	0.9-5	20.2	A-7-6(25)	25	18.9	26	20.3	16.2	17.7	24.2	23.2						F3
1156	124+5000	Rt 16 NB	0.9-5	18.9	A-7-6(26)	26	19.7	28	21.0	18.5	17.8	24.0	23.7						F3
1157	125+0000	Rt 16 NB	0.6-5	22.3	A-7-6(22)	22	19.9	25	25.2	25.8	22.8	24.2	28.1						F3
1158	125+0500	Rt 16 NB	1-5	24.0	A-7-6(21)	21	20.2	23	22.7	20.6	25.7	25.0	19.7						F3
1159	125+1000	Rt 16 NB	0.8-5	20.5	A-7-6(26)	26	20.2	28	19.6	19.4	21.8	22.5	14.8						F3
1160	125+1500	Rt 16 NB	0.9-5	23.8	A-7-6(25)	25	19.9	26	21.5	20.9	22.9	23.4	18.9						F3
1161	125+2000	Rt 16 NB	0.9-5	21.5	A-7-6(26)	26	20.2	27	22.7	20.6	22.3	19.1	29.0						F3
1162	125+2500	Rt 16 NB	0.8-5	18.7	A-7-6(31)	31	20.4	32	22.3	19.4	21.6	21.8	26.5						F3
1163	125+3000	Rt 16 NB	0.9-5	23.0	A-7-6(25)	25	22.1	26	28.7	27.6	27.5	28.7	30.8						F3
1164	125+3500	Rt 16 NB	1-5	21.9	A-7-6(31)	31	22.4	32	24.2	21.7	22.9	26.2	25.9						F3
1165	125+4000	Rt 16 NB	0.9-5	22.4	A-7-6(29)	29	21.8	28	24.2	22.8	22.2	29.6	22.3						F3
1166	125+4500	Rt 16 NB	0.9-5	28.6	A-7-6(26)	26	23.3	24	27.0	28.2	21.6	32.6	25.4						F3
1167	125+5000	Rt 16 NB	1-5	23.7	A-7-6(26)	26	21.4	27	24.2	21.0	29.0	23.2	23.5						F3
1168	126+0000	Rt 11 NB	0.4-5	22.0	A-7-6(28)	28	22.9	30	26.1	22.6	31.2	24.6	26.3						F3

Project No.: IM-6-029(107)117
PCN: 18694

Color Key					
Group Index:	GI≤20	GI>20			
Swell Potential:	Low	Marginal	High		
Moisture Content:	Below PL	0-5% Over PL	>5% Over PL		
Ave. In-Place: Moisture Content	MC < PL	0 ≤ MC < 6% Over PL	6 ≤ MC < 10% Over PL	10 ≤ MC < 16% Over PL	MC >16% Over PL

Lab No.	STA	Offset	Depth of Sample (ft)	Plastic Limit (PL)	AASHTO Class	Group Index	Optimum Moisture	Swell Potential (PI)	Ave. In-Place Moisture	Moisture Content @ Depth									Frost Class
										2 ft	3 ft	4 ft	5 ft	6 ft	7 ft	8 ft	9 ft	10 ft	
1169	126+0500	Rt 16 NB	0.9-5	18.9	A-7-6(30)	30	19.9	30	20.8	20.5	19.8	20.8	22.0						F3
1170	126+1000	Rt 16 NB	0.9-5	23.8	A-7-6(26)	26	20.7	26	21.5	22.2	19.7	21.5	22.9						F3
1171	126+1500	Rt 16 NB	0.7-5	22.9	A-7-6(22)	22	19.7	26	24.6	26.0	22.0	28.3	22.4						F3
1172	126+2000	Rt 16 NB	0.9-5	23.1	A-7-6(31)	31	21.9	30	21.3	19.1	21.0	22.4	22.8						F3
1173	126+2500	Rt 16 NB	0.9-5	24.3	A-7-6(31)	31	21.1	30	25.1	23.6	24.3	26.0	26.5						F3
1174	126+3000	Rt 16 NB	0.9-5	23.1	A-7-6(34)	34	20.7	33	24.0	17.9	23.0	25.8	29.1						F3
1175	126+3500	Rt 16 NB	1-5	21.4	A-7-6(38)	38	22.3	35	23.0	22.6	22.5	24.3	22.5						F3
1176	126+4000	Rt 16 NB	0.9-5	23.3	A-7-6(40)	40	20.8	37	22.8	21.8	22.1	23.6	23.9						F3
1177	126+4500	Rt 16 NB	1-5	23.4	A-7-6(35)	35	20.8	32	21.8	18.4	22.2	23.6	23.0						F3
1178	126+5000	Rt 16 NB	0.8-5	23.3	A-7-6(32)	32	21.4	32	23.9	21.3	25.8	23.5	25.1						F3
1179	127+0000	Rt 11 NB	0.5-5	21.6	A-7-6(36)	36	22.4	35	23.5	21.2	23.7	23.0	26.1						F3
1180	127+0500	Rt 16 NB	1.1-5	22.8	A-7-6(36)	36	21.6	34	21.7	13.4	23.0	25.7	24.9						F3
1181	127+1000	Rt 16 NB	1-5	24.5	A-7-6(32)	32	21.3	30	24.6	22.2	21.7	28.7	25.9						F3
1182	127+1500	Rt 16 NB	0.9-5	23.6	A-7-6(38)	38	22.3	35	24.4	24.8	23.5	25.5	24.0						F3
1183	127+2000	Rt 16 NB	0.9-5	20.6	A-7-6(30)	30	22.1	31	23.3	20.7	22.4	23.6	26.2						F3
1184	127+2500	Rt 16 NB	0.8-5	24.6	A-7-6(28)	28	23.0	26	24.5	22.5	21.4	28.4	25.7						F3
1185	127+3000	Rt 16 NB	0.8-4.5	23.2	A-7-6(25)	25	22.3	24	23.8	22.0	24.2	25.3	21.6						F3
1186	127+3500	Rt 16 NB	0.9-4.5	22.0	A-7-6(27)	27	22.5	26	22.1	18.7	22.6	24.8	24.1						F3
1187	127+4000	Rt 16 NB	0.9-5	24.8	A-7-6(26)	26	23.6	24	28.7	20.8	21.2	40.2	32.7						F3
1188	127+4500	Rt 16 NB	1-5	23.0	A-7-6(22)	22	21.9	21	21.1	20.2	19.1	22.3	22.9						F3

Project No.: IM-6-029(107)117
PCN: 18694

Color Key				
Group Index:	GI≤20	GI>20		
Swell Potential:	Low	Marginal	High	
Moisture Content:	Below PL	0-5% Over PL	>5% Over PL	
Ave. In-Place: Moisture Content	MC < PL	0 ≤ MC < 6% Over PL	6 ≤ MC < 10% Over PL	10 ≤ MC < 16% Over PL	MC >16% Over PL

Lab No.	STA	Offset	Depth of Sample (ft)	Plastic Limit (PL)	AASHTO Class	Group Index	Optimum Moisture	Swell Potential (PI)	Ave. In-Place Moisture	Moisture Content @ Depth									Frost Class
										2 ft	3 ft	4 ft	5 ft	6 ft	7 ft	8 ft	9 ft	10 ft	
1189	127+5000	Rt 16 NB	0.9-5	20.8	A-7-6(22)	22	20.0	22	20.5	19.2	20.0	22.7	20.3						F3
1190	128+0000	Rt 11 NB	0.4-5	20.7	A-7-6(21)	21	20.1	23	18.7	16.8	19.0	18.6	20.4						F3
1191	128+0500	Rt 16 NB	0.9-5	21.2	A-7-6(20)	20	20.2	21	19.2	16.3	21.1	19.8	19.3						F3
1192	128+1000	Rt 16 NB	0.9-5	20.8	A-6(18)	18	19.1	19	16.4	19.0	17.8	15.1	13.6						F3
1193	128+1500	Rt 16 NB	0.9-5	4.5	A-7-6(33)	33	19.2	36	18.1	19.2	20.1	16.8	16.5						F3
1194	128+2000	Rt 16 NB	1.1-5	20.4	A-6(20)	20	18.1	20	18.5	18.9	19.3	17.3	18.4						F3
1195	128+2500	Rt 16 NB	0.9-5	19.6	A-6(18)	18	18.8	20	17.8	17.7	17.2	18.7	17.7						F3
1196	128+3000	Rt 16 NB	1-4.5	20.5	A-6(19)	19	18.2	19	18.3	19.6	17.5	17.9	25.2						F3
1197	128+3500	Rt 16 NB	0.9-5	20.0	A-7-6(22)	22	18.8	21	19.0	19.6	15.6	21.0	19.8						F3
1198	128+4000	Rt 16 NB	0.9-4.5	17.8	A-6(21)	21	18.3	22	17.6	17.6	16.7	18.6	22.9						F3
1199	128+4500	Rt 16 NB	0.9-5	18.8	A-6(16)	16	17.7	16	17.8	15.7	18.7	17.3	19.5						F3
1200	128+5000	Rt 16 NB	0.9-5	18.8	A-6(18)	18	17.8	18	17.4	16.3	16.3	20.9	16.3						F3
1201	129+0000	Rt 11 NB	0.4-5	18.7	A-6(16)	16	17.5	17	17.2	18.4	15.8	17.0	17.7						F3
1202	129+0500	Rt 16 NB	0.9-5	17.8	A-6(21)	21	20.0	22	19.8	16.5	21.3	21.6	19.9						F3
1203	129+1000	Rt 16 NB	0.9-5	17.5	A-6(23)	23	19.1	22	17.1	15.6	18.3	15.4	19.2						F3
1204	129+1500	Rt 16 NB	0.9-5	17.3	A-6(22)	22	19.0	22	17.4	16.8	18.3	17.9	16.8						F3
1205	129+2000	Rt 16 NB	0.9-5	17.6	A-6(18)	18	18.2	21	18.0	15.7	19.2	19.7	17.4						F3

