OKLAHOMA Transportation

Oklahoma Department of Transportation
Roadway Design Division
200 N.E. 21st Street
Oklahoma City, OK 73105-3204

FINAL PAVEMENT DESIGN APPROVAL

Date: Monday, April 01, 2024

To: Pavement Design Committee

From: Pavement Design Engineer

Project: Project: J3-5589(004)PM J/P: 35589(04) Highway: I-35 County: McClain
Description: I-35: from 1.0 mile south of Ladd Road, north 4.2 miles to SH-74
Project Length: 4.678 miles

Scheduled Letting Date: ***FFY 2025***

The Committee submits the following preliminary estimates, pavement design options, project and design information, recommendations, and comments for the subject project pavement design:

A. Preliminary estimates for mainline paving based on final recommendations made by the Department:

Rigid:	N/A
Flexible:	$33,915,922

B. Pavement Design Options:

I. Rigid Option: N/A

II. Flexible Option:

I-35 – Mill & Overlay and Widening – Typicals 1-4

Overlay Driving Lane	Widening Driving Lane	Shoulder
2.0” AC Type S4 (PG 76-28OK)	2.0” AC Type S4 (PG 76-28OK)	2.0” AC Type S4 (PG 64-22OK)
2.0” Cold Milling**	3.0” AC Type S3 (PG 76-28OK)	3.0” AC Type S3 (PG 64-22OK)
	3.0” AC Type S3 (PG 64-22OK)	3.0” AC Type S3 (PG 64-22OK)
	8.0” Stabilized Subgrade	8.0” Stabilized Subgrade

**Place Fabric Reinforcement 2-ft either side of the longitudinal joint

I-35 – Mill & Overlay and Widening – Typicals 5-8

Overlay Driving Lane	Widening Driving Lane	Shoulder
2.0” AC Type S4 (PG 76-28OK)	2.0” AC Type S4 (PG 76-28OK)	2.0” AC Type S4 (PG 64-22OK)
3.0” AC Type S3 (PG 76-28OK)	3.0” AC Type S3 (PG 76-28OK)	3.0” AC Type S3 (PG 64-22OK)
5.0” Cold Milling**	3.0” AC Type S3 (PG 64-22OK)	3.0” AC Type S3 (PG 64-22OK)
	3.0” AC Type S3 (PG 64-22OK)	3.0” AC Type S3 (PG 64-22OK)
	3.0” AC Type S3 (PG 64-22OK)	3.0” AC Type S3 (PG 64-22OK)
	8.0” Aggregate Base Type A -Geotextile reinforcement	8.0” Aggregate Base Type A -Shoulder w/ TBSC Type E -Geotextile Reinforcement
	8.0” Stabilized Subgrade	8.0” Stabilized Subgrade

**Place Fabric Reinforcement 2-ft either side of the longitudinal joint

Ramps

Mainline	Shoulder
2.0" AC Type S4 (PG 64-22OK)	2.0" AC Type S4 (PG 64-22OK)
3.0" AC Type S3 (PG 64-22OK)	3.0" AC Type S3 (PG 64-22OK)
2.5" AC Type S3 (PG 64-22OK)	2.5" AC Type S3 (PG 64-22OK)
2.5" AC Type S3 (PG 64-22OK)	2.5" AC Type S3 (PG 64-22OK)
8.0" Stabilized Subgrade	8.0" Stabilized Subgrade

C. Project and Design Information:

Adjoining Pavement Type	ACC
Current Traffic Volume (ADT) - 2022	53,300 vehicles/ day
20 Year Projected Traffic Volume (ADT) - 2042	74,600 vehicles/ day
20 Year ESAL for Binder Grade Selection	54,600,000
Highway Type	Interstate
Heavy Truck Percentage	21%
Project Type	Full Depth, Mill & Overlay, and Widening
Design Life Overlay (yrs)	15
Design Life Full Depth (yrs)	30
Design Life Temp Pavement (yrs)	N/A
Is the Project Federally Funded?	Yes – Partially - NHS
Pavement Design Methodology	Pavement ME
Project Soil Classifications	A-1-b, A-2-4, A-4, A-6, A-7-6
Design Resilient Modulus (psi)	5,600
Soluble Sulfate Concentrations > 3,000 ppm	No
Corrosive Soils Present?	No
Shallow Bedrock Present?	No
Rock Rippability Issues Expected?	No
Shallow Groundwater Present?	No
Slope Stability Concerns?	No
Embankment Settlement Concerns?	No

Project and Design Information Comments and Details:

Each Geotech report should be read in its entirety.

Existing Pavement Information:

Pavement Stratigraphy: The total thickness of the full depth asphalt concrete in the roadway cores ranged between 9.25 to 16.5 inches. A cement stabilized subgrade was encountered underneath cores C-1 to C-18 and C-29 to C-46, ranging from 4.5 to 10 inches. Aggregate base was encountered underneath the remaining cores C-19 to C-28, ranging from 6 to 10 inches.

The subgrade materials encountered in the borings classified as A-1-b, A-2-4, A-4 and A-6 soils. The subgrade materials extended to the boring termination depth of 36 inches below the pavement, except for borings C-4, C-5, C-21 to C-23, C-37, C-40 and C-41 where auger refusal was encountered between 17.5 and 52 inches below the pavement. The subgrade materials appeared to be native to the site. The subgrade in borings C-19 and C-20 had an organic smell.

Stripping and separation are noticed in some of the cores.

OKLAHOMA Transportation

Oklahoma Department of Transportation
Roadway Design Division
200 N.E. 21st Street
Oklahoma City, OK 73105-3204

D. Final Pavement Design Recommendation:

I-35 Mainline: Flexible

Reason for Pavement Design Material Selection:

Consistent with existing

Pavement Design Notes:

1. A complete soil stabilization mix design should be performed during construction of the finished subgrade in accordance with ODOT OHD L-50, Soil Stabilization Mix Design Procedure to determine the appropriate type and the optimum percentage of chemical soil stabilizer to be used.

E. Comments:

This pavement design is consistent with other projects on our interstate corridor. District 3 supports the recommendations.

Amanda Warren, P.E.
Pavement Design Engineer

CONCUR: Ron Brown, P.E.
District 3 Engineer

Randy Woods, P.E.
Roadway Design Engineer

Attachments:

1. Comparative Estimates
2. Pavement Design Calculations
3. Geotechnical Report Summaries
4. Pavement Design Request Form
5. Title Sheet and Typical Sections from Plans

RED ROCK
CONSULTING

Pavement Design Report

I-35
MCCLAIN COUNTY, OKLAHOMA

35589(04)

Prepared For:

Olsson Associates
11600 Broadway Extension, Suite 300
Oklahoma City, Oklahoma 73114
Attention: Mr. Russell Beaty, PE

Prepared By:

Red Rock Consulting, LLC
PO Box 30591
Edmond, Oklahoma 73003
(405) 562-3328

February 28, 2024 – **REVISION 2**
Project No. 22119

RED ROCK
CONSULTING

February 28, 2024 – **REVISION 2**

Olsson Associates
11600 Broadway Extension, Suite 300
Oklahoma City, Oklahoma 73114

Attention: Mr. Russell Beaty, PE

Re: Pavement Design Report
I-35
McClain County, Oklahoma
35589(04)
RRC Project No. 22119

Dear Mr. Beaty,

We are pleased to submit herewith this report entitled "Pavement Design Report, I-35, McClain County, Oklahoma, 35589(04)".

In an effort to provide a more environmentally friendly service, this report has been provided electronically.

If you have any questions regarding the contents of this report, please contact Red Rock Consulting. It has been our pleasure to assist you with this project.

Yours very truly,
RED ROCK CONSULTING, LLC
CA No. 5707 Exp. 06/30/25

REGISTERED PROFESSIONAL ENGINEER
JEREMY BASLER
2-28-2024
20233
OKLAHOMA

Jeremy Basler, PE
Geotechnical Manager
Oklahoma PE No 20233

PAVEMENT DESIGN REPORT

I-35
MCCLAIN COUNTY, OKLAHOMA

35589(04)

PROJECT NO. 22119

APPENDICES

PAVEMENT DESIGN REPORT

I-35
MCCLAIN COUNTY, OKLAHOMA

35589(04)

PROJECT NO. 22119

INTRODUCTION

General

This report presents the results for the typical asphalt overlay and asphalt and concrete section recommendations for I-35 from 1.0 mile south of Ladd Road extending north approximately 4.7 miles in McClain County, Oklahoma.

Proposed Construction

The project includes the widening of the existing pavement of I-35 in the center median and outside lanes to accommodate adding one lane of traffic in each direction. The project also includes the potential overlay or reconstruction of the existing pavement of the I-35 mainline, construction of a portion of nine ramps to tie into the existing ramps at the Ladd Road and SH 74 interchanges and some temporary incidental paving on the south end of the project.

Scope of Work

The scope of this investigation includes the following:

1. Review of previous geotechnical and geological information of sites near this site. This was augmented with data obtained during the field investigation phase of the Shoulder Soils Survey and the Pavement and Subgrade Survey.

2. Pavement design recommendations for the mill and overlay section.

3. Pavement design recommendations for the new asphalt and concrete pavement sections.

PAVEMENT RECOMMENDATIONS

Recommendations for designing mill and overlay using a 15 year design life and new asphalt and concrete pavement using a 30-year design life were requested by ODOT. As requested, a 10 year design life was used for the incidental paving. The asphalt pavement design analysis was performed using the mechanistic-empirical (ME) pavement design computer software AASHTOWare Pavement ME Design 2.6.2.2. Information considered in the design is discussed briefly below.

The climate summary for the nearest climate station US, OK 138373 (35.15, -97.47), is as follows:

Mean annual air temperature (°F)	61.13
Mean annual precipitation (in)	34.17
Freezing index (°F – days)	102.07
Average annual number of freeze/thaw cycles	61.02

The functional performance of asphalt pavement with a target of 90% reliability is expressed in terms of the pavement distresses below. The design criteria or threshold values used fall within the typical values recommended by the pavement ME design program.

Terminal international roughness index (IRI)	172 inches/mile
Permanent deformation – total pavement	0.75 inches
AC total fatigue cracking: bottom up + reflective	25% lane area
AC total transverse cracking: thermal + reflective	2,500 feet/mile
Permanent deformation – AC only	0.25 inches
AC bottom-up fatigue cracking	25% lane area
AC thermal cracking	1,000 feet/mile
AC top-down fatigue cracking	25% lane area

The functional performance of concrete pavement with a target of 95% reliability is expressed in terms of the pavement distresses below. The design criteria or threshold values used fall within the typical values recommended by the pavement ME design program.

Terminal International Roughness Index (IRI)	172 in/mile
Mean joint faulting	0.12 inches
Jointed Plain Concrete Pavement (JPCP) transverse cracking	15% slabs

The annual average daily traffic (AADT) by vehicle classification was provided by Olsson Associates to use to calculate the traffic data for the asphalt and concrete pavement designs for this project. A summary of the traffic data is provided in Tables 1 and 2.

Table 1 – Mainline Traffic Data

Parameter	Value	Parameter	Value
AADT (2022):	53,300	Design Res. Mod. (psi):	5,600
AADT (2027):	57,974	Heavy Trucks (T_3):	21%
AADT (2042):	74,600	D (Directional Dist.):	55%
15 Year Flex ESALs:	38,860,000	L (Lane Dist.):	70%
20 Year Flex ESALs:	54,600,000	Design Speed (mph):	65
30 Year Flex ESALs:	91,170,000		
30 Year Rigid ESALs:	135,660,000		
Design PI:	13		

Table 2 – Ramps Traffic Data

Parameter	Value	Parameter	Value
AADT (2025):	4,900	Design Res. Mod. (psi):	5,600
AADT (2027):	5,603	Heavy Trucks (T_3):	4%
AADT (2045):	6,800	D (Directional Dist.):	100%
30 Year Flex ESALs:	4,460,000	L (Lane Dist.):	100%
20 Year Flex ESALs:	2,670,000	Design Speed (mph):	45
30 Year Rigid ESALs:	6,410,000		
Design PI:	13		

The hot mixed asphalt (HMA) courses recommended include PG 76-28 and PG 64-22 binders, as per typical sections/plans provided by Olsson Associates. The jointed plain concrete pavement (JPCP) should have 12 foot slabs with approximate 15 foot joints, 1 ½" to 1 ¾" diameter dowels and 12" dowel spacing. The material for the base course is assumed to be ODOT Type 'A' Aggregate Base.

Resilient modulus results from the Shoulder Soils Survey associated with this project were used to determine the resilient modulus for the existing subgrade layer. A Mr value of 5,600 psi was used for the subgrade. Mix design and laboratory testing were not conducted for the stabilized subgrade, aggregate base or cement treated base layers. Mr values of 15,000, 25,000 and 700,000 psi were assumed for the stabilized subgrade, aggregate base and cement treated base layers, respectively.

Milling of the existing I-35 pavement with an asphalt overlay is being considered for this project. Mill and overlay can be used for the areas of the existing pavement that have adequate drainage, sufficient subgrade support and exhibits only minor pavement distress in the surface course only. Minor pavement distress was observed in the surface of the existing asphalt pavement during the Pavement and Subgrade Survey field investigation. If the pavement distress exceeds the 5 inch milling depth recommended below, the pavement should be filled with suitable crack filler for the remainder of the crack depth following milling**. If pavement damage is not removed, the remaining damage will reflect**

through the asphalt overlay in a relatively short amount of time. If cracks extend from the pavement surface all the way to the subgrade, the pavement should be reconstructed for the full depth.

The recommended mill and overlay pavement section for a 15-year design life is shown in Table 3. The design requires at least 5 inches total asphalt pavement overlay following 5 inches of milling of the existing asphalt pavement. All materials and construction procedures should meet Oklahoma Department of Transportation (ODOT) specifications. The AASHTOWare Pavement ME design is provided in Appendix A.

Table 3 – *Mainline Mill and Overlay Pavement Section

Layer	Depth
Superpave Type S4 (PG 76-28 OK)	2"
Superpave Type S3 (PG 76-28 OK)	3"

*This pavement section represents mainline paving and not the shoulders. For shoulders replace the PG 76-28 OK layers with PG 64-22 OK. Fabric reinforcement should be placed 2-ft either side of the longitudinal saw joint

A new asphalt pavement section is proposed for the widening adjacent to the existing pavement, areas of realignment and if it is determined the existing pavement will be reconstructed. A new concrete pavement section for the mainline was also requested for comparison. The recommended full depth asphalt and concrete pavement sections for a 30-year design life are shown in Tables 4-7 and the pavement section for a 10 year design life for the incidental paving is shown in Table 8. Our 30-year analysis/design of the asphalt pavement sections would create a Terminal International Roughness Index (IRI) of 174.97 in/mile for the mainline and 173.55 for the Ramps which is higher than the target/typical. Therefore, resurfacing should be expected before the end of the 30-year design life. All materials and construction procedures should meet applicable ODOT standard specifications. The AASHTOWare Pavement ME designs are provided in Appendix A.

Table 4 – *Mainline Reconstruction/Lane Widening Full Depth Pavement Section

Layer	Depth
Superpave Type S4 (PG 76-28 OK)	2"
Superpave Type S3 (PG 76-28 OK)	3"
Superpave Type S3 (PG 64-22 OK)	3"
Superpave Type S3 (PG 64-22 OK)	3”
Superpave Type S3 (PG 64-22 OK)	3”
Aggregate Base	8”
Geotextile Reinforcement	
Stabilized Subgrade	8"

*This pavement section represents mainline paving and not the shoulders. For shoulders replace the PG 76-28 OK layers with PG 64-22 OK.

Table 5 – *Mainline Reconstruction/Lane Widening Concrete Pavement Section

Material	Thickness
Portland Cement 1 ¾” Dowel Jointed Concrete	12"
Separator Fabric	
Cement Treated Base	4"
Aggregate Base	8”
Geotextile Reinforcement	
Stabilized Subgrade	8"

*This pavement section also represents the Tied PC shoulders

Table 6 – Ramps Full Depth Pavement Section

Layer	Depth
Superpave Type S4 (PG 64-22 OK)	2"
Superpave Type S3 (PG 64-22 OK)	3"
Superpave Type S3 (PG 64-22 OK)	2.5"
Superpave Type S3 (PG 64-22 OK)	2.5”
Stabilized Subgrade	8"

Table 7 – *Ramps Concrete Pavement Section

Material	Thickness
Portland Cement 1 ½” Dowel Jointed Concrete	9"
Separator Fabric	
Cement Treated Base	4"
Stabilized Subgrade	8"

*This pavement section also represents the Tied PC shoulders

Table 8 – *Mainline Incidental Paving Full Depth Pavement Section

Layer	Depth
Superpave Type S4 (PG 76-28 OK)	2"
Superpave Type S3 (PG 76-28 OK)	3"
Superpave Type S3 (PG 64-22 OK)	3"
Aggregate Base	8”
Geotextile Reinforcement	
Stabilized Subgrade	8"

*This pavement section represents mainline paving and not the shoulders. For shoulders replace the PG 76-28 OK layers with PG 64-22 OK

The subgrade preparation, compaction, aggregate base, separator fabric, stabilized subgrade and cement treated base for the new pavement construction must meet applicable ODOT Standard Specifications.

The pavement subgrade will benefit from the use of stabilization. A soil-stabilizing agent mix design should be conducted as per OHD L-50 Soil Stabilization Mix Design Procedure prior to construction to determine the type appropriate for the soil classification and percent of stabilizing agent necessary. Chemical analysis of the soil and stabilizing agent should also be conducted. The subgrade preparation, compaction and stabilization must meet applicable ODOT Standard Specifications.

Asphalt mixes are sensitive to environmental interference during construction. Pavement should be placed only at appropriate temperatures and during dry weather without severe wind.

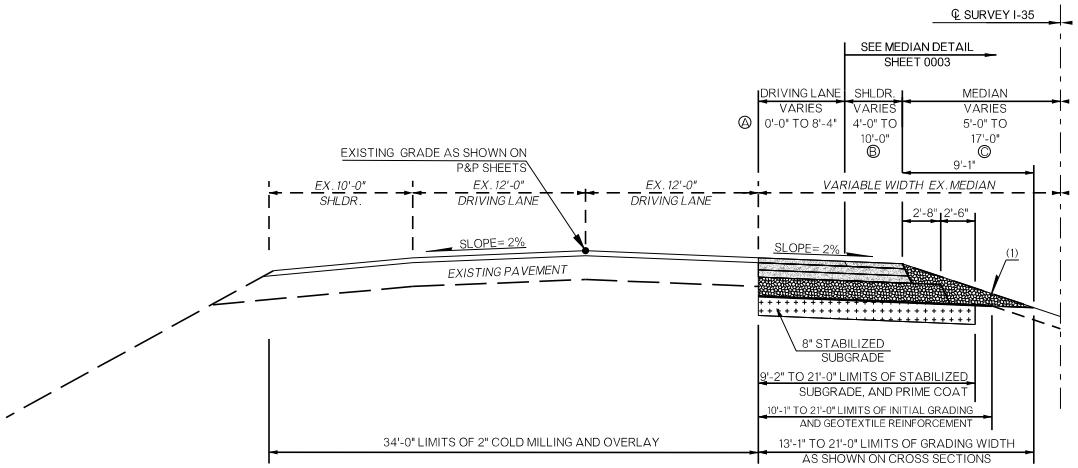
Minimizing subgrade saturation is an important factor in maintaining subgrade strength both during construction and after construction. Water allowed to pond on or adjacent to pavements could saturate the subgrade and cause premature pavement deterioration. Concrete pavement joints should be sealed as soon as possible following construction. The pavement should be sloped to provide rapid surface drainage and positive surface drainage should be maintained away from the edge of the paved areas. Design alternatives that could reduce the risk of subgrade saturation and improve long-term pavement performance includes crowning the pavement subgrade to drain toward the edges rather than to the center of the pavement and installing surface drains next to any areas where surface water could pond. Properly designed and constructed subsurface drainage will reduce the time subgrade soils are saturated and can also improve subgrade strength and performance.

Periodic maintenance extends the service life of the pavement and should include crack sealing, surface sealing and patching of any deteriorated areas. Thicker pavement sections could be used to reduce the required maintenance and extend the service life of the pavement

CLOSURE

The data presented in this report are based on the negotiated scope for this project and site conditions as they existed at the time of the field exploration. The conditions encountered in the exploratory borings are representative subsurface conditions within the study area.

This report was prepared for the exclusive use of Olsson Associates, ODOT and their agents and consultants. It should be made available to prospective contractors for information and factual data only and not as a warranty of subsurface conditions or discussions presented herein.



PAVEMENT REQUIREMENT			
8" PAVT. STRUCTURE	OVERLAY SECTION	DRIVING LANES	INSIDE SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)
		3" SUPERPAVE TYPE S3 (PG 76-28 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
BASE COURSE	EXISTING SURFACE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

TYPICAL NO. 1
I-35 SB MILL/RESURFACE
STA. 632+50.00 TO STA. 640+25.00

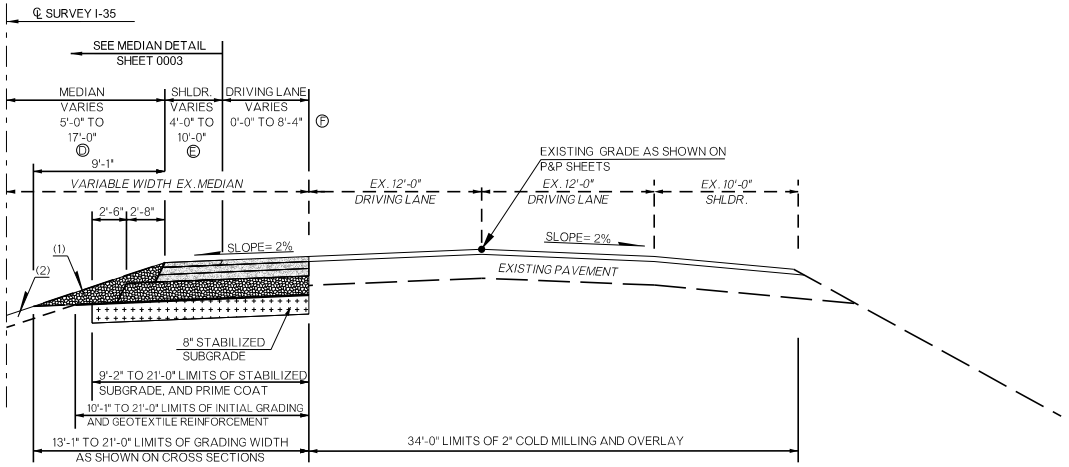
FLEXIBLE PAVEMENT DESIGN (30 YEAR DESIGN)

TYPICAL NO. 1 (INCIDENTAL SB WIDENING)

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY / FT.	PRICE / UNIT	COST / FT.
303(A)	1200	AGGREGATE BASE TYPE A	CY	0.3655	$ 79.00	$ 28.88
307(K)	4200	STABILIZED SUBGRADE	SY	1.9226	$ 13.00	$ 24.99
326(A)	1200	GEOTEXTILE REINFORCEMENT	SY	2.2004	$ 3.00	$ 6.60
402(E)	2600	TRAFFIC BOUND SURFACE COURSE TYPE E	TON	0.2751	$ 50.00	$ 13.76
407 (A)	7200	FOG SEAL	GAL	0.3778	$ 5.00	$ 1.89
407(B)	7300	TACK COAT	GAL	0.4856	$ 5.00	$ 2.43
408	8100	PRIME COAT	GAL	0.6729	$ 5.00	$ 3.36
411(B)	1320	SUPERPAVE, TYPE S3(PG 76-28 OK)	TON	0.0548	$ 150.00	$ 8.23
411(B)	1330	SUPERPAVE, TYPE S3(PG 64-22 OK)	TON	0.4263	$ 120.00	$ 51.15
411(C)	1400	SUPERPAVE, TYPE S4(PG 76-28 OK)	TON	0.4566	$ 155.00	$ 70.77
411(C)	1430	SUPERPAVE, TYPE S4(PG 64-22 OK)	TON	0.1176	$ 122.00	$ 14.35
412	3100	COLD MILLING PAVEMENT	SY	3.7778	$ 4.50	$ 17.00
619(C)	6600	SAWING PAVEMENT	LF	1.0000	$ 6.00	$ 6.00
					TOTAL PER FT.	$ 249.40

TYPICAL ESTIMATE - 775.00 FT X $ 249.40 = $ 193,285.42

Squad	OLSSON
Date	02-16-2024
S.W.O.	5560(01)
J.P. #	35589(04)
County	MCCLAIN COUNTY
Proj. No.	JP-35589(04)
Highway No.	I-35
Description	GRADE, DRAIN, BRIDGE & SURFACE



PAVEMENT REQUIREMENT			
8" PAVT. STRUCTURE	OVERLAY SECTION	DRIVING LANES	INSIDE SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)
		3" SUPERPAVE TYPE S3 (PG 76-28 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
BASE COURSE	EXISTING SURFACE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

TYPICAL NO. 2
I-35 NB MILL/RESURFACE
STA. 632+50.00 TO STA. 640+25.00

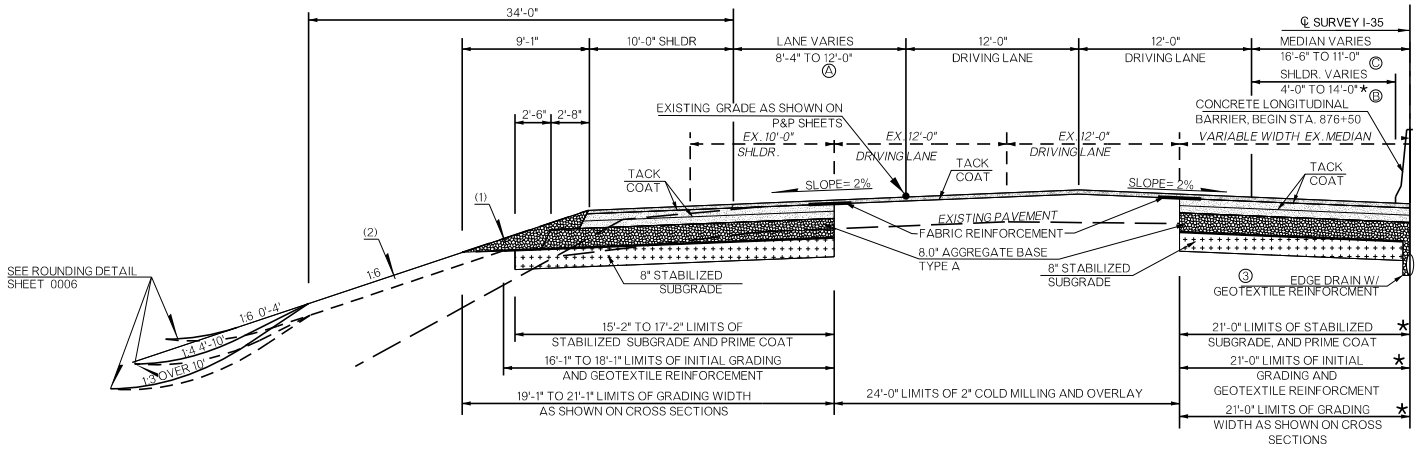
FLEXIBLE PAVEMENT DESIGN (30 YEAR DESIGN)

TYPICAL NO. 2 (INCIDENTAL NB WIDENING)

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY / FT.	PRICE / UNIT	COST / FT.
303(A)	1200	AGGREGATE BASE TYPE A	CY	0.3655	$ 79.00	$ 28.88
307(K)	4200	STABILIZED SUBGRADE	SY	1.9226	$ 13.00	$ 24.99
326(A)	1200	GEOTEXTILE REINFORCEMENT	SY	2.2004	$ 3.00	$ 6.60
402(E)	2600	TRAFFIC BOUND SURFACE COURSE TYPE E	TON	0.2751	$ 50.00	$ 13.76
407 (A)	7200	FOG SEAL	GAL	0.3778	$ 5.00	$ 1.89
407(B)	7300	TACK COAT	GAL	0.4856	$ 5.00	$ 2.43
408	8100	PRIME COAT	GAL	0.6729	$ 5.00	$ 3.36
411(B)	1320	SUPERPAVE, TYPE S3(PG 76-28 OK)	TON	0.0548	$ 150.00	$ 8.23
411(B)	1330	SUPERPAVE, TYPE S3(PG 64-22 OK)	TON	0.4263	$ 120.00	$ 51.15
411(C)	1400	SUPERPAVE, TYPE S4(PG 76-28 OK)	TON	0.4566	$ 155.00	$ 70.77
411(C)	1430	SUPERPAVE, TYPE S4(PG 64-22 OK)	TON	0.1176	$ 122.00	$ 14.35
412	3100	COLD MILLING PAVEMENT	SY	3.7778	$ 4.50	$ 17.00
619(C)	6600	SAWING PAVEMENT	LF	1.0000	$ 6.00	$ 6.00
					TOTAL PER FT.	$ 249.40

TYPICAL ESTIMATE - 775.00 FT X $ 249.40 = $ 193,285.42

Squad	OLSSON
Date	02-16-2024
S.W.O.	5560(01)
J.P. #	35589(04)
County	MCCLAIN COUNTY
Proj. No.	JP-35589(04)
Highway No.	I-35
Description	GRADE, DRAIN, BRIDGE & SURFACE



PAVEMENT REQUIREMENT				
8" PAVT. STRUCTURE	OVERLAY SECTION	DRIVING LANES	INSIDE SHOULDER	OUTSIDE SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)
		3" SUPERPAVE TYPE S3 (PG 76-28 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
BASE COURSE	EXISTING SURFACE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

TYPICAL NO. 3

I-35 SB MILL/RESURFACE

STA. 640+25.00 TO STA. 641+25.00

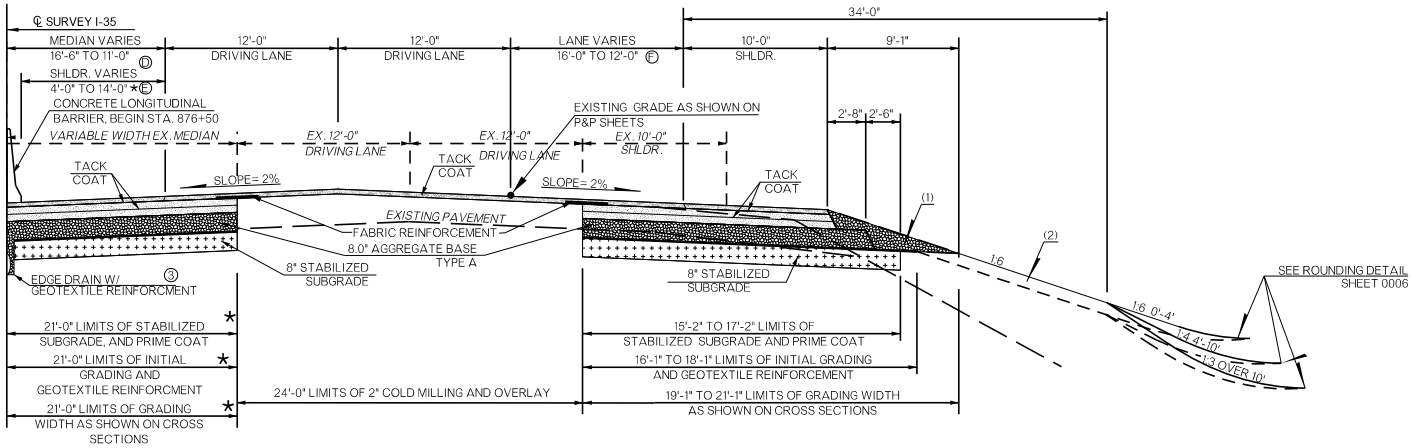
FLEXIBLE PAVEMENT DESIGN (30 YEAR DESIGN)

TYPICAL NO. 3 (INCIDENTAL SB WIDENING)

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY / FT.	PRICE / UNIT	COST / FT.
303(A)	1200	AGGREGATE BASE TYPE A	CY	1.1235	$ 79.00	$ 88.75
307(K)	4200	STABILIZED SUBGRADE	SY	5.3333	$ 13.00	$ 69.33
326(A)	1200	GEOTEXTILE REINFORCEMENT	SY	5.6111	$ 3.00	$ 16.83
402(E)	2600	TRAFFIC BOUND SURFACE COURSE TYPE E	TON	0.2751	$ 50.00	$ 13.76
407 (A)	7200	FOG SEAL	GAL	0.2667	$ 5.00	$ 1.33
407(B)	7300	TACK COAT	GAL	0.9139	$ 5.00	$ 4.57
408	8100	PRIME COAT	GAL	1.8667	$ 5.00	$ 9.33
409(A)	9200	FABRIC REINFORCEMENT	SY	0.4444	$ 3.50	$ 1.56
411(B)	1320	SUPERPAVE, TYPE S3(PG 76-28 OK)	TON	0.1944	$ 150.00	$ 29.17
411(B)	1330	SUPERPAVE, TYPE S3(PG 64-22 OK)	TON	1.4327	$ 120.00	$ 171.92
411(C)	1400	SUPERPAVE, TYPE S4(PG 76-28 OK)	TON	0.4252	$ 155.00	$ 65.90
411(C)	1430	SUPERPAVE, TYPE S4(PG 64-22 OK)	TON	0.4065	$ 122.00	$ 49.60
412	3100	COLD MILLING PAVEMENT	SY	2.6667	$ 4.50	$ 12.00
613(H)	0450	6" PERFORATED PIPE UNDERDRAIN ROUND	LF	1.0000	$ 25.00	$ 25.00
619(C)	6600	SAWING PAVEMENT	LF	2.0000	$ 6.00	$ 12.00
627(A)	6200	CONCRETE LONGITUDINAL BARRIER, DESIGN	LF	1.0000	$ 70.00	$ 70.00
					TOTAL PER FT.	$ 641.05

TYPICAL ESTIMATE - 100.00 FT X $ 641.05 = $ 64,105.40

Squad	OLSSON
Date	02-16-2024
S.W.O.	5560(01)
J.P. #	35589(04)
County	MCCLAIN COUNTY
Proj. No.	JP-35589(04)
Highway No.	I-35
Description	GRADE, DRAIN, BRIDGE & SURFACE



PAVEMENT REQUIREMENT				
8" PAVT. STRUCTURE	OVERLAY SECTION	DRIVING LANES	INSIDE SHOULDER	OUTSIDE SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)
		3" SUPERPAVE TYPE S3 (PG 76-28 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
BASE COURSE	EXISTING SURFACE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

TYPICAL NO. 4

I-35 NB MILL/RESURFACE

STA. 640+25.00 TO STA. 641+25.00

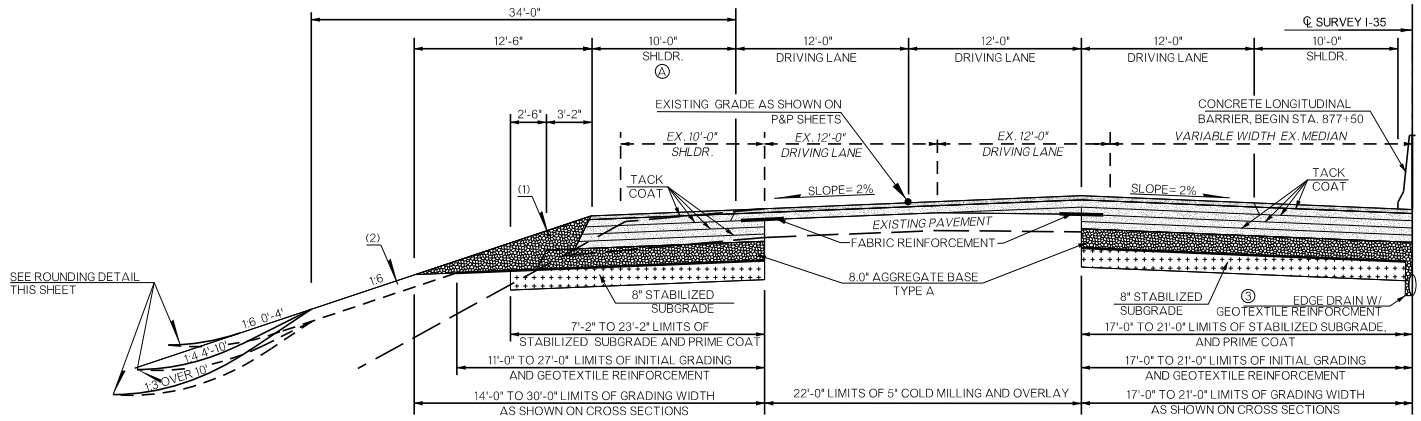
FLEXIBLE PAVEMENT DESIGN (30 YEAR DESIGN)

TYPICAL NO. 4 (INCIDENTAL NB WIDENING)

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY / FT.	PRICE / UNIT	COST / FT.
303(A)	1200	AGGREGATE BASE TYPE A	CY	1.1235	$ 79.00	$ 88.75
307(K)	4200	STABILIZED SUBGRADE	SY	5.3333	$ 13.00	$ 69.33
326(A)	1200	GEOTEXTILE REINFORCEMENT	SY	5.6111	$ 3.00	$ 16.83
402(E)	2600	TRAFFIC BOUND SURFACE COURSE TYPE E	TON	0.2751	$ 50.00	$ 13.76
407 (A)	7200	FOG SEAL	GAL	0.2667	$ 5.00	$ 1.33
407(B)	7300	TACK COAT	GAL	0.9139	$ 5.00	$ 4.57
408	8100	PRIME COAT	GAL	1.8667	$ 5.00	$ 9.33
409(A)	9200	FABRIC REINFORCEMENT	SY	0.4444	$ 3.50	$ 1.56
411(B)	1320	SUPERPAVE, TYPE S3(PG 76-28 OK)	TON	0.1944	$ 150.00	$ 29.17
411(B)	1330	SUPERPAVE, TYPE S3(PG 64-22 OK)	TON	1.4327	$ 120.00	$ 171.92
411(C)	1400	SUPERPAVE, TYPE S4(PG 76-28 OK)	TON	0.4252	$ 155.00	$ 65.90
411(C)	1430	SUPERPAVE, TYPE S4(PG 64-22 OK)	TON	0.4065	$ 122.00	$ 49.60
412	3100	COLD MILLING PAVEMENT	SY	2.6667	$ 4.50	$ 12.00
619(C)	6600	SAWING PAVEMENT	LF	2.0000	$ 6.00	$ 12.00
627(A)	6200	CONCRETE LONGITUDINAL BARRIER, DESIGN	LF	1.0000	$ 70.00	$ 70.00
					TOTAL PER FT.	$ 616.05

TYPICAL ESTIMATE - 100.00 FT X $ 616.05 = $ 61,605.40

Squad	OLSSON
Date	02-16-2024
S.W.O.	5560(01)
J.P. #	35589(04)
County	MCCLAIN COUNTY
Proj. No.	JP-35589(04)
Highway No.	I-35
Description	GRADE, DRAIN, BRIDGE & SURFACE



PAVEMENT REQUIREMENT			
14" PAVT. STRUCTURE	DRIVING LANES	INSIDE SHOULDER	OUTSIDE SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 76-28 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

TYPICAL NO. 5

I-35 SB FULL DEPTH

STA. 641+25.00 TO STA. 673+43.35
STA. 691+42.88 TO STA. 693+66.04
STA. 703+16.35 TO STA. 821+51.60
STA. 837+49.78 TO STA. 841+29.72
STA. 849+68.05 TO STA. 858+12.02
STA. 863+00.00 TO STA. 880+50.00

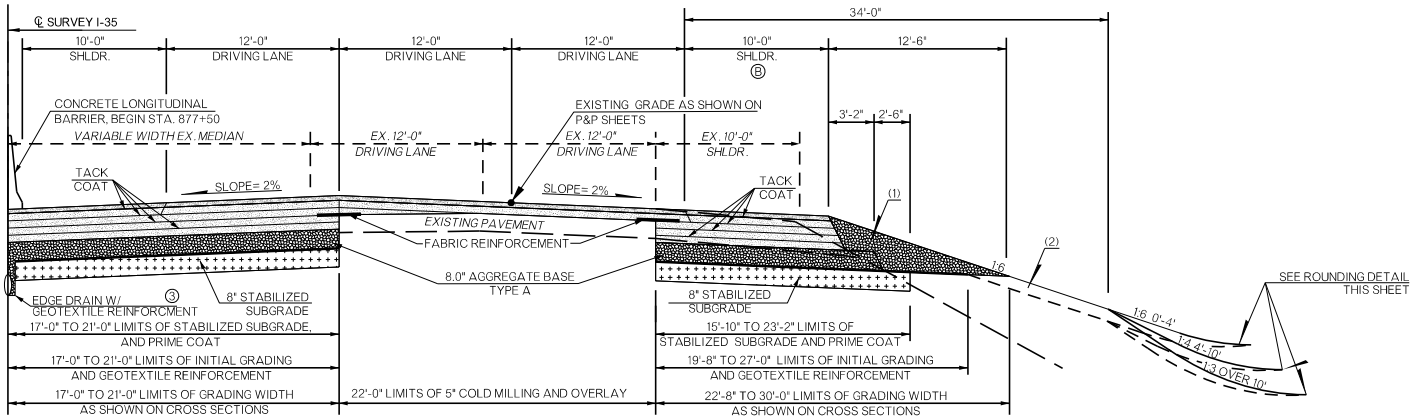
FLEXIBLE FULL DEPTH PAVEMENT DESIGN (30 YEAR DESIGN)/MILL AND OVERLAY (15 YEAR DESIGN)