APPENDIX B

Lab Results

Linear Laboratory Analysis

Department of Transportation, Materials and Research Division
300 Airport Road, Bismarck ND 58504 (701) 328-6900

Report Number	SS-33-2012	**Date Reported**	10/10/2012	**District**	Fargo
County	GRAND FORKS	**Submitted By**	Naumann	**Project Number**	IM-6-029(107)117
		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1089	1090	1091	1092
Reference Pt + Feet	119+1323	119+1500	119+2000	119+2500
Distance From CenterLine (Ft.)	Rt 16 NB	Rt 16 NB	Rt 16 NB	Rt 16 NB
Depth, Ft.	1.0 - 5.0	1.0 - 5.0	1.0 - 4.5	0.9 - 4.8
Field Sample No.	1089	1090	1091	1092
% Pass. 3/8" Sieve	100	100	99	99
% Pass. No. 4 Sieve	100	99	98	97
% Pass. No. 10 Sieve	98	93	95	95
% Coarse Sand (-No. 10 + No. 40)	3	5	6	6
% Fine Sand (-No. 40 + No. 200)	38	29	42	38
% Silt (0.074 - 0.005 mm)	39	42	30	35
% Clay (-0.005 mm)	19	17	18	16
Liquid Limit (-No. 40)	25	27	24	24
Plasticity Index (-No. 40)	8	9	7	7
Plastic Limit	18	19	17	17
Soil Color	BRN/GRY/BLK	BRN	BRN/BLK	BRN/BLK
Textural Class	LM	LM	SNDY LM	LM
Soil Class (AASHTO M-145)	A-4(2)	A-4(3)	A-4(1)	A-4(1)
Frost Class	F4	F4	F3	F4
Optimum Moisture (%)	13.3	13.9	13.6	13.3
Maximum Dry Density (pcf)	116.4	115.8	116.9	118.2
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 16.9	2 | 13.5	2 | 15.2	2 | 10.2
	3 | 13.3	3 | 14.4	3 | 15.9	3 | 9.9
	4 | 13.6	4 | 15.1	4 | 12.6	4 | 11.8
	5 | 12.6	5 | 16.7	5 | 8.8	5 | 9.5
Avg. Moisture of Sample Depth	14.1	15.0	14.5	10.7

Scott W. Wutzke, Testing Lab Supervisor
Date Printed: 1/14/2013

Linear Laboratory Analysis

Department of Transportation, Materials and Research Division
300 Airport Road, Bismarck ND 58504 (701) 328-6900

Report Number	SS-33-2012	**Date Reported**	10/10/2012	**District**	Fargo
County	GRAND FORKS	**Submitted By**	Naumann	**Project Number**	IM-6-029(107)117
		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1093	1094	1095	1096
Reference Pt + Feet	119+3000	119+3500	119+4000	119+4000
Distance From CenterLine (Ft.)	Rt 16 NB	Rt 16 NB	Rt 25 NB	Rt 25 NB
Depth, Ft.	1.0 - 4.5	0.9 - 5.0	1.3 - 3.5	3.5 - 5.0
Field Sample No.	1093	1094	1095	1096
% Pass. 3/8" Sieve	99	100	100	100
% Pass. No. 4 Sieve	99	100	97	99
% Pass. No. 10 Sieve	97	98	92	98
% Coarse Sand (-No. 10 + No. 40)	4	5	9	2
% Fine Sand (-No. 40 + No. 200)	38	38	29	15
% Silt (0.074 - 0.005 mm)	38	36	37	58
% Clay (-0.005 mm)	18	19	17	23
Liquid Limit (-No. 40)	25	25	30	32
Plasticity Index (-No. 40)	8	9	12	13
Plastic Limit	17	16	18	19
Soil Color	BRN/GRY/BLK	BLK/GRY	BRN/BLK	BRN/TAN
Textural Class	LM	LM	LM	SLTY CLY LM
Soil Class (AASHTO M-145)	A-4(2)	A-4(2)	A-6(4)	A-6(10)
Frost Class	F4	F4	F4	F3
Optimum Moisture (%)	13.2	13.0	14.1	16.2
Maximum Dry Density (pcf)	117.6	116.8	114.4	110.6
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 12.7	2 | 12.8	2 | 12.5	4 | 17.9
	3 | 11.7	3 | 12.0	3 | 15.2	5 | 17.9
	4 | 13.4	4 | 11.8	13.9	17.9
	5 | 17.0	5 | 13.1		
Avg. Moisture of Sample Depth	12.6	12.4		

Scott W. Wutzke, Testing Lab Supervisor
Date Printed: 1/14/2013

Linear Laboratory Analysis

Department of Transportation, Materials and Research Division
300 Airport Road, Bismarck ND 58504 (701) 328-6900

Report Number	SS-33-2012	**Date Reported**	10/10/2012	**District**	Fargo
County	GRAND FORKS	**Submitted By**	Naumann	**Project Number**	IM-6-029(107)117
		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1097	1098	1099	1100
Reference Pt + Feet	119+4500	119+5000	119+5000	120+0000
Distance From CenterLine (Ft.)	Rt 18 NB	Rt 18 NB	Rt 18 NB	Rt 18 NB
Depth, Ft.	1.0 - 4.0	1.0 - 3.5	3.5 - 5.0	1.0 - 5.0
Field Sample No.	1097	1098	1099	1100
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	99	99	99	100
% Pass. No. 10 Sieve	97	97	98	99
% Coarse Sand (-No. 10 + No. 40)	7	12	4	5
% Fine Sand (-No. 40 + No. 200)	34	42	34	35
% Silt (0.074 - 0.005 mm)	38	27	37	38
% Clay (-0.005 mm)	18	17	24	21
Liquid Limit (-No. 40)	27	26	35	31
Plasticity Index (-No. 40)	9	10	13	15
Plastic Limit	18	16	22	16
Soil Color	BRN/BLK	BRN	BRN/BLK	BRN/BLK
Textural Class	LM	SNDY LM	CLY LM	CLY LM
Soil Class (AASHTO M-145)	A-4(2)	A-4(1)	A-6(6)	A-6(6)
Frost Class	F4	F3	F3	F3
Optimum Moisture (%)	13.2	14.0	17.2	13.8
Maximum Dry Density (pcf)	117.4	114.8	107.8	116.2
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 13.1	2 | 13.1	4 | 24.3	2 | 14.3
	3 | 13.0	3 | 13.3	5 | 24.1	3 | 13.7
	4 | 13.1	13.2	24.2	4 | 14.2
	5 | 14.3			5 | 15.4
Avg. Moisture of Sample Depth	13.1			14.4

Scott W. Wutzke, Testing Lab Supervisor
Date Printed: 1/14/2013

Linear Laboratory Analysis

Department of Transportation, Materials and Research Division
300 Airport Road, Bismarck ND 58504 (701) 328-6900