TYPICAL NO. 5 (SB FULL DEPTH)

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY / FT.	PRICE / UNIT	COST / FT.
303(A)	1200	AGGREGATE BASE TYPE A	CY	0.7695	$ 79.00	$ 60.79
307(K)	4200	STABILIZED SUBGRADE	SY	3.7407	$ 13.00	$ 48.63
326(A)	1200	GEOTEXTILE REINFORCEMENT	SY	4.4444	$ 3.00	$ 13.33
402(E)	2600	TRAFFIC BOUND SURFACE COURSE TYPE E	TON	0.6038	$ 50.00	$ 30.19
407(A)	7200	FOG SEAL	GAL	0.2444	$ 5.00	$ 1.22
407(B)	7300	TACK COAT	GAL	1.1166	$ 5.00	$ 5.58
408	8100	PRIME COAT	GAL	1.3092	$ 5.00	$ 6.55
411(B)	1320	SUPERPAVE, TYPE S3(PG 76-28 OK)	TON	0.6767	$ 150.00	$ 101.50
411(B)	1330	SUPERPAVE, TYPE S3(PG 64-22 OK)	TON	1.8760	$ 120.00	$ 225.12
411(C)	1400	SUPERPAVE, TYPE S4(PG 76-28 OK)	TON	0.4480	$ 155.00	$ 69.44
411(C)	1430	SUPERPAVE, TYPE S4(PG 64-22 OK)	TON	0.1742	$ 122.00	$ 21.25
412	3100	COLD MILLING PAVEMENT	SY	2.4444	$ 4.50	$ 11.00
613(H)	0450	6" PERFORATED PIPE UNDERDRAIN ROUND	LF	1.0000	$ 25.00	$ 25.00
619(C)	6600	SAWING PAVEMENT	LF	2.0000	$ 6.00	$ 12.00
409(A)	9200	FABRIC REINFORCEMENT	SY	0.4444	$ 3.50	$ 1.56
					TOTAL PER FT.	$ 631.60

TYPICAL ESTIMATE - 18,250.67 FT X $ 631.60 = $ 11,527,201.29

Squad	OLSSON
Date	02-16-2023
S.W.O.	5560(01)
J.P. #	35589(04)
County	MCCLAIN COUNTY
Proj. No.	JP-35589(04)
Highway No.	I-35
Description	GRADE, DRAIN, BRIDGE & SURFACE



PAVEMENT REQUIREMENT			
14" PAVT. STRUCTURE	DRIVING LANES	INSIDE SHOULDER	OUTSIDE SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 76-28 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

TYPICAL NO. 6

I-35 NB FULL DEPTH

STA. 641+25.00 TO STA. 682+04.35
STA. 691+52.07 TO STA. 693+80.38
STA. 711+33.35 TO STA. 851+51.60
STA. 860+67.40 TO STA. 864+00.70

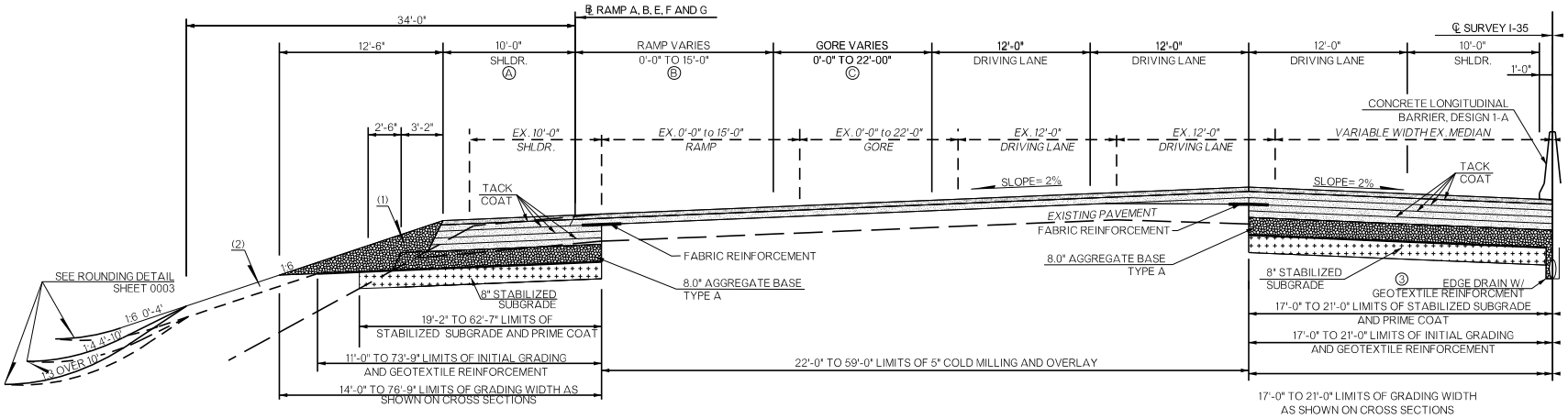
FLEXIBLE FULL DEPTH PAVEMENT DESIGN (30 YEAR DESIGN)/ MILL AND OVERLAY (15 YEAR DESIGN)

TYPICAL NO. 6 (NB FULL DEPTH)

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY /FT.	PRICE /UNIT	COST /FT.
303(A)	1200	AGGREGATE BASE TYPE A	CY	0.8722	$ 79.00	$ 68.91
307(K)	4200	STABILIZED SUBGRADE	SY	4.2029	$ 13.00	$ 54.64
326(A)	1200	GEOTEXTILE REINFORCEMENT	SY	4.9066	$ 3.00	$ 14.72
402(E)	2600	TRAFFIC BOUND SURFACE COURSE TYPE E	TON	0.6038	$ 50.00	$ 30.19
407(A)	7200	FOG SEAL	GAL	0.2444	$ 5.00	$ 1.22
407(B)	7300	TACK COAT	GAL	1.2553	$ 5.00	$ 6.28
408	8100	PRIME COAT	GAL	1.4710	$ 5.00	$ 7.36
411(B)	1320	SUPERPAVE, TYPE S3(PG 76-28 OK)	TON	0.6767	$ 150.00	$ 101.50
411(B)	1330	SUPERPAVE, TYPE S3(PG 64-22 OK)	TON	2.1866	$ 120.00	$ 262.39
411(C)	1400	SUPERPAVE, TYPE S4(PG 76-28 OK)	TON	0.4480	$ 155.00	$ 69.44
411(C)	1430	SUPERPAVE, TYPE S4(PG 64-22 OK)	TON	0.2260	$ 122.00	$ 27.57
412	3100	COLD MILLING PAVEMENT	SY	2.4444	$ 4.50	$ 11.00
613(H)	0450	6" PERFORATED PIPE UNDERDRAIN ROUND	LF	1.0000	$ 25.00	$ 25.00
619(C)	6600	SAWING PAVEMENT	LF	1.0000	$ 6.00	$ 6.00
409(A)	9200	FABRIC REINFORCEMENT	SY	0.4444	$ 3.50	$ 1.56
					TOTAL PER FT.	$ 687.76

TYPICAL ESTIMATE - 18,659.21 FT X $ 687.76 = $ 12,833,003.75

Squad	OLSSON
Date	02-16-2024
S.W.O.	5560(01)
J.P. #	35589(04)
County	MCCLAIN COUNTY
Proj. No.	JP-35589(04)
Highway No.	I-35
Description	GRADE, DRAIN, BRIDGE & SURFACE



PAVEMENT REQUIREMENT			
14" PAVT. STRUCTURE	DRIVING LANES	INSIDE SHOULDER	OUTSIDE SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 76-28 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

TYPICAL NO. 7

I-35 SB FULL DEPTH

STA. 673+43.35 TO STA. 691+42.88
STA. 693+66.04 TO STA. 703+16.35
STA. 821+51.60 TO STA. 837+49.78
STA. 841+29.72 TO STA. 849+68.05
STA. 858+12.02 TO STA. 863+00.00

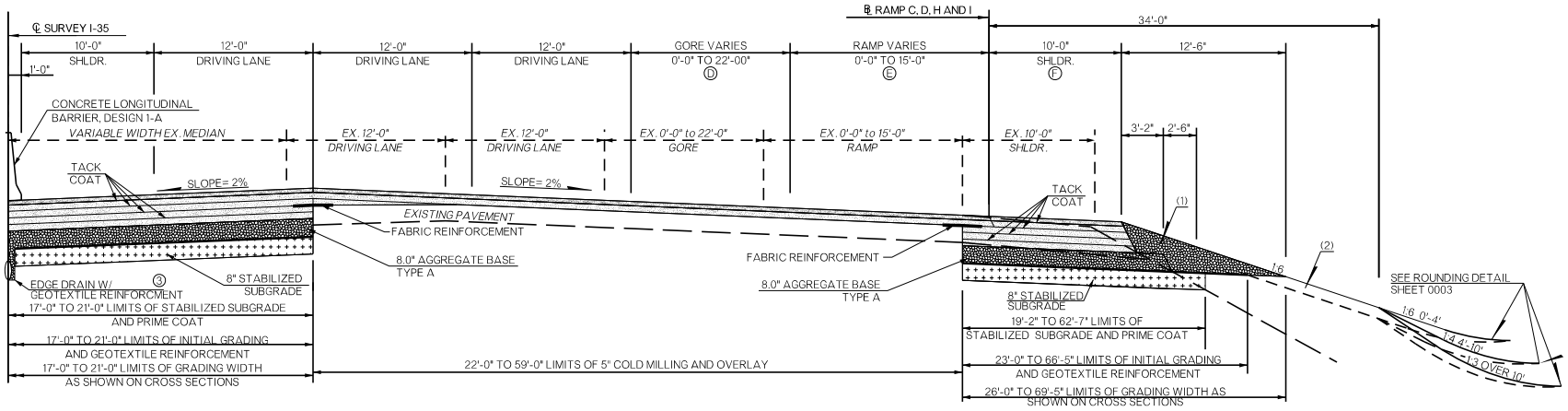
FLEXIBLE FULL DEPTH PAVEMENT DESIGN (30 YEAR DESIGN)/MILL AND OVERLAY (15 YEAR DESIGN)

TYPICAL NO. 7

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY /FT.	PRICE /UNIT	COST
303(A)	1200	AGGREGATE BASE TYPE A	CY	0.8891	$ 79.00	$ 70.24
307(K)	4200	STABILIZED SUBGRADE	SY	4.0011	$ 13.00	$ 52.01
326(A)	1200	GEOTEXTILE REINFORCEMENT	SY	5.2222	$ 3.00	$ 15.67
402(E)	2600	TRAFFIC BOUND SURFACE COURSE TYPE E	TON	0.6038	$ 50.00	$ 30.19
407 (A)	7200	FOG SEAL	GAL	0.3804	$ 5.00	$ 1.90
407(B)	7300	TACK COAT	GAL	1.7321	$ 5.00	$ 8.66
408	8100	PRIME COAT	GAL	1.4004	$ 5.00	$ 7.00
411(B)	1320	SUPERPAVE, TYPE S3(PG 76-28 OK)	TON	0.9051	$ 150.00	$ 135.77
411(B)	1330	SUPERPAVE, TYPE S3(PG 64-22 OK)	TON	2.3869	$ 120.00	$ 286.43
411(C)	1400	SUPERPAVE, TYPE S4(PG 76-28 OK)	TON	0.6003	$ 155.00	$ 93.05
411(C)	1430	SUPERPAVE, TYPE S4(PG 64-22 OK)	TON	0.2594	$ 122.00	$ 31.64
412	3100	COLD MILLING PAVEMENT	SY	3.8044	$ 4.50	$ 17.12
613(H)	0450	6" PERFORATED PIPE UNDERDRAIN ROUND	LF	1.0000	$ 25.00	$ 25.00
619(C)	6600	SAWING PAVEMENT	LF	2.0000	$ 6.00	$ 12.00
409(A)	9200	FABRIC REINFORCEMENT	SY	0.4444	$ 3.50	$ 1.56
					TOTAL PER FT.	$ 788.24

TYPICAL ESTIMATE - 5,674.33 FT X $ 788.24 = $ 4,472,761.54

Squad	OLSSON
Date	02-16-2024
S.W.O.	5560(01)
J.P. #	35589(04)
County	MCCLAIN COUNTY
Proj. No.	JP-35589(04)
Highway No.	I-35
Description	GRADE, DRAIN, BRIDGE & SURFACE



PAVEMENT REQUIREMENT			
14" PAVT. STRUCTURE	DRIVING LANES	INSIDE SHOULDER	OUTSIDE SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 76-28 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

TYPICAL NO. 8

I-35 NB FULL DEPTH

STA. 682+04.35 TO STA. 691+52.07
STA. 693+80.38 TO STA. 711+33.35
STA. 851+51.60 TO STA. 860+67.40
STA. 864+00.70 TO STA. 880+50.00

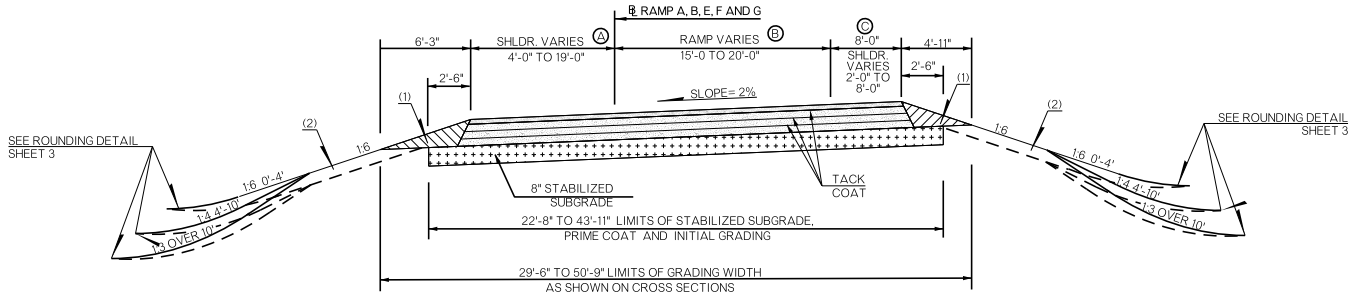
FLEXIBLE FULL DEPTH PAVEMENT DESIGN (30 YEAR DESIGN)/MILL AND OVERLAY (15 YEAR DESIGN)

TYPICAL NO. 8

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY /FT.	PRICE /UNIT	COST
303(A)	1200	AGGREGATE BASE TYPE A	CY	0.9321	$ 79.00	$ 73.64
307(K)	4200	STABILIZED SUBGRADE	SY	4.4724	$ 13.00	$ 58.14
326(A)	1200	GEOTEXTILE REINFORCEMENT	SY	5.2222	$ 3.00	$ 15.67
402(E)	2600	TRAFFIC BOUND SURFACE COURSE TYPE E	TON	0.6038	$ 50.00	$ 30.19
407 (A)	7200	FOG SEAL	GAL	0.3770	$ 5.00	$ 1.88
407(B)	7300	TACK COAT	GAL	1.7322	$ 5.00	$ 8.66
408	8100	PRIME COAT	GAL	1.5653	$ 5.00	$ 7.83
411(B)	1320	SUPERPAVE, TYPE S3(PG 76-28 OK)	TON	0.9040	$ 150.00	$ 135.60
411(B)	1330	SUPERPAVE, TYPE S3(PG 64-22 OK)	TON	2.4050	$ 120.00	$ 288.60
411(C)	1400	SUPERPAVE, TYPE S4(PG 76-28 OK)	TON	0.5965	$ 155.00	$ 92.45
411(C)	1430	SUPERPAVE, TYPE S4(PG 64-22 OK)	TON	0.2562	$ 122.00	$ 31.25
412	3100	COLD MILLING PAVEMENT	SY	3.7700	$ 4.50	$ 16.96
613(H)	0450	6" PERFORATED PIPE UNDERDRAIN ROUND	LF	1.0000	$ 25.00	$ 25.00
619(C)	6600	SAWING PAVEMENT	LF	2.0000	$ 6.00	$ 12.00
409(A)	9200	FABRIC REINFORCEMENT	SY	0.4444	$ 3.50	$ 1.56
					TOTAL PER FT.	$ 799.43

TYPICAL ESTIMATE - 5,265.79 FT X $ 799.43 = $ 4,209,626.75

Squad	OLSSON
Date	02-16-2024
S.W.O.	5560(01)
J.P. #	35589(04)
County	MCCLAIN COUNTY
Proj. No.	JP-35589(04)
Highway No.	I-35
Description	GRADE, DRAIN, BRIDGE & SURFACE



PAVEMENT REQUIREMENT			
11" PAVT. STRUCTURE	DRIVING LANES	INSIDE SHOULDER	OUTSIDE SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 64-22 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	2.5" SUPERPAVE TYPE S3 (PG 64-22 OK)	2.5" SUPERPAVE TYPE S3 (PG 64-22 OK)	2.5" SUPERPAVE TYPE S3 (PG 64-22 OK)
	2.5" SUPERPAVE TYPE S3 (PG 64-22 OK)	2.5" SUPERPAVE TYPE S3 (PG 64-22 OK)	2.5" SUPERPAVE TYPE S3 (PG 64-22 OK)

TYPICAL NO. 9

RAMP A, B, E, F, G

RAMP A - STA. 691+38.09 TO STA. 692+71.21
RAMP B - STA. 682+18.98 TO STA. 684+13.53
RAMP E - STA. 837+46.39 TO STA. 839+22.28
RAMP F - STA. 839+50.00 TO STA. 841+34.37
RAMP G - STA. 857+16.83 TO STA. 858+13.24

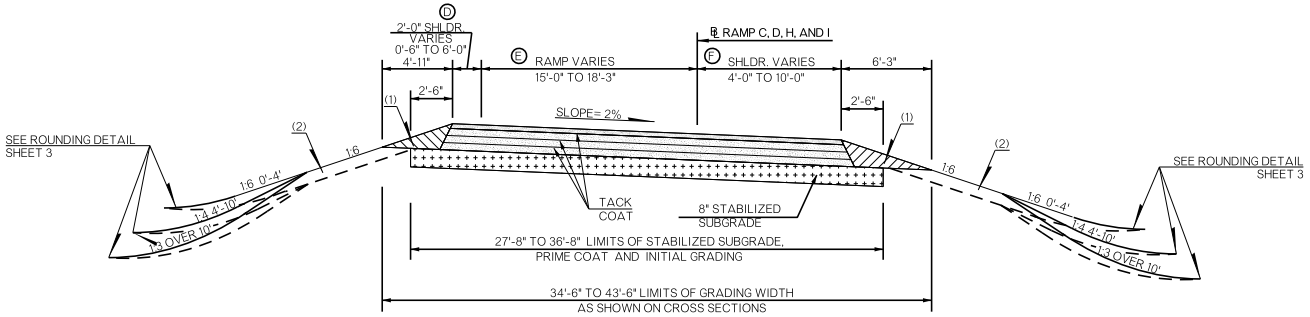
FLEXIBLE PAVEMENT DESIGN (30 YEAR DESIGN)

TYPICAL NO. 9 - RAMP A, B, E, F, G

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY / FT.	PRICE / UNIT	COST
307(K)	4200	STABILIZED SUBGRADE	SY	3.5905	$ 13.00	$ 46.68
407(B)	7300	TACK COAT	GAL	0.6829	$ 5.00	$ 3.41
408	8100	PRIME COAT	GAL	1.2567	$ 5.00	$ 6.28
411(B)	1330	SUPERPAVE, TYPE S3(PG 64-22 OK)	TON	1.3929	$ 120.00	$ 167.14
411(C)	1430	SUPERPAVE, TYPE S4(PG 64-22 OK)	TON	0.3399	$ 122.00	$ 41.47
					TOTAL PER FT.	$ 264.99

TYPICAL ESTIMATE - 784.34 FT X $ 264.99 = $ 207,840.94

Squad	OLSSON
Date	02-16-2024
S.W.O.	5560(01)
J.P. #	35589(04)
County	MCCLAIN COUNTY
Proj. No.	JP-35589(04)
Highway No.	I-35
Description	GRADE, DRAIN, BRIDGE & SURFACE



PAVEMENT REQUIREMENT			
11" PAVT. STRUCTURE	DRIVING LANES	INSIDE SHOULDER	OUTSIDE SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 64-22 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

TYPICAL NO. 10

RAMP C, D, H, I

RAMP C - STA. 401+83.39 TO STA. 403+16.35
RAMP D - STA. 392+52.15 TO STA. 393+82.67
RAMP H - STA. 862+12.02 TO STA. 861+03.61
RAMP I - STA. 862+12.02 TO STA. 864+04.32

FLEXIBLE PAVEMENT DESIGN (30 YEAR DESIGN)

TYPICAL NO. 10 - RAMP C, D, H, I

ITEM	CODE	DESCRIPTION	UNIT	QUANTITY / FT.	PRICE / UNIT	COST
307(K)	4200	STABILIZED SUBGRADE	SY	3.4251	$ 13.00	$ 44.53
407(B)	7300	TACK COAT	GAL	0.6457	$ 5.00	$ 3.23
408	8100	PRIME COAT	GAL	1.1988	$ 5.00	$ 5.99
411(B)	1330	SUPERPAVE, TYPE S3(PG 64-22 OK)	TON	1.4883	$ 120.00	$ 178.59
411(C)	1430	SUPERPAVE, TYPE S4(PG 64-22 OK)	TON	0.3214	$ 122.00	$ 39.21
					TOTAL PER FT.	$ 271.55

TYPICAL ESTIMATE - 564.19 FT X $ 271.55 = $ 153,206.12

Squad	OLSSON
Date	02-16-2024
S.W.O.	5560(01)
J.P. #	35589(04)
County	MCCLAIN COUNTY
Proj. No.	JP-35589(04)
Highway No.	I-35
Description	GRADE, DRAIN, BRIDGE & SURFACE

APPENDIX A

22119.Overlay.Mill5Fill5 with Agg Base

File Name: C:\Users\kkb\OneDrive\Documents\My ME Design\Projects\2022\22119\22119.Overlay.Mill5Fill5 with Agg Base.dgpx

Design Inputs

Design Life: 15 years
Design Type: AC_AC

Existing construction: June, 2005
Pavement construction: May, 2025
Traffic opening: May, 2027

Climate Data Sources (Lat/Lon) 35, -97.5

Design Structure

Layer type	Material Type	Thickness (in)
Flexible (OL)	Default asphalt concrete	5.0
Flexible (existing)	Default asphalt concrete	4.0
NonStabilized	Crushed stone	6.0
Subgrade	A-6	24.0
Subgrade	A-6	Semi-infinite

Volumetric at Construction:	
Effective binder content (%)	10.7
Air voids (%)	7.0

Traffic

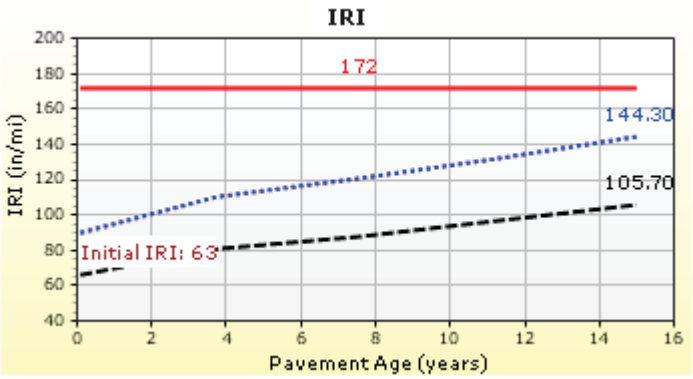
Age (year)	Heavy Trucks (cumulative)
2027 (initial)	13,914
2034 (7 years)	15,669,700
2042 (15 years)	33,836,400

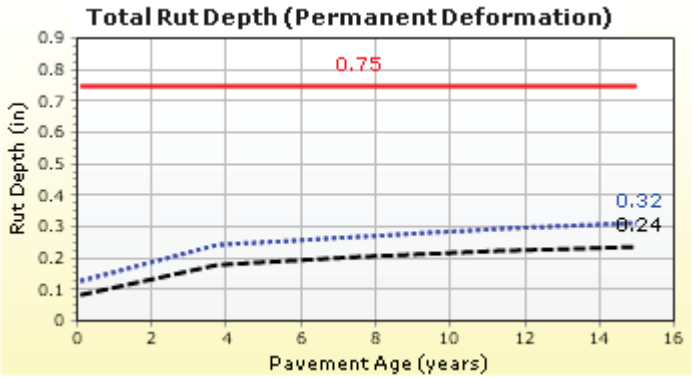
Design Outputs

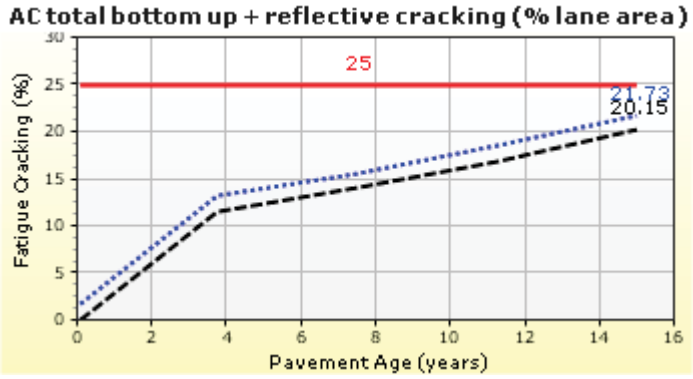
Distress Prediction Summary

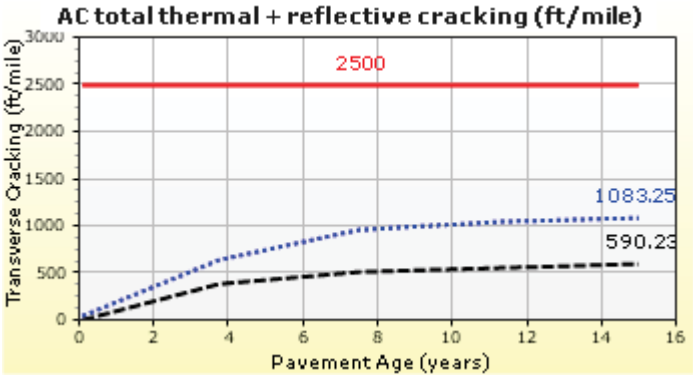
Distress Type	Distress @ Specified Reliability		Reliability (%)		Criterion Satisfied?
	Target	Predicted	Target	Achieved	
Terminal IRI (in/mile)	172.00	144.34	90.00	98.61	Pass
Permanent deformation - total pavement (in)	0.75	0.32	90.00	100.00	Pass
AC total fatigue cracking: bottom up + reflective (% lane area)	25.00	21.73	90.00	100.00	Pass
AC total transverse cracking: thermal + reflective (ft/mile)	2500.00	1083.25	90.00	100.00	Pass
Permanent deformation - AC only (in)	0.25	0.15	90.00	100.00	Pass
AC bottom-up fatigue cracking (% lane area)	25.00	0.00	50.00	100.00	Pass
AC thermal cracking (ft/mile)	1000.00	215.42	50.00	100.00	Pass
AC top-down fatigue cracking (% lane area)	25.00	13.32	90.00	99.95	Pass

Distress Charts









22119.Overlay.Mill5Fill5 with Stab Subgrade

File Name: C:\Users\kkb\OneDrive\Documents\My ME Design\Projects\2022\22119\22119.Overlay.Mill5Fill5 with Stab Subgrade.dgpx

Design Inputs

Design Life: 15 years
Design Type: AC_AC

Existing construction: June, 2005
Pavement construction: May, 2025
Traffic opening: May, 2027

Climate Data Sources (Lat/Lon): 35, -97.5

Design Structure

Layer type	Material Type	Thickness (in)
Flexible (OL)	Default asphalt concrete	5.0
Flexible (existing)	Default asphalt concrete	4.0
Subgrade	Cement Stabilized Subgrade	6.0
Subgrade	A-6	24.0
Subgrade	A-6	Semi-infinite

Volumetric at Construction:	
Effective binder content (%)	10.7
Air voids (%)	7.0

Traffic

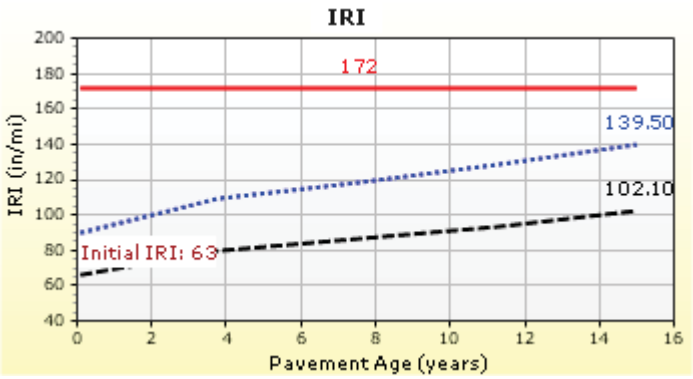
Age (year)	Heavy Trucks (cumulative)
2027 (initial)	13,914
2034 (7 years)	15,669,700
2042 (15 years)	33,836,400

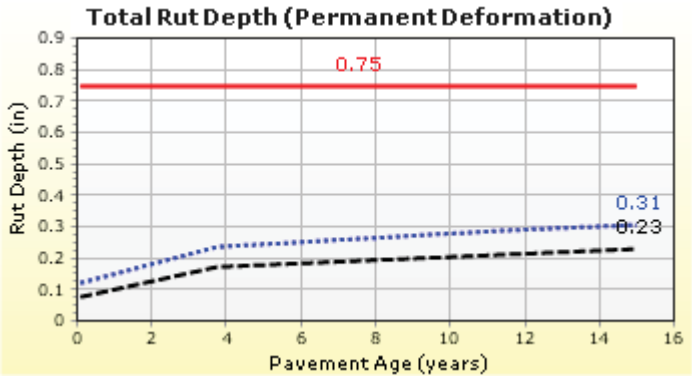
Design Outputs

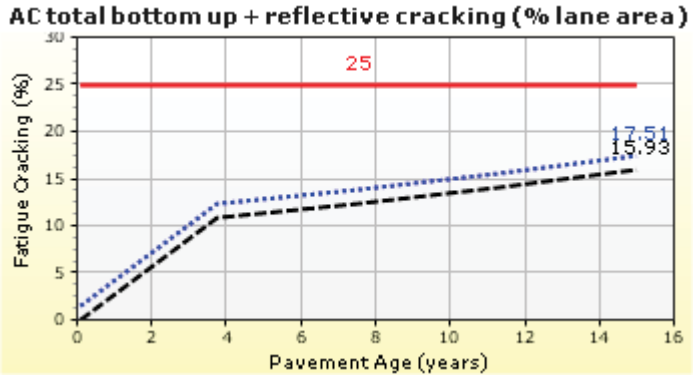
Distress Prediction Summary

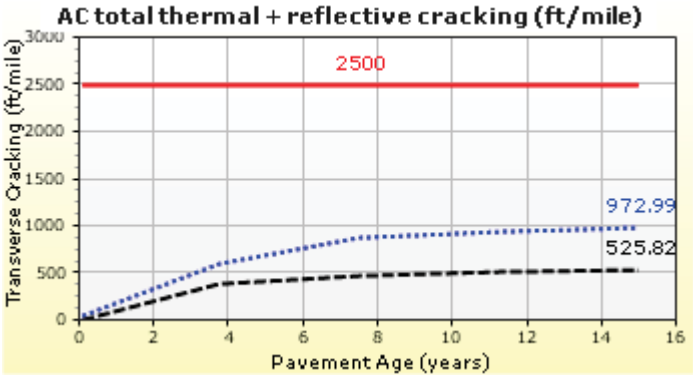
Distress Type	Distress @ Specified Reliability		Reliability (%)		Criterion Satisfied?
	Target	Predicted	Target	Achieved	
Terminal IRI (in/mile)	172.00	139.54	90.00	99.16	Pass
Permanent deformation - total pavement (in)	0.75	0.31	90.00	100.00	Pass
AC total fatigue cracking: bottom up + reflective (% lane area)	25.00	17.51	90.00	100.00	Pass
AC total transverse cracking: thermal + reflective (ft/mile)	2500.00	972.99	90.00	100.00	Pass
Permanent deformation - AC only (in)	0.25	0.15	90.00	99.99	Pass
AC bottom-up fatigue cracking (% lane area)	25.00	0.00	50.00	100.00	Pass
AC thermal cracking (ft/mile)	1000.00	151.01	50.00	100.00	Pass
AC top-down fatigue cracking (% lane area)	25.00	13.32	90.00	99.95	Pass

Distress Charts









22119 New Mainline AC 14

File Name: C:\Users\kkb\OneDrive\Documents\My ME Design\Projects\2022\22119\22119 New Mainline AC 14.dgpx

Design Inputs

Design Life: 30 years
Design Type: FLEXIBLE

Base construction: May, 2025
Pavement construction: May, 2026
Traffic opening: May, 2027

Climate Data Sources (Lat/Lon): 35, -97.5

Design Structure

Layer type	Material Type	Thickness (in)
Flexible	Default asphalt concrete	5.0
Flexible	Default asphalt concrete	9.0
NonStabilized	Crushed stone	8.0
Subgrade	Stabilized Subgrade	8.0
Subgrade	A-6	Semi-infinite

Volumetric at Construction:	
Effective binder content (%)	11.0
Air voids (%)	6.5

Traffic

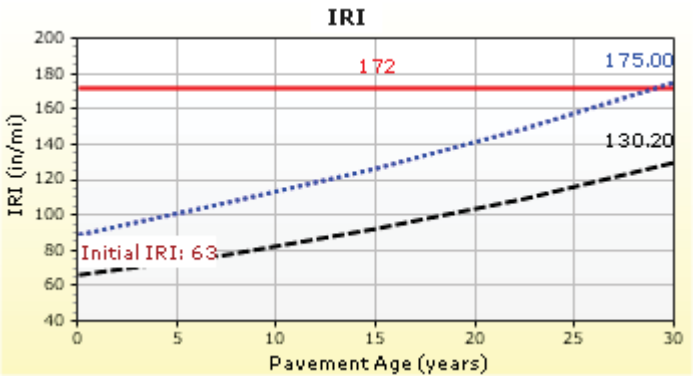
Age (year)	Heavy Trucks (cumulative)
2027 (initial)	13,914
2042 (15 years)	33,836,400
2057 (30 years)	79,375,700

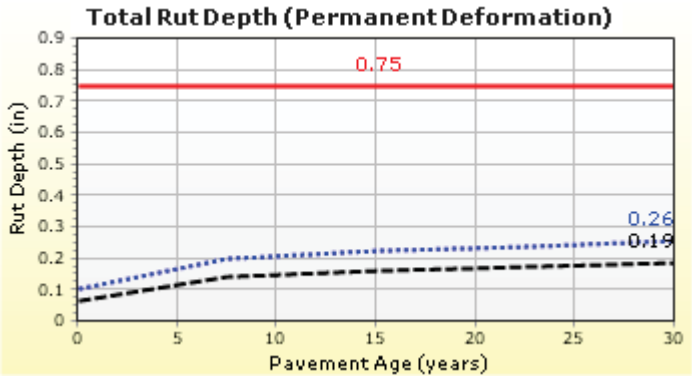
Design Outputs

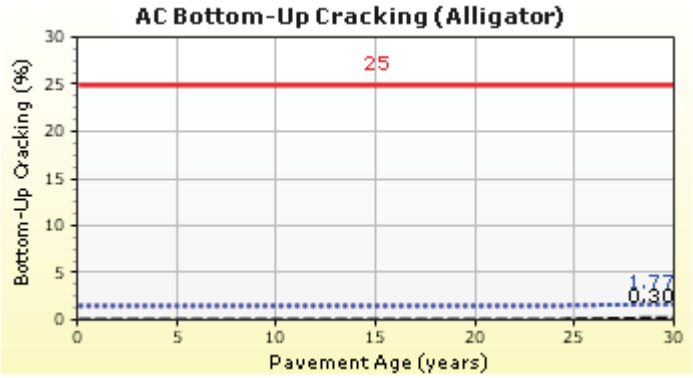
Distress Prediction Summary

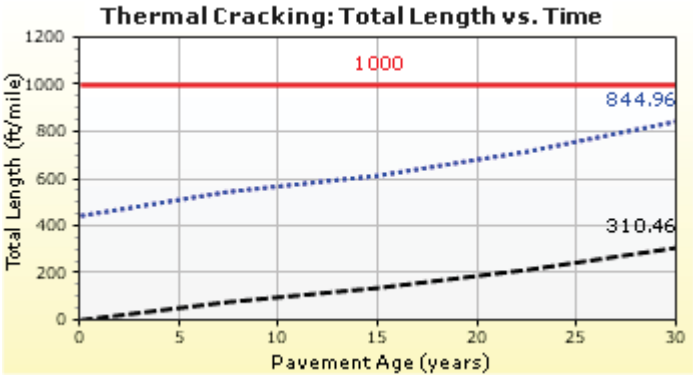
Distress Type	Distress @ Specified Reliability		Reliability (%)		Criterion Satisfied?
	Target	Predicted	Target	Achieved	
Terminal IRI (in/mile)	172.00	174.97	90.00	88.43	Fail
Permanent deformation - total pavement (in)	0.75	0.26	90.00	100.00	Pass
AC bottom-up fatigue cracking (% lane area)	25.00	1.77	90.00	100.00	Pass
AC thermal cracking (ft/mile)	1000.00	844.96	90.00	95.09	Pass
AC top-down fatigue cracking (% lane area)	25.00	15.67	90.00	99.69	Pass
Permanent deformation - AC only (in)	0.25	0.09	90.00	100.00	Pass

Distress Charts









22119 New Mainline PCC 12

File Name: C:\Users\kkb\OneDrive\Documents\My ME Design\Projects\2022\22119\22119 New Mainline PCC 12.dgpx

Design Inputs

Design Life: 30 years
Design Type: JPCP

Existing construction: -
Pavement construction: May, 2025
Traffic opening: May, 2027

Climate Data Sources (Lat/Lon) 35.389, -97.6

Design Structure

Layer type	Material Type	Thickness (in)
PCC	JPCP Default	12.0
Cement_Base	Cement Treated Base	4.0
NonStabilized	Crushed stone	8.0
Subgrade	Stabilized Subgrade	8.0
Subgrade	A-6	Semi-infinite

Joint Design:	
Joint spacing (ft)	15.0
Dowel diameter (in)	1.75
Slab width (ft)	12.0

Traffic

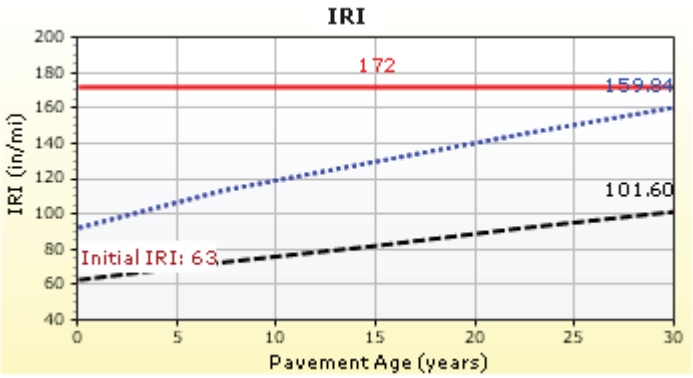
Age (year)	Heavy Trucks (cumulative)
2027 (initial)	13,914
2042 (15 years)	33,836,400
2057 (30 years)	79,375,700

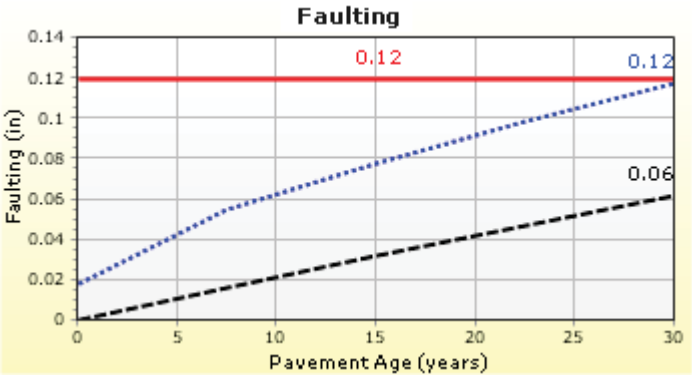
Design Outputs

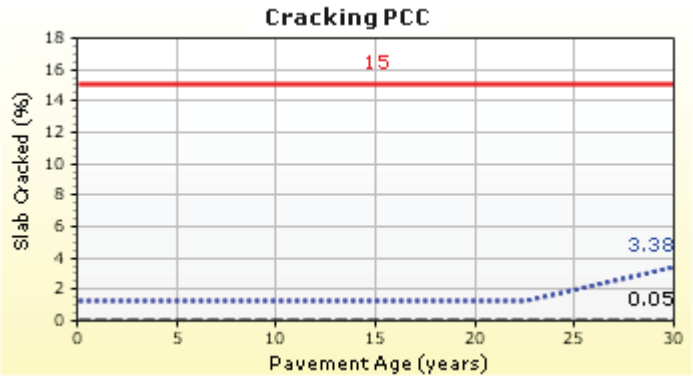
Distress Prediction Summary

Distress Type	Distress @ Specified Reliability		Reliability (%)		Criterion Satisfied?
	Target	Predicted	Target	Achieved	
Terminal IRI (in/mile)	172.00	159.84	95.00	97.66	Pass
Mean joint faulting (in)	0.12	0.12	95.00	95.69	Pass
JPCP transverse cracking (percent slabs)	15.00	3.38	95.00	100.00	Pass

Distress Charts







Threshold Value ····· @ Specified Reliability - - - @ 50% Reliability

22119 New Ramps AC 10 64-22

File Name: C:\Users\kkb\OneDrive\Documents\My ME Design\Projects\2022\22119\22119 New Ramps AC 10 64-22.dgpx

Design Inputs

Design Life: 30 years
Design Type: FLEXIBLE

Base construction: May, 2025
Pavement construction: May, 2026
Traffic opening: May, 2027

Climate Data Sources (Lat/Lon): 35, -97.5

Design Structure

Layer type	Material Type	Thickness (in)
Flexible	Default asphalt concrete	2.0
Flexible	Default asphalt concrete	8.0
Subgrade	Stabilized Subgrade	8.0
Subgrade	A-6	Semi-infinite

Volumetric at Construction:	
Effective binder content (%)	11.0
Air voids (%)	6.5

Traffic

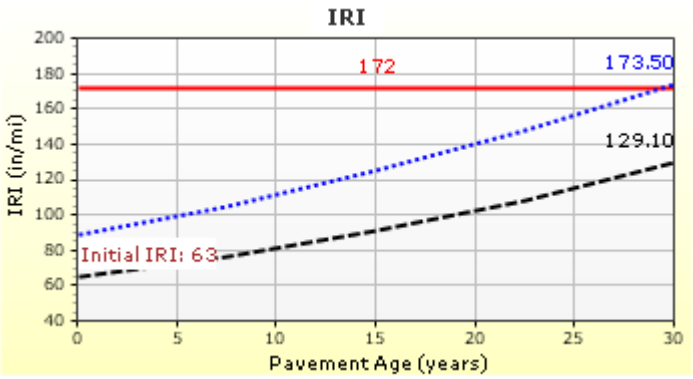
Age (year)	Heavy Trucks (cumulative)
2027 (initial)	304
2042 (15 years)	1,920,190
2057 (30 years)	4,504,520

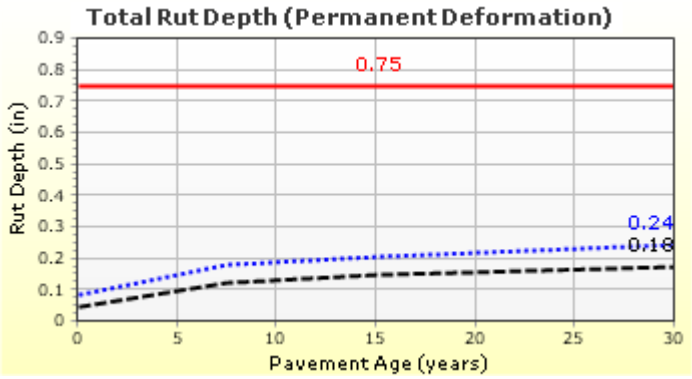
Design Outputs

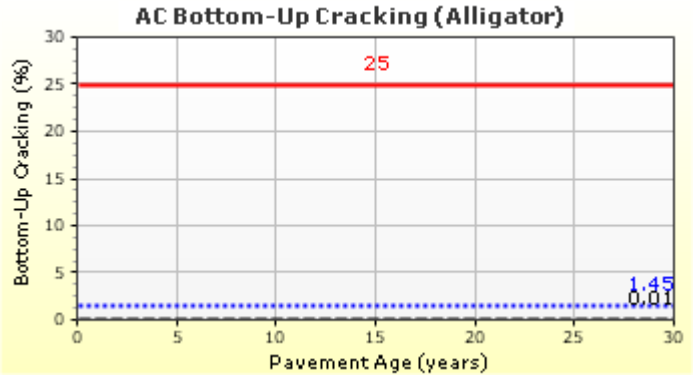
Distress Prediction Summary

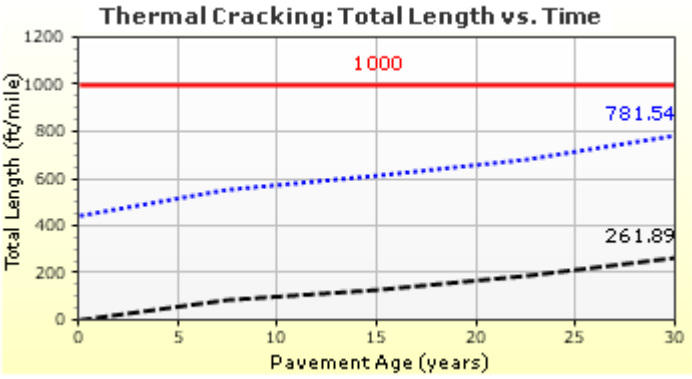
Distress Type	Distress @ Specified Reliability		Reliability (%)		Criterion Satisfied?
	Target	Predicted	Target	Achieved	
Terminal IRI (in/mile)	172.00	173.55	90.00	89.19	Fail
Permanent deformation - total pavement (in)	0.75	0.24	90.00	100.00	Pass
AC bottom-up fatigue cracking (% lane area)	25.00	1.45	90.00	100.00	Pass
AC thermal cracking (ft/mile)	1000.00	781.54	90.00	96.56	Pass
AC top-down fatigue cracking (% lane area)	25.00	14.82	90.00	99.83	Pass
Permanent deformation - AC only (in)	0.25	0.10	90.00	100.00	Pass

Distress Charts









22119 New Ramps PCC 9

File Name: C:\Users\kkb\OneDrive\Documents\My ME Design\Projects\2022\22119\22119 New Ramps PCC 9.dgpx

Design Inputs

Design Life: 30 years
Design Type: JPCP

Existing construction: -
Pavement construction: May, 2025
Traffic opening: May, 2027

Climate Data Sources (Lat/Lon): 35.389, -97.6

Design Structure

Layer type	Material Type	Thickness (in)
PCC	JPCP Default	9.0
Cement_Base	Cement Treated Base	4.0
Subgrade	Stabilized Subgrade	8.0
Subgrade	A-6	Semi-infinite

Joint Design:	
Joint spacing (ft)	15.0
Dowel diameter (in)	1.50
Slab width (ft)	12.0

Traffic

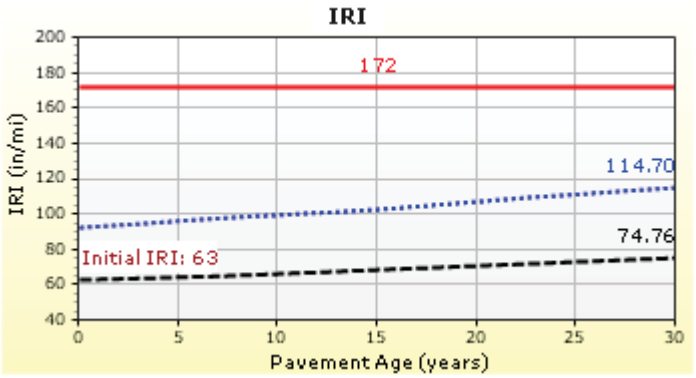
Age (year)	Heavy Trucks (cumulative)
2027 (initial)	304
2042 (15 years)	1,920,190
2057 (30 years)	4,504,520

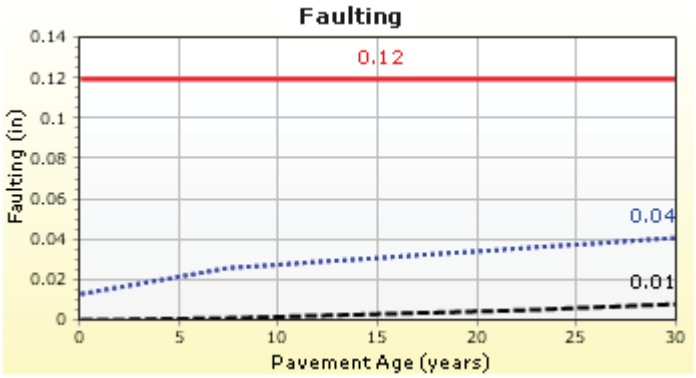
Design Outputs

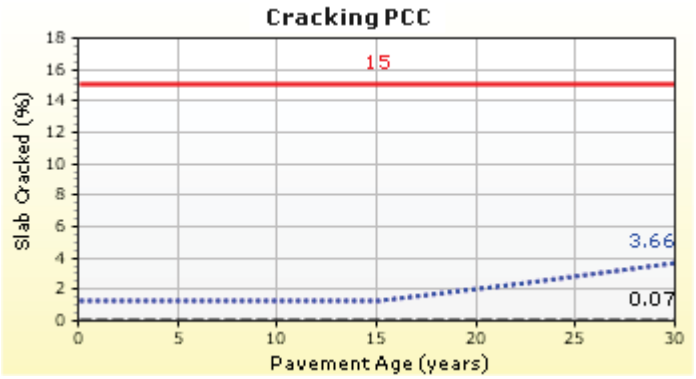
Distress Prediction Summary

Distress Type	Distress @ Specified Reliability		Reliability (%)		Criterion Satisfied?
	Target	Predicted	Target	Achieved	
Terminal IRI (in/mile)	172.00	114.70	95.00	100.00	Pass
Mean joint faulting (in)	0.12	0.04	95.00	100.00	Pass
JPCP transverse cracking (percent slabs)	15.00	3.66	95.00	100.00	Pass

Distress Charts







Layer Information

Layer 1 PCC : JPCP Default

PCC	
Thickness (in)	9.0
Unit weight (pcf)	150.0
Poisson's ratio	0.2

Thermal	
PCC coefficient of thermal expansion (in/in/ºF x 10^-6)	4.9
PCC thermal conductivity (BTU/hr-ft-ºF)	1.25
PCC heat capacity (BTU/lb-ºF)	0.28

Mix		
Cement type		Type I (1)
Cementitious material content (lb/yd^3)		600
Water to cement ratio		0.42
Aggregate type		Dolomite (2)
PCC zero-stress temperature (ºF)	Calculated Internally?	True
	User Value	-
	Calculated Value	101.6
Ultimate shrinkage (microstrain)	Calculated Internally?	True
	User Value	-
	Calculated Value	657.2
Reversible shrinkage (%)		50
Time to develop 50% of ultimate shrinkage (days)		35
Curing method		Curing Compound

PCC strength and modulus (Input Level: 3)

28-Day PCC compressive strength (psi)	4000.0
28-Day PCC elastic modulus (psi)	3600000.0

Identifiers

Field	Value
Display name/identifier	JPCP Default
Description of object	
Author	
Date Created	5/25/2021 10:12:41 AM
Approver	
Date approved	5/25/2021 10:12:41 AM
State	
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	
User defined field 2	
User defined field 3	
Revision Number	0

Layer 2 Chemically Stabilized : Cement Treated Base

Chemically Stabilized	
Layer thickness (in)	4
Poisson's ratio	0.2
Unit weight (pcf)	150

Strength	
Elastic/resilient modulus (psi)	700000

Thermal	
Heat capacity (BTU/lb-ºF)	0.2
Thermal conductivity (BTU/hr-ft-ºF)	1

Identifiers

Field	Value
Display name/identifier	Cement Treated Base
Description of object	Default material
Author	AASHTO
Date Created	1/1/2011 12:00:00 AM
Approver	
Date approved	1/1/2011 12:00:00 AM
State	
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	
User defined field 2	
User defined field 3	
Revision Number	0

Layer 3 Subgrade : Stabilized Subgrade

Unbound	
Layer thickness (in)	8.0
Poisson's ratio	0.35
Coefficient of lateral earth pressure (k0)	0.5

Modulus (Input Level: 3)

Analysis Type:	Annual representative values
Method:	Resilient Modulus (psi)

Resilient Modulus (psi)
15000.0

Use Correction factor for NDT modulus?	-
NDT Correction Factor:	-

Identifiers

Field	Value
Display name/identifier	Stabilized Subgrade
Description of object	Default material
Author	AASHTO
Date Created	1/1/2011 12:00:00 AM
Approver	
Date approved	1/1/2011 12:00:00 AM
State	
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	
User defined field 2	
User defined field 3	
Revision Number	0

Sieve

Liquid Limit	36.0
Plasticity Index	17.0
Is layer compacted?	False

	Is User Defined?	Value
Maximum dry unit weight (pcf)	True	115.2
Saturated hydraulic conductivity (ft/hr)	False	1.02e-05
Specific gravity of solids	False	2.7
Water Content (%)	True	20

User-defined Soil Water Characteristic Curve (SWCC)	
Is User Defined?	False
af	116.4986
bf	0.6287
cf	0.1631
hr	500.0000

Sieve Size	% Passing
0.001mm	
0.002mm	
0.020mm	
#200	76.1
#100	
#80	
#60	
#50	
#40	81.0
#30	
#20	
#16	
#10	85.0
#8	
#4	91.0
3/8-in.	100.0
1/2-in.	100.0
3/4-in.	100.0
1-in.	100.0
1 1/2-in.	100.0
2-in.	100.0
2 1/2-in.	
3-in.	
3 1/2-in.	100.0

Layer 4 Subgrade : A-6

Unbound	
Layer thickness (in)	Semi-infinite
Poisson's ratio	0.35
Coefficient of lateral earth pressure (k0)	0.5

Modulus (Input Level: 2)

Analysis Type:	Modify input values by temperature/moisture
Method:	Resilient Modulus (psi)

Resilient Modulus (psi)
5600.0

Use Correction factor for NDT modulus?	-
NDT Correction Factor:	-

Identifiers

Field	Value
Display name/identifier	A-6
Description of object	Default material
Author	AASHTO
Date Created	1/1/2011 12:00:00 AM
Approver	
Date approved	1/1/2011 12:00:00 AM
State	
District	
County	
Highway	
Direction of Travel	
From station (miles)	
To station (miles)	
Province	
User defined field 1	
User defined field 2	
User defined field 3	
Revision Number	0

Sieve

Liquid Limit	36.0
Plasticity Index	17.0
Is layer compacted?	False

	Is User Defined?	Value
Maximum dry unit weight (pcf)	True	115.2
Saturated hydraulic conductivity (ft/hr)	False	1.02e-05
Specific gravity of solids	False	2.7
Water Content (%)	True	20

User-defined Soil Water Characteristic Curve (SWCC)	
Is User Defined?	False
af	116.4986
bf	0.6287
cf	0.1631
hr	500.0000

Sieve Size	% Passing
0.001mm	
0.002mm	
0.020mm	
#200	76.1
#100	
#80	
#60	
#50	
#40	81.0
#30	
#20	
#16	
#10	85.0
#8	
#4	91.0
3/8-in.	100.0
1/2-in.	100.0
3/4-in.	100.0
1-in.	100.0
1 1/2-in.	100.0
2-in.	100.0
2 1/2-in.	
3-in.	100.0
3 1/2-in.	

Calibration Coefficients

PCC Faulting

$$C_{12} = C_1 + (C_2 * FR^{0.25})$$
$$C_{34} = C_3 + (C_4 * FR^{0.25})$$
$$FaultMax_0 = C_{12} * \delta_{curling} * \left[\log(1 + C_5 * 5.0^{EROD}) * \log\left(P_{200} * \frac{WetDays}{p_S}\right)\right]^{C_6}$$
$$FaultMax_i = FaultMax_0 + C_7 * \sum_{j=1}^{m} DE_j * \log(1 + C_5 * 5.0^{EROD})^{C_6}$$
$$\Delta Fault_i = C_{34} * (FaultMax_{i-1} - Fault_{i-1})^2 * DE_i$$
$$C_8 = DowelDeterioration$$

C1: 0.595	C2: 1.636	C3: 0.00217	C4: 0.00444
C5: 250	C6: 0.47	C7: 7.3	C8: 400

pccReliabilityFaultStandardDeviation
0.07162 * Pow(FAULT,0.368) + 0.00806

IRI-jpcp

C1 - Cracking	C1: 0.8203	C2: 0.4417
C2 - Spalling	C3: 1.4929	C4: 25.24
C3 - Faulting	**Reliability Standard Deviation**	
C4 - Site Factor	5.4	

PCC Cracking

$$\log(N) = C1 \cdot \left(\frac{MR}{\sigma}\right)^{C2}$$
$$CRK = \frac{100}{1 + C4\ FD^{C5}}$$

Fatigue Coefficients		Cracking Coefficients	
C1: 2	C2: 1.22	C4: 0.52	C5: -2.17

pccReliabilityCrackStandardDeviation
3.5522 * Pow(CRACK,0.3415) + 0.75

22119 New Mainline AC Incidental

File Name: C:\Users\kkb\OneDrive\Documents\My ME Design\Projects\2022\22119\22119 New Mainline AC Incidental.dgpx

Design Inputs

Design Life: 10 years
Design Type: FLEXIBLE

Base construction: May, 2025
Pavement construction: May, 2026
Traffic opening: May, 2027

Climate Data Sources (Lat/Lon): 35, -97.5

Design Structure

Layer type	Material Type	Thickness (in)
Flexible	Default asphalt concrete	5.0
Flexible	Default asphalt concrete	3.0
NonStabilized	Crushed stone	8.0
Subgrade	Stabilized Subgrade	8.0
Subgrade	A-6	Semi-infinite

Volumetric at Construction:	
Effective binder content (%)	11.0
Air voids (%)	6.5

Traffic

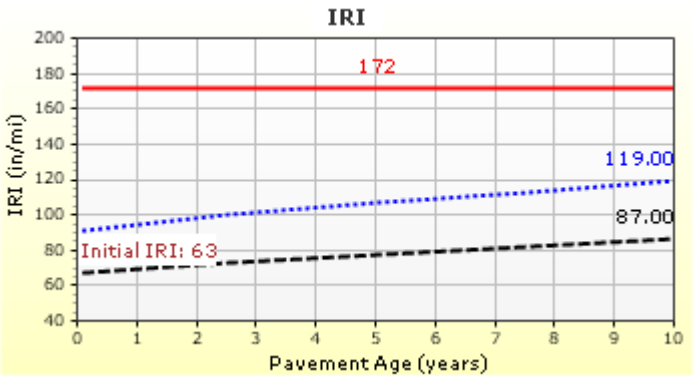
Age (year)	Heavy Trucks (cumulative)
2027 (initial)	13,914
2032 (5 years)	10,182,200
2037 (10 years)	21,424,300

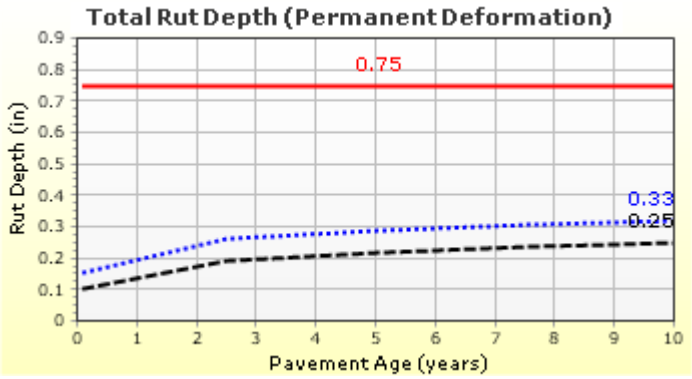
Design Outputs

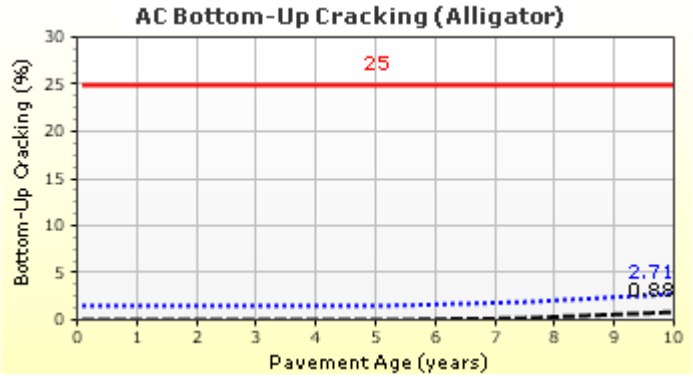
Distress Prediction Summary

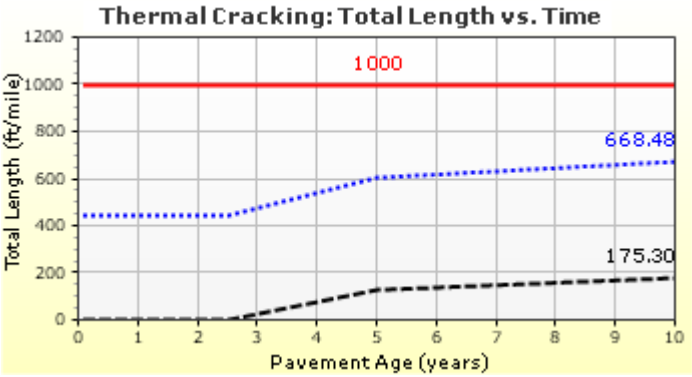
Distress Type	Distress @ Specified Reliability		Reliability (%)		Criterion Satisfied?
	Target	Predicted	Target	Achieved	
Terminal IRI (in/mile)	172.00	118.96	90.00	99.97	Pass
Permanent deformation - total pavement (in)	0.75	0.33	90.00	100.00	Pass
AC bottom-up fatigue cracking (% lane area)	25.00	2.71	90.00	100.00	Pass
AC thermal cracking (ft/mile)	1000.00	668.48	90.00	98.39	Pass
AC top-down fatigue cracking (% lane area)	25.00	12.09	90.00	99.99	Pass
Permanent deformation - AC only (in)	0.25	0.13	90.00	100.00	Pass

Distress Charts









RED ROCK
CONSULTING

Report of Geotechnical Investigation

OF

I-35 PAVEMENT AND SUBGRADE SURVEY
MCCLAIN COUNTY, OKLAHOMA

35589(04)

Prepared For:

Olsson Associates
11600 Broadway Extension, Suite 300
Oklahoma City, Oklahoma 73114
Attention: Mr. Russell Beaty, PE

Prepared By:

Red Rock Consulting, LLC
PO Box 30591
Edmond, Oklahoma 73003
(405) 562-3328

June 23, 2023
Project No. 22118

RED ROCK
CONSULTING

June 23, 2023

Olsson Associates
11600 Broadway Extension, Suite 300
Oklahoma City, Oklahoma 73114

Attention: Mr. Russell Beaty, PE

Re: Report of Geotechnical Investigation
I-35 Pavement and Subgrade Survey
35589(04)
McClain County, Oklahoma
Project No. 22118

Dear Mr. Beaty:

I am pleased to submit herewith this report entitled "Geotechnical Investigation, I-35 Pavement and Subgrade Survey, 35589(04), McClain County, Oklahoma".

In an effort to provide a more environmentally friendly service, this report has been provided electronically.

It has been our pleasure to assist you with this project. Should you have any questions regarding the contents of this report, please contact Red Rock Consulting.

Yours very truly,
RED ROCK CONSULTING, LLC
CA No. 5707 Exp. 06/30/23

Emma Coggin, EI
Project Specialist

Jeremy Basler, PE
Geotechnical Manager
Oklahoma PE No. 20233

REGISTERED PROFESSIONAL ENGINEER
JEREMY BASLER
6-23-2023
20233
OKLAHOMA

REPORT OF GEOTECHNICAL INVESTIGATION

I-35 PAVEMENT AND SUBGRADE SURVEY
MCCLAIN COUNTY, OKLAHOMA

35589(04)

PROJECT NO. 22118

APPENDICES

REPORT OF GEOTECHNICAL INVESTIGATION

I-35 PAVEMENT AND SUBGRADE SURVEY
MCCLAIN COUNTY, OKLAHOMA

35589(04)

PROJECT NO. 22118

INTRODUCTION

General

This report presents the results of the geotechnical investigation performed for the potential overlay or reconstruction of the existing pavement of the I-35 mainline along the current alignment from 1.0 mile south of Ladd Road extending north approximately 4.7 miles in McClain County, Oklahoma.

Proposed Construction

The proposed project will include the potential overlay or reconstruction of the existing pavement of the I-35 mainline along the current alignment from 1.0 mile south of Ladd Road extending north approximately 4.7 miles in McClain County, Oklahoma. The project also includes the widening of the existing pavement of I-35 in the center median and outside lanes to accommodate adding one lane of traffic in each direction.

The purpose of this investigation is to evaluate the existing pavement, base and subgrade materials at the site and to provide information pertaining to the geotechnical aspects of the proposed project.

Scope of Work

The scope of this investigation includes the following:

1. Review of previous geotechnical and geological information of sites near this site. This was augmented with data obtained during the field investigation phase of the project.

2. Evaluation of the existing pavement using Falling Weight Deflectometer (FWD) testing

3. Investigation of the subsurface soils of the mainline pavement by coring, drilling, sampling and testing a total of 46 boreholes within the planned project area

4. A laboratory testing program consisting of moisture content, Atterberg limits, and full sieve tests on the soils encountered

FIELD AND LABORATORY INVESTIGATIONS

Field Exploration

Falling Weight Deflectometer (FWD) testing was performed by Naji Khoury on December 6th, 2022 along the existing I-35 in accordance with Oklahoma Department of Transportation's (ODOT) Geotechnical Specifications for Roadway Design (2011). The tests were performed in the outside wheel path of the outside lane approximately every 500 feet or less per lane, staggered at a spacing of 250 feet or less between the northbound and southbound lanes. After completing the FWD testing, the data was analyzed and the structural properties of the pavement and subgrade layers were provided for each testing location. The full FWD report is presented in Appendix D.

Following the FWD testing, the subsurface exploration program consisted of coring and sampling 46 borings in the roadway. The subsurface exploration was performed by Red Rock Consulting on December 16th, 19th, 20th, 27th and 28th, 2022. The borings were located in the field by a representative of Red Rock Consulting by using GPS coordinates that correlated with marked locations that were provided by Naji Khoury. The GPS coordinates of each boring is included in the Core Logs in Appendix C. The locations of the borings should be considered accurate only to the degree implied by the methods used to define them.

Twenty three (23) borings were located within the pavement of I-35 northbound and twenty three (23) borings within the pavement of I-35 southbound. The roadway borings were located at selected FWD test locations, which were recommended by Naji Khoury. The approximate locations of the borings are shown on the Boring Location Diagrams in Appendix A.

The pavement at each boring location was cored with a 4-inch barrel using a coring machine which was mounted on the back of a trailer for the 4-inch samples. Measured pavement thicknesses are shown on the Pavement Core Data and Subgrade Soils Chart in Appendix B. Photographs of the cores and existing pavement are included on the Core Logs and Pavement Photographs in Appendix C. Correlation between the pavement thickness, FWD test locations and stations along the project length are included in the FWD report in Appendix D.

Following the coring of the pavement, the roadway boring locations were then drilled to depths of approximately 36 inches or refusal beneath the existing pavement. The borings were drilled using a HD99 Hydraulic Earth Drill.

Representative samples of the subgrade materials were obtained from the auger cuttings at depths shown on the Pavement Core Data and Subgrade Soils in Appendix B.

Samples were collected and transported back to the lab for further classification and testing. The final Pavement Core Data and Subgrade Soils Chart was developed from the draft logs, observations and test results of the samples returned to the laboratory. The stratigraphic contacts indicated are only for the specific dates and locations reported, and therefore, are not necessarily representative of other locations and times.

Laboratory Testing

Representative soil samples were tested to refine the field classifications and evaluate physical properties of the soils which may affect the geotechnical aspects of project design and construction.

The laboratory testing program included the following:

- Moisture content (AASHTO T265)
- Liquid limit (AASHTO T89)
- Plastic limit (AASHTO T90)
- Particle size analysis of soils (AASHTO T88)

The results of the physical laboratory tests conducted on the subgrade soils are shown on the Pavement Core Data and Subgrade Soils Chart in Appendix B. The laboratory results in entirety are included in Appendix E.

The above laboratory tests were performed in general accordance with applicable AASHTO procedures, or generally accepted practice. It should be noted that reference to AASHTO procedures does not imply that all cross-referenced procedures in AASHTO standards have been used, or that all AASHTO procedures used have been followed exactly. Only those AASHTO procedures and/or portions of procedures, which, in the professional judgment of the geotechnical engineer of record for this report, are applicable, appropriate, and necessary for this particular project, have been used or followed.

SITE DESCRIPTION

Surface Conditions

At the time of the field exploration, I-35 was a four lane divided Asphalt Concrete paved roadway with a grass median for the entire length of the project. The project area was partially developed with a few businesses and a small airport near the SH 74 interchange. Continuing south along I-35 was primarily agricultural fields and a few residences. The town of Goldsby was located towards the northern end of the job.

Traffic was high on I-35 during drilling operations. Large trucks consisted of approximately half of the traffic. Traffic control was required to drill the borings.

The existing pavement was in fair to good condition. A recent asphalt overlay was observed across the northern half of the project length along the northbound and southbound lanes. Minor to moderate transverse cracking and minor longitudinal cracking were observed.

For the Boring Location Diagrams, refer to Appendix A. For more detailed descriptions of the pavement distress, refer to the notes column in the Pavement Core Data and Subgrade Soils Chart in Appendix B and the Pavement Photographs in Appendix C. For photographs of the pavement cores and the existing pavement, refer to Appendix C.

Site Geology

The geology of the project site was researched using the “Division Three Engineering Classification of Geological Materials”, published by the Oklahoma Department of Transportation (ODOT) and the Geologic Map of the “Hydrologic Atlas 4 of Oklahoma,” Reconnaissance of the Water Resources of the Oklahoma City quadrangle, central Oklahoma,” by Roy H. Bingham and Robert L. Moore, U.S. Geological Survey, 1975.

ODOT PUBLICATION

Division Three of the “Engineering Classification of Geological Materials”, published by the Oklahoma Department of Transportation (ODOT) indicates the project site consists of Alluvium (Qas) and Terrace deposits (Qts) underlain by the Hennessey Unit (Phy).

Terrace deposits consist of sand, silt, clay, gravel, or mixtures of these. These materials were deposited by streams or wind and may be found adjacent to most streams.

The Hennessey unit consists of red platy to blocky clay shales and mudstone. The mudstones are hard and appear blocky. The red clay shale of the Hennessey unit is characterized by numerous bands or streaks of gray, white, or light green color ranging from a few inches to four feet in thickness. Small spheres of light green color up to 10 inches in diameter are an odd characteristic of the unit.

The total thickness of the unit varies from 400 to 600 feet. The Hennessey unit outcrops in a 5 to 20 mile wide north-south band across Cleveland, McClain, and Garvin Counties in Division three.

Topographically, the unit is near level to gently rolling prairies, but most of the more level outcrops of the unit are cultivated.

USGS MAP

According to the USGS geologic map, the project consists of Alluvium (Qal) and Terrace deposits (Qt) which are underlain by Purcell Sandstone (Pp).

Terrace deposits consist of lenticular beds of sand, silt, clay, and gravel. Thickness ranges from a few feet to about 100 feet and probably averages about 50 feet along major streams. These deposits are major aquifers along Cimarron, Canadian, and North Canadian Rivers.

Purcell Sandstone consists of red-brown to maroon fine- to coarse-grained sandstone, mudstone conglomerate, and red-brown shale. Thickness, 150 feet.

Subsurface Conditions

Information collected from the core locations explored indicates that the existing pavement of I-35 along the project consisted of Asphalt Concrete. The total thickness of the full depth asphalt concrete in the roadway cores ranged between 9.25 to 16.5 inches. A cement stabilized subgrade was encountered underneath cores C-1 to C-18 and C-29 to C-46, ranging from 4.5 to 10 inches. Aggregate base was encountered underneath the remaining cores C-19 to C-28, ranging from 6 to 10 inches.

The condition of the existing surface pavement and the pavement cores are described in the Pavement Core Data and Subgrade Soils Chart in Appendix B and the Core Logs in Appendix C.

Beneath the pavement section, the subgrade materials consisted of silty, clayey sand with various amounts of gravel, clayey sand, sandy silt, silty sand with various amounts

of gravel and lean clay with various amounts of sand and silt. The subgrade materials encountered in the borings classified as A-1-b, A-2-4, A-4 and A-6 soils. The subgrade materials extended to the boring termination depth of 36 inches below the pavement, except for borings C-4, C-5, C-21 to C-23, C-37, C-40 and C-41 where auger refusal was encountered between 17.5 and 52 inches below the pavement. The subgrade materials appeared to be native to the site. The subgrade in borings C-19 and C-20 had an organic smell. Subsurface conditions are described in greater detail on the Pavement Data and Subgrade Soils Chart in Appendix B and on the Core Logs in Appendix C. Laboratory results of the subsurface materials tested are included in Appendix E.

Groundwater Conditions

Groundwater conditions were monitored in the borings during and following coring/boring and sampling. Groundwater was not encountered in any of the borings during these times.

To obtain more accurate groundwater level information, long-term observations in a well or piezometer that is sealed from the influence of surface water would be needed. Fluctuations in groundwater levels can occur due to seasonal variations in the amount of rainfall, runoff, altered drainage paths, and other factors not evident at the time borings were advanced. Consequently, the contractor should be aware of this possibility while constructing this project.

CLOSURE

The data presented in this report are based on the negotiated scope for this project and site conditions as they existed at the time of the field exploration. The conditions encountered in the exploratory borings are assumed to be representative of the subsurface conditions within the study area.

This report was prepared for the exclusive use of Olsson Associates, ODOT, and their agents and consultants. It should be made available to prospective contractors for information and factual data only and not as a warranty of subsurface conditions similar to those interpreted from the Pavement Core Data and Subgrade Soils Chart or discussions presented herein.