Report Number	SS-33-2012	**Date Reported**	10/10/2012	**District**	Fargo
County	GRAND FORKS	**Submitted By**	Naumann	**Project Number**	IM-6-029(107)117
		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1101	1102	1103	1104
Reference Pt + Feet	120+0500	120+1000	120+1500	120+2000
Distance From CenterLine (Ft.)	Rt 18 NB	Rt 18 NB	Rt 27 NB	Rt 21 NB
Depth, Ft.	1.1 - 4.0	1.0 - 3.7	1.0 - 4.0	1.0 - 5.0
Field Sample No.	1101	1102	1103	1104
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	99	100	100	100
% Pass. No. 10 Sieve	98	100	99	99
% Coarse Sand (-No. 10 + No. 40)	8	9	8	6
% Fine Sand (-No. 40 + No. 200)	34	53	48	34
% Silt (0.074 - 0.005 mm)	38	25	25	38
% Clay (-0.005 mm)	19	13	19	21
Liquid Limit (-No. 40)	28	22	25	29
Plasticity Index (-No. 40)	10	6	8	12
Plastic Limit	18	16	17	17
Soil Color	BRN/BLK	BRN/BLK	BRN/BLK	BLK/GRY
Textural Class	LM	SNDY LM	SNDY LM	CLY LM
Soil Class (AASHTO M-145)	A-4(3)	A-4(0)	A-4(1)	A-6(4)
Frost Class	F4	F3	F3	F4
Optimum Moisture (%)	12.9	11.6	12.5	13.3
Maximum Dry Density (pcf)	118.9	120.8	117.9	116.0
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 14.1	2 | 10.9	2 | 12.1	2 | 15.4
	3 | 13.4	3 | 12.9	3 | 13.8	3 | 13.6
	4 | 11.5	4 | 5.0	4 | 12.5	4 | 13.8
	5 | 11.5	5 | 11.7	5 | 16.5	5 | 12.3
Avg. Moisture of Sample Depth	13.0	11.9	12.8	13.8

Scott W. Wutzke, Testing Lab Supervisor
Date Printed: 1/14/2013

Linear Laboratory Analysis

Department of Transportation, Materials and Research Division
300 Airport Road, Bismarck ND 58504 (701) 328-6900

Report Number	SS-33-2012	**Date Reported**	10/10/2012	**District**	Fargo
County	GRAND FORKS	**Submitted By**	Naumann	**Project Number**	IM-6-029(107)117
		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1105	1106	1107	1108
Reference Pt + Feet	120+2500	120+3000	120+3500	120+4000
Distance From CenterLine (Ft.)	Rt 21 NB	Rt 18 NB	Rt 18 NB	Rt 18 NB
Depth, Ft.	1.0 - 5.0	1.1 - 5.0	0.9 - 5.0	0.9 - 4.0
Field Sample No.	1105	1106	1107	1108
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	100	100	100	99
% Pass. No. 10 Sieve	99	99	99	96
% Coarse Sand (-No. 10 + No. 40)	9	11	9	11
% Fine Sand (-No. 40 + No. 200)	40	44	37	38
% Silt (0.074 - 0.005 mm)	32	31	32	29
% Clay (-0.005 mm)	18	14	21	18
Liquid Limit (-No. 40)	26	23	28	28
Plasticity Index (-No. 40)	10	7	11	10
Plastic Limit	17	17	17	18
Soil Color	BRN/BLK	BRN/BLK	BLK/GRY	BRN/BLK
Textural Class	LM	SNDY LM	CLY LM	SNDY LM
Soil Class (AASHTO M-145)	A-4(2)	A-4(0)	A-6(3)	A-4(2)
Frost Class	F4	F3	F4	F3
Optimum Moisture (%)	12.2	11.6	12.7	12.2
Maximum Dry Density (pcf)	117.7	120.2	116.7	117.8
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 12.3	2 | 13.6	2 | 11.8	2 | 13.5
	3 | 11.8	3 | 9.7	3 | 16.1	3 | 8.4
	4 | 11.6	4 | 10.2	4 | 7.0	4 | 12.1
	5 | 11.6	5 | 14.8	5 | 11.5	5 | 7.7
Avg. Moisture of Sample Depth	11.8	12.1	11.7	11.4

Scott W. Wutzke, Testing Lab Supervisor
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Linear Laboratory Analysis

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		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1109	1110	1111	1112
Reference Pt + Feet	120+4500	120+5000	121+0000	121+0500
Distance From CenterLine (Ft.)	Rt 18 NB	Rt 18 NB	Rt 18 NB	Rt 18 NB
Depth, Ft.	1.0 - 5.0	0.9 - 5.0	1.0 - 5.0	0.8 - 5.0
Field Sample No.	1109	1110	1111	1112
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	99	98	100	99
% Pass. No. 10 Sieve	96	97	99	98
% Coarse Sand (-No. 10 + No. 40)	6	6	8	6
% Fine Sand (-No. 40 + No. 200)	26	28	33	27
% Silt (0.074 - 0.005 mm)	44	58	39	41
% Clay (-0.005 mm)	20	4	19	24
Liquid Limit (-No. 40)	31	33	30	34
Plasticity Index (-No. 40)	15	13	12	17
Plastic Limit	16	20	18	17
Soil Color	BRN/GRY/BLK	BRN/BLK	BRN/BLK	BRN/GRY/BLK
Textural Class	CLY LM	SLTY LM	LM	CLY LM
Soil Class (AASHTO M-145)	A-6(7)	A-6(6)	A-6(4)	A-6(8)
Frost Class	F3	F3	F3	F3
Optimum Moisture (%)	12.6	14.2	13.1	13.9
Maximum Dry Density (pcf)	116.6	113.0	115.6	114.5
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 18.9	2 | 13.7	2 | 14.6	2 | 13.3
	3 | 14.6	3 | 15.9	3 | 13.6	3 | 14.6
	4 | 11.3	4 | 14.6	4 | 13.9	4 | 17.9
	5 | 14.6	5 | 16.8	5 | 16.2	5 | 16.8
Avg. Moisture of Sample Depth	14.8	15.2	14.6	15.7

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		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1113	1114	1115	1116
Reference Pt + Feet	121+1000	121+1500	121+2000	121+2500
Distance From CenterLine (Ft.)	Rt 18 NB	Rt 18 NB	Rt 18 NB	Rt 18 NB
Depth, Ft.	0.9 - 4.0	0.8 - 5.0	1.0 - 5.0	0.8 - 5.0
Field Sample No.	1113	1114	1115	1116
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	99	99	99	99
% Pass. No. 10 Sieve	98	98	97	98
% Coarse Sand (-No. 10 + No. 40)	6	6	7	6
% Fine Sand (-No. 40 + No. 200)	28	37	34	34
% Silt (0.074 - 0.005 mm)	41	34	34	35
% Clay (-0.005 mm)	23	21	22	23
Liquid Limit (-No. 40)	34	29	32	31
Plasticity Index (-No. 40)	16	12	15	14
Plastic Limit	18	17	17	17
Soil Color	BLK/GRY	BRN/GRY/BLK	BRN/GRY/BLK	BLK/GRY
Textural Class	CLY LM	CLY LM	CLY LM	CLY LM
Soil Class (AASHTO M-145)	A-6(8)	A-6(4)	A-6(5)	A-6(5)
Frost Class	F3	F3	F3	F3
Optimum Moisture (%)	14.7	12.5	14.1	14.0
Maximum Dry Density (pcf)	113.1	118.3	114.6	114.0
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 9.5	2 | 6.0	2 | 12.6	2 | 14.7
	3 | 16.4	3 | 16.1	3 | 15.8	3 | 15.2
	4 | 15.1	4 | 8.7	4 | 17.6	4 | 13.7
	5 | 21.6	5 | 31.6	5 | 19.0	5 | 13.1
Avg. Moisture of Sample Depth	13.6	15.5	16.2	14.2

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		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1117	1118	1119	1120
Reference Pt + Feet	121+3000	121+3500	121+4000	121+4000
Distance From CenterLine (Ft.)	Rt 18 NB	Rt 18 NB	Rt 18 NB	Rt 18 NB
Depth, Ft.	0.8 - 5.0	1.0 - 5.0	0.8 - 3.5	3.5 - 5.0
Field Sample No.	1117	1118	1119	1120
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	99	99	98	100
% Pass. No. 10 Sieve	96	97	94	99
% Coarse Sand (-No. 10 + No. 40)	6	5	8	5
% Fine Sand (-No. 40 + No. 200)	30	35	60	28
% Silt (0.074 - 0.005 mm)	38	39	16	41
% Clay (-0.005 mm)	22	19	10	26
Liquid Limit (-No. 40)	31	28	0	32
Plasticity Index (-No. 40)	14	13	NP	16
Plastic Limit	17	15	0	17
Soil Color	BLK/GRY	BRN/GRY/BLK	BRN	BRN/GRY
Textural Class	CLY LM	LM	SNDY LM	CLY LM
Soil Class (AASHTO M-145)	A-6(6)	A-6(4)	A-2-4(0)	A-6(8)
Frost Class	F3	F3	F3	F3
Optimum Moisture (%)	14.4	13.7	11.8	14.9
Maximum Dry Density (pcf)	113.9	116.0	116.9	112.9
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 13.9	2 | 13.6	2 | 15.5	4 | 16.2
	3 | 16.2	3 | 10.6	3 | 7.6	5 | 13.6
	4 | 13.3	4 | 17.1	11.5	14.9
	5 | 14.4	5 | 15.3		
Avg. Moisture of Sample Depth	14.4	14.2		

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		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1121	1122	1123	1124
Reference Pt + Feet	121+4500	121+5000	122+0000	122+0500
Distance From CenterLine (Ft.)	Rt 18 NB	Rt 18 NB	Rt 17 NB	Rt 17 NB
Depth, Ft.	0.8 - 5.0	1.1 - 4.5	0.9 - 4.3	0.9 - 5.0
Field Sample No.	1121	1122	1123	1124
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	100	100	100	100
% Pass. No. 10 Sieve	99	99	99	99
% Coarse Sand (-No. 10 + No. 40)	5	5	5	4
% Fine Sand (-No. 40 + No. 200)	31	42	28	25
% Silt (0.074 - 0.005 mm)	42	33	44	38
% Clay (-0.005 mm)	21	19	22	32
Liquid Limit (-No. 40)	29	26	32	36
Plasticity Index (-No. 40)	13	10	15	10
Plastic Limit	16	17	17	26
Soil Color	BRN	BRN/BLK	BRN/BLK	BRN/GRY/BLK
Textural Class	CLY LM	LM	CLY LM	CLY
Soil Class (AASHTO M-145)	A-6(5)	A-4(2)	A-6(7)	A-4(6)
Frost Class	F3	F4	F3	F4
Optimum Moisture (%)	13.8	13.8	15.4	18.4
Maximum Dry Density (pcf)	116.5	114.9	112.2	106.4
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 5.1	2 | 13.4	2 | 20.0	2 | 16.5
	3 | 14.9	3 | 16.1	3 | 19.3	3 | 17.6
	4 | 14.8	4 | 12.9	4 | 13.5	4 | 19.6
	5 | 16.9	5 | 8.4	5 | 8.8	5 | 21.2
Avg. Moisture of Sample Depth	12.9	14.1	17.6	18.7

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		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1125	1126	1127	1128
Reference Pt + Feet	122+1000	122+1500	122+2000	122+2500
Distance From CenterLine (Ft.)	Rt 17 NB	Rt 17 NB	Rt 17 NB	Rt 17 NB
Depth, Ft.	0.9 - 5.0	0.9 - 5.0	0.8 - 4.8	0.8 - 5.0
Field Sample No.	1125	1126	1127	1128
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	99	99	98	100
% Pass. No. 10 Sieve	97	97	95	100
% Coarse Sand (-No. 10 + No. 40)	6	13	13	7
% Fine Sand (-No. 40 + No. 200)	18	56	54	54
% Silt (0.074 - 0.005 mm)	49	16	14	23
% Clay (-0.005 mm)	25	12	14	15
Liquid Limit (-No. 40)	38	18	19	22
Plasticity Index (-No. 40)	18	3	2	8
Plastic Limit	20	15	17	14
Soil Color	BRN/GRY/BLK	BRN/BLK	BRN/BLK	BRN/GRY/BLK
Textural Class	CLY LM	SNDY LM	SNDY LM	SNDY LM
Soil Class (AASHTO M-145)	A-6(12)	A-2-4(0)	A-2-4(0)	A-4(0)
Frost Class	F3	F3	F3	F3
Optimum Moisture (%)	17.6	10.9	10.9	11.0
Maximum Dry Density (pcf)	108.2	121.5	120.0	121.1
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 11.7	2 | 7.2	2 | 13.1	2 | 7.5
	3 | 17.9	3 | 9.5	3 | 9.3	3 | 9.7
	4 | 24.2	4 | 4.9	4 | 6.4	4 | 13.7
	5 | 38.3	5 | 22.7	5 | 13.0	5 | 17.3
Avg. Moisture of Sample Depth	23.0	11.1	9.6	12.0

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		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1129	1130	1131	1132
Reference Pt + Feet	122+3000	122+3500	122+3500	122+4000
Distance From CenterLine (Ft.)	Rt 17 NB	Rt 17 NB	Rt 17 NB	Rt 26 NB
Depth, Ft.	0.9 - 5.0	0.9 - 3.5	3.5 - 5.0	1.0 - 5.0
Field Sample No.	1129	1130	1131	1132
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	100	99	100	99
% Pass. No. 10 Sieve	99	98	99	97
% Coarse Sand (-No. 10 + No. 40)	11	5	4	7
% Fine Sand (-No. 40 + No. 200)	46	30	42	37
% Silt (0.074 - 0.005 mm)	22	38	33	31
% Clay (-0.005 mm)	19	25	21	22
Liquid Limit (-No. 40)	25	30	28	27
Plasticity Index (-No. 40)	11	13	12	12
Plastic Limit	14	16	16	15
Soil Color	BRN/GRY/BLK	BRN	BLK	BLK/GRY
Textural Class	SNDY LM	CLY LM	CLY LM	CLY LM
Soil Class (AASHTO M-145)	A-6(1)	A-6(6)	A-6(3)	A-6(3)
Frost Class	F3	F3	F4	F3
Optimum Moisture (%)	11.8	13.6	14.6	13.5
Maximum Dry Density (pcf)	120.4	115.4	114.2	116.6
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 9.7	2 | 11.8	4 | 14.9	2 | 17.4
	3 | 13.5	3 | 15.4	5 | 12.6	3 | 19.6
	4 | 10.8	13.6	13.7	4 | 10.4
	5 | 8.6			5 | 15.6
Avg. Moisture of Sample Depth	10.6			15.7

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Comments

Lab Number	1133	1134	1135	1136
Reference Pt + Feet	122+4500	122+5000	123+0000	123+0500
Distance From CenterLine (Ft.)	Rt 15 NB	Rt 15 NB	Rt 15 NB	Rt 15 NB
Depth, Ft.	1.0 - 5.0	1.2 - 5.0	0.8 - 5.0	0.8 - 5.0
Field Sample No.	1133	1134	1135	1136
% Pass. 3/8" Sieve	99	99	100	100
% Pass. No. 4 Sieve	99	99	100	99
% Pass. No. 10 Sieve	97	98	100	98
% Coarse Sand (-No. 10 + No. 40)	5	5	5	3
% Fine Sand (-No. 40 + No. 200)	31	43	62	51
% Silt (0.074 - 0.005 mm)	39	34	19	25
% Clay (-0.005 mm)	22	17	13	19
Liquid Limit (-No. 40)	31	26	0	23
Plasticity Index (-No. 40)	14	7	NP	4
Plastic Limit	17	19	0	18
Soil Color	BRN/GRY/BLK	BLK/GRY	BRN/GRY/BLK	BRN/GRY/BLK
Textural Class	CLY LM	LM	SNDY LM	SNDY LM
Soil Class (AASHTO M-145)	A-6(6)	A-4(1)	A-2-4(0)	A-4(0)
Frost Class	F3	F4	F3	F3
Optimum Moisture (%)	13.8	13.4	12.6	15.1
Maximum Dry Density (pcf)	115.5	116.3	115.8	114.7
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 9.2	2 | 8.4	2 | 20.1	2 | 20.3
	3 | 11.4	3 | 17.7	3 | 16.6	3 | 19.1
	4 | 19.7	4 | 27.9	4 | 25.6	4 | 16.7
	5 | 11.5	5 | 26.5	5 | 23.8	5 | 16.7
Avg. Moisture of Sample Depth	12.9	20.1	21.6	18.2

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Comments

Lab Number	1137	1138	1139	1140
Reference Pt + Feet	123+1000	123+1500	123+2000	123+2500
Distance From CenterLine (Ft.)	Rt 40 NB	Rt 25 NB	Rt 16 NB	Rt 16 NB
Depth, Ft.	1.3 - 5.0	1.0 - 5.0	1.1 - 5.0	0.7 - 5.0
Field Sample No.	1137	1138	1139	1140
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	100	100	100	100
% Pass. No. 10 Sieve	99	100	100	100
% Coarse Sand (-No. 10 + No. 40)	4	4	3	3
% Fine Sand (-No. 40 + No. 200)	59	51	44	42
% Silt (0.074 - 0.005 mm)	23	29	33	34
% Clay (-0.005 mm)	13	16	21	21
Liquid Limit (-No. 40)	0	31	31	28
Plasticity Index (-No. 40)	NP	6	1	11
Plastic Limit	0	25	30	17
Soil Color	BRN/BLK	BRN/GRY/BLK	BRN/GRY/BLK	BRN/GRY/BLK
Textural Class	SNDY LM	SNDY LM	CLY LM	CLY LM
Soil Class (AASHTO M-145)	A-4(0)	A-4(0)	A-4(0)	A-6(3)
Frost Class	F3	F3	F4	F4
Optimum Moisture (%)	11.7	12.3	14.7	14.5
Maximum Dry Density (pcf)	118.5	117.5	112.3	113.2
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 16.4	2 | 18.9	2 | 18.2	2 | 19.1
	3 | 17.8	3 | 20.3	3 | 24.7	3 | 19.7
	4 | 21.4	4 | 13.7	4 | 25.0	4 | 19.8
	5 | 19.3	5 | 18.1	5 | 22.7	5 | 21.9
Avg. Moisture of Sample Depth	18.7	17.7	22.6	20.1