APPENDIX B

Surveyed By: Dawson Wiseman
Date Surveyed: December 16, 19, 20, 27 and 28, 2022

RED ROCK CONSULTING

RRC Project No: 22118
J/P No: 35589(04)
Location: McClain County, Oklahoma

Pavement Core Data and Subgrade Soils Chart

Boring	Field No.	Soil Group	Station	I-35 CL	Description	Depth (in)	LL	PI	Percent Passing				OSI	MC %	Notes
									# 4	# 10	# 40	# 200			
C-1			640+24	40' right	**15" ASPHALT CONCRETE**	0-15	tack layer at 11 inches								
					7" CEMENT STABILIZED SUBGRADE	15-22									
	1A	A-4(0)			**SANDY SILTY CLAY (CL-ML),** brown	22-46	22	5	99	98	89	53.9	4.0	19	•Minor severity transverse cracking
	1B				**SANDY SILTY CLAY (CL-ML),** red	46-58								16	
C-2			652+91	40' right	**16" ASPHALT CONCRETE**	0-16	separation at 8 inches, tack layer at 11 inches								
					8" CEMENT STABILIZED SUBGRADE	16-24									
	2A				**SILTY, CLAYEY SAND (SC-SM),** brown	24-42								13	
	2B	A-4(1)			**SANDY SILTY CLAY (CL-ML),** reddish brown	42-60	21	7	99	99	88	60.2	5.4	11	
C-3			662+06	40' right	**15" ASPHALT CONCRETE**	0-15	separation at 3, 8 and 11 1/2 inches, minor stripping at 3, 8 and 11 1/2 to 15 inches								
					8" CEMENT STABILIZED SUBGRADE	15-23									
	3A				**SANDY SILTY CLAY (CL-ML),** brown	23-41								14	
	3B	A-4(1)			**SANDY SILTY CLAY (CL-ML),** reddish brown	41-59	20	7	98	97	89	58.8	5.2	12	
C-4			672+36	40' right	**14 1/2" ASPHALT CONCRETE**	0-14.5	separation at 6 1/2 inches, tack layer at 10 1/2 inches								
					6" CEMENT STABILIZED SUBGRADE	14.5-20.5									•Minor severity transverse cracking
	4A	A-4(0)			**SILTY, CLAYEY SAND (SC-SM),** reddish brown	20.5-50.5	19	5	100	99	91	47.1	2.8	12	
					*Auger refusal at 50.5 inches										
C-5			682+54	40' right	**14" ASPHALT CONCRETE**	0-14	tack layer at 11 inches								
					8" CEMENT STABILIZED SUBGRADE	14-22									
	5A	A-4(0)			**SILTY, CLAYEY SAND (SC-SM),** brown	22-40	20	4	99	97	83	44.2	2.1	14	
	5B				**SANDY LEAN CLAY (CL),** reddish brown	40-52								16	
					*Auger refusal at 52 inches										
C-6			690+04	40' right	**14" ASPHALT CONCRETE**	0-14	tack layer at 10 inches								
					8" CEMENT STABILIZED SUBGRADE	14-22									
	6A				**CLAYEY SAND (SC),** brown	22-40								14	
	6B	A-6(9)			**LEAN CLAY with SAND (CL),** brown	40-58	29	15	99	99	96	77.4	11.8	18	
C-7			701+90	C-7	**14 1/2" ASPHALT CONCRETE**	0-14.5	separation at 2 inches, tack layer at 9 inches								
					4 1/2" CEMENT STABILIZED SUBGRADE	14.5-19									•Minor severity longitudinal cracking
	7A	A-4(1)			**CLAYEY SAND (SC),** brown	19-55	21	10	97	95	81	45.9	4.2	13	

Surveyed By: Dawson Wiseman
Date Surveyed: December 16, 19, 20, 27 and 28, 2022

RED ROCK CONSULTING

RRC Project No: 22118
J/P No: 35589(04)
Location: McClain County, Oklahoma

Pavement Core Data and Subgrade Soils Chart

Boring	Field No.	Soil Group	Station	I-35 CL	Description	Depth (in)	LL	PI	Percent Passing				OSI	MC %	Notes
									# 4	# 10	# 40	# 200			
C-8			712+30	40' right	**14" ASPHALT CONCRETE**	0-14	separation at 3 inches, tack layer at 11 inches								
					10" CEMENT STABILIZED SUBGRADE	14-24									
	8A	A-4(0)			**SILTY SAND (SM),** brown	24-48	NV	NP	96	92	81	39	0.0	14	
	8B				**SANDY LEAN CLAY (CL),** reddish brown	48-60								15	
C-9			722+10	40' right	**14 1/2" ASPHALT CONCRETE**	0-14.5	separation at 3 inches, tack layer at 11 inches								
					8" CEMENT STABILIZED SUBGRADE	14.5-22.5									•Minor severity transverse cracking
	9A				**SANDY SILT (ML),** brown	22.5-52.5								12	
	9B	A-4(2)			**SANDY LEAN CLAY (CL),** brown	52.5-58.5	21	10	98	97	88	56.8	6.3	12	
C-10			731+99	40' right	**14" ASPHALT CONCRETE**	0-14	separation at 2 1/2 inches, tack layer at 9 inches								
					9" CEMENT STABILIZED SUBGRADE	14-23									•Minor severity transverse cracking
	10A	A-2-4			**SILTY SAND (SM),** brown	23-41	16	3	100	99	85	34.7	0.6	11	
	10B				**SANDY LEAN CLAY (CL),** reddish brown	41-59								12	
C-11			741+97	40' right	**13 1/2" ASPHALT CONCRETE**	0-13.5	separation at 2 1/2 inches, tack layer at 9 1/2 inches								
					10" CEMENT STABILIZED SUBGRADE	13.5-23.5									•Moderate severity transverse cracking
	11A				**SILTY, CLAYEY SAND (SC-SM),** brown	23.5-47.5								14	
	11B	A-6(12)			**LEAN CLAY with SAND (CL),** reddish brown	47.5-59.5	32	20	100	100	94	74.9	14.4	17	
C-12			752+06	40' right	**15 1/2" ASPHALT CONCRETE**	0-15.5	separation at 2 1/2 and 8 inches, moderate stripping at 8 inches, tack layer at 10 inches								
					10" CEMENT STABILIZED SUBGRADE	15.5-25.5									
	12A				**SILTY, CLAYEY SAND (SC-SM),** brown	25.5-49.5								13	
	12B	A-4(4)			**SANDY LEAN CLAY (CL),** brown	49.5-61.5	24	10	98	97	92	69.8	8.2	16	
C-13			761+72	40' right	**16 1/2" ASPHALT CONCRETE**	0-16.5	separation at 9 1/2 inches, tack layer at 11 inches								
					8" CEMENT STABILIZED SUBGRADE	16.5-24.5									
	13A	A-4(0)			**SILTY, CLAYEY SAND (SC-SM),** brown	24.5-48.5	19	5	100	99	84	36.3	1.2	12	
	13B				**SANDY LEAN CLAY (CL),** brown	48.5-60.5								13	
C-14			771+57	40' right	**13" ASPHALT CONCRETE**	0-13	separation at 10 inches, tack layer at 11 inches								
					6" CEMENT STABILIZED SUBGRADE	13-19									•Recent asphalt overlay
	14A	A-2-4			**SILTY SAND (SM),** brown	19-52	NV	NP	98	96	82	31.9	0.0	11	
	14B				**LEAN CLAY with SAND (CL),** brown	52-55								16	

Surveyed By: Dawson Wiseman
Date Surveyed: December 16, 19, 20, 27 and 28, 2022

RED ROCK CONSULTING

RRC Project No: 22118
J/P No: 35589(04)
Location: McClain County, Oklahoma

Pavement Core Data and Subgrade Soils Chart

Boring	Field No.	Soil Group	Station	I-35 CL	Description	Depth (in)	LL	PI	Percent Passing				OSI	MC %	Notes
									# 4	# 10	# 40	# 200			
C-15			781+57	40' right	**12" ASPHALT CONCRETE**	0-12	separation at 4 1/4 inches, tack layer at 7 inches								
					9" CEMENT STABILIZED SUBGRADE	12-21									•Recent asphalt overlay
	15A				**SANDY SILT (ML),** brown	21-45								12	
	15B	A-6(7)			**LEAN CLAY with SAND (CL),** brown	45-57	27	12	100	100	96	79.4	10.2	16	
C-16			791+38	40' right	**11" ASPHALT CONCRETE**	0-11	tack layer at 6 inches								
					7" CEMENT STABILIZED SUBGRADE	11-17									•Recent asphalt overlay
	16A	A-4(0)			**SANDY SILT (ML),** light brown	17-35	19	3	99	95	82	39.7	2.8	15	
	16B				**SANDY SILT (ML),** brown	35-53								15	
C-17			801+33	40' right	**11" ASPHALT CONCRETE**	0-11	separation at 6 1/4 inches								
					10" CEMENT STABILIZED SUBGRADE	11-21									•Recent asphalt overlay
	17A				**SILTY SAND (SM),** light brown	21-39								13	
	17B	A-4(6)			**LEAN CLAY with SAND (CL),** dark brown	39-57	26	10	100	99	97	81.8	9.2	18	
C-18			813+93	40' right	**12" ASPHALT CONCRETE**	0-12	separation at 2 1/2 inches, tack layer at 7 1/4 inches								
					10" CEMENT STABILIZED SUBGRADE	12-22									•Recent asphalt overlay
	18A	A-4(0)			**SANDY SILT (ML),** light brown	22-46	19	3	100	99	88	52.6	2.8	14	
	18B				**SANDY LEAN CLAY (CL),** brown	46-58								14	
C-19			828+73	40' right	**11 1/2" ASPHALT CONCRETE**	0-11.5	tack layer at 7 1/4 inches								
					10" AGGREGATE BASE	11.5-21.5									•Recent asphalt overlay
	19A				**SILTY SAND (SM),** dark brown, organic smell	21.5-45.5								12	
	19B	A-4(4)			**LEAN CLAY with SAND (CL),** dark brown, organic smell	45.5-57.5	23	8	97	95	91	76.5	7.8	12	
C-20			843+61	40' right	**10" ASPHALT CONCRETE**	0-10	tack layer at 5 1/2 inches								
					6" AGGREGATE BASE	10-16									•Recent asphalt overlay
	20A	A-2-4			**SILTY SAND (SM),** light brown	16-40	NV	NP	97	93	81	32.7	0.0	8	
	20B				**SILTY, CLAYEY SAND (SC-SM),** dark brown, organic smell	40-52								14	

Surveyed By: Dawson Wiseman
Date Surveyed: December 16, 19, 20, 27 and 28, 2022

RED ROCK CONSULTING

RRC Project No: 22118
J/P No: 35589(04)
Location: McClain County, Oklahoma

Pavement Core Data and Subgrade Soils Chart

Boring	Field No.	Soil Group	Station	I-35 CL	Description	Depth (in)	LL	PI	Percent Passing				OSI	MC %	Notes
									# 4	# 10	# 40	# 200			
C-21			860+17	40' right	**9 1/4" ASPHALT CONCRETE**	0-9.25	tack layer at 5 inches								
					8" AGGREGATE BASE	9.25-17.25									
	21A				**SILTY, CLAYEY SAND (SC-SM), light brown**	17.25-41.25								10	•Recent asphalt overlay
	22B	A-4(1)			**CLAYEY SAND (SC), dark brown**	41.25-47.25	21	8	94	91	80	48.1	4.0	11	
					*Auger refusal at 47.25 inches										
C-22			868+53	40' right	**13" ASPHALT CONCRETE**	0-13	separation at 2 1/2 and 9 inches, deterioration at 2 1/2 inches								
					6" AGGREGATE BASE	13-19									•Recent asphalt overlay
	22A	A-2-4			**SILTY, CLAYEY SAND (SC-SM),** light brown	19-31	19	6	93	83	62	30.2	0.9	17	
					*Auger refusal at 31 inches										
C-23			875+98	40' right	**10" ASPHALT CONCRETE**	0-10	tack layer at 5 1/2 inches								
					10" AGGREGATE BASE	10-20									•Recent asphalt overlay
	23A	A-1-b			**SILTY, CLAYEY SAND with GRAVEL(SC-SM),** light brown	20-32	17	4	78	69	50	21.3	0.3	15	
					*Auger refusal at 32 inches										
C-24			871+41	40' left	**11" ASPHALT CONCRETE**	0-11	separation at 9 1/2 inches								
					8" AGGREGATE BASE	11-19									•Recent asphalt overlay
	24A				**SILTY SAND (SM),** brown	19-43								5	
	24B	A-4(3)			**SILTY CLAY with SAND (CL-ML),** reddish brown	43-55	23	6	98	96	93	79.6	7.0	10	
C-25			866+41	40' left	**11" ASPHALT CONCRETE**	0-11	tack layer at 6 1/2 inches, separation at 9 inches								
					8" AGGREGATE BASE	11-19									•Recent asphalt overlay
	25A				**SILTY SAND with GRAVEL (SM),** brown	19-43								5	
	25B	A-4(3)			**SILTY CLAY with SAND (CL-ML),** brown	43-55	22	7	100	99	95	78.6	7.2	11	
C-26			851+52	40' left	**9 1/4" ASPHALT CONCRETE**	0-9.25	separation and minor stripping at 4 1/4 inches, deterioration at 8 inches								
					8" AGGREGATE BASE	9.25-17.25									•Recent asphalt overlay
	26A	A-2-4			**SILTY SAND with GRAVEL (SM),** brown	17.25-29.25	NV	NP	83	74	57	28.7	0.0	8	
	26B				**SANDY SILT (ML),** brown	29.25-53.25								11	

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RED ROCK CONSULTING

RRC Project No: 22118
J/P No: 35589(04)
Location: McClain County, Oklahoma

Pavement Core Data and Subgrade Soils Chart

Boring	Field No.	Soil Group	Station	I-35 CL	Description	Depth (in)	LL	PI	Percent Passing				OSI	MC %	Notes
									# 4	# 10	# 40	# 200			
C-27			836+73	40' left	**12" ASPHALT CONCRETE**	0-12	tack layer at 9 inches								
					8" AGGREGATE BASE	12-20									•Recent asphalt overlay
	27A				**SILTY SAND with GRAVEL (SM),** light brown	20-32								6	
	27B	A-4(0)			**SANDY SILT (ML),** brown	32-56	NV	NP	100	99	92	51.3	0.0	10	
C-28			821+87	40' left	**11" ASPHALT CONCRETE**	0-11	separation at 5 1/2 inches								
					6" AGGREGATE BASE	11-17									•Recent asphalt overlay
	28A	A-2-4			**SILTY SAND (SM),** brown	17-41	NV	NP	94	90	75	30.4	0.0	6	
	28B				**LEAN CLAY with SAND (CL),** brown	41-53								12	
C-29			807+01	40' left	**13" ASPHALT CONCRETE**	0-13	separation at 8 1/2 inches								
					6" CEMENT STABILIZED SUBGRADE	13-19									•Recent asphalt overlay
	29A				**SILTY SAND (SM),** brown	19-43								13	
	29B	A-4(5)			**LEAN CLAY with SAND(CL),** dark brown	43-55	24	9	100	100	96	78.1	8.4	14	
C-30			797+11	40' left	**11" ASPHALT CONCRETE**	0-11	separation at 6 1/2 inches, severe stripping from 8 to 11 inches								
					8" CEMENT STABILIZED SUBGRADE	11-19									•Recent asphalt overlay
	30A				**SILTY SAND (SM),** brown	19-31								12	
	30B	A-4(0)			**SILTY, CLAYEY SAND (SC-SM),** brown	31-43	19	4	99	99	90	46.3	2.3	9	
	30C				**SANDY LEAN CLAY (CL),** brown	43-55								15	
C-31			787+20	40' left	**12" ASPHALT CONCRETE**	0-12	separation at 4 1/2 inches, tack layer at 7 inches								
					6 1/2" CEMENT STABILIZED SUBGRADE	12-18.5									•Recent asphalt overlay
	31A				**CLAYEY SAND (SC),** brown	18.5-42.5								12	
	31B	A-4(1)			**SANDY SILTY CLAY (CL-ML),** dark brown to black	42.5-54.5	21	5	100	99	93	67.6	5.4	13	
C-32			777+24	40' left	**11 1/2" ASPHALT CONCRETE**	0-11.5	tack layer at 7 inches								
					6" CEMENT STABILIZED SUBGRADE	11.5-17.5									•Recent asphalt overlay
	32A				**SILTY, CLAYEY SAND (SC-SM),** brown	17.5-29.5								16	
	32B	A-6(6)			**LEAN CLAY with SAND (CL),** brown	29.5-53.5	25	11	100	99	95	74.7	9.4	15	

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RED ROCK CONSULTING

RRC Project No: 22118
J/P No: 35589(04)
Location: McClain County, Oklahoma

Pavement Core Data and Subgrade Soils Chart

Boring	Field No.	Soil Group	Station	I-35 CL	Description	Depth (in)	LL	PI	Percent Passing				OSI	MC %	Notes
									# 4	# 10	# 40	# 200			
C-33			767+10	40' left	**11" ASPHALT CONCRETE**	0-11	tack layer at 6 inches								
					7" CEMENT STABILIZED SUBGRADE	11-18									•Recent asphalt overlay
	33A				**SILTY SAND (SM),** light brown	18-42								13	
	33B	A-4(1)			**SANDY SILTY CLAY (CL-ML),** light brown	42-54	20	6	100	99	92	63.5	5.2	14	
C-34			757+26	40' left	**15" ASPHALT CONCRETE**	0-15	tack layer at 6 inches, separation at 11 inches								
					5" CEMENT STABILIZED SUBGRADE	15-20									•Minor severity transverse cracking
	34A				**SILTY SAND (SM),** brown	20-44								9	
	34B	A-4(0)			**SILTY, CLAYEY SAND (SC-SM),** reddish brown	44-56	20	6	99	98	86	47.6	3.2	13	
C-35			747+34	40' left	**14" ASPHALT CONCRETE**	0-14	separation at 7 inches, tack layer at 9 1/2 inches								
					7" CEMENT STABILIZED SUBGRADE	14-21									•Minor severity transverse cracking
	35A	A-2-4			**SILTY SAND (SM),** brown	21-39	NV	NP	98	96	81	31.4	0.0	14	
	35B				**SANDY LEAN CLAY (CL),** brown	39-50								17	
C-36			737+44	40' left	**15 1/2" ASPHALT CONCRETE**	0-15.5	separation at 2 1/2 and 8 inches, tack layer at 11 inches								
					7" CEMENT STABILIZED SUBGRADE	15.5-22.5									•Minor severity transverse cracking
	36A				**SILTY SAND (SM),** brown	22.5-46.5								12	
	36B	A-4(4)			**SANDY LEAN CLAY (CL),** brown	46.5-58.5	24	10	100	99	93	68.3	8.0	14	
C-37			727+60	40' left	**14 1/2" ASPHALT CONCRETE**	0-14.5	separation at 2 1/2 inches, tack layer at 10 inches								
					7 1/2" CEMENT STABILIZED SUBGRADE	14.5-22									
	37A	A-4(0)			**SILTY SAND (SM),** reddish brown	22-46	NV	NP	100	98	85	38.2	0.0	11	•Minor severity transverse cracking
	37B				**SANDY LEAN CLAY (CL),** reddish brown	46-52								11	
					*Auger refusal at 52 inches										
C-38			717+64	40' left	**14" ASPHALT CONCRETE**	0-14	separation at 3 inches, tack layer at 10 1/2 inches								
					7 1/2" CEMENT STABILIZED SUBGRADE	14-21.5									
	38A				**SILTY SAND (SM),** brown	21.5-51.5								13	
	38B	A-4(2)			**SANDY LEAN CLAY (CL),** brown	51.5-57.5	23	9	100	99	90	57.3	6.2	13	

Surveyed By: Dawson Wiseman
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RED ROCK CONSULTING

RRC Project No: 22118
J/P No: 35589(04)
Location: McClain County, Oklahoma

Pavement Core Data and Subgrade Soils Chart

Boring	Field No.	Soil Group	Station	I-35 CL	Description	Depth (in)	LL	PI	Percent Passing				OSI	MC %	Notes
									# 4	# 10	# 40	# 200			
C-39			707+72	40' left	**14" ASPHALT CONCRETE**	0-14	separation at 9 inches								
					8" CEMENT STABILIZED SUBGRADE	14-22									
	39A	A-4(0)			**SILTY SAND (SM),** brown	22-40	NV	NP	100	99	86	35.8	0.0	13	
	39B				**SANDY LEAN CLAY (CL),** brown	40-58								13	
C-40			693+85	40' left	**12 1/2" ASPHALT CONCRETE**	0-12.5	tack layer at 7 1/2 inches								
					5" CEMENT STABILIZED SUBGRADE	12.5-17.5									
					*Auger refusal at 17.5 inches										
C-41			687+92	41' left	**12" ASPHALT CONCRETE**	0-12									
					6" CEMENT STABILIZED SUBGRADE	12-18									
	41A	A-4(3)			**SANDY LEAN CLAY (CL),** red	18-42	24	9	97	96	89	61.1	6.7	15	
					*Auger refusal at 42 inches										
C-42			677+79	40' left	**14" ASPHALT CONCRETE**	0-14	separation at 6 1/2 inches, tack layer at 9 3/4 inches								
					8" CEMENT STABILIZED SUBGRADE	14-22									
	42A	A-4(0)			**SILTY, CLAYEY SAND (SC-SM),** brown	22-46	20	4	99	97	85	46.2	2.4	13	
	42B				**SANDY LEAN CLAY (CL),** reddish brown	46-58								15	
C-43			668+19	40' left	**15 1/2" ASPHALT CONCRETE**	0-15.5	separation and severe stripping at 7 inches tack layer at 11 1/2 inches								
					8" CEMENT STABILIZED SUBGRADE	15.5-23.5									•Minor severity transverse cracking
	43A				**SANDY SILTY CLAY (CL-ML),** brown	23.5-47.5								16	
	43B	A-4(3)			**SANDY LEAN CLAY (CL),** reddish brown	47.5-59.5	24	9	100	100	94	64.7	7.2	14	
C-44			658+08	40' left	**15 1/2" ASPHALT CONCRETE**	0-15.5	separation at 6 1/2 inches, separation and deterioration at 11 inches								
					8" CEMENT STABILIZED SUBGRADE	15.5-23.5									•Minor severity transverse cracking
	44A	A-4(0)			**SANDY SILTY CLAY (CL-ML),** brown	23.5-41.5	21	5	100	99	89	55.9	4.2	16	
	44B				**SANDY LEAN CLAY (CL),** brown	41.5-59.5								16	

Surveyed By: Dawson Wiseman
Date Surveyed: December 16, 19, 20, 27 and 28, 2022

RED ROCK CONSULTING

RRC Project No: 22118
J/P No: 35589(04)
Location: McClain County, Oklahoma

Pavement Core Data and Subgrade Soils Chart

Boring	Field No.	Soil Group	Station	I-35 CL	Description	Depth (in)	LL	PI	Percent Passing				OSI	MC %	Notes
									# 4	# 10	# 40	# 200			
C-45			648+15	40' left	**14 3/4" ASPHALT CONCRETE**	0-14.75	separation at 8 inches, tack layer at 10 inches								
					8 1/2" CEMENT STABILIZED SUBGRADE	14.75-23.25									•Minor severity transverse cracking
	45A	A-4(0)			**SILTY, CLAYEY SAND (SC-SM),** reddish brown	23.25-53.25	19	5	99	98	82	42.8	2.1	13	
	45B				**SANDY LEAN CLAY (CL),** reddish brown	53.25-59.25								10	
C-46			633+22	40' left	**16" ASPHALT CONCRETE**	0-16	separation at 10 1/2 inches								
					8" CEMENT STABILIZED SUBGRADE	16-24									•Minor severity transverse cracking
	46A				**SILTY, CLAYEY SAND (SC-SM),** reddish brown	24-54								14	
	46B	A-4(5)			**LEAN CLAY with SAND (CL),** brown	54-60	25	10	100	99	95	76.1	9.0	16	

APPENDIX C

Top

Coring
C-1

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-1
Station	640+24
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.107261
Longitude	-97.434100

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	10	Type B		
	Asphalt Concrete	2	Type C, tack layer at 11 inches		
	Asphalt Concrete	3	Type A		
	Total Core Thickness	15			
2	CEMENT STABILIZED SUBGRADE	7			
3	SANDY SILTY CLAY (CL-ML), brown	24		A-4(0)	4
4	SANDY SILTY CLAY (CL-ML), red	12			

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☐ Separation ☑ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-2

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-2
Station	652+91
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.109989
Longitude	-97.436700

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	11	Type B, separation at 8 inches		
	Asphalt Concrete	2	Type C, tack layer at 12 inches		
	Asphalt Concrete	3	Type B		
	Total Core Thickness	16			
				AASHTO	OSI
2	CEMENT STABILIZED SUBGRADE	8			
3	SILTY, CLAYEY SAND (SC-SM), brown	18			
4	SANDY SILTY CLAY (CL-ML), reddish brown	18		A-4(1)	5.4

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Coring
C-3

Top

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-3
Station	662+06
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.112131
Longitude	-97.438600

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	10 1/2	Type B, separation and minor stripping at 3 and 8 inches		
	Asphalt Concrete	1	Type C, separation at 11 1/2 inches		
	Asphalt Concrete	3 1/2	Type B, minor stripping from 11 1/2 to 15 inches		
	Total Core Thickness	15			
2	CEMENT STABILIZED SUBGRADE	8			
3	SANDY SILTY CLAY (CL-ML), brown	18			
4	SANDY SILTY CLAY (CL-ML), reddish brown	18		A-4(1)	5.2

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☑ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Coring
C-4

Top

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-4
Station	672+36
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.114300
Longitude	-97.440600

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	9 1/2	Type B, separation at 6 1/2 inches		
	Asphalt Concrete	2 1/2	Type C, tack layer at 10 1/2 inches		
	Asphalt Concrete	2 1/2	Type B		
	Total Core Thickness	14 1/2			
2	CEMENT STABILIZED SUBGRADE	6			
3	SILTY, CLAYEY SAND (SC-SM), reddish brown	30		A-4(0)	2.8
	*Auger refusal at 50.5 inches				

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Coring
C-5

Top

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-5
Station	682+54
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.116489
Longitude	-97.442700

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	10	Type B		
	Asphalt Concrete	2	Type C, tack layer at 11 inches		
	Asphalt Concrete	2	Type B		
	Total Core Thickness	14			
2	CEMENT STABILIZED SUBGRADE	8			
3	SILTY, CLAYEY SAND (SC-SM), brown	18		A-4(0)	2.1
4	SANDY LEAN CLAY (CL), reddish brown	12			
	*Auger refusal at 52 inches				

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☐ Separation ☑ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Coring
C-6

Top

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-6
Station	690+04
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.118111
Longitude	-97.444200

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	9	Type B		
	Asphalt Concrete	2 1/2	Type C, tack layer at 10 inches		
	Asphalt Concrete	2 1/2	Type B		
	Total Core Thickness	14			
				AASHTO	OSI
2	CEMENT STABILIZED SUBGRADE	8			
3	CLAYEY SAND (SC), brown	18			
4	LEAN CLAY with SAND (CL), brown	18		A-6(9)	11.8

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☐ Separation ☑ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-7

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-7
Station	701+90
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.120811
Longitude	-97.446700

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	8	Type B, separation at 2 inches		
	Asphalt Concrete	2 1/2	Type C, tack layer at 9 inches		
	Asphalt Concrete	4	Type B		
	Total Core Thickness	14 1/2			
2	CEMENT STABILIZED SUBGRADE	4 1/2			
3	CLAYEY SAND (SC), brown	36		A-4(1)	4.2

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Coring
C-8

Top

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-8
Station	712+30
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.123031
Longitude	-97.448700

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	10 1/4	Type B, separation at 3 inches		
	Asphalt Concrete	2	Type C, tack layer at 11 inches		
	Asphalt Concrete	1 3/4	Type A		
	Total Core Thickness	14			
2	CEMENT STABILIZED SUBGRADE	10			
3	SILTY SAND (SM), brown	24		A-4(0)	0
4	SANDY LEAN CLAY (CL), reddish brown	12			

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Coring
C-9

Top

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-9
Station	722+10
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.125150
Longitude	-97.450700

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	10	Type B, separation at 3 inches		
	Asphalt Concrete	2	Type C, tack layer at 11 inches		
	Asphalt Concrete	2 1/2	Type A		
	Total Core Thickness	14 1/2			
				AASHTO	OSI
2	CEMENT STABILIZED SUBGRADE	8			
3	SANDY SILT (ML), brown	30			
4	SANDY LEAN CLAY (CL), brown	6		A-4(2)	6.3

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Coring
C-10

Top

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-10
Station	731+99
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.127319
Longitude	-97.452700

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	8	Type B, separation at 2 1/2 inches		
	Asphalt Concrete	2	Type C, tack layer at 9 inches		
	Asphalt Concrete	4	Type A		
	Total Core Thickness	14			
2	CEMENT STABILIZED SUBGRADE	9			
3	SILTY SAND (SM), brown	18		A-2-4	0.59
4	SANDY LEAN CLAY (CL), reddish brown	18			

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-11

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-11
Station	741+97
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.129511
Longitude	-97.454770

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	8 1/2	Type B, separation at 2 1/2 inches		
	Asphalt Concrete	2 1/2	Type C, tack layer at 9 1/2 inches		
	Asphalt Concrete	2 1/2	Type A		
	Total Core Thickness	13 1/2			
				AASHTO	OSI
2	CEMENT STABILIZED SUBGRADE	10			
3	SILTY, CLAYEY SAND (SC-SM), brown	24			
4	LEAN CLAY with SAND (CL), reddish brown	12		A-6(12)	14.4

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-12

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-12
Station	752+06
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.131669
Longitude	-97.456700

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	9 1/2	Type B, separation at 2 1/2 and 8 inches, moderate stripping at 8 inches		
	Asphalt Concrete	2 1/2	Type C, tack layer at 10 inches		
	Asphalt Concrete	3 1/2	Type A		
	Total Core Thickness	15 1/2			
2	CEMENT STABILIZED SUBGRADE	10			
3	SILTY, CLAYEY SAND (SC-SM), brown	24			
4	SANDY LEAN CLAY (CL), brown	12		A-4(4)	8.2

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☑ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-13

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-13
Station	761+72
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.133831
Longitude	-97.458700

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	10	Type B, separation and minor stripping at 9 1/2 inches		
	Asphalt Concrete	3	Type C, tack layer at 11 inches		
	Asphalt Concrete	3 1/2	Type A		
	Total Core Thickness	16 1/2			
2	CEMENT STABILIZED SUBGRADE	8			
3	SILTY, CLAYEY SAND (SC-SM), brown	24		A-4(0)	1.2
4	SANDY LEAN CLAY (CL), brown	12			

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☑ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-14

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-14
Station	771+57
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.136000
Longitude	-97.460700

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	5	Type B, separation at 10 inches		
	Asphalt Concrete	2 1/2	Type C, tack layer at 11 inches		
	Asphalt Concrete	5 1/2	Type A		
	*3 inches destroyed in core barrel				
	Total Core Thickness	13			
				AASHTO	OSI
2	CEMENT STABILIZED SUBGRADE	6			
3	SILTY SAND (SM), brown	33		A-2-4	0
4	LEAN CLAY with SAND (CL), brown	3			

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-15

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-15
Station	781+57
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.138181
Longitude	-97.462700

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	6	Type B, separation at 4 1/4 inches		
	Asphalt Concrete	2	Type C, tack layer at 7 inches		
	Asphalt Concrete	4	Type A		
	Total Core Thickness	12			
				AASHTO	OSI
2	CEMENT STABILIZED SUBGRADE	9			
3	SANDY SILT (ML), brown	24			
4	LEAN CLAY with SAND (CL), brown	12		A-6(7)	10.2

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Coring
C-16

Top

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-16
Station	791+38
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.140350
Longitude	-97.464700

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	5	Type B		
	Asphalt Concrete	2 1/2	Type C, tack layer at 6 inches		
	Asphalt Concrete	3 1/2	Type A		
	Total Core Thickness	11			
2	CEMENT STABILIZED SUBGRADE	7			
3	SANDY SILT (ML), light brown	18		A-4(0)	2.8
4	SANDY SILT (ML), brown	18			

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☐ Separation ☑ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-17

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-17
Station	801+33
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.142500
Longitude	-97.466700

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	5	Type B		
	Asphalt Concrete	2 1/2	Type C, separation at 6 1/4 inches		
	Asphalt Concrete	3 1/2	Type A		
	Total Core Thickness	11			
				AASHTO	OSI
2	CEMENT STABILIZED SUBGRADE	10			
3	SILTY SAND (SM), light brown	18			
4	LEAN CLAY with SAND (CL), dark brown	18		A-4(6)	9.2

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-18

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-18
Station	813+93
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.145219
Longitude	-97.469300

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	6 1/2	Type B, separation at 2 1/2 inches		
	Asphalt Concrete	2 1/2	Type C, tack layer at 7 1/4 inches		
	Asphalt Concrete	3	Type A		
	Total Core Thickness	12			
2	CEMENT STABILIZED SUBGRADE	10			
3	SANDY SILT (ML), light brown	24		A-4(0)	2.8
4	SANDY LEAN CLAY (CL), brown	12			

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-19

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-19
Station	828+73
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.148461
Longitude	-97.472300

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	5 1/2	Type B		
	Asphalt Concrete	2	Type C, tack layer at 7 1/4 inches		
	Asphalt Concrete	4	Type A		
	Total Core Thickness	11 1/2			
2	AGGREGATE BASE	10			
3	SILTY SAND (SM), dark brown, organic smell	24			
4	LEAN CLAY with SAND (CL), dark brown, organic smell	12		A-4(4)	7.8

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☐ Yes ☑ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-20

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-20
Station	843+61
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.135053
Longitude	-97.475300

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	5	Type B		
	Asphalt Concrete	1/2	Type C, tack layer at 5 1/2 inches		
	Asphalt Concrete	2	Type B		
	Asphalt Concrete	2 1/2	Type A		
	Total Core Thickness	10			
2	AGGREGATE BASE	6			
3	SILTY SAND (SM), light brown	24		A-2-4	0
4	SILTY, CLAYEY SAND (SC-SM), dark brown, organic smell	12			

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☐ Separation ☑ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☐ Yes ☑ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-21

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-21
Station	860+17
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.155275
Longitude	-97.478611

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	4	Type B,		
	Asphalt Concrete	2	Type C, tack layer at 5 inches		
	Asphalt Concrete	3 1/4	Type A		
	Total Core Thickness	9 1/4			
2	AGGREGATE BASE	8			
3	SILTY, CLAYEY SAND (SC-SM), light brown	24			
4	CLAYEY SAND (SC), dark brown	6		A-4(1)	4
	*Auger refusal at 47.25 inches				

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☐ Separation ☑ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☐ Yes ☑ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-22

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-22
Station	868+53
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.157150
Longitude	-97.480400

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	8	Type B, separation and deterioration at 2 1/2 inches		
	Asphalt Concrete	2	Type C, separation at 9 inches		
	Asphalt Concrete	3	Type A		
	Total Core Thickness	13			
				AASHTO	OSI
2	AGGREGATE BASE	6			
3	SILTY, CLAYEY SAND (SC-SM), light brown	12		A-2-4	0.91
	*Auger refusal at 31 inches				

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☐ Yes ☑ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-23

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' right
Core	C-23
Station	875+98
Coring Location	Outer Wheel Path
Lane Direction	NB
Latitude	35.158769
Longitude	-97.481900

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	5	Type B,		
	Asphalt Concrete	2	Type C, tack layer at 5 1/2 inches		
	Asphalt Concrete	3	Type A		
	Total Core Thickness	10			
				AASHTO	OSI
2	AGGREGATE BASE	10			
3	SILTY, CLAYEY SAND with GRAVEL (SC-SM), light brown	12		A-1-b	0.25
	*Auger refusal at 32 inches				

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☐ Separation ☑ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☐ Yes ☑ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-24

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' left
Core	C-24
Station	871+41
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.157669
Longitude	-97.481100

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	5 1/2	Type B		
	Asphalt Concrete	2 1/2	Type C		
	Asphalt Concrete	3	Type A, separation at 9 1/2 inches		
	Total Core Thickness	11			
2	AGGREGATE BASE	8			
3	SILTY SAND (SM), brown	24			
4	SILTY CLAY with SAND (CL-ML), reddish brown	12		A-4(3)	7

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☐ Yes ☑ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-25

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' left
Core	C-25
Station	866+41
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.156581
Longitude	-97.480100

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	6	Type B		
	Asphalt Concrete	2	Type C, tack layer at 6 1/2 inches		
	Asphalt Concrete	3	Type A, separation at 9 inches		
	Total Core Thickness	11			
				AASHTO	OSI
2	AGGREGATE BASE	8			
3	SILTY SAND with GRAVEL (SM), brown	24			
4	SILTY CLAY with SAND (CL-ML), brown	12		A-4(3)	7.2

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☐ Yes ☑ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-26

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' left
Core	C-26
Station	851+52
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.153331
Longitude	-97.477100

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	3 1/2	Type B		
	Asphalt Concrete	3/4	Type C, separation and minor stripping at 4 1/4 inches		
	Asphalt Concrete	5	Type A, deterioration at 8 inches		
	Total Core Thickness	9 1/4			
2	AGGREGATE BASE	8			
3	SILTY SAND with GRAVEL (SM), brown	12		A-2-4	0
4	SANDY SILT (ML), brown	24			

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☑ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☐ Yes ☑ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-27

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' left
Core	C-27
Station	836+73
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.150069
Longitude	-97.474100

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	8	Type B		
	Asphalt Concrete	1	Type C, tack layer at 9 inches		
	Asphalt Concrete	3	Type A		
	Total Core Thickness	12			
2	AGGREGATE BASE	8			
3	SILTY SAND with GRAVEL (SM), light brown	12			
4	SANDY SILT (ML), brown	24		A-4(0)	0

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☐ Separation ☑ N/A

Honeycomb or "D" Cracking in PCC: ☑ Honeycomb ☐ "D" ☐ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☐ Yes ☑ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-28

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' left
Core	C-28
Station	821+87
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.146819
Longitude	-97.471100

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	5	Type B		
	Asphalt Concrete	2 1/4	Type C, separation at 5 1/2 inches		
	Asphalt Concrete	3 3/4	Type A		
	Total Core Thickness	11			
2	AGGREGATE BASE	6			
3	SILTY SAND (SM), brown	24		A-2-4	0
4	LEAN CLAY with SAND (CL), brown	12			

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☐ Yes ☑ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-29

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' left
Core	C-29
Station	807+01
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.143561
Longitude	-97.468100

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	7 1/2	Type B		
	Asphalt Concrete	2 1/2	Type C, separation at 8 1/2 inches		
	Asphalt Concrete	3	Type A		
	Total Core Thickness	13			
				AASHTO	OSI
2	CEMENT STABILIZED SUBGRADE	6			
3	SILTY SAND (SM), brown	24			
4	LEAN CLAY with SAND (CL), dark brown	12		A-4(5)	8.4

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-30

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' left
Core	C-30
Station	797+11
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.141389
Longitude	-97.466100

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	5 1/2	Type B		
	Asphalt Concrete	1 1/2	Type C, separation at 6 1/2 inches		
	Asphalt Concrete	4	Type A, severe stripping from 8 to 11 inches		
	Total Core Thickness	11			
2	CEMENT STABILZED SUBGRADE	8			
3	SILTY SAND (SM), brown	12			
4	SILTY, CLAYEY SAND (SC-SM), brown	12		A-4(0)	2.3
5	SANDY LEAN CLAY (CL), brown	12			

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

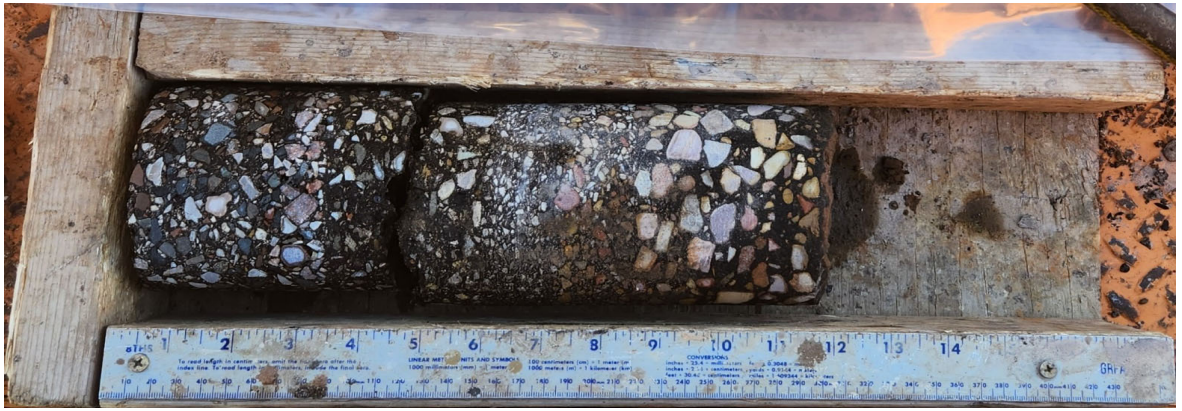
Stripping and/or Separation: ☑ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top



Coring
C-31

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' left
Core	C-31
Station	787+20
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.139219
Longitude	-97.464100

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	6	Type B, separation at 4 1/2 inches		
	Asphalt Concrete	2 1/2	Type C, tack layer at 7 inches		
	Asphalt Concrete	3 1/2	Type A		
	Total Core Thickness	12			
2	CEMENT STABILZED SUBGRADE	6 1/2			
3	CLAYEY SAND (SC), brown	24			
4	SANDY SILTY CLAY (CL-ML), dark brown to black	12		A-4(1)	5.4

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

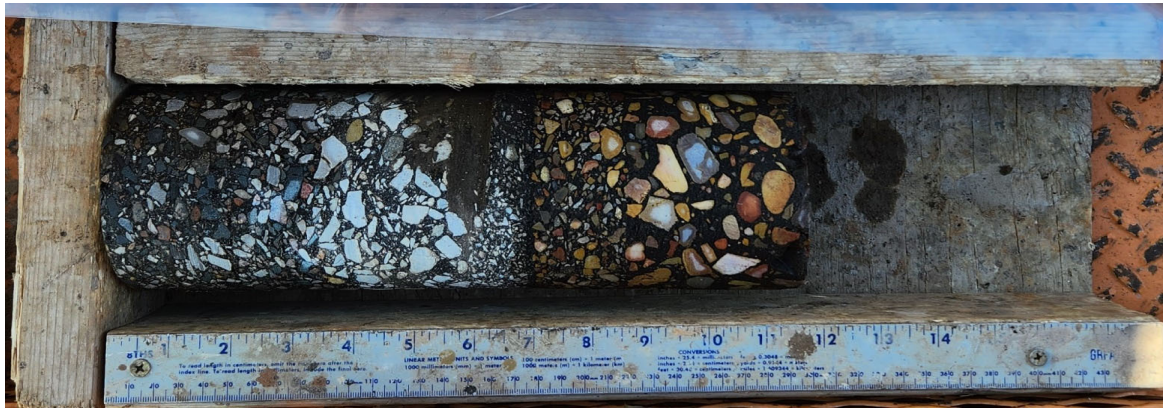
Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top



Coring
C-32

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' left
Core	C-32
Station	777+24
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.137050
Longitude	-97.462100

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	6	Type B		
	Asphalt Concrete	2 1/2	Type C, tack layer at 7 inches		
	Asphalt Concrete	3	Type A		
	Total Core Thickness	11 1/2			
2	CEMENT STABILZED SUBGRADE	6			
3	SILTY, CLAYEY SAND (SC-SM), brown	12			
4	LEAN CLAY with SAND (CL), brown	24		A-6(6)	9.4

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☐ Separation ☑ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-33

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' left
Core	C-33
Station	767+10
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.134881
Longitude	-97.460000

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	5 1/2	Type B		
	Asphalt Concrete	2	Type C, tack layer at 6 inches		
	Asphalt Concrete	3 1/2	Type A		
	Total Core Thickness	11			
				AASHTO	OSI
2	CEMENT STABILZED SUBGRADE	7			
3	SILTY SAND (SM), light brown	24			
4	SANDY SILTY CLAY (CL-ML), light brown	12		A-4(1)	5.2

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☐ Separation ☑ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-34

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' left
Core	C-34
Station	757+26
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.132711
Longitude	-97.458000

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	10	Type B		
	Asphalt Concrete	1	Type C, tack layer at 6 inches		
	Asphalt Concrete	4	Type A, separation at 11 inches		
	*4 inches destroyed in barrel				
	Total Core Thickness	15			
				AASHTO	OSI
2	CEMENT STABILZED SUBGRADE	5			
3	SILTY SAND (SM), brown	24			
4	SILTY, CLAYEY SAND (SC-SM), reddish brown	12		A-4(0)	3.2

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

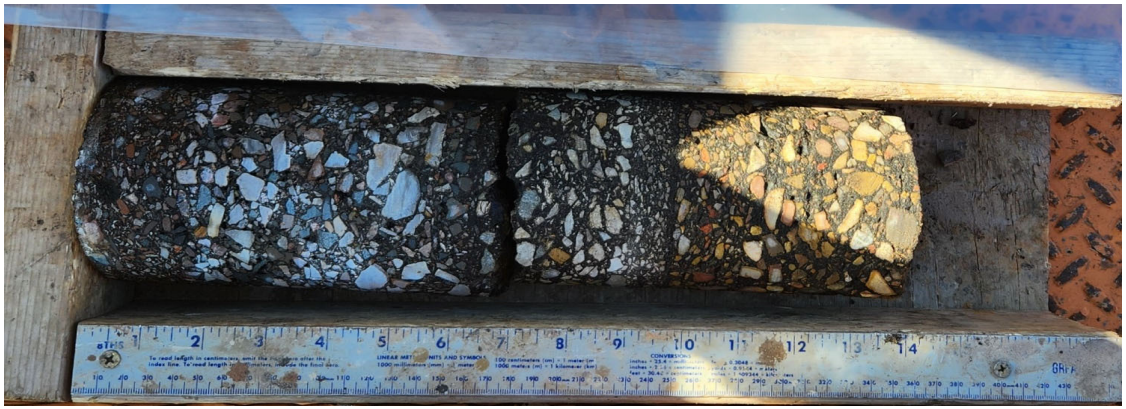
Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top



Coring
C-35

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' left
Core	C-35
Station	747+34
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.130550
Longitude	-97.456000

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	9	Type B, separation at 7 inches		
	Asphalt Concrete	2	Type C, tack layer at 9 1/2 inches		
	Asphalt Concrete	3	Type A		
	Total Core Thickness	14			
2	CEMENT STABILZED SUBGRADE	7			
3	SILTY SAND (SM), brown	18		A-2-4	0
4	SANDY LEAN CLAY (CL), brown	18			