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Comments

Lab Number	1141	1142	1143	1144
Reference Pt + Feet	123+3000	123+3500	123+4000	123+4500
Distance From CenterLine (Ft.)	Rt 16 NB	Rt 16 NB	Rt 16 NB	Rt 16 NB
Depth, Ft.	0.9 - 5.0	0.9 - 5.0	0.8 - 5.0	0.8 - 5.0
Field Sample No.	1141	1142	1143	1144
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	100	100	100	100
% Pass. No. 10 Sieve	99	99	99	100
% Coarse Sand (-No. 10 + No. 40)	2	2	2	1
% Fine Sand (-No. 40 + No. 200)	23	27	27	27
% Silt (0.074 - 0.005 mm)	49	47	47	44
% Clay (-0.005 mm)	25	23	23	27
Liquid Limit (-No. 40)	34	34	33	35
Plasticity Index (-No. 40)	15	15	16	17
Plastic Limit	18	18	18	18
Soil Color	BRN/GRY/BLK	BRN/GRY/BLK	BRN/BLK	BRN/GRY/BLK
Textural Class	CLY LM	CLY LM	CLY LM	CLY LM
Soil Class (AASHTO M-145)	A-6(10)	A-6(9)	A-6(9)	A-6(10)
Frost Class	F3	F3	F3	F3
Optimum Moisture (%)	15.0	15.6	14.8	15.7
Maximum Dry Density (pcf)	112.6	111.6	112.6	110.6
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 21.6	2 | 17.3	2 | 17.7	2 | 15.3
	3 | 21.4	3 | 15.3	3 | 15.4	3 | 17.2
	4 | 22.0	4 | 21.8	4 | 14.2	4 | 19.4
	5 | 33.1	5 | 22.1	5 | 23.9	5 | 19.0
Avg. Moisture of Sample Depth	24.5	19.1	17.8	17.7

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		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1145	1146	1147	1148
Reference Pt + Feet	123+5000	124+0000	124+0500	124+1000
Distance From CenterLine (Ft.)	Rt 16 NB	Rt 16 NB	Rt 11 NB	Rt 16 NB
Depth, Ft.	0.9 - 5.0	0.9 - 5.0	0.5 - 5.0	1.1 - 5.0
Field Sample No.	1145	1146	1147	1148
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	100	100	100	100
% Pass. No. 10 Sieve	100	100	100	100
% Coarse Sand (-No. 10 + No. 40)	1	2	2	2
% Fine Sand (-No. 40 + No. 200)	26	25	28	15
% Silt (0.074 - 0.005 mm)	48	47	43	54
% Clay (-0.005 mm)	25	26	27	29
Liquid Limit (-No. 40)	34	35	34	39
Plasticity Index (-No. 40)	16	16	14	20
Plastic Limit	18	19	19	19
Soil Color	BRN/GRY/BLK	BLK/GRY	BRN/GRY/BLK	BRN/GRY/BLK
Textural Class	CLY LM	CLY LM	CLY LM	SLTY CLY LM
Soil Class (AASHTO M-145)	A-6(10)	A-6(10)	A-6(8)	A-6(16)
Frost Class	F3	F3	F3	F3
Optimum Moisture (%)	16.0	16.1	15.3	18.2
Maximum Dry Density (pcf)	109.9	110.4	113.1	105.0
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 15.0	2 | 13.5	2 | 16.9	2 | 12.1
	3 | 15.1	3 | 16.7	3 | 14.7	3 | 15.0
	4 | 18.0	4 | 14.8	4 | 20.3	4 | 15.6
	5 | 18.6	5 | 15.7	5 | 15.8	5 | 19.2
Avg. Moisture of Sample Depth	16.7	15.2	16.9	15.5

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Linear Laboratory Analysis

Department of Transportation, Materials and Research Division
300 Airport Road, Bismarck ND 58504 (701) 328-6900

Report Number	SS-33-2012	**Date Reported**	10/10/2012	**District**	Fargo
County	GRAND FORKS	**Submitted By**	Naumann	**Project Number**	IM-6-029(107)117
		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1149	1150	1151	1152
Reference Pt + Feet	124+1500	124+2000	124+2500	124+3000
Distance From CenterLine (Ft.)	Rt 16 NB	Rt 16 NB	Rt 16 NB	Rt 16 NB
Depth, Ft.	0.9 - 5.0	0.9 - 5.0	0.9 - 5.0	0.8 - 5.0
Field Sample No.	1149	1150	1151	1152
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	100	100	99	100
% Pass. No. 10 Sieve	100	99	99	100
% Coarse Sand (-No. 10 + No. 40)	1	2	1	1
% Fine Sand (-No. 40 + No. 200)	11	13	12	14
% Silt (0.074 - 0.005 mm)	55	56	53	54
% Clay (-0.005 mm)	32	29	33	31
Liquid Limit (-No. 40)	49	38	45	41
Plasticity Index (-No. 40)	22	19	22	21
Plastic Limit	27	19	24	20
Soil Color	BRN/GRY/BLK	BRN/GRY/BLK	BRN/GRY/BLK	BRN/GRY/BLK
Textural Class	SLTY CLY	SLTY CLY LM	CLY	CLY
Soil Class (AASHTO M-145)	A-7-6(22)	A-6(15)	A-7-6(20)	A-7-6(18)
Frost Class	F3	F3	F3	F3
Optimum Moisture (%)	19.5	17.1	18.2	18.5
Maximum Dry Density (pcf)	103.3	107.6	101.3	103.1
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 15.7	2 | 18.0	2 | 17.5	2 | 17.9
	3 | 18.0	3 | 17.3	3 | 18.3	3 | 17.9
	4 | 26.1	4 | 20.6	4 | 20.7	4 | 20.4
	5 | 22.0	5 | 19.6	5 | 21.0	5 | 19.5
Avg. Moisture of Sample Depth	20.5	18.9	19.4	18.9

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Linear Laboratory Analysis

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Report Number	SS-33-2012	**Date Reported**	10/10/2012	**District**	Fargo
County	GRAND FORKS	**Submitted By**	Naumann	**Project Number**	IM-6-029(107)117
		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1153	1154	1155	1156
Reference Pt + Feet	124+3500	124+4000	124+4500	124+5000
Distance From CenterLine (Ft.)	Rt 16 NB	Rt 16 NB	Rt 16 NB	Rt 16 NB
Depth, Ft.	0.9 - 5.0	0.9 - 5.0	0.9 - 5.0	0.9 - 5.0
Field Sample No.	1153	1154	1155	1156
% Pass. 3/8" Sieve	99	100	100	100
% Pass. No. 4 Sieve	99	100	100	100
% Pass. No. 10 Sieve	98	100	99	99
% Coarse Sand (-No. 10 + No. 40)	2	1	1	2
% Fine Sand (-No. 40 + No. 200)	6	7	8	8
% Silt (0.074 - 0.005 mm)	59	58	55	54
% Clay (-0.005 mm)	31	33	36	35
Liquid Limit (-No. 40)	51	49	46	47
Plasticity Index (-No. 40)	28	28	26	28
Plastic Limit	23	21	20	19
Soil Color	BLK/GRY	BRN/GRY/BLK	BLK/GRY	BRN/GRY/BLK
Textural Class	SLTY CLY	SLTY CLY	CLY	CLY
Soil Class (AASHTO M-145)	A-7-6(28)	A-7-6(27)	A-7-6(25)	A-7-6(26)
Frost Class	F3	F3	F3	F3
Optimum Moisture (%)	21.8	22.1	18.9	19.7
Maximum Dry Density (pcf)	95.3	98.1	103.2	100.9
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 25.6	2 | 16.5	2 | 16.2	2 | 18.5
	3 | 21.0	3 | 25.5	3 | 17.7	3 | 17.8
	4 | 35.0	4 | 21.4	4 | 24.2	4 | 24.0
	5 | 33.6	5 | 26.6	5 | 23.2	5 | 23.7
Avg. Moisture of Sample Depth	28.8	22.5	20.3	21.0