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-36

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' left
Core	C-36
Station	737+44
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.128369
Longitude	-97.454000

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	10	Type B, separation at 2 1/2 and 8 inches		
	Asphalt Concrete	2	Type C, tack layer at 11 inches		
	Asphalt Concrete	3 1/2	Type A		
	Total Core Thickness	15 1/2			
2	CEMENT STABILZED SUBGRADE	7			
3	SILTY SAND (SM), brown	24			
4	SANDY LEAN CLAY (CL), brown	12		A-4(4)	8

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

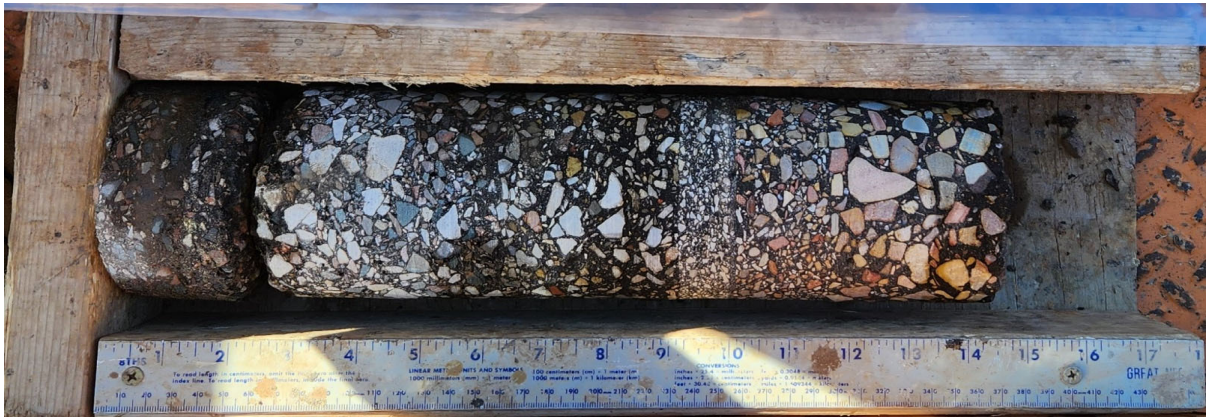
Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top



Coring
C-37

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' left
Core	C-37
Station	727+60
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.126200
Longitude	-97.452000

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	9	Type B, separation at 2 1/2 inches		
	Asphalt Concrete	2 1/2	Type C, tack layer at 10 inches		
	Asphalt Concrete	3	Type A		
	Total Core Thickness	14 1/2			
2	CEMENT STABILZED SUBGRADE	7 1/2			
3	SILTY SAND (SM), reddish brown	24		A-4(0)	0
4	SANDY LEAN CLAY (CL), reddish brown	6			
	*Auger refusal at 52 inches				

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

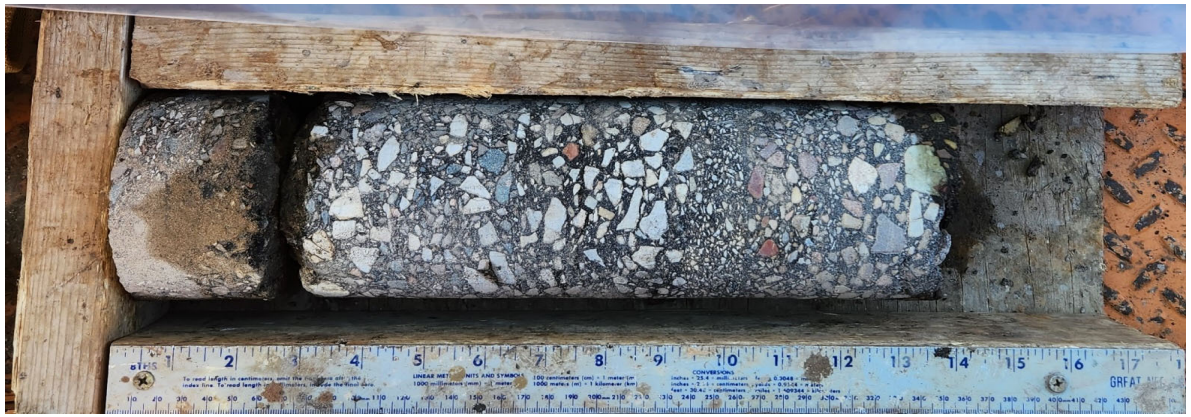
Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top



Coring
C-38

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' left
Core	C-38
Station	717+64
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.124031
Longitude	-97.450000

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	9 1/2	Type B, separation at 3 inches		
	Asphalt Concrete	2	Type C, tack layer at 10 1/2 inches		
	Asphalt Concrete	2 1/2	Type A		
	Total Core Thickness	14			
2	CEMENT STABILZED SUBGRADE	7 1/2			
3	SILTY SAND (SM), brown	30			
4	SANDY LEAN CLAY (CL), brown	6		A-4(2)	6.2

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-39

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' left
Core	C-39
Station	707+72
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.121869
Longitude	-97.448000

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	8 3/4	Type B,		
	Asphalt Concrete	2	Type C, separation at 9 inches		
	Asphalt Concrete	3 1/4	Type A		
	Total Core Thickness	14			
2	CEMENT STABILZED SUBGRADE	8			
3	SILTY SAND (SM), brown	18		A-4(0)	0
4	SANDY LEAN CLAY (CL), brown	18			

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

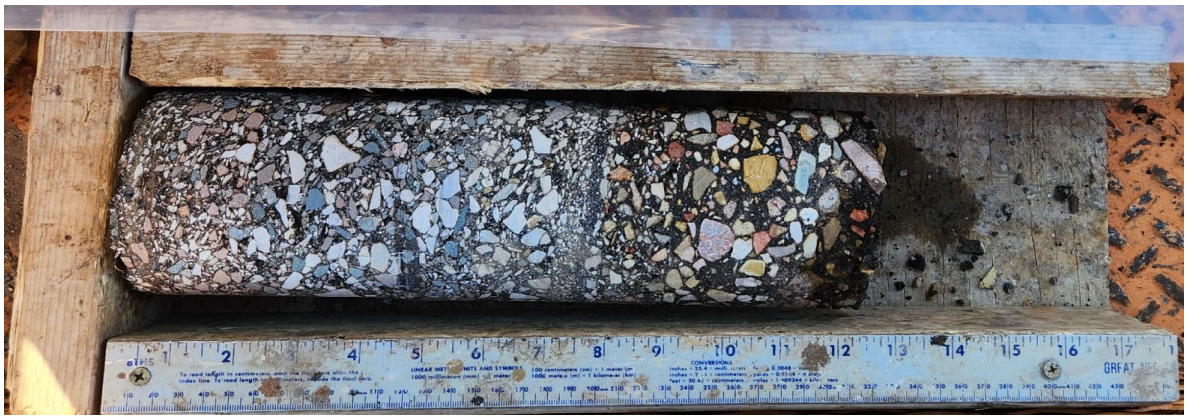
Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top



Coring
C-40

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' left
Core	C-40
Station	693+85
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.118819
Longitude	-97.445200

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics
1	Asphalt Concrete	7 1/2	Type B,
	Asphalt Concrete	1 1/2	Type C, tack layer at 7 1/2 inches
	Asphalt Concrete	3 1/2	Type A
	Total Core Thickness	12 1/2	
			AASHTO OSI
2	CEMENT STABILZED SUBGRADE	5	
	*Auger refusal at 17.5 inches		

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☐ Separation ☑ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-41

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	41' left
Core	C-41
Station	687+92
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.117519
Longitude	-97.444000

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	
1	Asphalt Concrete	12	Type B	
	Total Core Thickness	12		
			AASHTO	OSI
2	CEMENT STABILZED SUBGRADE	6		
3	SANDY LEAN CLAY (CL), red	24	A-4(3)	6.7
	*Auger refusal at 42 inches			

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☐ Separation ☑ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-42

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' left
Core	C-42
Station	677+79
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.115339
Longitude	-97.441900

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	9	Type B, separation at 6 1/2 inches		
	Asphalt Concrete	2 1/2	Type C, tack layer at 9 3/4 inches		
	Asphalt Concrete	2 1/2	Type A		
	Total Core Thickness	14			
2	CEMENT STABILZED SUBGRADE	8			
3	SILTY, CLAYEY SAND (SC-SM), brown	24		A-4(0)	2.4
4	SANDY LEAN CLAY (CL), reddish brown	12			

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-43

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' left
Core	C-43
Station	668+19
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.113189
Longitude	-97.440000

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	10 1/2	Type B, separation and severe stripping at 7 inches		
	Asphalt Concrete	3	Type C, tack layer at 11 1/2 inches		
	Asphalt Concrete	2	Type A		
	Total Core Thickness	15 1/2			
2	CEMENT STABILZED SUBGRADE	8			
3	SANDY SILTY CLAY (CL-ML), brown	24			
4	SANDY LEAN CLAY (CL), reddish brown	12		A-4(3)	7.2

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☑ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-44

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' left
Core	C-44
Station	658+08
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.111019
Longitude	-97.437900

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	10	Type B, separation at 6 1/2 inches		
	Asphalt Concrete	2 1/4	Type C, separation and deterioration at 11 inches		
	Asphalt Concrete	3 1/4	Type A		
	Total Core Thickness	15 1/2			
2	CEMENT STABILZED SUBGRADE	8			
3	SANDY SILTY CLAY (CL-ML), brown	18		A-4(0)	4.2
4	SANDY LEAN CLAY (CL), brown	18			

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☑ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-45

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' left
Core	C-45
Station	648+15
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.108850
Longitude	-97.435900

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	9 1/2	Type B, separation at 8 inches		
	Asphalt Concrete	1 1/2	Type C, tack layer at 10 inches		
	Asphalt Concrete	3 3/4	Type A		
	Total Core Thickness	14 3/4			
2	CEMENT STABILZED SUBGRADE	8 1/2			
3	SILTY, CLAYEY SAND (SC-SM), reddish brown	30		A-4(0)	2.1
4	SANDY LEAN CLAY (CL), reddish brown	6			

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

Top

Coring
C-46

Surveyed By: Dawson Wiseman

Date Surveyed: December 16, 19, 20, 27 and 28, 2022

CORE LOG

RRC No.	22118
State Aid Project No.	35589(04)
Location	I-35
County	McClain
I-35 CL	40' left
Core	C-46
Station	633+22
Coring Location	Outer Wheel Path
Lane Direction	SB
Latitude	35.105589
Longitude	-97.432900

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	9 1/2	Type B,		
	Asphalt Concrete	2 1/2	Type C, separation at 10 1/2 inches		
	Asphalt Concrete	4	Type A		
	Total Core Thickness	16			
2	CEMENT STABILZED SUBGRADE	8			
3	SILTY, CLAYEY SAND (SC-SM), reddish brown	30			
4	LEAN CLAY with SAND (CL), brown	6		A-4(5)	9

*Asphalt type based on visual observation only

CORE DATA

Surface Material Type: ☑ A.C. ☐ P.C.C. ☐ Continuously Reinforced Concrete

Stripping and/or Separation: ☐ Stripping ☑ Separation ☐ N/A

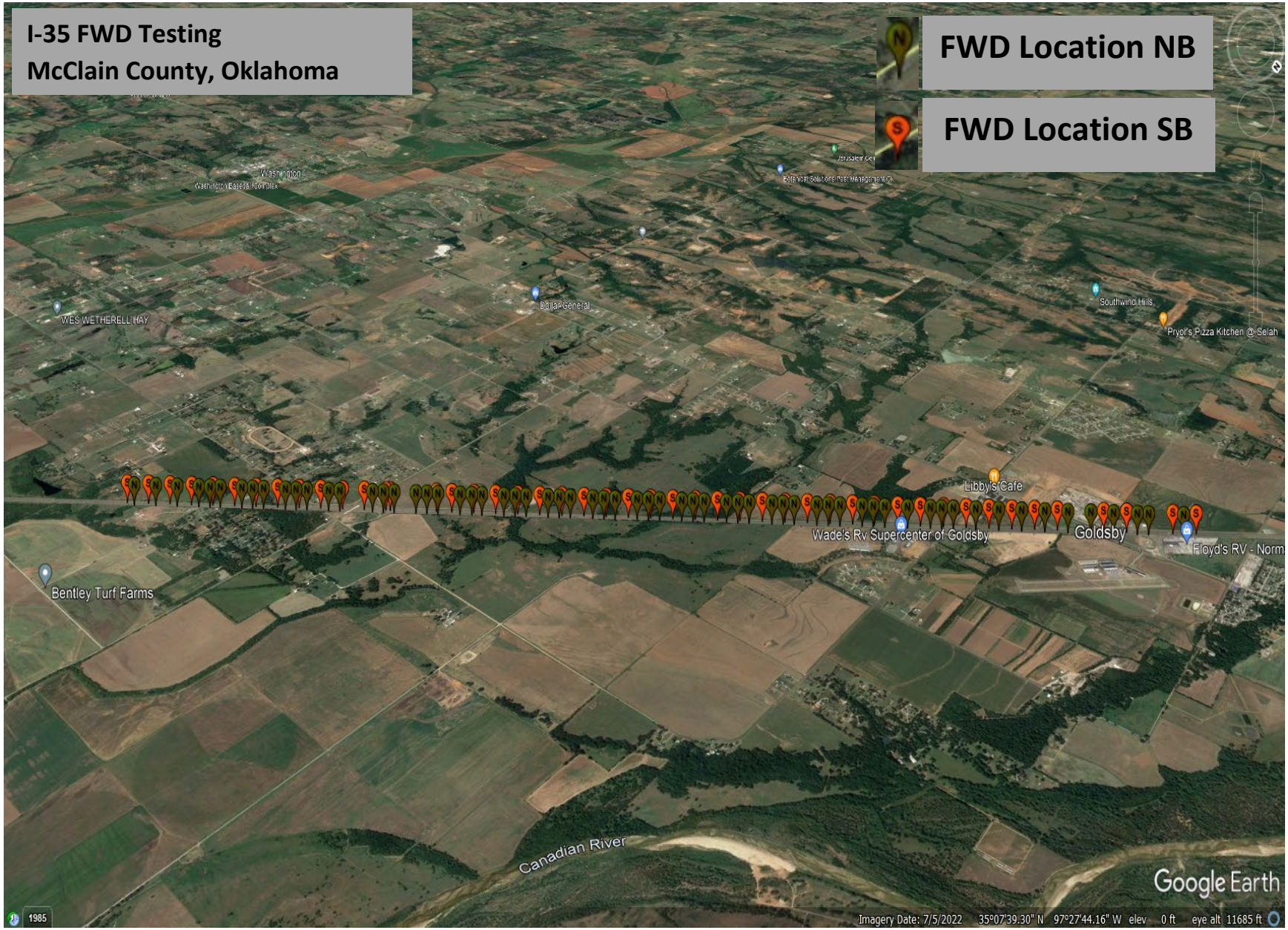
Honeycomb or "D" Cracking in PCC: ☐ Honeycomb ☐ "D" ☑ N/A

Stabilized Subgrade Beneath Pavement or Sub-base? ☑ Yes ☐ No ☐ Unknown

RED ROCK CONSULTING

APPENDIX D

APPENDIX A – FWD TEST LOCATIONS


I-35 FWD Testing
McClain County, Oklahoma
FWD Location NB
FWD Location SB
WES WETHERELL HAY
Dollar General
Southwind Hills
Pryor's Pizza Kitchen @ Selah
Libby's Cafe
Wade's Rv Supercenter of Goldsby
Goldsby
Floyd's RV - Norm
Bentley Turf Farms
Canadian River
Google Earth
1985
Imagery Date: 7/5/2022 35°07'39.30" N 97°27'44.16" W elev 0 ft eye alt 11685 ft

APPENDIX B – FWD FIELD TESTING DATA

APPENDIX E

RED ROCK CONSULTING
PO Box 30591
Edmond, OK 73003
405-562-3328

SUMMARY OF LABORATORY RESULTS

CLIENT Olsson Associates **PROJECT NAME** I-35 Pavement & Subgrade Survey 35589(04)

PROJECT NUMBER 22118 **PROJECT LOCATION** McClain County, Oklahoma

Borehole	Depth (in)	% Moist.	Liquid Limit	Plastic Limit	Plasticity Index	-3" Sieve	- 3/4" Sieve	-1/2" Sieve	-4 Sieve	-10 Sieve	-40 Sieve	-200 Sieve
C-01	22-46	18.5	22	17	5	100	100	100	99	98	89	53.9
C-01	46-58	15.5										
C-02	24-42	13.0										
C-02	42-60	10.8	21	14	7	100	100	100	99	99	88	60.2
C-03	23-41	14.2										
C-03	41-59	11.9	20	13	7	100	100	100	98	97	89	58.8
C-04	21-51	11.7	19	14	5	100	100	100	100	99	91	47.1
C-05	22-40	14.1	20	16	4	100	100	100	99	97	83	44.2
C-05	40-52	15.8										
C-06	22-40	13.6										
C-06	40-58	18.4	29	14	15	100	100	100	99	99	96	77.4
C-07	19-55	13.0	21	11	10	100	100	100	97	95	81	45.9
C-08	24-48	14.2	NV	NP	NP	100	100	100	96	92	81	39.0
C-08	48-60	14.7										
C-09	23-53	11.7										
C-09	53-59	12.0	21	11	10	100	100	100	98	97	88	56.8
C-10	23-41	11.0	16	13	3	100	100	100	100	99	85	34.7
C-10	41-59	12.4										
C-11	24-48	14.2										
C-11	48-60	17.3	32	12	20	100	100	100	100	100	94	74.9
C-12	26-50	13.2										
C-12	50-62	15.6	24	14	10	100	100	100	98	97	92	69.8
C-13	25-49	11.5	19	14	5	100	100	100	100	99	84	36.3
C-13	49-61	12.6										
C-14	19-52	11.0	NV	NP	NP	100	100	100	98	96	82	31.9
C-14	52-55	15.6										
C-15	21-45	11.8										
C-15	45-57	16.2	27	15	12	100	100	100	100	100	96	79.4
C-16	17-35	15.3	19	16	3	100	100	100	99	95	82	39.7
C-16	35-53	14.6										
C-17	21-39	12.7										
C-17	39-57	18.3	26	16	10	100	100	100	100	99	97	81.8
C-18	22-46	13.9	19	16	3	100	100	100	100	99	88	52.6
C-18	46-58	14.2										
C-19	22-46	12.4										
C-19	46-58	12.1	23	15	8	100	100	100	97	95	91	76.5
C-20	16-40	8.4	NV	NP	NP	100	100	100	97	93	81	32.7
C-20	40-52	14.2										
C-21	17-41	10.3										
C-21	41-47	10.8	21	13	8	100	100	100	94	91	80	48.1
C-22	19-31	17.4	19	13	6	100	100	100	93	83	62	30.2
C-23	20-32	15.0	17	13	4	100	100	100	78	69	50	21.3
C-24	19-43	4.9										

RED ROCK CONSULTING
PO Box 30591
Edmond, OK 73003
405-562-3328

SUMMARY OF LABORATORY RESULTS

CLIENT Olsson Associates **PROJECT NAME** I-35 Pavement & Subgrade Survey 35589(04)

PROJECT NUMBER 22118 **PROJECT LOCATION** McClain County, Oklahoma

Borehole	Depth (in)	% Moist.	Liquid Limit	Plastic Limit	Plasticity Index	-3" Sieve	- 3/4" Sieve	-1/2" Sieve	-4 Sieve	-10 Sieve	-40 Sieve	-200 Sieve
C-24	43-55	9.5	23	17	6	100	100	100	98	96	93	79.6
C-25	19-43	5.1										
C-25	43-55	11.1	22	15	7	100	100	100	100	99	95	78.6
C-26	17-29	7.6	NV	NP	NP	100	100	100	83	74	57	28.7
C-26	29-53	10.7										
C-27	20-32	6.2										
C-27	32-56	10.2	NV	NP	NP	100	100	100	100	99	92	51.3
C-28	17-41	5.8	NV	NP	NP	100	100	100	94	90	75	30.4
C-28	41-53	12.4										
C-29	19-43	12.8										
C-29	43-55	14.1	24	15	9	100	100	100	100	100	96	78.1
C-30	19-31	11.8										
C-30	31-43	8.9	19	15	4	100	100	100	99	99	90	46.3
C-30	43-55	14.8										
C-31	19-43	11.7										
C-31	43-55	12.9	21	16	5	100	100	100	100	99	93	67.6
C-32	18-30	16.0										
C-32	30-54	14.9	25	14	11	100	100	100	100	99	95	74.7
C-33	18-42	12.9										
C-33	42-54	14.4	20	14	6	100	100	100	100	99	92	63.5
C-34	20-44	9.4										
C-34	44-56	12.7	20	14	6	100	100	100	99	98	86	47.6
C-35	21-39	14.4	NV	NP	NP	100	100	100	98	96	81	31.4
C-35	39-50	17.2										
C-36	23-47	11.9										
C-36	47-59	14.4	24	14	10	100	100	100	100	99	93	68.3
C-37	22-46	10.6	NV	NP	NP	100	100	100	100	98	85	38.2
C-37	46-52	11.4										
C-38	22-52	12.6										
C-38	52-58	13.2	23	14	9	100	100	100	100	99	90	57.3
C-39	22-40	12.7	NV	NP	NP	100	100	100	100	99	86	35.8
C-39	40-58	14.9										
C-41	18-42	14.7	24	15	9	100	100	100	97	96	89	61.1
C-42	22-46	12.7	20	16	4	100	100	100	99	97	85	46.2
C-42	46-58	14.6										
C-43	24-48	16.0										
C-43	48-60	13.7	24	15	9	100	100	100	100	100	94	64.7
C-44	24-42	16.1	21	16	5	100	100	100	100	99	89	55.9
C-44	42-60	16.3										
C-45	23-53	12.8	19	14	5	100	100	100	99	98	82	42.8
C-45	53-59	10.4										
C-46	24-54	14.3										
C-46	54-60	15.9	25	15	10	100	100	100	100	99	95	76.1

APPENDIX F

RED ROCK CONSULTING

GENERAL NOTES

SOIL PROPERTY ABBREVIATIONS

N	Uncorrected SPT Penetration, blows per foot
N_{60}	Corrected SPT Penetration, blows per foot
Q_u	Unconfined Compressive Strength, psf
Mc	Moisture Content, %
LL	Liquid Limit, %
PL	Plastic Limit, %
PI	Plasticity Index, %

DRILLING & SAMPLING ABBREVIATIONS

BS	Bag Sample
SPT	Split Spoon Sample
ST	Shelby Tube Sample
AU	Auger Sample
TC	Texas Cone Penetrometer
DCP	Dynamic Cone Penetrometer

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)
-- used to classify all soils unless otherwise noted --

Major Divisions			Group Symbol	Typical Names
Course-Grained Soils >50% retained on #200 sieve	**Gravels** 50% + of course fraction retained on #4 sieve	Clean Gravels	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		Gravels with Fines	GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	Sands 50% + of course fraction passes #4 sieve	Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines
			SP	Poorly graded sands and gravelly sands, little or no fines
		Sands with Fines	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
Fine-Grained Soils <50% passes #200 sieve	**Silts and Clays** Liquid Limit ≤ 50%		ML	Inorganic silts, very fine sands, rock four, silty or clayey fine sands
			CL	Inorganic clays of low to medium plasticity, gravelly/sandy/silty/lean clays
			OL	Organic silts and organic silty clays of low plasticity
	Silts and Clays Liquid Limit > 50%		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
			CH	Inorganic clays or high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
Highly Organic Soils			PT	Peat, muck, and other highly organic soils

Prefix: G = Gravel, S = Sand, M = Silt, C = Clay, O = Organic **Suffix:** W = Well Graded, P = Poorly Graded, M = Silty, L = Clay, LL < 50%, H = Clay, LL > 50%

PLASTICITY OF COHESIVE SOIL

Degree of Plasticity	Plasticity Index	Swell Potential
None	0 to 4	Very Low
Slight	5 to 9	Low
Medium	10 to 19	Low to Medium
High	20 to 39	Medium to High
Very High	40+	Very High

MOISTURE OF COHESIVE SOIL

Description	Condition	Moisture Content
Dry, Dusty	Dry	0 to 10%
Damp	Moist	10 to 30%
Free Water	Wet	30 to 70%

CONSISTENCY - COHESIVE SOILS

Consistency	SPT
Very Soft	<2
Soft	2 to 4
Medium Stiff	5 to 8
Stiff	9 to 14
Very Stiff	15 to 30
Hard	31+

DENSITY – COHESIONLESS SOILS

Relative Density	SPT
Very Loose	<4
Loose	4 to 10
Medium Dense	11 to 30
Dense	31 to 50
Very Dense	51+

ROCK HARDNESS

SPT (in/50)	TCP (in/100)	Rock Description
6+	6+	Very Soft / Very Poorly Cemented
5 - 6	3 - 6	Soft / Poorly Cemented
4 - 5	2 - 3	Moderately Hard / Cemented
3 - 4	1 - 2	Hard / Well Cemented
<3	<1	Very Hard / Very Well Cemented

ROCK CORE QUALITY

Core Quality	RQD
Excellent Quality	90 – 100%
Good Quality	75 – 90%
Fair Quality	50 – 75%
Poor Quality	25 – 50%
Very Poor Quality	<25%

RED ROCK
CONSULTING

Report of Geotechnical Investigation

OF

I-35 SHOULDER SOILS SURVEY
MCCLAIN COUNTY, OKLAHOMA

35589(04)

Prepared For:

Olsson Associates
11600 Broadway Extension, Suite 300
Oklahoma City, Oklahoma 73114
Attention: Mr. Russell Beaty, PE

Prepared By:

Red Rock Consulting, LLC
PO Box 30591
Edmond, Oklahoma 73003
(405) 562-3328

June 23, 2023
Project No. 22117

RED ROCK
CONSULTING

June 23, 2023

Olsson Associates
11600 Broadway Extension, Suite 300
Oklahoma City, Oklahoma 73114

Attention: Mr. Russell Beaty, PE

Re: Report of Geotechnical Investigation
I-35 Shoulder Soils Survey
35589(04)
McClain County, Oklahoma
Project No. 22117

Dear Mr. Beaty:

I am pleased to submit herewith this report entitled "Geotechnical Investigation, I-35 Shoulder Soils Survey, 35589(04), McClain County, Oklahoma".

In an effort to provide a more environmentally friendly service, this report has been provided electronically.

It has been our pleasure to assist you with this project. Should you have any questions regarding the contents of this report, please contact Red Rock Consulting.

Yours very truly,
RED ROCK CONSULTING, LLC
CA No. 5707 Exp. 06/30/23

Emma Coggin, EI
Project Specialist

Jeremy Basler, PE
Geotechnical Manager
Oklahoma PE No. 20233

REGISTERED PROFESSIONAL ENGINEER
JEREMY BASLER
6-23-2023
20233
OKLAHOMA

REPORT OF GEOTECHNICAL INVESTIGATION

I-35 SHOULDER SOILS SURVEY
MCCLAIN COUNTY, OKLAHOMA

35589(04)

PROJECT NO. 22117

APPENDICES

REPORT OF GEOTECHNICAL INVESTIGATION

I-35 SHOULDER SOILS SURVEY
MCCLAIN COUNTY, OKLAHOMA

35589(04)

PROJECT NO. 22117

INTRODUCTION

General

This report presents the results of the geotechnical investigation performed for the widening of the existing pavement of I-35 in the center median and outside lanes to accommodate adding one lane of traffic in each direction from 1.0 mile south of Ladd Road extending north approximately 4.7 miles in McClain County, Oklahoma.

Proposed Construction

The project includes the widening of the existing pavement of I-35 in the center median and outside lanes to accommodate adding one lane of traffic in each direction from 1.0 mile south of Ladd Road extending north approximately 4.7 miles in McClain County, Oklahoma. The project also includes the potential overlay or reconstruction of the existing pavement of the I-35 mainline.

The purpose of this investigation is to evaluate the subsurface conditions at the site and to provide information pertaining to the geotechnical aspects of the proposed project.

Scope of Work

The scope of this investigation includes the following:

1. Review of previous geotechnical and geological information of sites near this site. This was augmented with data obtained during the field investigation phase of the project.

2. Investigation of the subsurface soils by drilling and sampling a total of 33 boreholes within the planned project area.

3. A laboratory testing program consisting of moisture content, Atterberg limits, full sieve, soluble sulfates, standard proctor and resilient modulus tests on the soils encountered

4. Presentation of laboratory test data

FIELD AND LABORATORY INVESTIGATIONS

Field Exploration

Subsurface exploration was performed from December 12th to 16th, 2022. The borings were located in the field by a representative of Red Rock Consulting by measuring distances from known site reference points as depicted on the plans provided by Olsson Associates. The locations of the borings should be considered accurate only to the degree implied by the methods used to define them.

The subsurface exploration program consisted of drilling and sampling a total of 33 borings under the full-time supervision of an engineer. All of the borings were advanced in the grass median of the existing I-35 mainline. The boring locations are shown on the Boring Location Diagrams, which are included in Appendix A.

The boring locations were drilled to depths of 36 inches beneath the existing ground surface using a HD99 Hydraulic Earth Drill. Representative samples of the borings were obtained from the auger cuttings at depths shown on the Shoulder Soils Survey chart in Appendix B.

Samples were collected and transported back to the lab for further classification and testing. The final Shoulder Soils Survey chart was developed from the draft logs, observations and test results of the samples returned to the laboratory. The stratigraphic contacts indicated are only for the specific dates and locations reported, and therefore, are not necessarily representative of other locations and times. The Shoulder Soils Survey chart, presenting conditions encountered at each location explored, are included in Appendix B.

Laboratory Testing

Representative soil samples were tested to refine the field classifications and evaluate physical properties of the soils which may affect the geotechnical aspects of project design and construction. The laboratory testing program included the following:

- Moisture content (AASHTO T265)
- Liquid limit (AASHTO T89)
- Plastic limit (AASHTO T90)
- Particle size analysis (AASHTO T88)
- Soluble sulfates (OHD L-49)
- Standard Proctor (AASHTO T99)
- Resilient modulus tests (AASHTO T307)

The results of the physical laboratory tests conducted are shown on the Shoulder Soils Survey chart in Appendix B. The laboratory results in entirety are included in Appendix C.

The above laboratory tests were performed in general accordance with applicable AASHTO procedures, or generally accepted practice. It should be noted that reference to AASHTO procedures does not imply that all cross-referenced procedures in AASHTO standards have been used, or that all AASHTO procedures used have been followed exactly. Only those AASHTO procedures and/or portions of procedures, which, in the professional judgment of the geotechnical engineer of record for this report, are applicable, appropriate, and necessary for this particular project, have been used or followed.

SITE DESCRIPTION

Surface Conditions

At the time of the field exploration, the borings were located in the existing I-35 grass median of I-35. I-35 was a four lane divided highway with a grass median for the entire length of the project. The project area was partially developed with a few businesses and a small airport near the SH 74 interchange. Continuing south along I-35 was primarily agricultural fields and a few residences. The town of Goldsby was located towards the northern end of the job.

Traffic was high on I-35 during drilling operations. Large trucks consisted of approximately half of the traffic. Traffic control was required to drill the borings.

For the Boring Location Diagrams, refer to Appendix A.

Site Geology

The geology of the project site was researched using the “Division Three Engineering Classification of Geological Materials”, published by the Oklahoma Department of Transportation (ODOT) and the Geologic Map of the “Hydrologic Atlas 4 of Oklahoma,” Reconnaissance of the Water Resources of the Oklahoma City quadrangle, central Oklahoma,” by Roy H. Bingham and Robert L. Moore, U.S. Geological Survey, 1975.

ODOT PUBLICATION

Division Three of the “Engineering Classification of Geological Materials”, published by the Oklahoma Department of Transportation (ODOT) indicates the project site consists of Terrace deposits (Qts) underlain by the Hennessey Unit (Phy).

Terrace deposits consist of sand, silt, clay, gravel, or mixtures of these. These materials were deposited by streams or wind and may be found adjacent to most streams.

The Hennessey unit consists of red platy to blocky clay shales and mudstone. The mudstones are hard and appear blocky. The red clay shale of the Hennessey unit is characterized by numerous bands or streaks of gray, white, or light green color ranging from a few inches to four feet in thickness. Small spheres of light green color up to 10 inches in diameter are an odd characteristic of the unit.

The total thickness of the unit varies from 400 to 600 feet. The Hennessey unit outcrops in a 5 to 20 mile wide north-south band across Cleveland, McClain, and Garvin Counties in Division three.

Topographically, the unit is near level to gently rolling prairies, but most of the more level outcrops of the unit are cultivated.

USGS MAP

According to the USGS geologic map, the project consists of Terrace deposits (Qt) which are underlain by Purcell Sandstone (Pp).

Terrace deposits consist of lenticular beds of sand, silt, clay, and gravel. Thickness ranges from a few feet to about 100 feet and probably averages about 50 feet along major streams. These deposits are major aquifers along Cimarron, Canadian, and North Canadian Rivers.

Purcell Sandstone consists of red-brown to maroon fine- to coarse-grained sandstone, mudstone conglomerate, and red-brown shale. Thickness, 150 feet.

Subsurface Conditions

Information collected during the field investigation indicates that the subgrade materials consisted of lean clay with various amounts of sand and silt, silty sand with various amounts of gravel, clayey sand with various amounts of gravel, sandy silt and silty, clayey sand. The subgrade materials encountered in the borings consisted of A-2-4, A-4, A-6 and A-7-6 soils. The subgrade materials encountered in the borings appeared to be native to the site except for borings SS-1, SS-5, SS-11, SS-13 and SS-17 where minor amounts of possible fill was encountered.

All of the conditions summarized above can be found on the Shoulder Soils Survey chart in Appendix B. Laboratory results can be found in Appendix C.

Soluble Sulfates

Sulfates are naturally occurring in some soils. If combined with calcium based materials, such as cement, lime, fly ash and cement kiln dust, sulfate rich soils can expand up to 250 percent of the original size when exposed to moisture.

A level of “less than 200 ppm” is the lowest and “greater than 8,000 ppm” is the highest reportable level when using the colorimeter method OHD L-49. Soluble sulfate levels less than 3,000 ppm are considered to be too low to be of concern when considering the

use of calcium based construction materials. Soluble sulfate levels in excess of 8,000 ppm are considered to be high risk.

The maximum soluble sulfate level encountered at the project site was 1,235 ppm. Since the maximum value is less than 3,000 ppm, the use of calcium based construction materials should not cause localized distresses in this project. However, good mix design and construction practices should be followed.

Any material imported to the site during construction for use as a fill material should be tested for soluble sulfates. Soluble sulfate levels are shown on the Shoulder Soils Survey chart in Appendix B and are included in Appendix C.

Groundwater Conditions

Groundwater conditions were monitored in the borings during and immediately after drilling. Groundwater was not encountered in any of the borings at these times.

To obtain more accurate groundwater level information, long-term observations in a well or piezometer that is sealed from the influence of surface water would be needed. Fluctuations in groundwater levels can occur due to seasonal variations in the amount of rainfall, runoff, altered drainage paths, and other factors not evident at the time borings were advanced. Consequently, the contractor should be aware of this possibility while constructing this project.

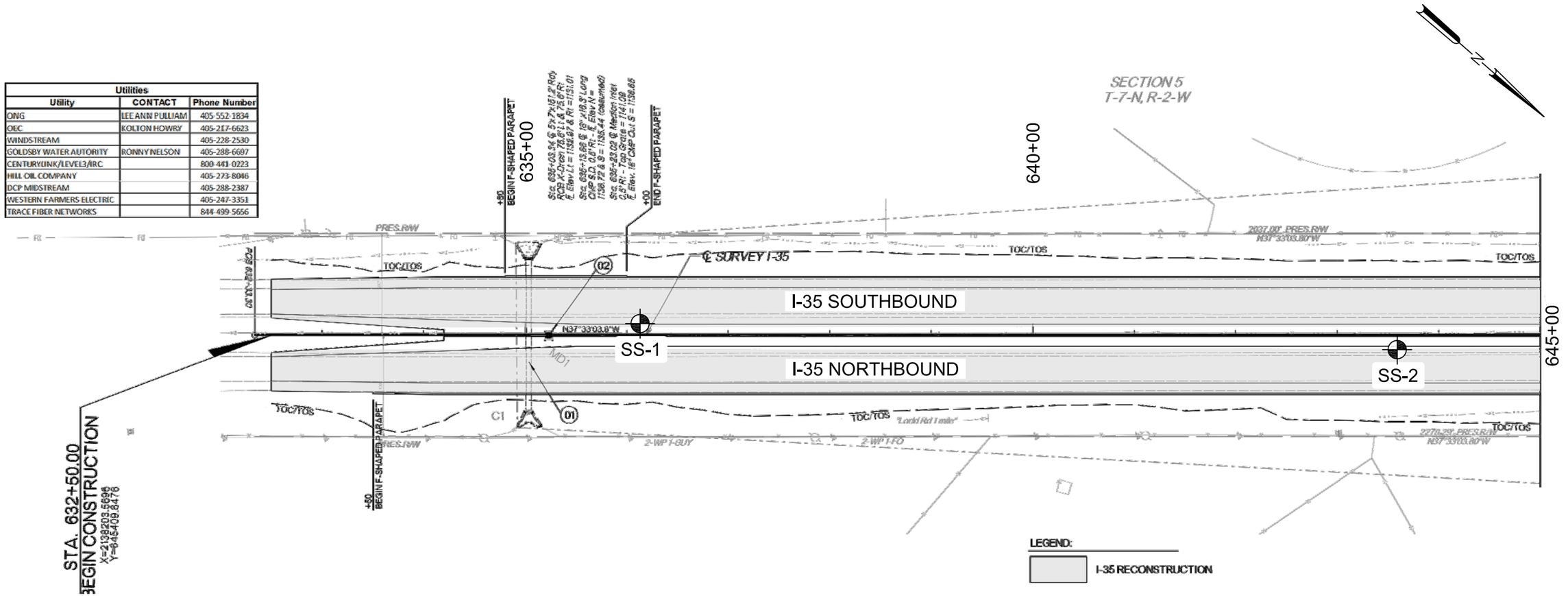
CLOSURE

The data presented in this report are based on the negotiated scope for this project and site conditions as they existed at the time of the field exploration. The conditions encountered in the exploratory borings are assumed to be representative of the subsurface conditions within the study area.

This report was prepared for the exclusive use of Olsson Associates, ODOT and their agents and consultants. It should be made available to prospective contractors for information and factual data only and not as a warranty of subsurface conditions similar to those interpreted from the Shoulder Soils Survey chart or discussions presented herein.