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Linear Laboratory Analysis

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Report Number	SS-33-2012	**Date Reported**	10/10/2012	**District**	Fargo
County	GRAND FORKS	**Submitted By**	Naumann	**Project Number**	IM-6-029(107)117
		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1157	1158	1159	1160
Reference Pt + Feet	125+0000	125+0500	125+1000	125+1500
Distance From CenterLine (Ft.)	Rt 16 NB	Rt 16 NB	Rt 16 NB	Rt 16 NB
Depth, Ft.	0.6 - 5.0	1.0 - 5.0	0.8 - 5.0	0.9 - 5.0
Field Sample No.	1157	1158	1159	1160
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	99	99	100	100
% Pass. No. 10 Sieve	97	97	99	99
% Coarse Sand (-No. 10 + No. 40)	5	3	3	3
% Fine Sand (-No. 40 + No. 200)	9	8	9	8
% Silt (0.074 - 0.005 mm)	49	52	52	48
% Clay (-0.005 mm)	34	34	36	41
Liquid Limit (-No. 40)	48	47	49	50
Plasticity Index (-No. 40)	25	23	28	26
Plastic Limit	22	24	21	24
Soil Color	BRN/GRY/BLK	BRN/GRY/BLK	BRN/GRY/BLK	BRN/GRY/BLK
Textural Class	CLY	CLY	CLY	CLY
Soil Class (AASHTO M-145)	A-7-6(22)	A-7-6(21)	A-7-6(26)	A-7-6(25)
Frost Class	F3	F3	F3	F3
Optimum Moisture (%)	19.9	20.2	20.2	19.9
Maximum Dry Density (pcf)	101.0	101.0	100.9	100.1
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 25.8	2 | 20.6	2 | 19.4	2 | 20.9
	3 | 22.8	3 | 25.7	3 | 21.8	3 | 22.9
	4 | 24.2	4 | 25.0	4 | 22.5	4 | 23.4
	5 | 28.1	5 | 19.7	5 | 14.8	5 | 18.9
Avg. Moisture of Sample Depth	25.2	22.7	19.6	21.5

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		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1161	1162	1163	1164
Reference Pt + Feet	125+2000	125+2500	125+3000	125+3500
Distance From CenterLine (Ft.)	Rt 16 NB	Rt 16 NB	Rt 16 NB	Rt 16 NB
Depth, Ft.	0.9 - 5.0	0.8 - 5.0	0.9 - 5.0	1.0 - 5.0
Field Sample No.	1161	1162	1163	1164
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	99	100	99	98
% Pass. No. 10 Sieve	98	99	98	97
% Coarse Sand (-No. 10 + No. 40)	3	2	5	2
% Fine Sand (-No. 40 + No. 200)	7	6	5	5
% Silt (0.074 - 0.005 mm)	47	49	49	50
% Clay (-0.005 mm)	42	42	40	40
Liquid Limit (-No. 40)	48	51	49	54
Plasticity Index (-No. 40)	27	32	26	32
Plastic Limit	22	19	23	22
Soil Color	BRN/GRY/BLK	BRN/GRY/BLK	BLK/GRY	BRN/GRY/BLK
Textural Class	CLY	CLY	CLY	CLY
Soil Class (AASHTO M-145)	A-7-6(26)	A-7-6(31)	A-7-6(25)	A-7-6(31)
Frost Class	F3	F3	F3	F3
Optimum Moisture (%)	20.2	20.4	22.1	22.4
Maximum Dry Density (pcf)	100.5	100.3	95.7	95.2
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 20.6	2 | 19.4	2 | 27.6	2 | 21.7
	3 | 22.3	3 | 21.6	3 | 27.5	3 | 22.9
	4 | 19.1	4 | 21.8	4 | 28.7	4 | 26.2
	5 | 29.0	5 | 26.5	5 | 30.8	5 | 25.9
Avg. Moisture of Sample Depth	22.7	22.3	28.7	24.2

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Linear Laboratory Analysis

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Report Number	SS-33-2012	**Date Reported**	10/10/2012	**District**	Fargo
County	GRAND FORKS	**Submitted By**	Naumann	**Project Number**	IM-6-029(107)117
		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1165	1166	1167	1168
Reference Pt + Feet	125+4000	125+4500	125+5000	126+0000
Distance From CenterLine (Ft.)	Rt 16 NB	Rt 16 NB	Rt 16 NB	Rt 11 NB
Depth, Ft.	0.9 - 5.0	0.9 - 5.0	1.0 - 5.0	0.4 - 5.0
Field Sample No.	1165	1166	1167	1168
% Pass. 3/8" Sieve	100	100	99	100
% Pass. No. 4 Sieve	100	100	99	100
% Pass. No. 10 Sieve	99	99	97	97
% Coarse Sand (-No. 10 + No. 40)	1	2	2	3
% Fine Sand (-No. 40 + No. 200)	5	6	5	6
% Silt (0.074 - 0.005 mm)	53	51	50	48
% Clay (-0.005 mm)	40	40	40	41
Liquid Limit (-No. 40)	51	53	50	52
Plasticity Index (-No. 40)	28	24	27	30
Plastic Limit	22	29	24	22
Soil Color	BRN/GRY/BLK	BRN/GRY/BLK	BRN/GRY/BLK	BRN/GRY/BLK
Textural Class	CLY	CLY	CLY	CLY
Soil Class (AASHTO M-145)	A-7-6(29)	A-7-6(26)	A-7-6(26)	A-7-6(28)
Frost Class	F3	F3	F3	F3
Optimum Moisture (%)	21.8	23.3	21.4	22.9
Maximum Dry Density (pcf)	96.5	93.0	97.7	94.8
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 22.8	2 | 28.2	2 | 21.0	2 | 22.6
	3 | 22.2	3 | 21.6	3 | 29.0	3 | 31.2
	4 | 29.6	4 | 32.6	4 | 23.2	4 | 24.6
	5 | 22.3	5 | 25.4	5 | 23.5	5 | 26.3
Avg. Moisture of Sample Depth	24.2	27.0	24.2	26.1

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Linear Laboratory Analysis

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County	GRAND FORKS	**Submitted By**	Naumann	**Project Number**	IM-6-029(107)117
		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1169	1170	1171	1172
Reference Pt + Feet	126+0500	126+1000	126+1500	126+2000
Distance From CenterLine (Ft.)	Rt 16 NB	Rt 16 NB	Rt 16 NB	Rt 16 NB
Depth, Ft.	0.9 - 5.0	0.9 - 5.0	0.7 - 5.0	0.9 - 5.0
Field Sample No.	1169	1170	1171	1172
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	99	99	99	100
% Pass. No. 10 Sieve	98	98	97	99
% Coarse Sand (-No. 10 + No. 40)	3	3	7	2
% Fine Sand (-No. 40 + No. 200)	4	5	8	4
% Silt (0.074 - 0.005 mm)	48	48	46	45
% Clay (-0.005 mm)	44	42	37	48
Liquid Limit (-No. 40)	49	50	49	53
Plasticity Index (-No. 40)	30	26	26	30
Plastic Limit	19	24	23	23
Soil Color	BRN/GRY/BLK	BRN/GRY/BLK	BRN/GRY/BLK	BRN/GRY/BLK
Textural Class	CLY	CLY	CLY	CLY
Soil Class (AASHTO M-145)	A-7-6(30)	A-7-6(26)	A-7-6(22)	A-7-6(31)
Frost Class	F3	F3	F3	F3
Optimum Moisture (%)	19.9	20.7	19.7	21.9
Maximum Dry Density (pcf)	102.3	100.7	100.9	97.5
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 20.5	2 | 22.2	2 | 26.0	2 | 19.1
	3 | 19.8	3 | 19.7	3 | 22.0	3 | 21.0
	4 | 20.8	4 | 21.5	4 | 28.3	4 | 22.4
	5 | 22.0	5 | 22.9	5 | 22.4	5 | 22.8
Avg. Moisture of Sample Depth	20.8	21.5	24.6	21.3

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Linear Laboratory Analysis

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Report Number	SS-33-2012	**Date Reported**	10/10/2012	**District**	Fargo
County	GRAND FORKS	**Submitted By**	Naumann	**Project Number**	IM-6-029(107)117
		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1173	1174	1175	1176
Reference Pt + Feet	126+2500	126+3000	126+3500	126+4000
Distance From CenterLine (Ft.)	Rt 16 NB	Rt 16 NB	Rt 16 NB	Rt 16 NB
Depth, Ft.	0.9 - 5.0	0.9 - 5.0	1.0 - 5.0	0.9 - 5.0
Field Sample No.	1173	1174	1175	1176
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	99	99	100	100
% Pass. No. 10 Sieve	98	98	99	99
% Coarse Sand (-No. 10 + No. 40)	3	2	1	1
% Fine Sand (-No. 40 + No. 200)	4	3	2	2
% Silt (0.074 - 0.005 mm)	45	42	39	43
% Clay (-0.005 mm)	46	50	56	53
Liquid Limit (-No. 40)	55	56	57	60
Plasticity Index (-No. 40)	31	33	35	37
Plastic Limit	24	23	21	23
Soil Color	BRN/GRY/BLK	BRN/GRY/BLK	BRN/GRY/BLK	BRN/GRY/BLK
Textural Class	CLY	CLY	CLY	CLY
Soil Class (AASHTO M-145)	A-7-6(31)	A-7-6(34)	A-7-6(38)	A-7-6(40)
Frost Class	F3	F3	F3	F3
Optimum Moisture (%)	21.1	20.7	22.3	20.8
Maximum Dry Density (pcf)	98.6	100.5	97.1	98.1
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 23.6	2 | 17.9	2 | 22.6	2 | 21.8
	3 | 24.3	3 | 23.0	3 | 22.5	3 | 22.1
	4 | 26.0	4 | 25.8	4 | 24.3	4 | 23.6
	5 | 26.5	5 | 29.1	5 | 22.5	5 | 23.9
Avg. Moisture of Sample Depth	25.1	24.0	23.0	22.8