APPENDIX A

Utilities		
Utility	CONTACT	Phone Number
ONG	LEE ANN PULLIAM	405-552-1834
OEC	KOLTON HOWRY	405-217-6623
WINDSTREAM		405-228-2530
GOLDSBY WATER AUTORITY	RONNY NELSON	405-288-6697
CENTURYLINK/LEVEL3/IRC		800-441-0223
HILL OIL COMPANY		405-273-8046
DCP MIDSTREAM		405-288-2387
WESTERN FARMERS ELECTRIC		405-247-3351
TRACE FIBER NETWORKS		844-499-5656



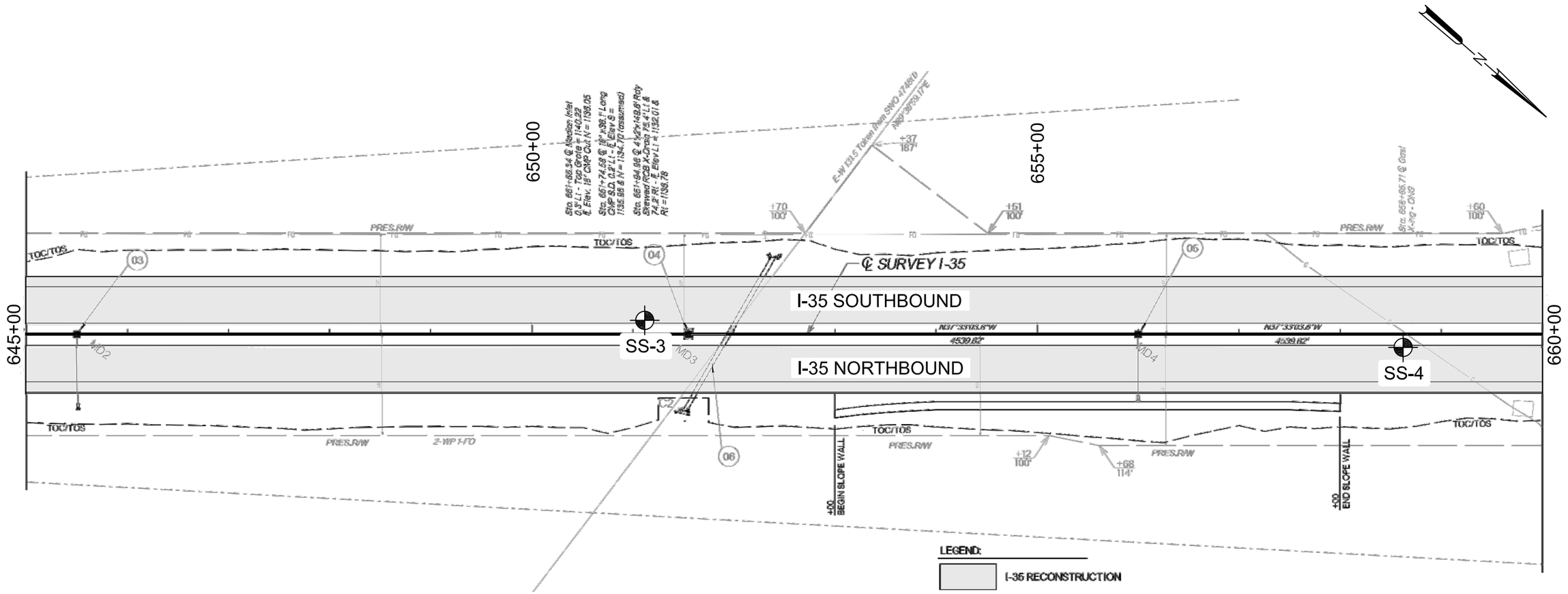
Boring	Station	I-35 CL Survey
SS-1	636+13	11' left
SS-2	643+60	15' right

Stations and offsets estimated from plans provided by Olsson Associates

RED ROCK CONSULTING
PO Box 30591
Edmond, Oklahoma 73003
(405) 562-3328

BORING LOCATION DIAGRAM
I-35 SHOULDER SURVEY
MCCLAIN COUNTY, OKLAHOMA
J/P 35589(04)

Project Mngr:	EDC	RRC Project No.	22117
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	12/14/2022
Approved By:	JWB	Page No:	1/17



Boring	Station	I-35 CL Survey
SS-3	651+12	13' left
SS-4	658+63	14' right

Stations and offsets estimated from plans provided by Olsson Associates

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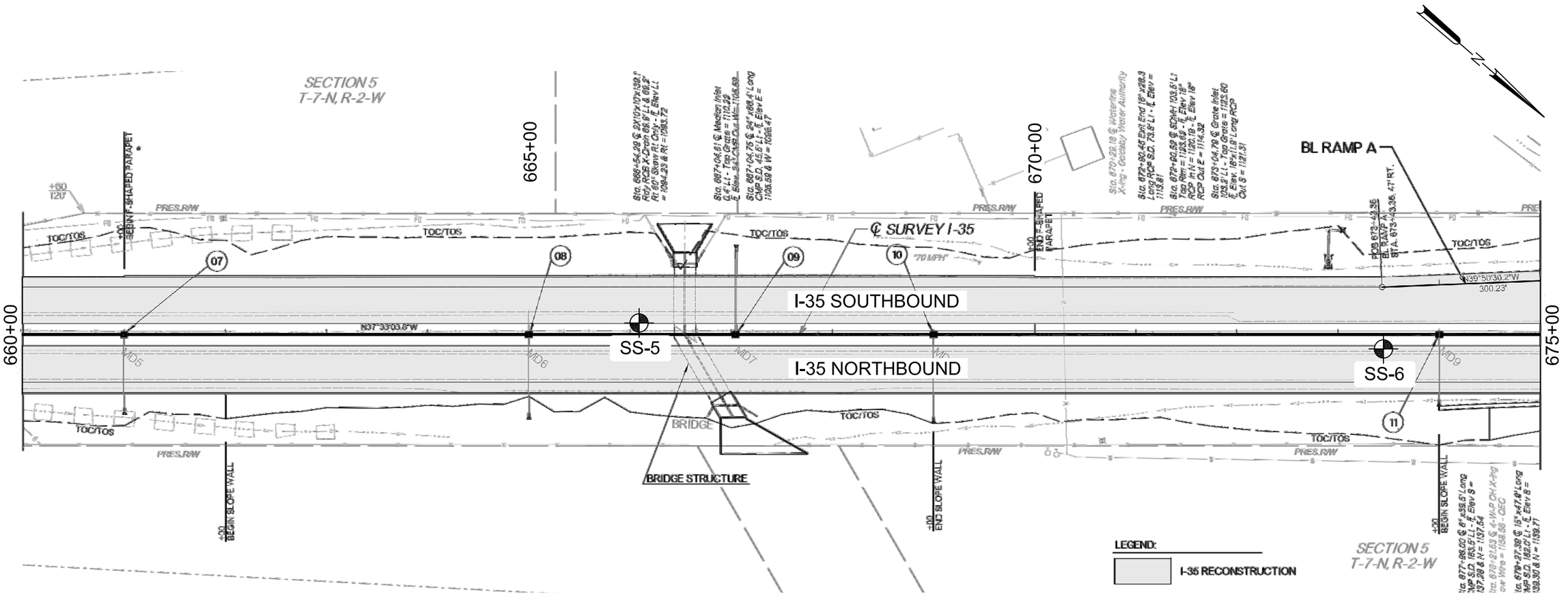

Boring	Station	I-35 CL Survey
SS-5	666+10	13' left
SS-6	673+46	14' right

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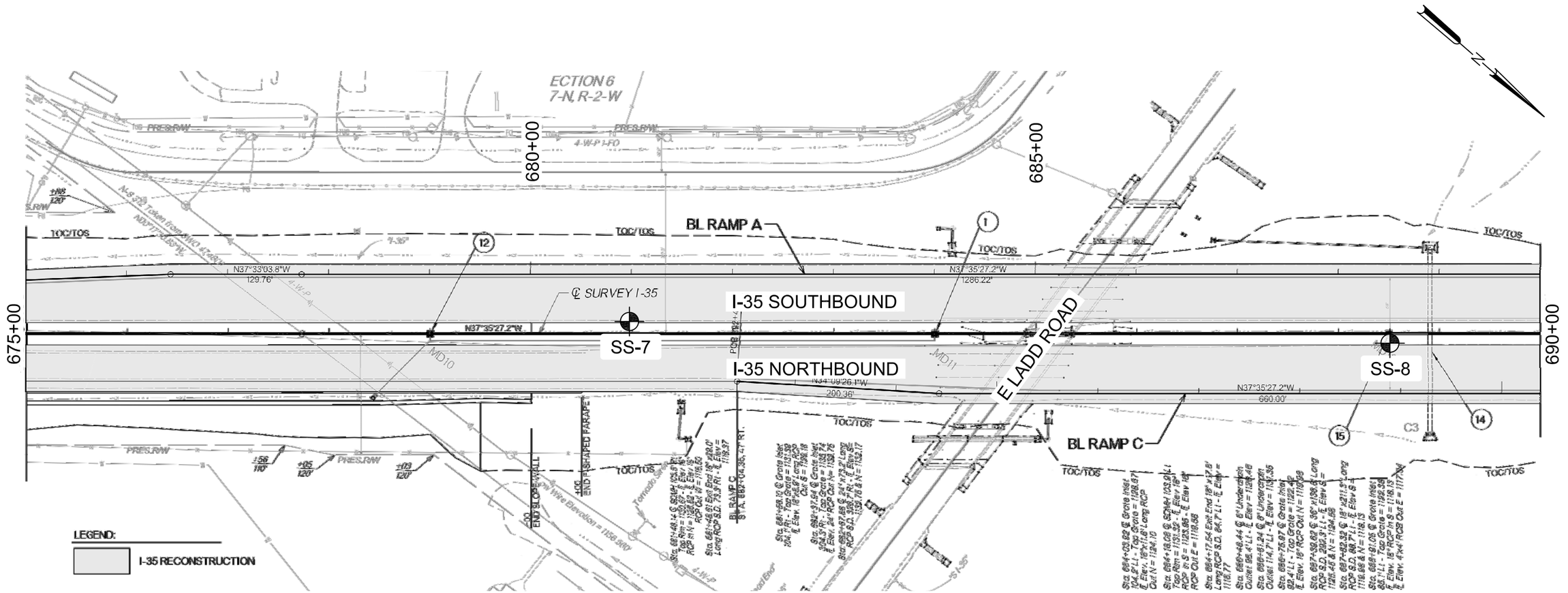

Boring	Station	I-35 CL Survey
SS-7	680+98	13' left
SS-8	688+52	10' right

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MCCLAIN COUNTY, OKLAHOMA
J/P 35589(04)

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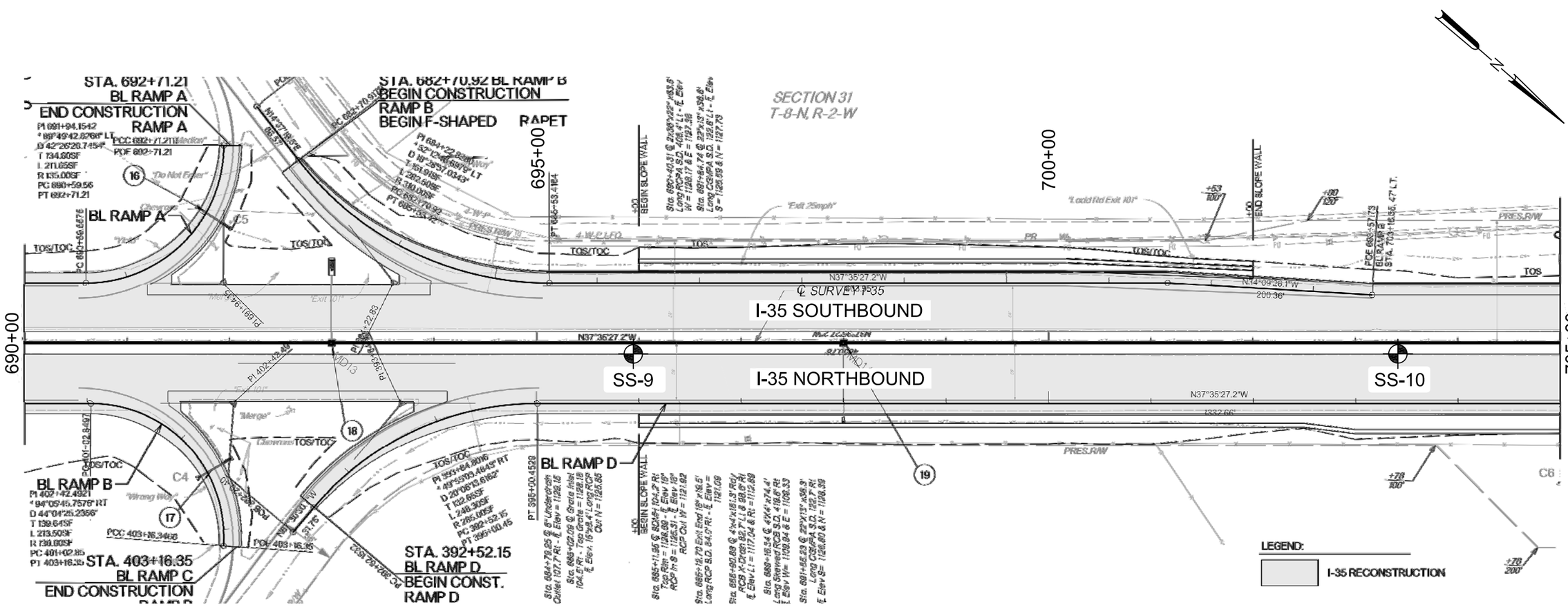

Boring	Station	I-35 CL Survey
SS-9	695+95	11' right
SS-10	703+42	10' right

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I-35 SHOULDER SURVEY
MCCLAIN COUNTY, OKLAHOMA
J/P 35589(04)

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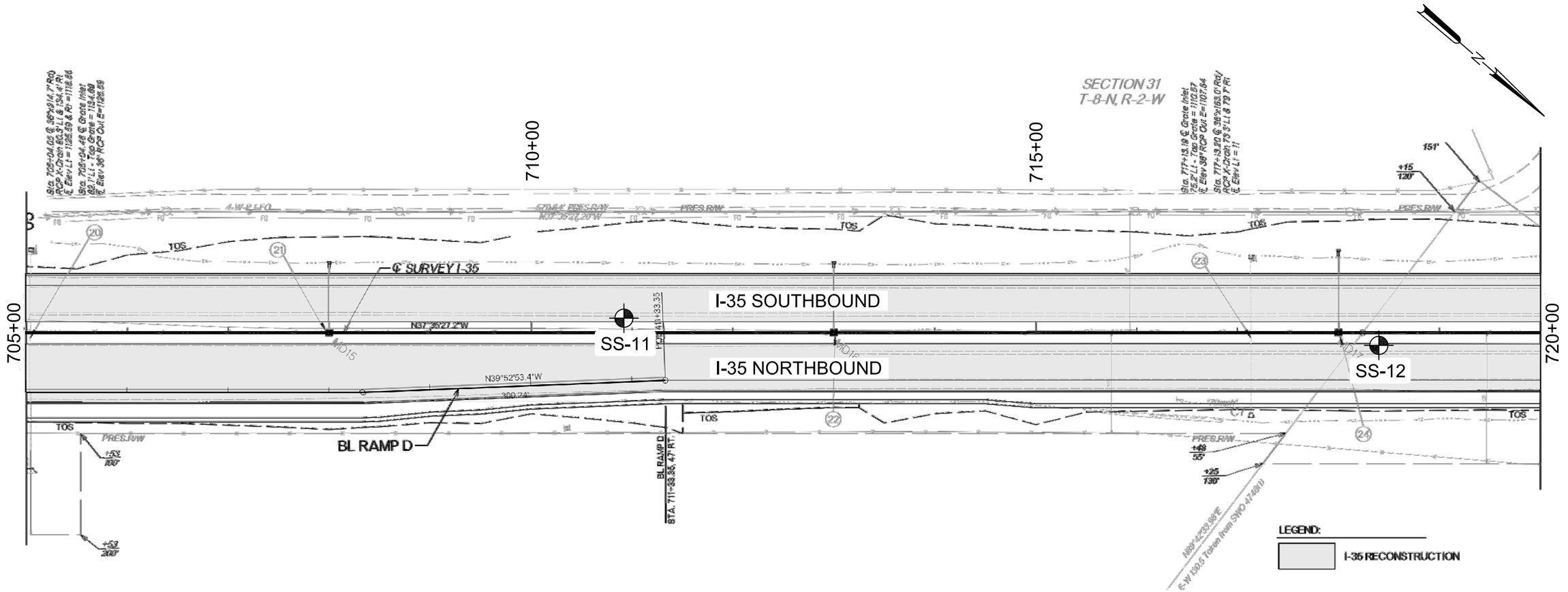
Approved By:	JWB	Page No:	5/17



Boring	Station	I-35 CL Survey
SS-11	710+92	14' left
SS-12	718+40	13' right

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MCCLAIN COUNTY, OKLAHOMA
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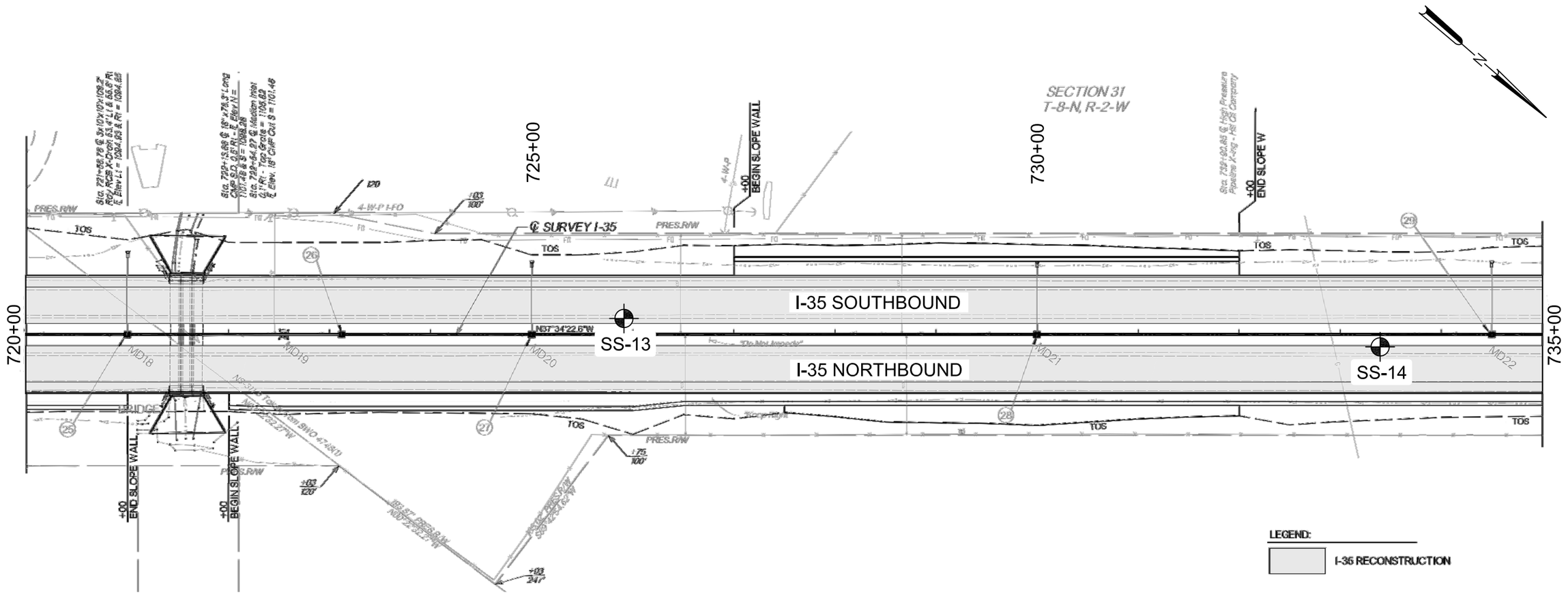
Approved By:	JWB	Page No:	6/17



Boring	Station	I-35 CL Survey
SS-13	725+92	15' left
SS-14	733+40	14' right

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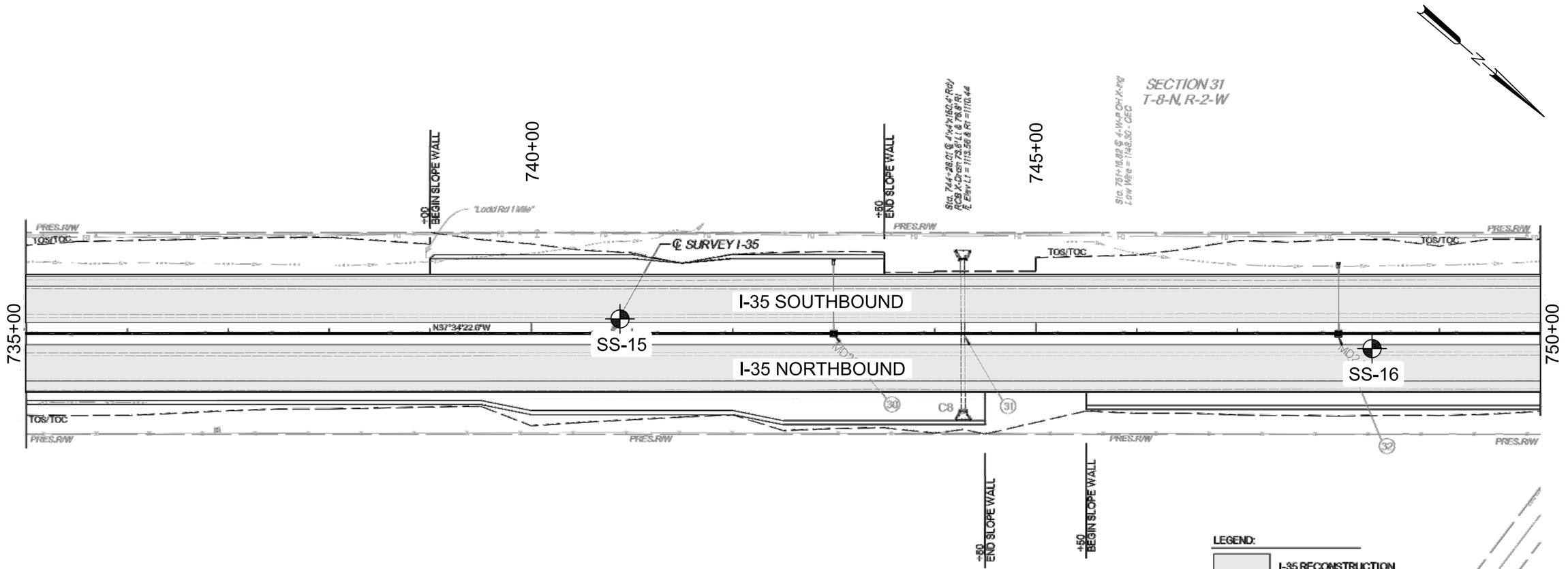

Boring	Station	I-35 CL Survey
SS-15	740+89	14' left
SS-16	748+34	15' right

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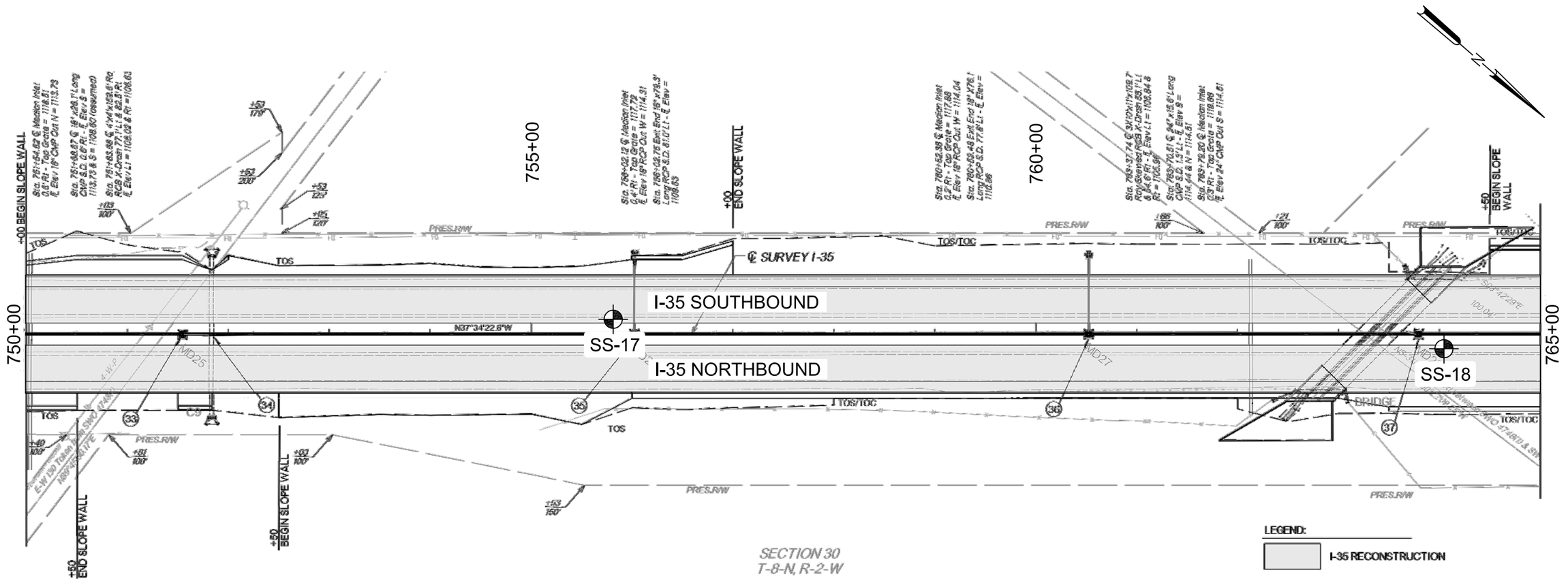

LEGEND:

I-35 RECONSTRUCTION

Boring	Station	I-35 CL Survey
SS-17	755+82	15' left
SS-18	764+05	14' right

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I-35 SHOULDER SURVEY
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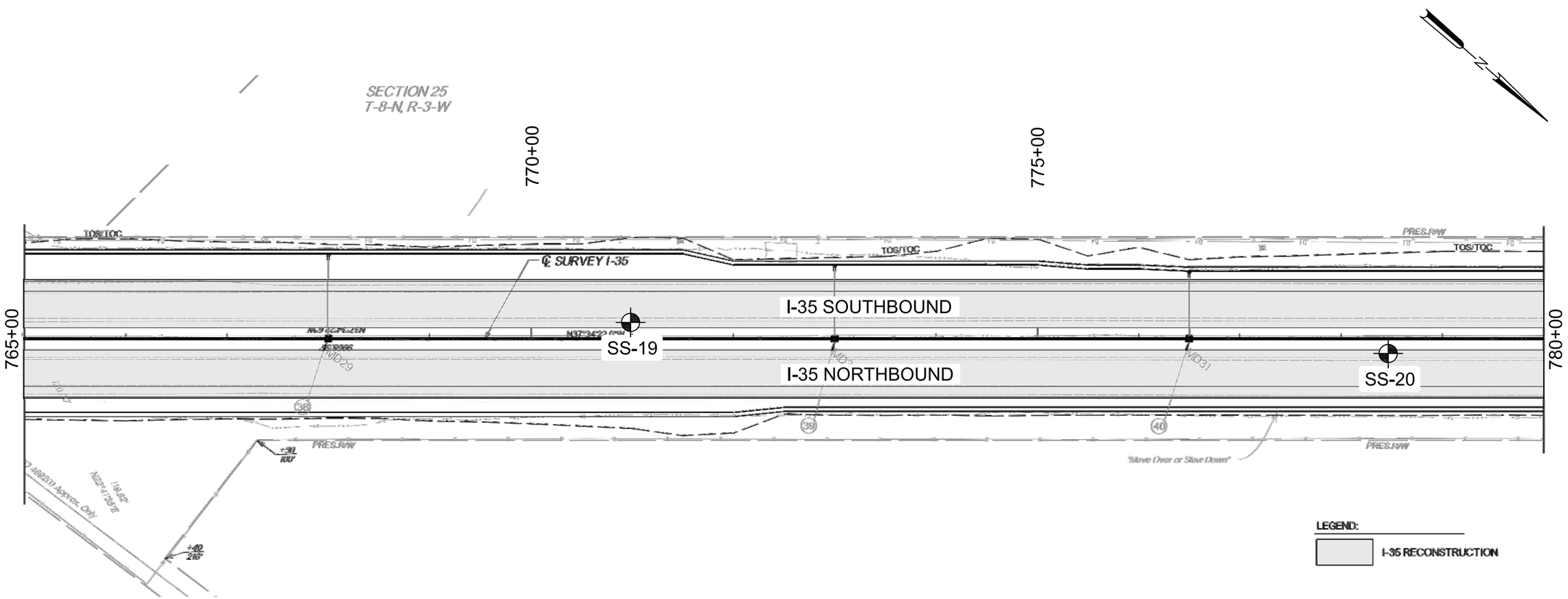

Boring	Station	I-35 CL Survey
SS-19	770+99	15' left
SS-20	778+47	14' right

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BORING LOCATION DIAGRAM
I-35 SHOULDER SURVEY
MCCLAIN COUNTY, OKLAHOMA
J/P 35589(04)

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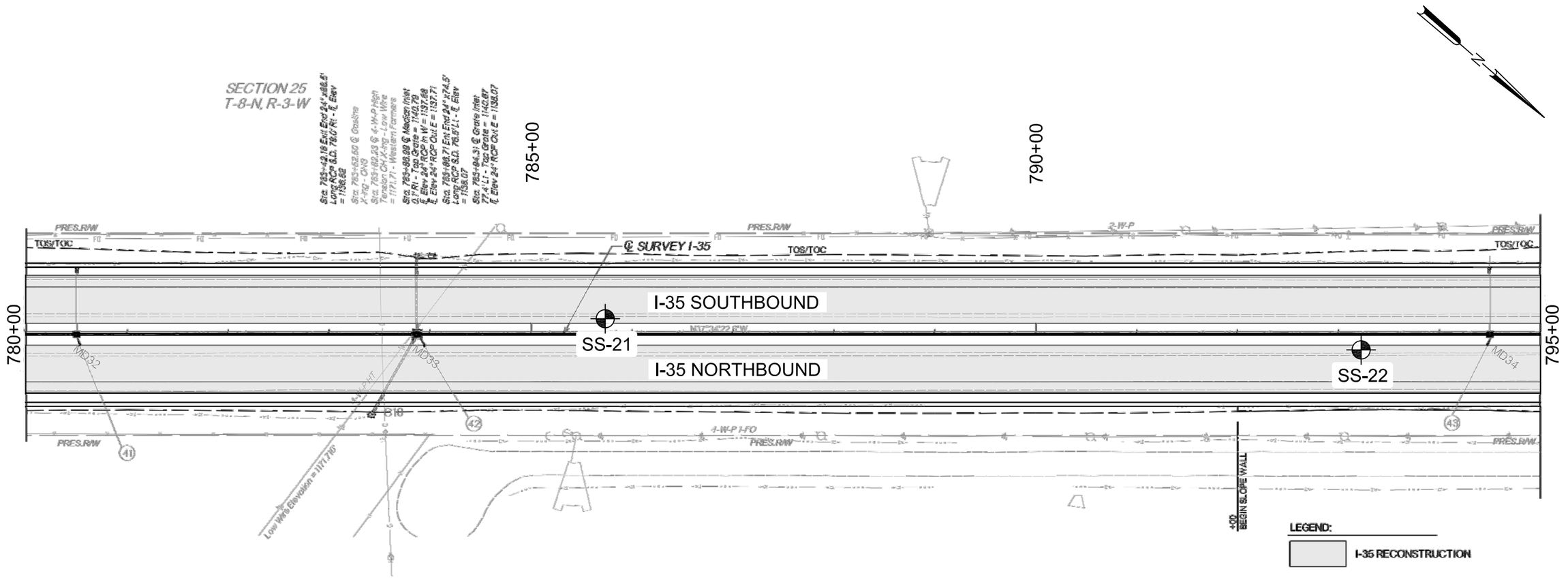

Boring	Station	I-35 CL Survey
SS-21	785+74	15' left
SS-22	793+23	15' right

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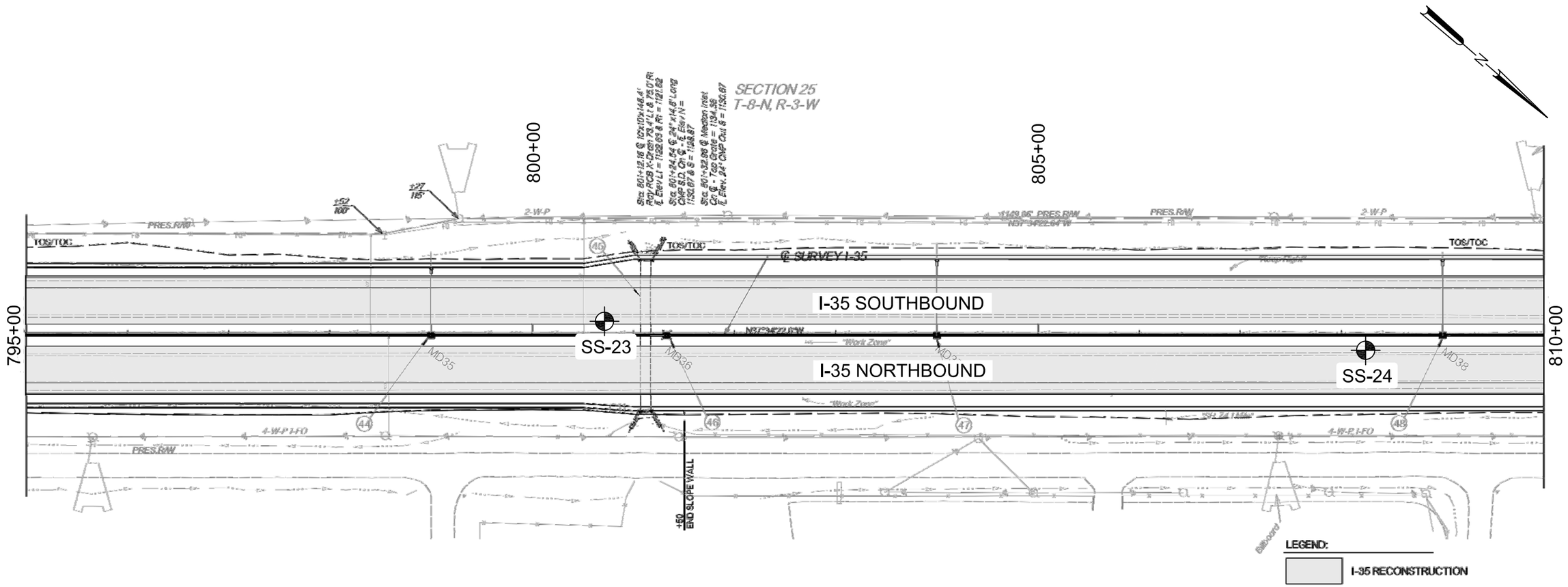

Boring	Station	I-35 CL Survey
SS-23	800+72	15' left
SS-24	808+25	15' right

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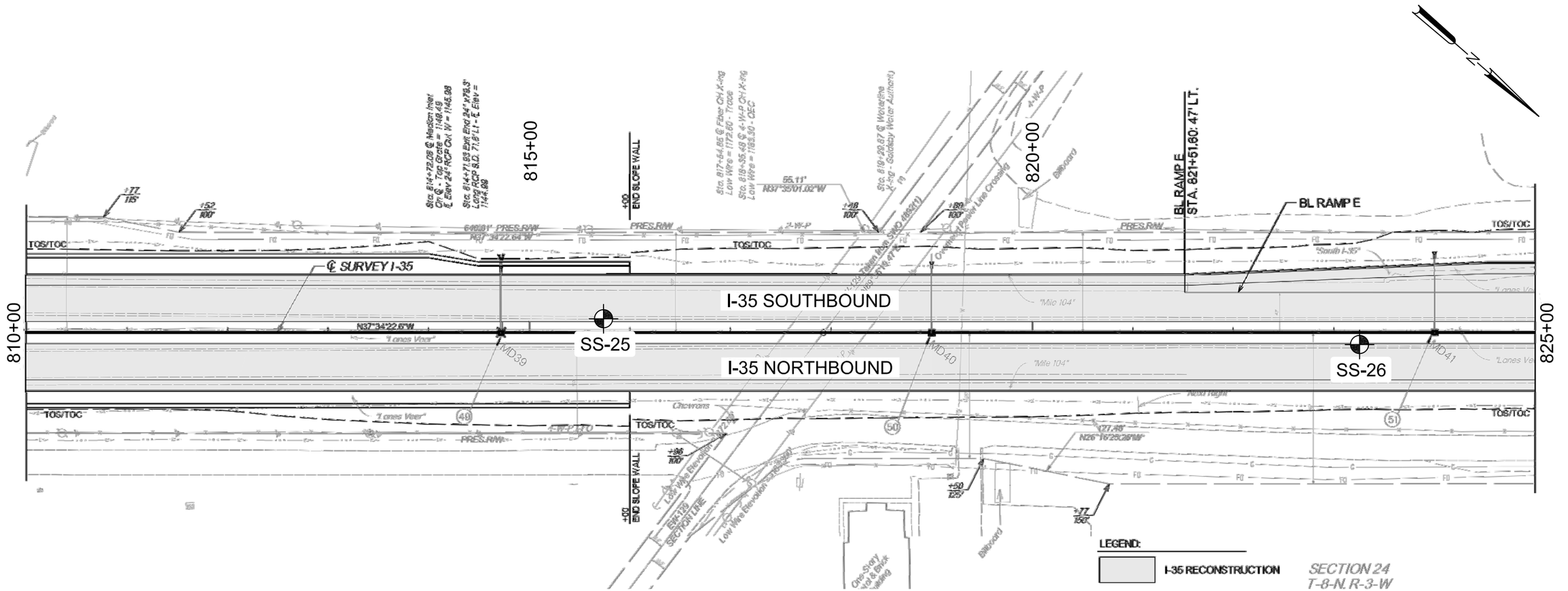

SECTION 24
T-8-N, R-3-W

Boring	Station	I-35 CL Survey
SS-25	815+75	13' left
SS-26	823+26	12' right

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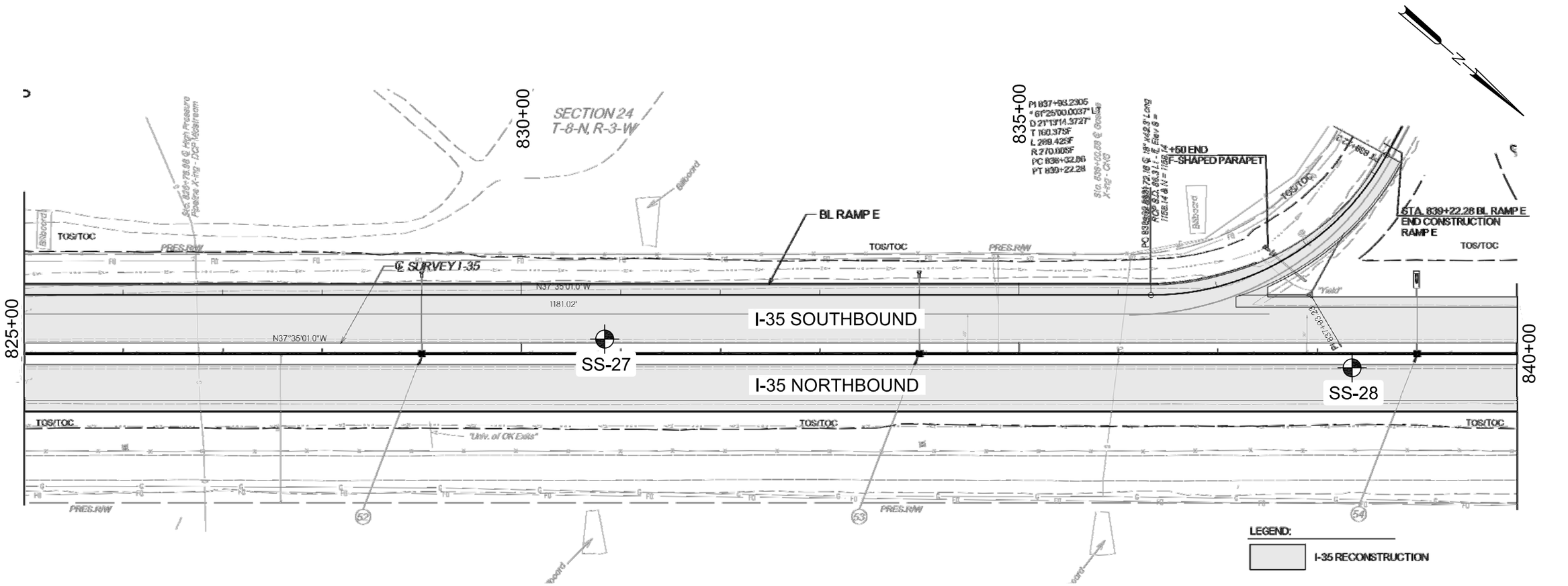

Boring	Station	I-35 CL Survey
SS-27	830+84	14' left
SS-28	838+36	14' right

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BORING LOCATION DIAGRAM
I-35 SHOULDER SURVEY
MCCLAIN COUNTY, OKLAHOMA
J/P 35589(04)