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		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1177	1178	1179	1180
Reference Pt + Feet	126+4500	126+5000	127+0000	127+0500
Distance From CenterLine (Ft.)	Rt 16 NB	Rt 16 NB	Rt 11 NB	Rt 16 NB
Depth, Ft.	1.0 - 5.0	0.8 - 5.0	0.5 - 5.0	1.1 - 5.0
Field Sample No.	1177	1178	1179	1180
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	100	99	100	100
% Pass. No. 10 Sieve	99	98	97	99
% Coarse Sand (-No. 10 + No. 40)	1	3	2	1
% Fine Sand (-No. 40 + No. 200)	2	4	2	3
% Silt (0.074 - 0.005 mm)	47	37	39	43
% Clay (-0.005 mm)	49	54	54	53
Liquid Limit (-No. 40)	55	55	56	56
Plasticity Index (-No. 40)	32	32	35	34
Plastic Limit	23	23	22	23
Soil Color	BRN/GRY/BLK	BRN/GRY/BLK	BRN/GRY/BLK	BRN/GRY/BLK
Textural Class	CLY	CLY	CLY	CLY
Soil Class (AASHTO M-145)	A-7-6(35)	A-7-6(32)	A-7-6(36)	A-7-6(36)
Frost Class	F3	F3	F3	F3
Optimum Moisture (%)	20.8	21.4	22.4	21.6
Maximum Dry Density (pcf)	98.2	98.8	97.2	98.6
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 18.4	2 | 21.3	2 | 21.2	2 | 13.4
	3 | 22.2	3 | 25.8	3 | 23.7	3 | 23.0
	4 | 23.6	4 | 23.5	4 | 23.0	4 | 25.7
	5 | 23.0	5 | 25.1	5 | 26.1	5 | 24.9
Avg. Moisture of Sample Depth	21.8	23.9	23.5	21.7

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		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1181	1182	1183	1184
Reference Pt + Feet	127+1000	127+1500	127+2000	127+2500
Distance From CenterLine (Ft.)	Rt 16 NB	Rt 16 NB	Rt 16 NB	Rt 16 NB
Depth, Ft.	1.0 - 5.0	0.9 - 5.0	0.9 - 5.0	0.8 - 5.0
Field Sample No.	1181	1182	1183	1184
% Pass. 3/8" Sieve	100	100	99	100
% Pass. No. 4 Sieve	100	100	99	99
% Pass. No. 10 Sieve	99	99	97	98
% Coarse Sand (-No. 10 + No. 40)	1	1	2	2
% Fine Sand (-No. 40 + No. 200)	3	2	3	3
% Silt (0.074 - 0.005 mm)	47	46	45	47
% Clay (-0.005 mm)	48	50	47	46
Liquid Limit (-No. 40)	54	59	51	51
Plasticity Index (-No. 40)	30	35	31	27
Plastic Limit	25	24	21	25
Soil Color	BRN/GRY/BLK	BRN/GRY/BLK	BRN/GRY/BLK	BRN/GRY
Textural Class	CLY	CLY	CLY	CLY
Soil Class (AASHTO M-145)	A-7-6(32)	A-7-6(38)	A-7-6(30)	A-7-6(28)
Frost Class	F3	F3	F3	F3
Optimum Moisture (%)	21.3	22.3	22.1	23.0
Maximum Dry Density (pcf)	96.4	96.4	98.3	96.4
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 22.2	2 | 24.8	2 | 20.7	2 | 22.5
	3 | 21.7	3 | 23.5	3 | 22.4	3 | 21.4
	4 | 28.7	4 | 25.5	4 | 23.6	4 | 28.4
	5 | 25.9	5 | 24.0	5 | 26.2	5 | 25.7
Avg. Moisture of Sample Depth	24.6	24.4	23.3	24.5

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		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1185	1186	1187	1188
Reference Pt + Feet	127+3000	127+3500	127+4000	127+4500
Distance From CenterLine (Ft.)	Rt 16 NB	Rt 16 NB	Rt 16 NB	Rt 16 NB
Depth, Ft.	0.8 - 4.5	0.9 - 4.5	0.9 - 5.0	1.0 - 5.0
Field Sample No.	1185	1186	1187	1188
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	100	100	100	100
% Pass. No. 10 Sieve	100	99	100	99
% Coarse Sand (-No. 10 + No. 40)	1	1	1	1
% Fine Sand (-No. 40 + No. 200)	3	3	5	3
% Silt (0.074 - 0.005 mm)	52	52	55	63
% Clay (-0.005 mm)	43	44	39	32
Liquid Limit (-No. 40)	47	48	49	44
Plasticity Index (-No. 40)	24	26	24	21
Plastic Limit	23	22	25	23
Soil Color	BRN/GRY/BLK	BRN/GRY/BLK	BRN/GRY/BLK	BRN/GRY/BLK
Textural Class	CLY	CLY	SLTY CLY	SLTY CLY
Soil Class (AASHTO M-145)	A-7-6(25)	A-7-6(27)	A-7-6(26)	A-7-6(22)
Frost Class	F3	F3	F3	F3
Optimum Moisture (%)	22.3	22.5	23.6	21.9
Maximum Dry Density (pcf)	99.0	99.2	95.8	98.3
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 22.0	2 | 18.7	2 | 20.8	2 | 20.2
	3 | 24.2	3 | 22.6	3 | 21.2	3 | 19.1
	4 | 25.3	4 | 24.8	4 | 40.2	4 | 22.3
	5 | 21.6	5 | 24.1	5 | 32.7	5 | 22.9
Avg. Moisture of Sample Depth	23.8	22.1	28.7	21.1

Scott W. Wutzke, Testing Lab Supervisor
Date Printed: 1/14/2013

Linear Laboratory Analysis

Department of Transportation, Materials and Research Division
300 Airport Road, Bismarck ND 58504 (701) 328-6900

Report Number	SS-33-2012	**Date Reported**	10/10/2012	**District**	Fargo
County	GRAND FORKS	**Submitted By**	Naumann	**Project Number**	IM-6-029(107)117
		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1189	1190	1191	1192
Reference Pt + Feet	127+5000	128+0000	128+0500	128+1000
Distance From CenterLine (Ft.)	Rt 16 NB	Rt 11 NB	Rt 16 NB	Rt 16 NB
Depth, Ft.	0.9 - 5.0	0.4 - 5.0	0.9 - 5.0	0.9 - 5.0
Field Sample No.	1189	1190	1191	1192
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	99	99	99	99
% Pass. No. 10 Sieve	98	95	96	97
% Coarse Sand (-No. 10 + No. 40)	3	3	3	3
% Fine Sand (-No. 40 + No. 200)	3	4	3	3
% Silt (0.074 - 0.005 mm)	59	56	60	63
% Clay (-0.005 mm)	32	33	31	28
Liquid Limit (-No. 40)	43	44	42	40
Plasticity Index (-No. 40)	22	23	21	19
Plastic Limit	21	21	21	21
Soil Color	BRN/GRY/BLK	BRN/BLK	BRN/BLK	BRN/BLK
Textural Class	SLTY CLY	SLTY CLY	SLTY CLY	SLTY CLY LM
Soil Class (AASHTO M-145)	A-7-6(22)	A-7-6(21)	A-7-6(20)	A-6(18)
Frost Class	F3	F3	F3	F3
Optimum Moisture (%)	20.0	20.1	20.2	19.1
Maximum Dry Density (pcf)	103.1	103.1	103.0	106.4
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 19.2	2 | 16.8	2 | 16.3	2 | 19.0
	3 | 20.0	3 | 19.0	3 | 21.1	3 | 17.8
	4 | 22.7	4 | 18.6	4 | 19.8	4 | 15.1
	5 | 20.3	5 | 20.4	5 | 19.3	5 | 13.6
Avg. Moisture of Sample Depth	20.5	18.7	19.2	16.4