Project Mngr:	EDC	RRC Project No.	22117
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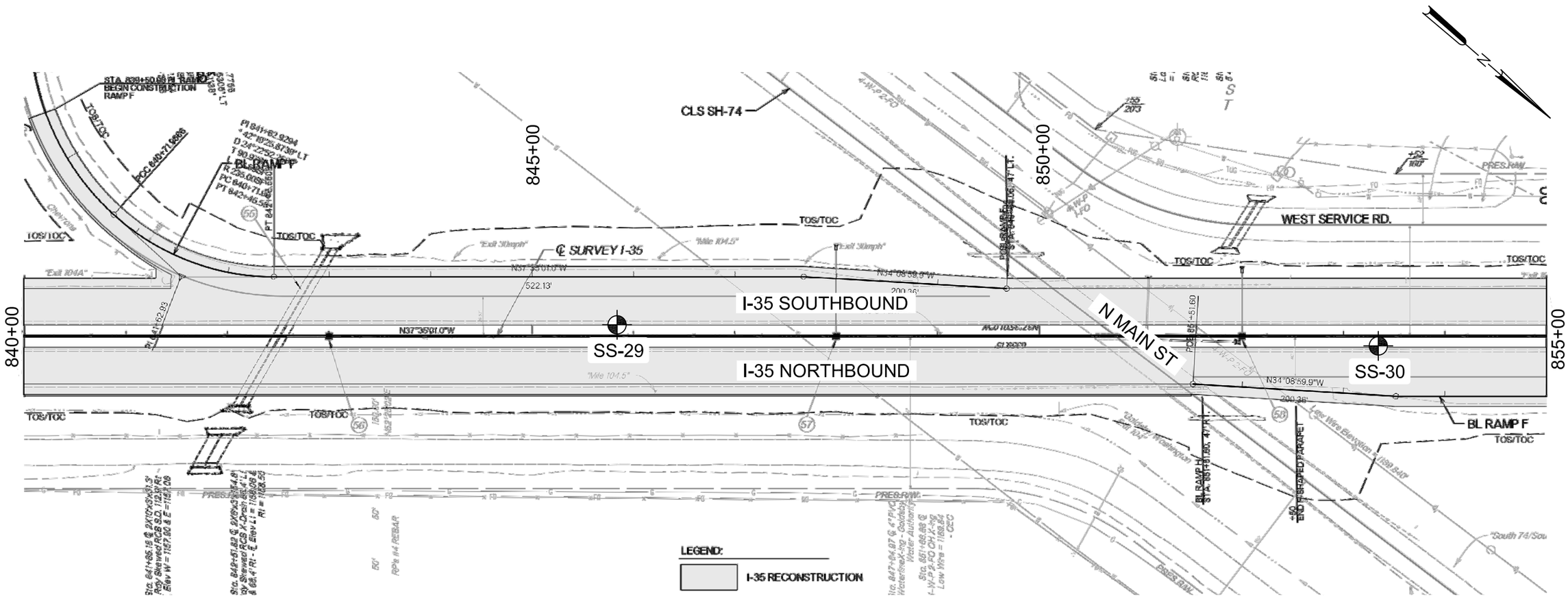

Boring	Station	I-35 CL Survey
SS-29	845+85	11' left
SS-30	853+35	10' right

Stations and offsets estimated from plans provided by Olsson Associates

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BORING LOCATION DIAGRAM
I-35 SHOULDER SURVEY
MCCLAIN COUNTY, OKLAHOMA
J/P 35589(04)

Project Mngr:	EDC	RRC Project No.	22117
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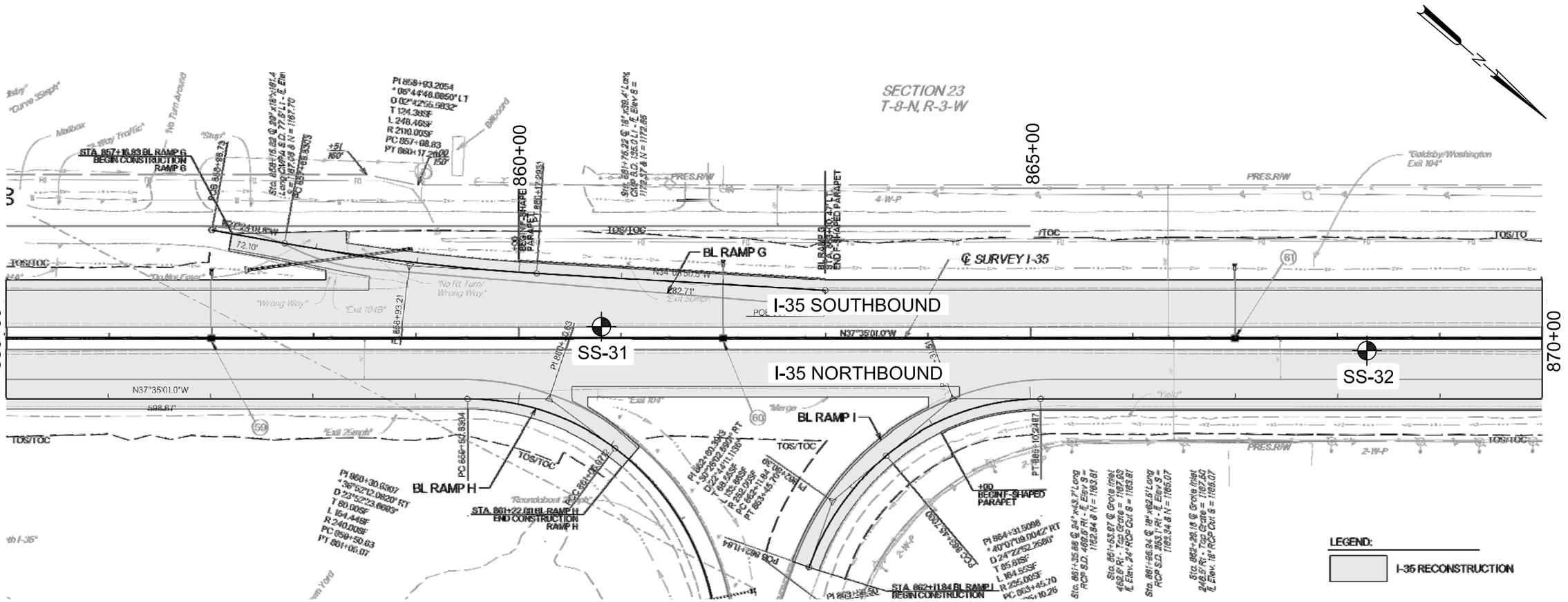
Approved By:	JWB	Page No:	15/17



Boring	Station	I-35 CL Survey
SS-31	860+82	11' left
SS-32	868+30	12' right

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MCCLAIN COUNTY, OKLAHOMA
J/P 35589(04)

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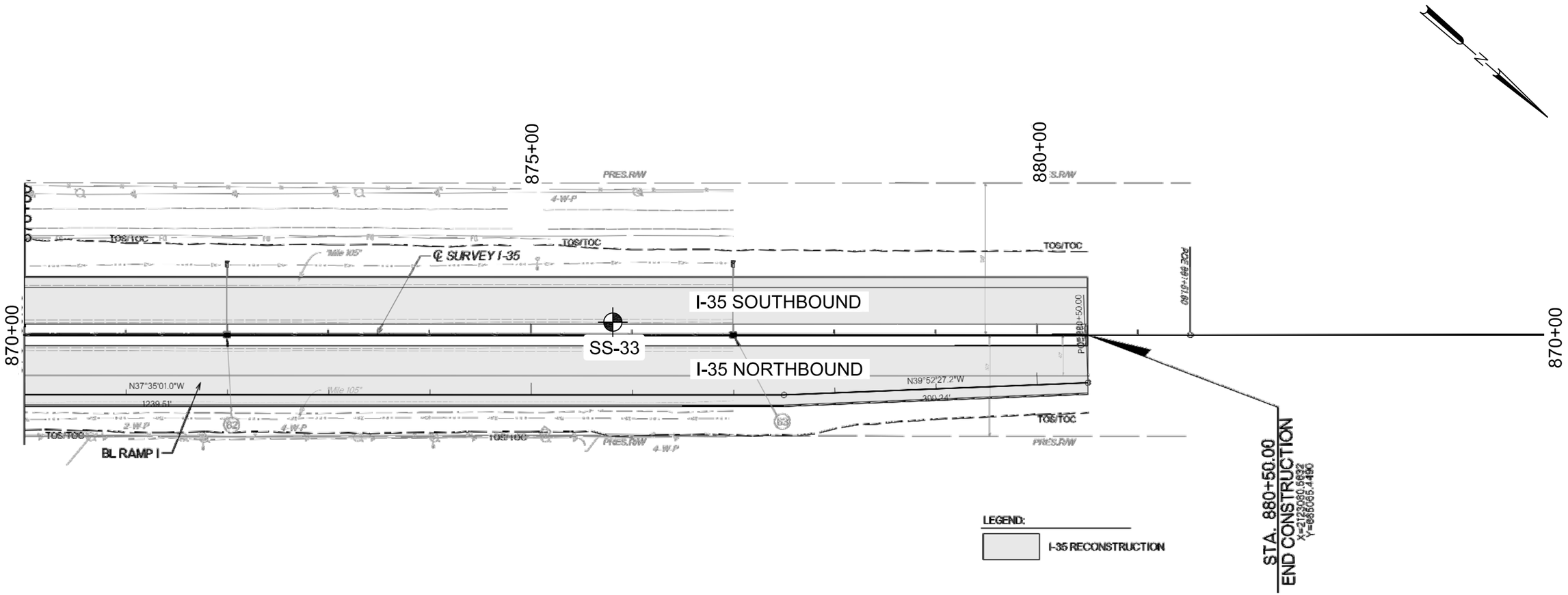

Boring	Station	I-35 CL Survey
SS-33	875+81	12' left

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BORING LOCATION DIAGRAM
I-35 SHOULDER SURVEY
MCCLAIN COUNTY, OKLAHOMA
J/P 35589(04)

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Approved By:	JWB	Page No:	17/17

APPENDIX B

Surveyed By: Dawson Wiseman
Date Surveyed: December 12 to 16, 2022

RED ROCK CONSULTING

RRC Project No: 22117
Project No: 35589(04)
Location: McClain County, Oklahoma

Shoulder Soils Survey

Boring	Field No.	Soil Group	Approximate Station (I-35 CL Survey)	Description	Depth (in)	L.L.	P.I.	Percent Passing						OSI	MC %	Soluble Sulfates (ppm)
								3 in	3/4 in	#4	#10	#40	#200			
SS-1	1A		636+13, 11' left	**POSSIBLE FILL, SIMILAR AS 6A,** dark reddish brown	0-6										22	
	1B			**SIMILAR AS 6A,** dark reddish brown	6-30										16	
	1C	A-4(0)		**SILTY SAND (SM),** reddish brown	30-36	NV	NP	100	100	96	92	82	49.7	0	15	<200
SS-2	2A		643+60, 15' right	**SIMILAR AS 8B,** dark brown	0-6										15	
	2B	A-6(9)		**LEAN CLAY with SAND (CL),** reddish brown	6-24	32	16	100	100	98	95	87	70.3	12	14	<200
	2C			**SIMILAR AS 2B,** red	24-36										14	
SS-3	3A		651+12, 13' left	**SIMILAR AS 9B,** dark reddish brown	0-6										22	
	3B	A-6(4)		**SANDY LEAN CLAY (CL),** reddish brown	6-30	29	12	100	100	89	85	76	57.9	8	16	276
	3C			**SIMILAR AS 1C,** reddish brown	30-36										15	
Bulk 1		A-6(5)		**SANDY LEAN CLAY (CL),** reddish brown	6-30	33	14	100	100	93	88	77	55.3	9		
SS-4	4A		658+63, 14' right	**SIMILAR AS 6A,** dark brown	0-6										9	
	4B	A-6(11)		**LEAN CLAY with SAND (CL),** reddish brown	6-36	33	17	100	100	98	95	89	77.3	13	16	<200
SS-5	5A		666+10, 13' left	**POSSIBLE FILL, SIMILAR AS 6A ,** dark reddish brown	0-6										14	
	5B			**SIMILAR AS 6A,** dark reddish brown	6-24										12	
	5C	A-4(0)		**SILTY SAND (SM),** light brown	24-36	NV	NP	100	100	96	92	80	42.4	0	17	<200
Bulk 2		A-4(0)		**SILTY SAND (SM),** light brown	24-36	NV	NP	100	100	92	87	77	37.7	0		
SS-6	6A	A-2-4	673+46, 14' right	**SILTY SAND with GRAVEL (SM),** dark brown	0-6	NV	NP	100	100	83	75	63	34.0	0	12	<200
	6B			**SIMILAR AS 3B,** reddish brown	6-18										15	
				*Auger refusal at 18 inches												
SS-7	7A		680+98, 13' left	**SIMILAR AS 6A,** reddish brown	0-6										14	
	7B	A-6(2)		**CLAYEY SAND (SC),** reddish brown	6-18	27	13	100	100	88	81	70	45.3	6	13	1235
				*Auger refusal at 18 inches												
SS-8	8A		688+52, 10' right	**SIMILAR AS 8B,** dark brown	0-6										15	
	8B	A-4(0)		**CLAYEY SAND with GRAVEL (SC),** reddish brown	6-12	27	10	100	100	77	70	60	38.2	3	13	934
				*Auger refusal at 12 inches												
SS-9	9A		695+95, 11' right	**SIMILAR AS 9B,** brown	0-6										16	
	9B	A-4(0)		**SILTY, CLAYEY SAND (SC-SM),** brown	6-24	25	6	100	100	86	78	67	41.8	3	17	700
				*Auger refusal at 24 inches												
SS-10	10A		703+42, 10' right	**SIMILAR AS 10B,** dark brown	0-6										17	
	10B	A-4(0)		**SILTY, CLAYEY SAND (SC-SM),** brown	6-36	23	7	100	100	91	84	75	45.7	3	14	1171
Bulk 4		A-4(0)		**SILTY, CLAYEY SAND (SC-SM),** brown	6-36	21	4	100	100	94	90	78	46.2	2		

Surveyed By: Dawson Wiseman
Date Surveyed: December 12 to 16, 2022

RED ROCK CONSULTING

RRC Project No: 22117
Project No: 35589(04)
Location: McClain County, Oklahoma

Shoulder Soils Survey

Boring	Field No.	Soil Group	Approximate Station (I-35 CL Survey)	Description	Depth (in)	L.L.	P.I.	Percent Passing						OSI	MC %	Soluble Sulfates (ppm)
								3 in	3/4 in	#4	#10	#40	#200			
SS-11	11A		710+92, 14' left	**POSSIBLE FILL, SIMILAR AS 17A,** dark reddish brown	0-6										18	
	11B			**SIMILAR AS 13B,** reddish brown	6-33										16	
	11C	A-4(0)		**SILTY SAND (SM),** reddish brown	33-36	NV	NP	100	100	99	96	86	44.8	0	14	355
SS-12	12A		718+40, 13' right	**SIMILAR AS 6A,** dark brown	0-6										18	
	12B			**SIMILAR AS 14C,** reddish brown	6-18										17	
	12C	A-6(10)		**LEAN CLAY with SAND (CL),** dark brown	18-36	32	16	100	100	98	94	88	75.5	13	15	<200
SS-13	13A		725+92, 15' left	**POSSIBLE FILL, SIMILAR AS 17A,** reddish brown	0-6										28	
	13B	A-6(11)		**LEAN CLAY with SAND (CL),** reddish brown	6-30	33	19	100	100	96	94	87	70.4	13	17	<200
	13C			**SIMILAR AS 10B,** light brown	30-36										13	
SS-14	14A		733+40, 14' right	**SIMILAR AS 18C,** dark brown	0-6										22	
	14B			**SIMILAR AS 14C,** red	6-24										17	
	14C	A-4(2)		**SANDY LEAN CLAY (CL),** reddish brown	24-36	25	9	100	100	98	93	82	55.5	6	14	<200
SS-15	15A		740+89, 14' left	**SIMILAR AS 16B,** dark brown	0-6										24	
	15B			**SIMILAR AS 14C,** brown	6-24										19	
	15C	A-4(0)		**SILTY SAND (SM),** reddish brown	24-36	NV	NP	100	100	99	96	85	42.9	0	16	<200
SS-16	16A		748+34, 15' right	**SIMILAR AS 16B,** reddish brown	0-6										12	
	16B	A-6(4)		**SANDY LEAN CLAY (CL),** reddish brown	6-24	28	13	100	100	95	88	74	52.9	8	13	<200
	16C			**SIMILAR AS 15C,** reddish brown	24-36										12	
SS-17	17A	A-6(1)	755+82, 15' left	**POSSIBLE FILL, CLAYEY SAND with GRAVEL (SC),** dark brown	0-6	34	11	100	100	77	70	58	40.0	5	18	<200
	17B			**SIMILAR AS 10B,** dark brown	6-30										14	
	17C			**SIMILAR AS 15C,** reddish brown	30-36										14	
SS-18	18A		764+05, 14' right	**SIMILAR AS 17A,** reddish brown	0-6										20	
	18B			**SIMILAR AS 14C,** reddish brown	6-24										13	
	18C	A-4(1)		**SANDY SILTY CLAY (CL-ML),** reddish brown	24-36	23	5	100	100	98	96	90	59.0	5	14	<200
Bulk 3		A-4(0)		**SANDY SILTY CLAY (CL-ML),** reddish brown	24-36	20	5	100	100	93	88	80	62.3	5		
SS-19	19A		770+99, 15' left	**SIMILAR AS 17A,** dark brown	0-6										25	
	19B	A-4(1)		**SANDY SILTY CLAY (CL-ML),** reddish brown	6-36	21	7	100	100	99	97	86	51.0	4	13	<200
SS-20	20A	A-6(6)	778+47, 14' right	**SANDY LEAN CLAY (CL),** dark brown	0-6	32	12	100	100	97	94	85	65.8	10	11	<200
	20B			**SIMILAR AS 21B,** brown	6-24										15	
	20C			**SIMILAR AS 15C,** brown	24-36										12	

Surveyed By: Dawson Wiseman
Date Surveyed: December 12 to 16, 2022

RED ROCK CONSULTING

RRC Project No: 22117
Project No: 35589(04)
Location: McClain County, Oklahoma

Shoulder Soils Survey

Boring	Field No.	Soil Group	Approximate Station (I-35 CL Survey)	Description	Depth (in)	L.L.	P.I.	Percent Passing						OSI	MC %	Soluble Sulfates (ppm)
								3 in	3/4 in	#4	#10	#40	#200			
SS-21	21A		785+74, 15' left	**SIMILAR AS 20A,** reddish brown	0-6										25	
	21B	A-4(2)		**SANDY SILTY CLAY (CL-ML),** reddish brown	6-18	27	7	100	100	86	82	76	56.0	6	14	<200
	21C			**SIMILAR AS 15C,** reddish brown	18-36										15	
SS-22	22A		793+23, 15' right	**SIMILAR AS 24A,** dark brown	0-6										17	
	22B			**SIMILAR AS 21B,** brown	6-24										14	
	22C	A-4(0)		**SANDY SILT (ML),** reddish brown	24-36	NV	NP	100	100	97	95	85	51.4	0	13	<200
SS-23	23A		800+72, 15' left	**SIMILAR AS 20A,** dark brown	0-6										24	
	23B	A-4(2)		**SANDY LEAN CLAY (CL),** reddish brown	6-30	26	8	100	100	91	87	79	58.8	6	13	<200
	23C			**SIMILAR AS 15C,** reddish brown	30-36										13	
SS-24	24A	A-6(7)	808+25, 15' right	**SANDY LEAN CLAY with GRAVEL (CL),** dark brown	0-6	39	17	100	100	83	80	72	57.2	11	19	<200
	24B			**SIMILAR AS 23B,** brown	6-30										16	
	24C			**SIMILAR AS 22C,** reddish brown	30-36										13	
SS-25	25A	A-6(12)	815+75, 13' left	**LEAN CLAY with SAND (CL),** dark brown	0-6	37	18	100	100	100	96	88	73.1	14	24	<200
	25B			**SIMILAR AS 26B,** reddish brown	6-24										17	
	25C			**SIMILAR AS 22C,** reddish brown	24-36										13	
SS-26	26A		823+26, 12' right	**SIMILAR AS 26B,** reddish brown	0-6										17	
	26B	A-6(12)		**LEAN CLAY with SAND (CL),** reddish brown	6-30	34	19	100	100	99	97	90	75.7	14	15	<200
	26C			**SIMILAR AS 29C,** brown	30-36										7	
SS-27	27A		830+84, 14' left	**SIMILAR AS 29C,** dark brown	0-6										14	
	27B			**SIMILAR AS 29C,** dark brown	6-24										10	
	27C	A-2-4		**SILTY SAND with GRAVEL (SM),** light brown	24-36	NV	NP	100	100	81	77	68	30.1	0	11	<200
SS-28	28A		838+36, 14' right	**SIMILAR AS 29C,** dark brown	0-6										27	
	28B	A-4(3)		**SANDY LEAN CLAY (CL),** reddish brown	6-24	24	8	100	100	99	95	88	68.8	7	14	<200
	28C			**SIMILAR AS 29C,** light brown	24-36										12	
SS-29	29A		845+85, 11' left	**SIMILAR AS 20A,** dark brown	0-6										21	
	29B			**SIMILAR AS 21B,** reddish brown	6-30										16	
	29C	A-4(0)		**SILTY SAND with GRAVEL (SM),** reddish brown	30-36	NV	NP	100	100	78	77	72	45.0	0	12	<200
SS-30	30A	A-7-6(16)	853+35, 10' right	**LEAN CLAY with SAND (CL),** reddish brown	0-6	41	22	100	100	97	94	86	76.4	17	20	<200
	30B			**SIMILAR AS 30A,** reddish brown	6-30										16	
	30C			**SIMILAR AS 29C,** brown	30-36										16	

Surveyed By: Dawson Wiseman
Date Surveyed: December 12 to 16, 2022

RED ROCK CONSULTING

RRC Project No: 22117
Project No: 35589(04)
Location: McClain County, Oklahoma

Shoulder Soils Survey

Boring	Field No.	Soil Group	Approximate Station (I-35 CL Survey)	Description	Depth (in)	L.L.	P.I.	Percent Passing						OSI	MC %	Soluble Sulfates (ppm)
								3 in	3/4 in	#4	#10	#40	#200			
SS-31	31A		860+82, 11' left	**SANDY LEAN CLAY (CL),** dark brown	0-6	25	10	100	100	93	90	83	63.3	8	15	393
	31B			**SIMILAR AS 31A,** dark brown	6-18										20	
	31C			**SIMILAR AS 21B,** reddish brown	18-30										16	
	31D			**SIMILAR AS 29C,** reddish brown	30-36										13	
SS-32	32A		868+30, 12' right	**SIMILAR AS 31A,** dark brown	0-6										20	
	32B	A-6(16)		**LEAN CLAY with SAND (CL),** reddish brown	6-30	39	21	100	100	97	95	88	80.1	16	17	<200
	32C			**SIMILAR AS 19B,** reddish brown	30-36										16	
SS-33	33A	A-4(4)	875+81, 12' left	**LEAN CLAY with SAND (CL),** dark brown	0-6	26	8	100	100	100	97	90	77.6	8	19	320
	33B			**SIMILAR AS 26B,** reddish brown	6-30										14	
	33C			**SIMILAR AS 27C,** reddish brown	30-36										17	

APPENDIX C

RED ROCK CONSULTING
PO Box 30591
Edmond, OK 73003
405-562-3328

SUMMARY OF LABORATORY RESULTS

CLIENT Olsson Associates

PROJECT NAME I-35 Shoulder Soils Survey 35589(04)

PROJECT NUMBER 22117

PROJECT LOCATION McClain County, Oklahoma

Borehole	Depth (in)	% Moist.	Liquid Limit	Plastic Limit	Plasticity Index	-3" Sieve	- 3/4" Sieve	-4 Sieve	-10 Sieve	-40 Sieve	-200 Sieve	Sulfates (ppm)
Bulk 01	6-30		33	19	14	100	100	93	88	77	55.3	
Bulk 02	24-36		NV	NP	NP	100	100	92	87	77	37.7	
Bulk 03	24-36		20	15	5	100	100	93	88	80	62.3	
Bulk 04	6-36		21	17	4	100	100	94	90	78	46.2	
SS-01	0-6	21.7										
SS-01	6-30	15.6										
SS-01	30-36	15.4	NV	NP	NP	100	100	96	92	82	49.7	<200
SS-02	0-6	15.4										
SS-02	6-24	14.4	32	16	16	100	100	98	95	87	70.3	<200
SS-02	24-36	13.8										
SS-03	0-6	21.7										
SS-03	6-30	15.5	29	17	12	100	100	89	85	76	57.9	276
SS-03	30-36	14.5										
SS-04	0-6	8.7										
SS-04	6-36	15.6	33	16	17	100	100	98	95	89	77.3	<200
SS-05	0-6	13.7										
SS-05	6-24	12.4										
SS-05	24-36	17.0	NV	NP	NP	100	100	96	92	80	42.4	<200
SS-06	0-6	12.3	NV	NP	NP	100	100	83	75	63	34.0	<200
SS-06	6-18	15.2										
SS-07	0-6	13.5										
SS-07	6-18	13.4	27	14	13	100	100	88	81	70	45.3	1235
SS-08	0-6	14.5										
SS-08	6-12	12.5	27	17	10	100	100	77	70	60	38.2	934
SS-09	0-6	16.2										
SS-09	6-24	16.6	25	19	6	100	100	86	78	67	41.8	700
SS-10	0-6	16.6										
SS-10	6-36	13.5	23	16	7	100	100	91	84	75	45.7	1171
SS-11	0-6	18.4										
SS-11	6-33	15.7										
SS-11	33-36	14.4	NV	NP	NP	100	100	99	96	86	44.8	355
SS-12	0-6	18.2										
SS-12	6-18	16.5										
SS-12	18-36	15.1	32	16	16	100	100	98	94	88	75.5	<200
SS-13	0-6	28.8										
SS-13	6-30	16.5	33	14	19	100	100	96	94	87	70.4	<200
SS-13	30-36	12.9										
SS-14	0-6	22.0										
SS-14	6-24	17.0										
SS-14	24-36	14.2	25	16	9	100	100	98	93	82	55.5	<200
SS-15	0-6	24.4										
SS-15	6-24	18.9										
SS-15	24-36	15.6	NV	NP	NP	100	100	99	96	85	42.9	<200

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SUMMARY OF LABORATORY RESULTS

CLIENT Olsson Associates **PROJECT NAME** I-35 Shoulder Soils Survey 35589(04)

PROJECT NUMBER 22117 **PROJECT LOCATION** McClain County, Oklahoma

Borehole	Depth (in)	% Moist.	Liquid Limit	Plastic Limit	Plasticity Index	-3" Sieve	- 3/4" Sieve	-4 Sieve	-10 Sieve	-40 Sieve	-200 Sieve	Sulfates (ppm)
SS-16	0-6	12.3										
SS-16	6-24	13.0	28	15	13	100	100	95	88	74	52.9	<200
SS-16	24-36	11.6										
SS-17	0-6	18.0	34	23	11	100	100	77	70	58	40.0	<200
SS-17	6-30	14.0										
SS-17	30-36	13.5										
SS-18	0-6	19.7										
SS-18	6-24	13.0										
SS-18	24-36	14.1	23	17	6	100	100	98	96	90	59.0	<200
SS-19	0-6	24.8										
SS-19	6-36	13.2	21	14	7	100	100	99	97	86	51.0	<200
SS-20	0-6	11.1	32	20	12	100	100	97	94	85	65.8	<200
SS-20	6-24	14.9										
SS-20	24-36	11.7										
SS-21	0-6	25.1										
SS-21	6-18	14.2	27	20	7	100	100	86	82	76	56.0	<200
SS-21	18-36	14.7										
SS-22	0-6	16.9										
SS-22	6-24	13.8										
SS-22	24-36	12.8	NV	NP	NP	100	100	97	95	85	51.4	<200
SS-23	0-6	23.8										
SS-23	6-30	13.3	26	18	8	100	100	91	87	79	58.8	<200
SS-23	30-36	12.5										
SS-24	0-6	18.7	39	22	17	100	100	83	80	72	57.2	<200
SS-24	6-30	15.8										
SS-24	30-36	12.6										
SS-25	0-6	23.8	37	19	18	100	100	100	96	88	73.1	<200
SS-25	6-24	16.9										
SS-25	24-36	12.9										
SS-26	0-6	16.7										
SS-26	6-30	14.7	34	15	19	100	100	99	97	90	75.7	<200
SS-26	30-36	6.7										
SS-27	0-6	13.8										
SS-27	6-24	10.1										
SS-27	24-36	10.5	NV	NP	NP	100	100	81	77	68	30.1	<200
SS-28	0-6	27.3										
SS-28	6-24	14.1	24	16	8	100	100	99	95	88	68.8	<200
SS-28	24-36	12.1										
SS-29	0-6	21.2										
SS-29	6-30	15.9										
SS-29	30-36	11.6	NV	NP	NP	100	100	78	77	72	45.0	<200
SS-30	0-6	20.2	41	19	22	100	100	97	94	86	76.4	<200
SS-30	6-30	15.8										

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SUMMARY OF LABORATORY RESULTS

CLIENT Olsson Associates **PROJECT NAME** I-35 Shoulder Soils Survey 35589(04)

PROJECT NUMBER 22117 **PROJECT LOCATION** McClain County, Oklahoma

Borehole	Depth (in)	% Moist.	Liquid Limit	Plastic Limit	Plasticity Index	-3" Sieve	- 3/4" Sieve	-4 Sieve	-10 Sieve	-40 Sieve	-200 Sieve	Sulfates (ppm)
SS-30	30-36	15.7										
SS-31	0-6	14.9	25	15	10	100	100	93	90	83	63.3	393
SS-31	6-18	20.3										
SS-31	18-30	26.2										
SS-31	30-36	12.9										
SS-32	0-6	19.5										
SS-32	6-30	17.2	39	18	21	100	100	97	95	88	80.1	<200
SS-32	30-36	16.1										
SS-33	0-6	18.9	26	18	8	100	100	100	97	90	77.6	320
SS-33	6-30	13.9										
SS-33	30-36	16.6										

RED ROCK CONSULTING

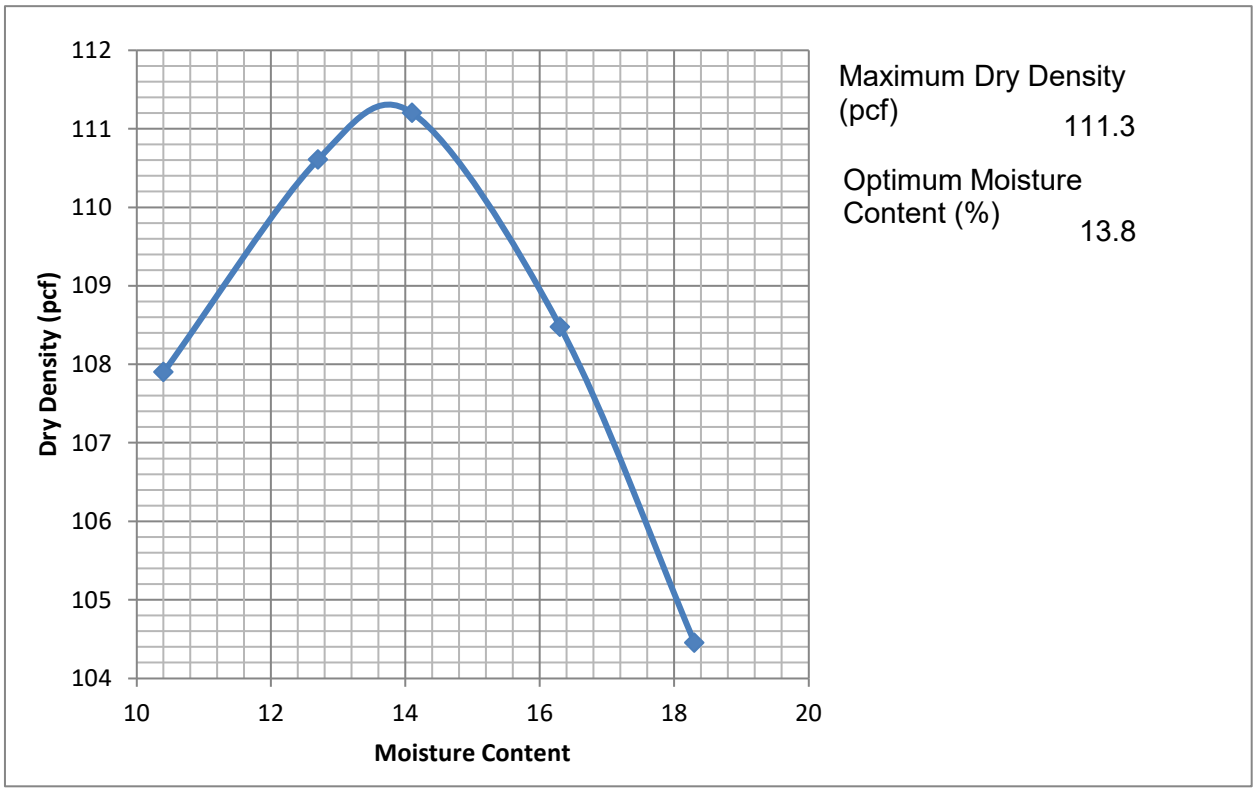
Proctor

Project #: 22117 Project Name: I-35 Shoulder Soils Survey 35589(04)

Tested By: CP Test Date: 6.12.23 Client: Olsson Associates

Weight of Hammer: 5.5 No. of Blows: 25

Bulk 1



Liquid Limit: 33 USCS CL

Plasticity Index: 14 AASHTO A-6(5)

Method: A Soil Classification: Sandy Lean Clay

Resilient Modulus of Subgrade Soils (Recompacted Samples)

1. Project Number I-35 Shoulder Soils Survey 35589(04)
2. County//State Name McClain // Oklahoma
3. Test Date 6/19/2023

4.Sample Number Bulk 1 (Compacted @ OMC)
5. Material Type 2
6. Soil Series n/a
7. Horizon n/a

9. Soil Properties

Optimum Moisture Content, (%)	13.80
Maximum Dry Density, pcf	111.30
95% MDD (pcf)	105.74

8. Specimen Properties

Compaction Water content, wc, %	13.95
Compaction Dry Density, pcf	106.23
Moisture Content After Mr Test, w(%)	13.67
Permanent Deformation (in)	0.065

10. Test Information

Preconditioning-Permanent Strain>5%	No
Testing-Permanent Strain >5%	No
Number of Load Sequences Completed	15
Quick Shear Test	No

Column #	1	2	3	4	5	6	7	8	9	10	11	12	13
Parameter	Chamber Confining Pressure	Nominal Maximum Axial Stress	Actual Applied Max. Axial Load	Actual Applied Cyclic Load	Actual Applied Contact Load	Actual Applied Max. Axial Stress	Actual Applied Cyclic Stress	Actual Applied Contact Stress	Recov. Def. LVDT # 1 Reading	Recov. Def. LVDT # 2 Reading	Average Recov. Def. LVDT 1 & 2	Resilient Strain	Resilient Modulus
Designation	S3	Scyclic	Pmax	Pcyclic	Pcontact	Smax	Scyclic	Scontact	H1	H2	Havg	er	Mr
Unit	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in	in	in/in	psi
Precision	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequence 1	6	2	24.99	22.73	2.26	1.99	1.81	0.18	0.0011	0.0012	0.0011	0.00014	12784
Sequence 2	6	4	50.11	45.22	4.90	3.99	3.60	0.39	0.0022	0.0024	0.0023	0.00029	12303
Sequence 3	6	6	75.36	67.70	7.66	6.00	5.39	0.61	0.0035	0.0039	0.0037	0.00046	11782
Sequence 4	6	8	100.10	90.06	10.05	7.97	7.17	0.80	0.0050	0.0055	0.0053	0.00066	10898
Sequence 5	6	10	124.97	112.91	12.06	9.95	8.99	0.96	0.0068	0.0075	0.0071	0.00089	10102
Sequence 6	4	2	25.12	22.73	2.39	2.00	1.81	0.19	0.0012	0.0013	0.0012	0.00015	11782
Sequence 7	4	4	50.74	45.47	5.28	4.04	3.62	0.42	0.0026	0.0028	0.0027	0.00034	10738
Sequence 8	4	6	75.23	67.95	7.28	5.99	5.41	0.58	0.0039	0.0043	0.0041	0.00051	10537
Sequence 9	4	8	100.35	90.31	10.05	7.99	7.19	0.80	0.0055	0.0060	0.0057	0.00072	10009
Sequence 10	4	10	125.85	113.17	12.69	10.02	9.01	1.01	0.0070	0.0077	0.0074	0.00092	9787
Sequence 11	2	2	24.87	22.73	2.14	1.98	1.81	0.17	0.0012	0.0014	0.0013	0.00016	11201
Sequence 12	2	4	50.49	45.47	5.02	4.02	3.62	0.40	0.0027	0.0029	0.0028	0.00035	10211
Sequence 13	2	6	75.23	67.70	7.54	5.99	5.39	0.60	0.0042	0.0046	0.0044	0.00055	9823
Sequence 14	2	8	100.61	90.43	10.17	8.01	7.20	0.81	0.0058	0.0064	0.0061	0.00076	9444
Sequence 15	2	10	125.35	113.17	12.18	9.98	9.01	0.97	0.0075	0.0083	0.0079	0.00099	9102

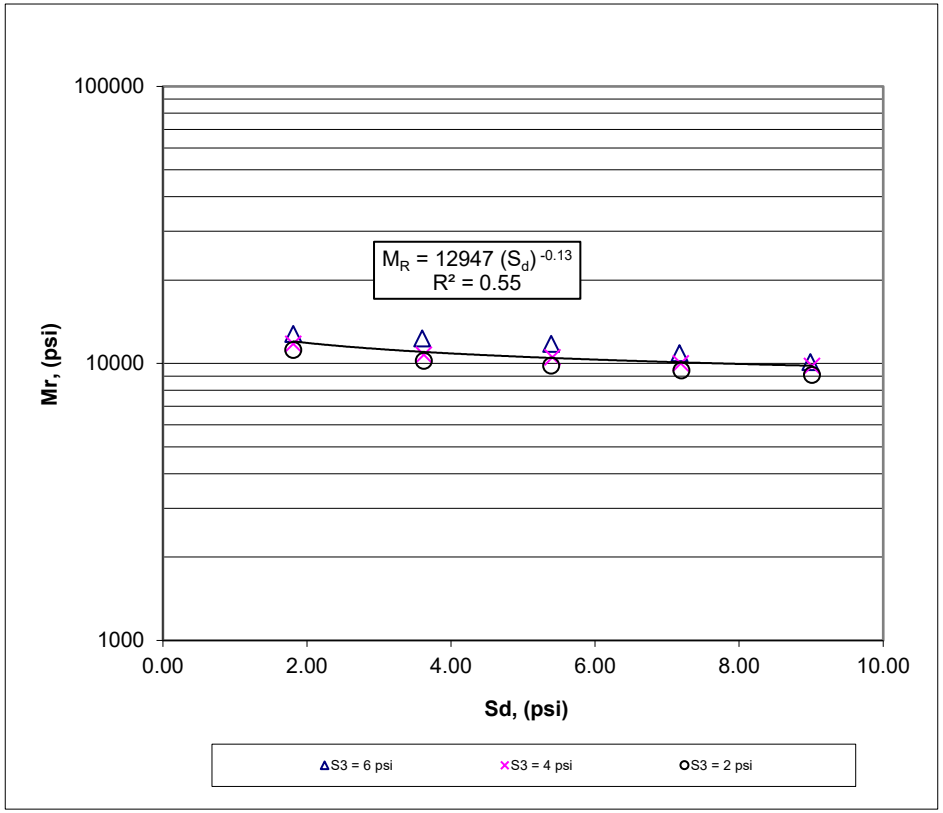
* Reported results are based on the average of the last 5 cycles of each load sequence

Resilient Modulus of Subgrade Soils (Recompacted Samples)

(Plot)

1. Sample Number	Bulk 1 (Compacted @ OMC)
2. Material Type	2
3. Soil Series	n/a
4. Horizon	n/a
5. Test Date	6/19/2023

Column #	1	**2**	3	4	**5**
Parameter	Chamber Confining Pressure	**Desired Applied Cyclic Stress**	Actual Applied Cyclic Stress	Actual Resilient Modulus	**Predicted Resilient Modulus***
Designation	S3	**Scyclic**	Scyclic	Mr	**Mr**
Unit	psi	**psi**	psi	psi	**psi**
Precision	—	**—**	—	—	**—**
Sequence 1	6	**1.80**	1.81	12784	**12021**
Sequence 2	6	**3.60**	3.60	12303	**11014**
Sequence 3	6	**5.40**	5.39	11782	**10464**
Sequence 4	6	**7.20**	7.17	10898	**10091**
Sequence 5	6	**9.00**	8.99	10102	**9811**
Sequence 6	4	**1.80**	1.81	11782	**12021**
Sequence 7	4	**3.60**	3.62	10738	**11014**
Sequence 8	4	**5.40**	5.41	10537	**10464**
Sequence 9	4	**7.20**	7.19	10009	**10091**
Sequence 10	4	**9.00**	9.01	9787	**9811**
Sequence 11	2	**1.80**	1.81	11201	**12021**
Sequence 12	2	**3.60**	3.62	10211	**11014**
Sequence 13	2	**5.40**	5.39	9823	**10464**
Sequence 14	2	**7.20**	7.20	9444	**10091**
Sequence 15	2	**9.00**	9.01	9102	**9811**
*Predicted Mr values at the desired applied cyclic stresses using Model #1					



Model #1; $Mr = K1 \times Sd^{K2}$

S3 (psi)	K1	K2	R^2
6	14297	-0.14	0.86
4	12568	-0.11	0.98
2	12066	-0.13	1.00
All	12947	-0.13	0.55