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Linear Laboratory Analysis

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Report Number	SS-33-2012	**Date Reported**	10/10/2012	**District**	Fargo
County	GRAND FORKS	**Submitted By**	Naumann	**Project Number**	IM-6-029(107)117
		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1193	1194	1195	1196
Reference Pt + Feet	128+1500	128+2000	128+2500	128+3000
Distance From CenterLine (Ft.)	Rt 16 NB	Rt 16 NB	Rt 16 NB	Rt 16 NB
Depth, Ft.	0.9 - 5.0	1.1 - 5.0	0.9 - 5.0	1.0 - 4.5
Field Sample No.	1193	1194	1195	1196
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	100	100	99	100
% Pass. No. 10 Sieve	98	98	96	99
% Coarse Sand (-No. 10 + No. 40)	2	2	7	2
% Fine Sand (-No. 40 + No. 200)	3	2	3	1
% Silt (0.074 - 0.005 mm)	61	67	60	67
% Clay (-0.005 mm)	33	27	26	29
Liquid Limit (-No. 40)	41	40	40	40
Plasticity Index (-No. 40)	36	20	20	19
Plastic Limit	5	20	20	21
Soil Color	BRN/BLK	BRN/BLK	BRN/BLK	BRN/BLK
Textural Class	SLTY CLY	SLTY CLY LM	SLTY CLY LM	SLTY CLY LM
Soil Class (AASHTO M-145)	A-7-6(33)	A-6(20)	A-6(18)	A-6(19)
Frost Class	F3	F3	F3	F3
Optimum Moisture (%)	19.2	18.1	18.8	18.2
Maximum Dry Density (pcf)	105.7	105.9	106.3	106.6
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 19.2	2 | 18.9	2 | 17.7	2 | 19.6
	3 | 20.1	3 | 19.3	3 | 17.2	3 | 17.5
	4 | 16.8	4 | 17.3	4 | 18.7	4 | 17.9
	5 | 16.5	5 | 18.4	5 | 17.7	5 | 25.2
Avg. Moisture of Sample Depth	18.1	18.5	17.8	18.3

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Linear Laboratory Analysis

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Report Number	SS-33-2012	**Date Reported**	10/10/2012	**District**	Fargo
County	GRAND FORKS	**Submitted By**	Naumann	**Project Number**	IM-6-029(107)117
		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1197	1198	1199	1200
Reference Pt + Feet	128+3500	128+4000	128+4500	128+5000
Distance From CenterLine (Ft.)	Rt 16 NB	Rt 16 NB	Rt 16 NB	Rt 16 NB
Depth, Ft.	0.9 - 5.0	0.9 - 4.5	0.9 - 5.0	0.9 - 5.0
Field Sample No.	1197	1198	1199	1200
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	100	100	100	100
% Pass. No. 10 Sieve	99	97	99	99
% Coarse Sand (-No. 10 + No. 40)	1	2	2	1
% Fine Sand (-No. 40 + No. 200)	2	2	2	3
% Silt (0.074 - 0.005 mm)	65	68	69	69
% Clay (-0.005 mm)	31	26	27	27
Liquid Limit (-No. 40)	41	40	35	37
Plasticity Index (-No. 40)	21	22	16	19
Plastic Limit	20	18	19	19
Soil Color	BRN/BLK	BRN/BLK	BRN/BLK	BRN/BLK
Textural Class	SLTY CLY	SLTY CLY LM	SLTY CLY LM	SLTY CLY LM
Soil Class (AASHTO M-145)	A-7-6(22)	A-6(21)	A-6(16)	A-6(18)
Frost Class	F3	F3	F3	F3
Optimum Moisture (%)	18.8	18.3	17.7	17.8
Maximum Dry Density (pcf)	105.2	106.4	109.1	108.7
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 19.6	2 | 17.6	2 | 15.7	2 | 16.3
	3 | 15.6	3 | 16.7	3 | 18.7	3 | 16.3
	4 | 21.0	4 | 18.6	4 | 17.3	4 | 20.9
	5 | 19.8	5 | 22.9	5 | 19.5	5 | 16.3
Avg. Moisture of Sample Depth	19.0	17.6	17.8	17.4

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Report Number	SS-33-2012	**Date Reported**	10/10/2012	**District**	Fargo
County	GRAND FORKS	**Submitted By**	Naumann	**Project Number**	IM-6-029(107)117
		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1201	1202	1203	1204
Reference Pt + Feet	129+0000	129+0500	129+1000	129+1500
Distance From CenterLine (Ft.)	Rt 11 NB	Rt 16 NB	Rt 16 NB	Rt 16 NB
Depth, Ft.	0.4 - 5.0	0.9 - 5.0	0.9 - 5.0	0.9 - 5.0
Field Sample No.	1201	1202	1203	1204
% Pass. 3/8" Sieve	100	100	100	100
% Pass. No. 4 Sieve	100	100	100	100
% Pass. No. 10 Sieve	99	99	99	99
% Coarse Sand (-No. 10 + No. 40)	1	2	1	1
% Fine Sand (-No. 40 + No. 200)	2	2	2	2
% Silt (0.074 - 0.005 mm)	69	66	67	66
% Clay (-0.005 mm)	27	29	30	31
Liquid Limit (-No. 40)	35	39	40	39
Plasticity Index (-No. 40)	17	22	22	22
Plastic Limit	19	18	18	17
Soil Color	BRN/BLK	BLK/GRY	BRN/BLK	BRN/BLK
Textural Class	SLTY CLY LM	SLTY CLY LM	SLTY CLY LM	SLTY CLY
Soil Class (AASHTO M-145)	A-6(16)	A-6(21)	A-6(23)	A-6(22)
Frost Class	F3	F3	F3	F3
Optimum Moisture (%)	17.5	20.0	19.1	19.0
Maximum Dry Density (pcf)	109.2	102.8	106.1	105.3
% Organic Content				
Depth (Ft.) | Moisture (%)	2 | 18.4	2 | 16.5	2 | 15.6	2 | 16.8
	3 | 15.8	3 | 21.3	3 | 18.3	3 | 18.3
	4 | 17.0	4 | 21.6	4 | 15.4	4 | 17.9
	5 | 17.7	5 | 19.9	5 | 19.2	5 | 16.8
Avg. Moisture of Sample Depth	17.2	19.8	17.1	17.4

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Linear Laboratory Analysis

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Report Number	SS-33-2012	**Date Reported**	10/10/2012	**District**	Fargo
County	GRAND FORKS	**Submitted By**	Naumann	**Project Number**	IM-6-029(107)117
		AASHTO Test Method	T-99	**PCN**	18694

Comments

Lab Number	1205		
Reference Pt + Feet	129+2000		
Distance From CenterLine (Ft.)	Rt 16 NB		
Depth, Ft.	0.9 - 5.0		
Field Sample No.	1205		
% Pass. 3/8" Sieve	100		
% Pass. No. 4 Sieve	99		
% Pass. No. 10 Sieve	97		
% Coarse Sand (-No. 10 + No. 40)	3		
% Fine Sand (-No. 40 + No. 200)	5		
% Silt (0.074 - 0.005 mm)	60		
% Clay (-0.005 mm)	29		
Liquid Limit (-No. 40)	38		
Plasticity Index (-No. 40)	21		
Plastic Limit	18		
Soil Color	BRN/BLK		
Textural Class	SLTY CLY LM		
Soil Class (AASHTO M-145)	A-6(18)		
Frost Class	F3		
Optimum Moisture (%)	18.2		
Maximum Dry Density (pcf)	106.4		
% Organic Content			
Depth (Ft.) | Moisture (%)	2	|	15.7
	3	|	19.2
	4	|	19.7
	5	|	17.4
Avg. Moisture of Sample Depth	18.0		

Scott W. Wutzke, Testing Lab Supervisor
Date Printed: 1/14/2013

APPENDIX C

Pavement Evaluation Log

PAVEMENT EVALUATION LOG FOR LINEAR SOIL SURVEY

North Dakota Department of Transportation, Materials & Research

Sheet 1 of 1

SFN #####

Project Number	PCN	Date of Survey
IM-6-029(107)117	18694	9/24/2012
Section Maintenance Contact Wayne Worden		Completed by Jamie Naumann
Highway Reference Points 119+1323 to 129+2000	Surface Type Concrete - Asphalt Shoulder	

Location	Pavement Distress	Description	Maintenance Comment	Picture Number	Drilling Required
119+1323 to 129 +2000	Transv. Cracks	~40' Crack Spacing. Last crack seal 2010.	No real concerns.		No

Comments

I met with Wayne Worden on 9/24/2012 and he said there are no issues that he wanted further drilling. All the culverts have already been surveyed. I drilled the asphalt shoulder throughout the whole project.