Resilient Modulus of Subgrade Soils (Recompacted Samples)

1. Project Number I-35 Shoulder Soils Survey 35589(04)
2. County//State Name McClain // Oklahoma
3. Test Date 6/19/2023

4.Sample Number Bulk 1 (Compacted @ Wetter than OMC)
5. Material Type 2
6. Soil Series n/a
7. Horizon n/a

9. Soil Properties

Optimum Moisture Content, (%)	13.80
Maximum Dry Density, pcf	111.30
95% MDD (pcf)	105.74

8. Specimen Properties

Compaction Water content, wc, %	16.87
Compaction Dry Density, pcf	107.23
Moisture Content After Mr Test, w(%)	17.01
Permanent Deformation (in)	0.300

10. Test Information

Preconditioning-Permanent Strain>5%	No
Testing-Permanent Strain >5%	No
Number of Load Sequences Completed	15
Quick Shear Test	No

Column #	1	2	3	4	5	6	7	8	9	10	11	12	13
Parameter	Chamber Confining Pressure	Nominal Maximum Axial Stress	Actual Applied Max. Axial Load	Actual Applied Cyclic Load	Actual Applied Contact Load	Actual Applied Max. Axial Stress	Actual Applied Cyclic Stress	Actual Applied Contact Stress	Recov. Def. LVDT # 1 Reading	Recov. Def. LVDT # 2 Reading	Average Recov. Def. LVDT 1 & 2	Resilient Strain	Resilient Modulus
Designation	S3	Scyclic	Pmax	Pcyclic	Pcontact	Smax	Scyclic	Scontact	H1	H2	Havg	er	Mr
Unit	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in	in	in/in	psi
Precision	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequence 1	6	2	25.12	22.73	2.39	2.00	1.81	0.19	0.0022	0.0020	0.0021	0.00027	6786
Sequence 2	6	4	49.99	45.47	4.52	3.98	3.62	0.36	0.0052	0.0048	0.0050	0.00063	5787
Sequence 3	6	6	74.61	67.70	6.91	5.94	5.39	0.55	0.0085	0.0077	0.0081	0.00101	5320
Sequence 4	6	8	99.98	90.06	9.92	7.96	7.17	0.79	0.0124	0.0110	0.0117	0.00146	4898
Sequence 5	6	10	125.35	113.17	12.18	9.98	9.01	0.97	0.0162	0.0147	0.0154	0.00193	4667
Sequence 6	4	2	24.74	22.61	2.14	1.97	1.80	0.17	0.0023	0.0021	0.0022	0.00027	6554
Sequence 7	4	4	50.37	45.22	5.15	4.01	3.60	0.41	0.0056	0.0050	0.0053	0.00066	5444
Sequence 8	4	6	75.36	67.57	7.79	6.00	5.38	0.62	0.0090	0.0081	0.0086	0.00107	5012
Sequence 9	4	8	100.10	89.93	10.17	7.97	7.16	0.81	0.0128	0.0117	0.0122	0.00153	4676
Sequence 10	4	10	125.10	112.41	12.69	9.96	8.95	1.01	0.0178	0.0162	0.0170	0.00212	4212
Sequence 11	2	2	24.99	22.48	2.51	1.99	1.79	0.20	0.0030	0.0027	0.0029	0.00036	5001
Sequence 12	2	4	49.86	45.22	4.65	3.97	3.60	0.37	0.0066	0.0060	0.0063	0.00079	4556
Sequence 13	2	6	75.11	67.45	7.66	5.98	5.37	0.61	0.0109	0.0100	0.0105	0.00131	4102
Sequence 14	2	8	100.10	90.18	9.92	7.97	7.18	0.79	0.0150	0.0137	0.0143	0.00179	4009
Sequence 15	2	10	125.85	113.17	12.69	10.02	9.01	1.01	0.0189	0.0172	0.0180	0.00225	3998

* Reported results are based on the average of the last 5 cycles of each load sequence

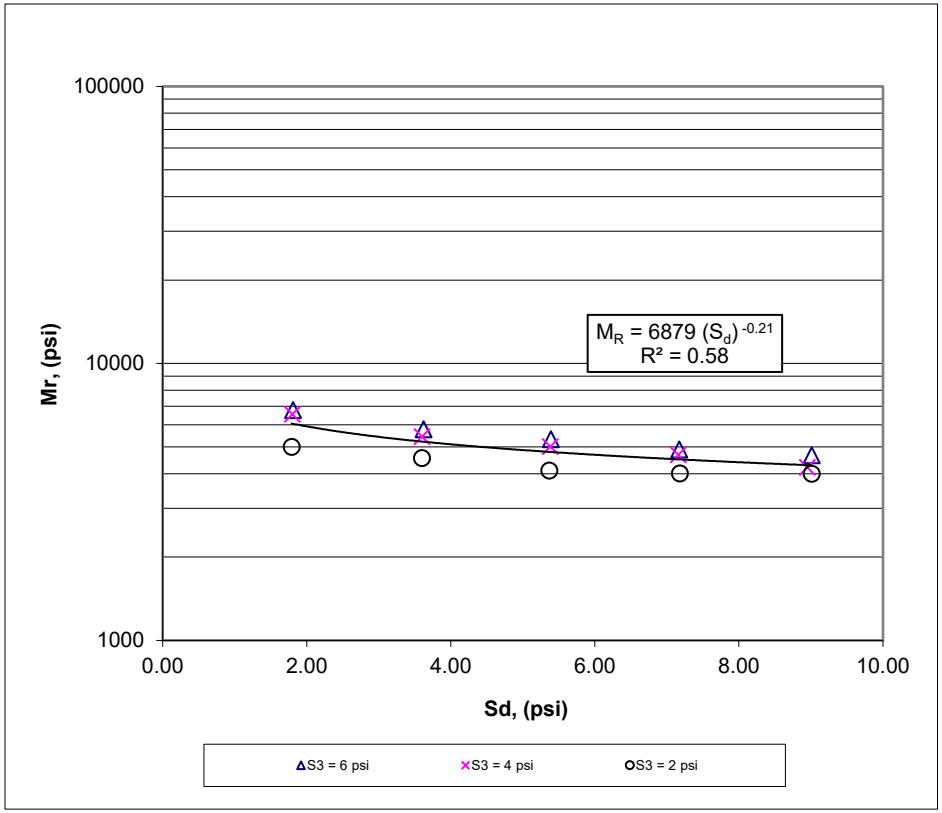
Resilient Modulus of Subgrade Soils (Recompacted Samples)

(Plot)

1. Sample Number	Bulk 1 (Compacted @ Wetter than OMC)
2. Material Type	Type 2
3. Soil Series	n/a
4. Horizon	n/a
5. Test Date	6/19/2023

Column #	1	**2**	3	4	**5**
Parameter	Chamber Confining Pressure	**Desired Applied Cyclic Stress**	Actual Applied Cyclic Stress	Actual Resilient Modulus	**Predicted Resilient Modulus***
Designation	S3	**Scyclic**	Scyclic	Mr	**Mr**
Unit	psi	**psi**	psi	psi	**psi**
Precision	—	**—**	—	—	**—**
Sequence 1	6	**1.80**	1.81	6786	**6063**
Sequence 2	6	**3.60**	3.62	5787	**5224**
Sequence 3	6	**5.40**	5.39	5320	**4788**
Sequence 4	6	**7.20**	7.17	4898	**4501**
Sequence 5	6	**9.00**	9.01	4667	**4290**
Sequence 6	4	**1.80**	1.80	6554	**6063**
Sequence 7	4	**3.60**	3.60	5444	**5224**
Sequence 8	4	**5.40**	5.38	5012	**4788**
Sequence 9	4	**7.20**	7.16	4676	**4501**
Sequence 10	4	**9.00**	8.95	4212	**4290**
Sequence 11	2	**1.80**	1.79	5001	**6063**
Sequence 12	2	**3.60**	3.60	4556	**5224**
Sequence 13	2	**5.40**	5.37	4102	**4788**
Sequence 14	2	**7.20**	7.18	4009	**4501**
Sequence 15	2	**9.00**	9.01	3998	**4290**

*Predicted Mr values at the desired applied cyclic stresses using Model #1



Model #1; Mr = K1 x Sd ^{K2}

S3 (psi)	K1	K2	R^2
6	7816	-0.23	1.00
4	7673	-0.26	0.99
2	5445	-0.15	0.96
All	6879	-0.21	0.58

RED ROCK CONSULTING

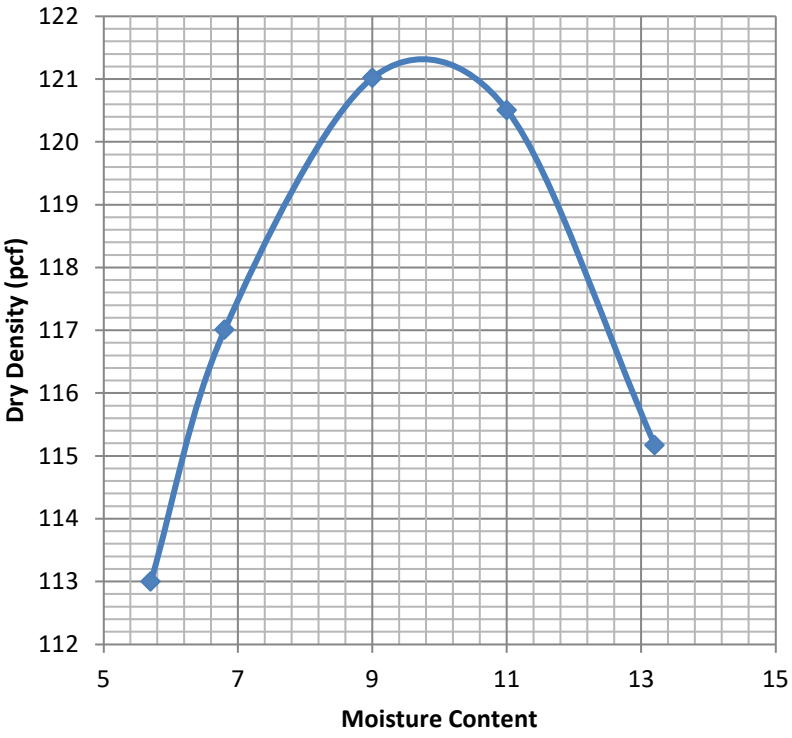
Proctor

Project #: 22117 Project Name: I-35 Shoulder Soils Survey 35589(04)

Tested By: CP Test Date: 6.9.23 Client: Olsson Associates

Weight of Hammer: 5.5 No. of Blows: 25

Bulk 2



Maximum Dry Density (pcf) 121.2

Optimum Moisture Content (%) 9.7

Liquid Limit: NV USCS SM

Plasticity Index: NP AASHTO A-4(0)

Method: A Soil Classification: Silty Sand

Resilient Modulus of Subgrade Soils (Recompacted Samples)

1. Project Number I-35 Shoulder Soils Survey 35589(04)
2. County//State Name McClain // Oklahoma
3. Test Date 6/19/2023

4.Sample Number Bulk 2 (Compacted @ OMC)
5. Material Type 2
6. Soil Series n/a
7. Horizon n/a

9. Soil Properties

Optimum Moisture Content, (%)	9.70
Maximum Dry Density, pcf	121.20
95% MDD (pcf)	115.14

8. Specimen Properties

Compaction Water content, wc, %	9.76
Compaction Dry Density, pcf	116.3
Moisture Content After Mr Test, w(%)	9.61
Permanent Deformation (in)	<1/6

10. Test Information

Preconditioning-Permanent Strain>5%	No
Testing-Permanent Strain >5%	No
Number of Load Sequences Completed	15
Quick Shear Test	No

Column #	1	2	3	4	5	6	7	8	9	10	11	12	13
Parameter	Chamber Confining Pressure	Nominal Maximum Axial Stress	Actual Applied Max. Axial Load	Actual Applied Cyclic Load	Actual Applied Contact Load	Actual Applied Max. Axial Stress	Actual Applied Cyclic Stress	Actual Applied Contact Stress	Recov. Def. LVDT # 1 Reading	Recov. Def. LVDT # 2 Reading	Average Recov. Def. LVDT 1 & 2	Resilient Strain	Resilient Modulus
Designation	S3	Scyclic	Pmax	Pcyclic	Pcontact	Smax	Scyclic	Scontact	H1	H2	Havg	er	Mr
Unit	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in	in	in/in	psi
Precision	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequence 1	6	2	26.00	23.11	2.89	2.07	1.84	0.23	0.0011	0.0012	0.0011	0.00014	12814
Sequence 2	6	4	51.12	45.72	5.40	4.07	3.64	0.43	0.0024	0.0025	0.0024	0.00030	12059
Sequence 3	6	6	76.24	68.08	8.16	6.07	5.42	0.65	0.0036	0.0038	0.0037	0.00047	11606
Sequence 4	6	8	100.73	90.56	10.17	8.02	7.21	0.81	0.0051	0.0054	0.0052	0.00066	10994
Sequence 5	6	10	126.10	113.29	12.81	10.04	9.02	1.02	0.0066	0.0070	0.0068	0.00085	10672
Sequence 6	4	2	25.50	22.98	2.51	2.03	1.83	0.20	0.0013	0.0013	0.0013	0.00016	11253
Sequence 7	4	4	50.37	45.34	5.02	4.01	3.61	0.40	0.0026	0.0028	0.0027	0.00034	10627
Sequence 8	4	6	75.61	67.95	7.66	6.02	5.41	0.61	0.0041	0.0043	0.0042	0.00052	10332
Sequence 9	4	8	100.35	90.43	9.92	7.99	7.20	0.79	0.0055	0.0058	0.0056	0.00070	10232
Sequence 10	4	10	125.47	113.29	12.18	9.99	9.02	0.97	0.0071	0.0075	0.0073	0.00091	9889
Sequence 11	2	2	24.99	22.61	2.39	1.99	1.80	0.19	0.0013	0.0014	0.0013	0.00017	10872
Sequence 12	2	4	50.24	45.34	4.90	4.00	3.61	0.39	0.0028	0.0030	0.0029	0.00036	9913
Sequence 13	2	6	75.11	67.82	7.28	5.98	5.40	0.58	0.0043	0.0045	0.0044	0.00056	9720
Sequence 14	2	8	100.48	90.56	9.92	8.00	7.21	0.79	0.0059	0.0062	0.0061	0.00076	9490
Sequence 15	2	10	126.10	113.42	12.69	10.04	9.03	1.01	0.0076	0.0080	0.0078	0.00097	9288

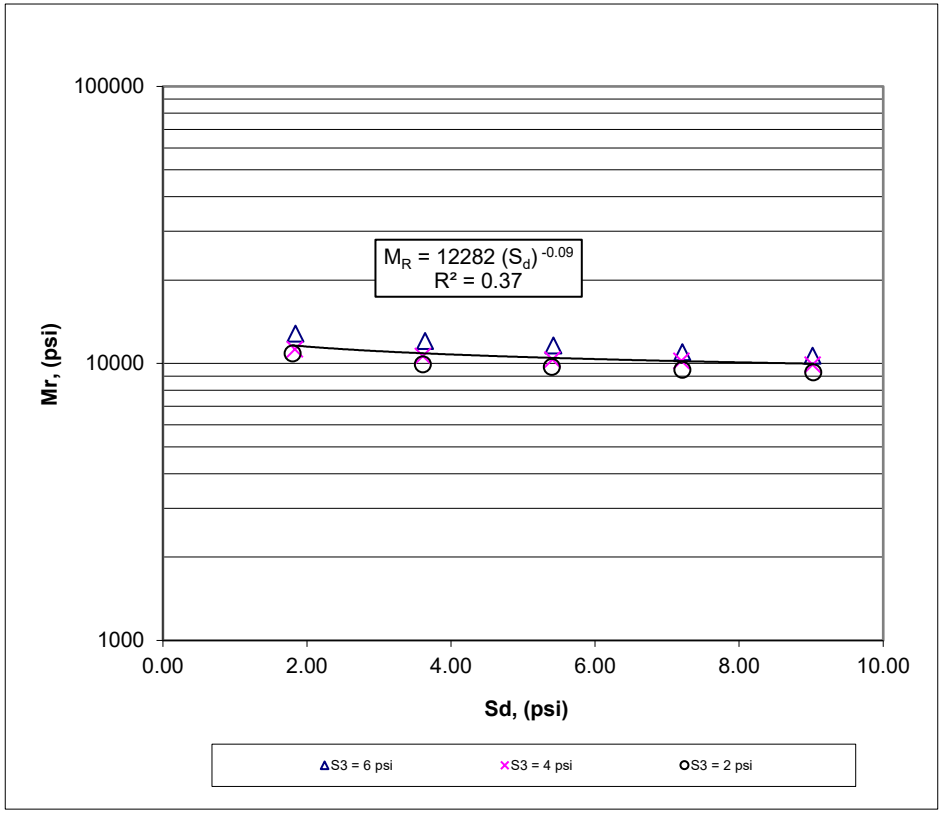
* Reported results are based on the average of the last 5 cycles of each load sequence

Resilient Modulus of Subgrade Soils (Recompacted Samples)

(Plot)

1. Sample Number	Bulk 2 (Compacted @ OMC)
2. Material Type	2
3. Soil Series	n/a
4. Horizon	n/a
5. Test Date	6/19/2023

Column #	1	**2**	3	4	**5**
Parameter	Chamber Confining Pressure	**Desired Applied Cyclic Stress**	Actual Applied Cyclic Stress	Actual Resilient Modulus	**Predicted Resilient Modulus***
Designation	S3	**Scyclic**	Scyclic	Mr	**Mr**
Unit	psi	**psi**	psi	psi	**psi**
Precision	—	**—**	—	—	**—**
Sequence 1	6	**1.80**	1.84	12814	**11619**
Sequence 2	6	**3.60**	3.64	12059	**10883**
Sequence 3	6	**5.40**	5.42	11606	**10474**
Sequence 4	6	**7.20**	7.21	10994	**10193**
Sequence 5	6	**9.00**	9.02	10672	**9981**
Sequence 6	4	**1.80**	1.83	11253	**11619**
Sequence 7	4	**3.60**	3.61	10627	**10883**
Sequence 8	4	**5.40**	5.41	10332	**10474**
Sequence 9	4	**7.20**	7.20	10232	**10193**
Sequence 10	4	**9.00**	9.02	9889	**9981**
Sequence 11	2	**1.80**	1.80	10872	**11619**
Sequence 12	2	**3.60**	3.61	9913	**10883**
Sequence 13	2	**5.40**	5.40	9720	**10474**
Sequence 14	2	**7.20**	7.21	9490	**10193**
Sequence 15	2	**9.00**	9.03	9288	**9981**
*Predicted Mr values at the desired applied cyclic stresses using Model #1					



Model #1; Mr = K1 x Sd ^{K2}

S3 (psi)	K1	K2	R^2
6	13869	-0.11	0.98
4	11767	-0.08	0.98
2	11386	-0.09	0.97
All	12282	-0.09	0.37

Resilient Modulus of Subgrade Soils (Recompacted Samples)

1. Project Number I-35 Shoulder Soils Survey 35589(04)
2. County//State Name McClain // Oklahoma
3. Test Date 6/19/2023

4.Sample Number Bulk 2 (Compacted @ OMC +2%)
5. Material Type 2
6. Soil Series n/a
7. Horizon n/a

9. Soil Properties

Optimum Moisture Content, (%)	9.70
Maximum Dry Density, pcf	121.20
95% MDD (pcf)	115.14

8. Specimen Properties

Compaction Water content, wc, %	11.54
Compaction Dry Density, pcf	116.53
Moisture Content After Mr Test, w(%)	11.21
Permanent Deformation (in)	0.240

10. Test Information

Preconditioning-Permanent Strain>5%	No
Testing-Permanent Strain >5%	No
Number of Load Sequences Completed	15
Quick Shear Test	No

Column #	1	2	3	4	5	6	7	8	9	10	11	12	13
Parameter	Chamber Confining Pressure	Nominal Maximum Axial Stress	Actual Applied Max. Axial Load	Actual Applied Cyclic Load	Actual Applied Contact Load	Actual Applied Max. Axial Stress	Actual Applied Cyclic Stress	Actual Applied Contact Stress	Recov. Def. LVDT # 1 Reading	Recov. Def. LVDT # 2 Reading	Average Recov. Def. LVDT 1 & 2	Resilient Strain	Resilient Modulus
Designation	S3	Scyclic	Pmax	Pcyclic	Pcontact	Smax	Scyclic	Scontact	H1	H2	Havg	er	Mr
Unit	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in	in	in/in	psi
Precision	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequence 1	6	2	24.37	21.85	2.51	1.94	1.74	0.20	0.0017	0.0019	0.0018	0.00022	7812
Sequence 2	6	4	49.74	44.59	5.15	3.96	3.55	0.41	0.0039	0.0044	0.0041	0.00052	6853
Sequence 3	6	6	74.73	67.07	7.66	5.95	5.34	0.61	0.0063	0.0067	0.0065	0.00081	6575
Sequence 4	6	8	99.35	89.05	10.30	7.91	7.09	0.82	0.0095	0.0102	0.0098	0.00123	5777
Sequence 5	6	10	125.22	112.41	12.81	9.97	8.95	1.02	0.0123	0.0132	0.0128	0.00159	5612
Sequence 6	4	2	24.24	21.73	2.51	1.93	1.73	0.20	0.0021	0.0023	0.0022	0.00027	6366
Sequence 7	4	4	49.61	44.71	4.90	3.95	3.56	0.39	0.0045	0.0048	0.0046	0.00058	6158
Sequence 8	4	6	74.73	67.20	7.54	5.95	5.35	0.60	0.0070	0.0075	0.0072	0.00090	5927
Sequence 9	4	8	98.97	89.05	9.92	7.88	7.09	0.79	0.0102	0.0109	0.0106	0.00132	5365
Sequence 10	4	10	124.60	112.54	12.06	9.92	8.96	0.96	0.0135	0.0145	0.0140	0.00175	5134
Sequence 11	2	2	24.62	22.23	2.39	1.96	1.77	0.19	0.0026	0.0028	0.0027	0.00034	5256
Sequence 12	2	4	50.49	45.34	5.15	4.02	3.61	0.41	0.0054	0.0058	0.0056	0.00070	5121
Sequence 13	2	6	75.11	67.57	7.54	5.98	5.38	0.60	0.0087	0.0093	0.0090	0.00112	4783
Sequence 14	2	8	99.48	89.30	10.17	7.92	7.11	0.81	0.0115	0.0124	0.0119	0.00149	4765
Sequence 15	2	10	125.47	113.29	12.18	9.99	9.02	0.97	0.0163	0.0173	0.0168	0.00210	4300

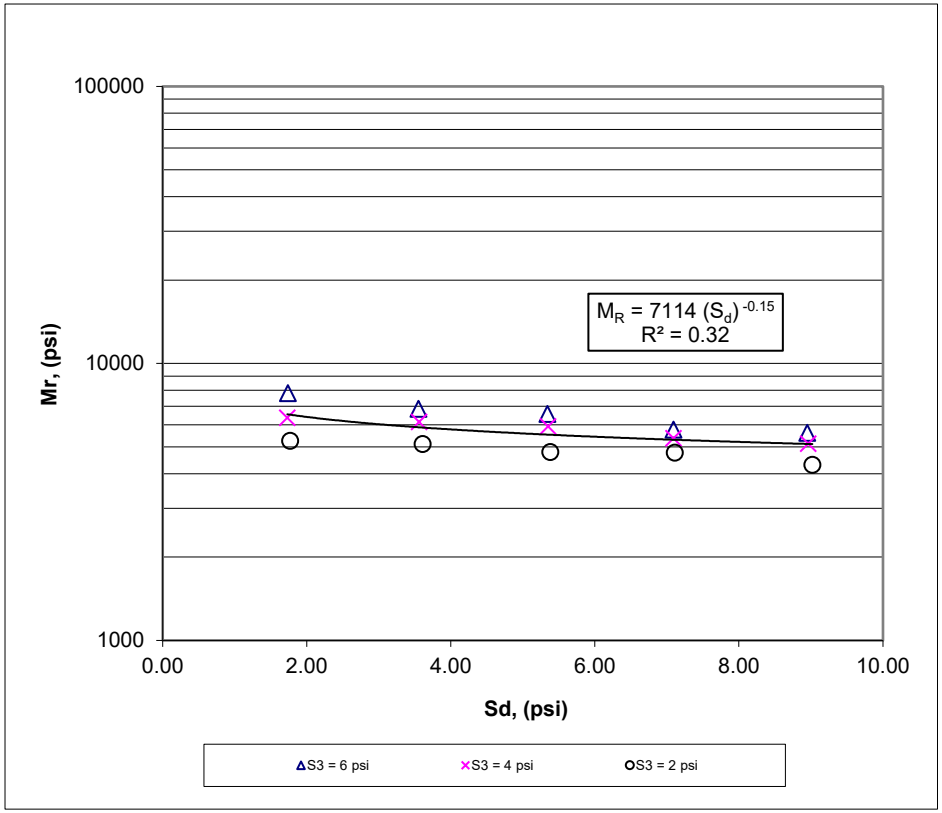
* Reported results are based on the average of the last 5 cycles of each load sequence

Resilient Modulus of Subgrade Soils (Recompacted Samples)

(Plot)

1. Sample Number	Bulk 2 (Compacted @ OMC +2%)
2. Material Type	Type 2
3. Soil Series	n/a
4. Horizon	n/a
5. Test Date	6/19/2023

Column #	1	**2**	3	4	**5**
Parameter	Chamber Confining Pressure	**Desired Applied Cyclic Stress**	Actual Applied Cyclic Stress	Actual Resilient Modulus	**Predicted Resilient Modulus***
Designation	S3	**Scyclic**	Scyclic	Mr	**Mr**
Unit	psi	**psi**	psi	psi	**psi**
Precision	—	**—**	—	—	**—**
Sequence 1	6	**1.80**	1.74	7812	**6514**
Sequence 2	6	**3.60**	3.55	6853	**5871**
Sequence 3	6	**5.40**	5.34	6575	**5525**
Sequence 4	6	**7.20**	7.09	5777	**5292**
Sequence 5	6	**9.00**	8.95	5612	**5118**
Sequence 6	4	**1.80**	1.73	6366	**6514**
Sequence 7	4	**3.60**	3.56	6158	**5871**
Sequence 8	4	**5.40**	5.35	5927	**5525**
Sequence 9	4	**7.20**	7.09	5365	**5292**
Sequence 10	4	**9.00**	8.96	5134	**5118**
Sequence 11	2	**1.80**	1.77	5256	**6514**
Sequence 12	2	**3.60**	3.61	5121	**5871**
Sequence 13	2	**5.40**	5.38	4783	**5525**
Sequence 14	2	**7.20**	7.11	4765	**5292**
Sequence 15	2	**9.00**	9.02	4300	**5118**
*Predicted Mr values at the desired applied cyclic stresses using Model #1					



Model #1; $Mr = K1 \times Sd^{K2}$

S3 (psi)	K1	K2	R^2
6	8850	-0.20	0.96
4	7041	-0.13	0.85
2	5728	-0.11	0.82
All	7114	-0.15	0.32

RED ROCK CONSULTING

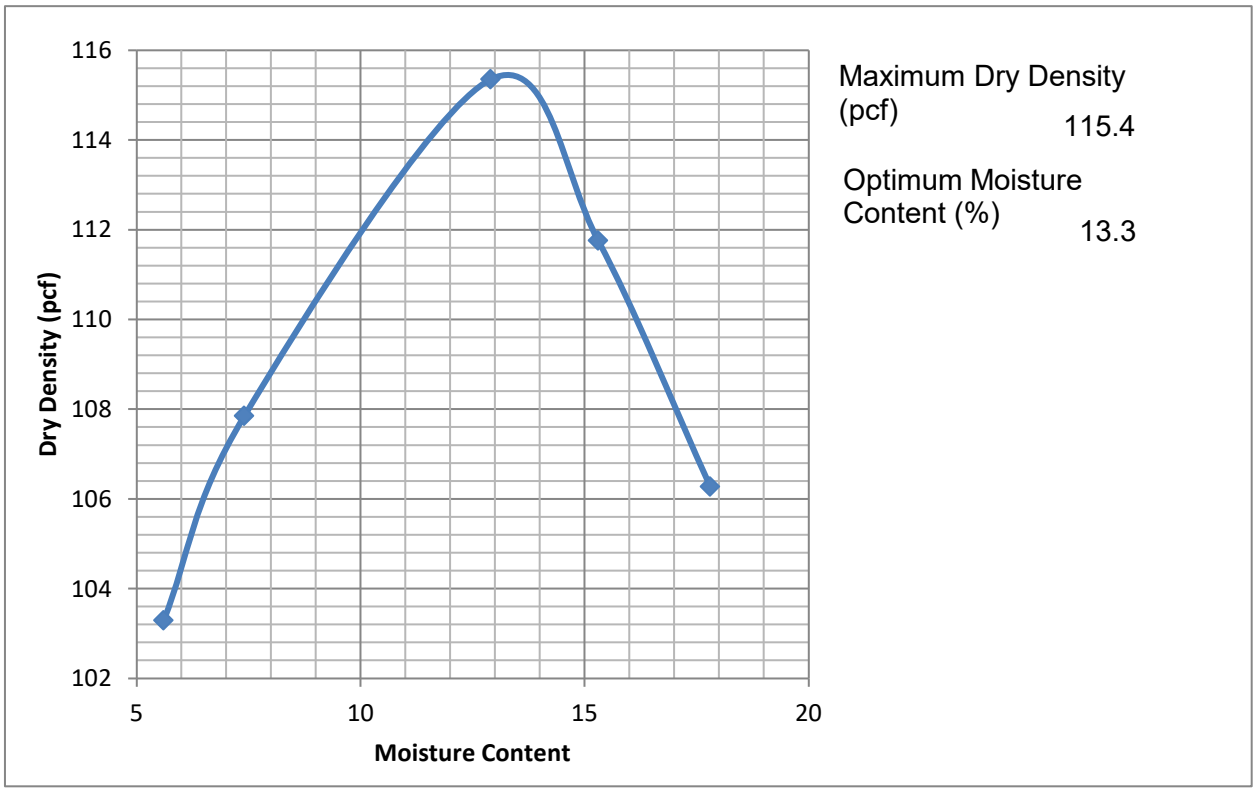
Proctor

Project #: 22117 Project Name: I-35 Shoulder Soils Survey 355889(04)

Tested By: CP Test Date: 6.9.23 Client: Olsson Associates

Weight of Hammer: 5.5 No. of Blows: 25

Bulk 3



Liquid Limit: 20 USCS CL-ML

Plasticity Index: 5 AASHTO A-4(0)

Method: A Soil Classification: Sandy, Silty Clay

Resilient Modulus of Subgrade Soils (Recompacted Samples)

1. Project Number I-35 Shoulder Soils Survey 35589(04)
2. County//State Name McClain // Oklahoma
3. Test Date 6/21/2023

4.Sample Number Bulk 3 (Compacted @ OMC)
5. Material Type 2
6. Soil Series n/a
7. Horizon n/a

9. Soil Properties

Optimum Moisture Content, (%)	13.30
Maximum Dry Density, pcf	115.40
95% MDD (pcf)	109.63

8. Specimen Properties

Compaction Water content, wc, %	13.56
Compaction Dry Density, pcf	110.23
Moisture Content After Mr Test, w(%)	13.10
Permanent Deformation (in)	0.07

10. Test Information

Preconditioning-Permanent Strain>5%	No
Testing-Permanent Strain >5%	No
Number of Load Sequences Completed	15
Quick Shear Test	No

Column #	1	2	3	4	5	6	7	8	9	10	11	12	13
Parameter	Chamber Confining Pressure	Nominal Maximum Axial Stress	Actual Applied Max. Axial Load	Actual Applied Cyclic Load	Actual Applied Contact Load	Actual Applied Max. Axial Stress	Actual Applied Cyclic Stress	Actual Applied Contact Stress	Recov. Def. LVDT # 1 Reading	Recov. Def. LVDT # 2 Reading	Average Recov. Def. LVDT 1 & 2	Resilient Strain	Resilient Modulus
Designation	S3	Scyclic	Pmax	Pcyclic	Pcontact	Smax	Scyclic	Scontact	H1	H2	Havg	er	Mr
Unit	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in	in	in/in	psi
Precision	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequence 1	6	2	24.99	22.61	2.39	1.99	1.80	0.19	0.0011	0.0012	0.0011	0.00014	12712
Sequence 2	6	4	50.37	45.34	5.02	4.01	3.61	0.40	0.0023	0.0025	0.0024	0.00030	12018
Sequence 3	6	6	75.49	67.82	7.66	6.01	5.40	0.61	0.0035	0.0038	0.0037	0.00046	11757
Sequence 4	6	8	100.23	90.31	9.92	7.98	7.19	0.79	0.0050	0.0055	0.0052	0.00065	10998
Sequence 5	6	10	125.47	113.04	12.43	9.99	9.00	0.99	0.0066	0.0072	0.0069	0.00086	10439
Sequence 6	4	2	24.99	22.73	2.26	1.99	1.81	0.18	0.0012	0.0013	0.0012	0.00015	11892
Sequence 7	4	4	50.37	45.22	5.15	4.01	3.60	0.41	0.0027	0.0028	0.0028	0.00034	10453
Sequence 8	4	6	75.23	67.70	7.54	5.99	5.39	0.60	0.0041	0.0044	0.0043	0.00053	10109
Sequence 9	4	8	99.98	90.18	9.80	7.96	7.18	0.78	0.0055	0.0060	0.0057	0.00072	10012
Sequence 10	4	10	125.85	113.04	12.81	10.02	9.00	1.02	0.0069	0.0075	0.0072	0.00090	9989
Sequence 11	2	2	24.99	22.48	2.51	1.99	1.79	0.20	0.0013	0.0014	0.0013	0.00016	10922
Sequence 12	2	4	49.86	45.09	4.77	3.97	3.59	0.38	0.0029	0.0030	0.0029	0.00037	9747
Sequence 13	2	6	75.61	67.95	7.66	6.02	5.41	0.61	0.0045	0.0048	0.0046	0.00058	9323
Sequence 14	2	8	100.35	90.18	10.17	7.99	7.18	0.81	0.0061	0.0066	0.0063	0.00079	9111
Sequence 15	2	10	124.97	113.04	11.93	9.95	9.00	0.95	0.0077	0.0083	0.0080	0.00100	8981

* Reported results are based on the average of the last 5 cycles of each load sequence

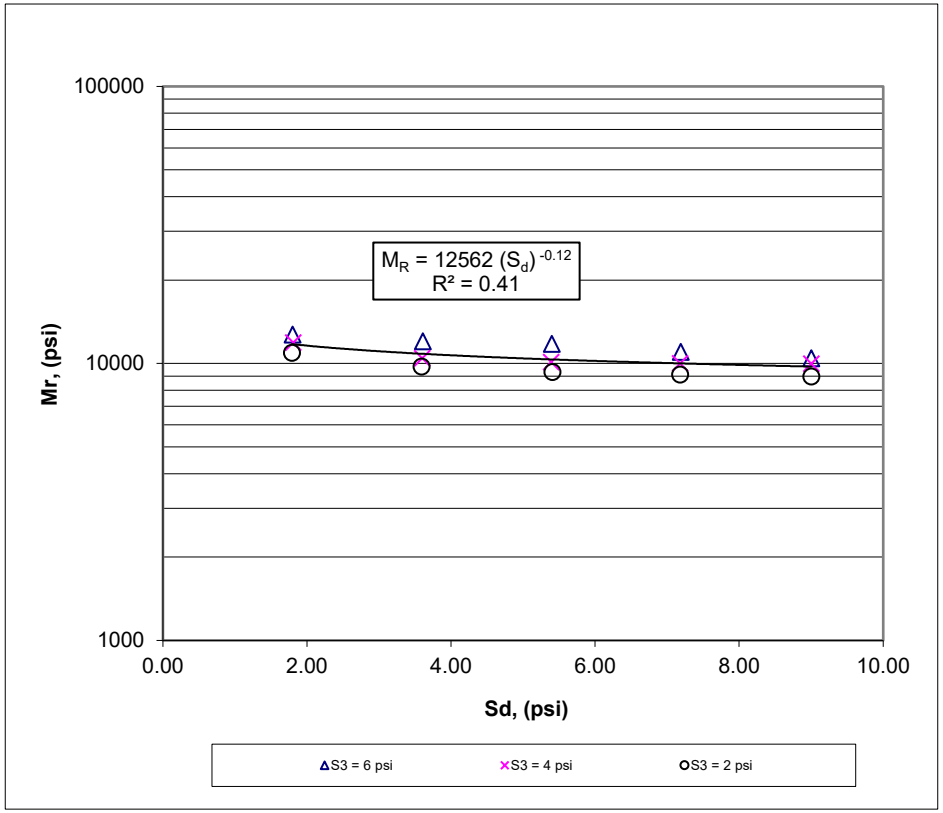
Resilient Modulus of Subgrade Soils (Recompacted Samples)

(Plot)

1. Sample Number	Bulk 3 (Compacted @ OMC)
2. Material Type	2
3. Soil Series	n/a
4. Horizon	n/a
5. Test Date	6/21/2023

Column #	1	**2**	3	4	**5**
Parameter	Chamber Confining Pressure	**Desired Applied Cyclic Stress**	Actual Applied Cyclic Stress	Actual Resilient Modulus	**Predicted Resilient Modulus***
Designation	S3	**Scyclic**	Scyclic	Mr	**Mr**
Unit	psi	**psi**	psi	psi	**psi**
Precision	—	**—**	—	—	**—**
Sequence 1	6	**1.80**	1.80	12712	**11737**
Sequence 2	6	**3.60**	3.61	12018	**10834**
Sequence 3	6	**5.40**	5.40	11757	**10338**
Sequence 4	6	**7.20**	7.19	10998	**10000**
Sequence 5	6	**9.00**	9.00	10439	**9746**
Sequence 6	4	**1.80**	1.81	11892	**11737**
Sequence 7	4	**3.60**	3.60	10453	**10834**
Sequence 8	4	**5.40**	5.39	10109	**10338**
Sequence 9	4	**7.20**	7.18	10012	**10000**
Sequence 10	4	**9.00**	9.00	9989	**9746**
Sequence 11	2	**1.80**	1.79	10922	**11737**
Sequence 12	2	**3.60**	3.59	9747	**10834**
Sequence 13	2	**5.40**	5.41	9323	**10338**
Sequence 14	2	**7.20**	7.18	9111	**10000**
Sequence 15	2	**9.00**	9.00	8981	**9746**

*Predicted Mr values at the desired applied cyclic stresses using Model #1



Model #1; Mr = K1 x Sd ^{K2}

S3 (psi)	K1	K2	R^2
6	13820	-0.12	0.91
4	12398	-0.11	0.89
2	11578	-0.12	0.97
All	12562	-0.12	0.41

Resilient Modulus of Subgrade Soils (Recompacted Samples)

1. Project Number I-35 Shoulder Soils Survey 35589(04)
2. County//State Name McClain // Oklahoma
3. Test Date 6/21/2023

4.Sample Number Bulk 3 (Compacted @ OMC +2%)
5. Material Type 2
6. Soil Series n/a
7. Horizon n/a

9. Soil Properties

Optimum Moisture Content, (%)	13.30
Maximum Dry Density, pcf	115.40
95% MDD (pcf)	109.63

8. Specimen Properties

Compaction Water content, wc, %	15.67
Compaction Dry Density, pcf	110.23
Moisture Content After Mr Test, w(%)	15.32
Permanent Deformation (in)	0.340

10. Test Information

Preconditioning-Permanent Strain>5%	No
Testing-Permanent Strain >5%	No
Number of Load Sequences Completed	15
Quick Shear Test	No

Column #	1	2	3	4	5	6	7	8	9	10	11	12	13
Parameter	Chamber Confining Pressure	Nominal Maximum Axial Stress	Actual Applied Max. Axial Load	Actual Applied Cyclic Load	Actual Applied Contact Load	Actual Applied Max. Axial Stress	Actual Applied Cyclic Stress	Actual Applied Contact Stress	Recov. Def. LVDT # 1 Reading	Recov. Def. LVDT # 2 Reading	Average Recov. Def. LVDT 1 & 2	Resilient Strain	Resilient Modulus
Designation	S3	Scyclic	Pmax	Pcyclic	Pcontact	Smax	Scyclic	Scontact	H1	H2	Havg	er	Mr
Unit	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in	in	in/in	psi
Precision	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequence 1	6	2	25.12	22.73	2.39	2.00	1.81	0.19	0.0024	0.0022	0.0023	0.00029	6229
Sequence 2	6	4	49.49	44.71	4.77	3.94	3.56	0.38	0.0049	0.0044	0.0047	0.00058	6102
Sequence 3	6	6	75.36	67.95	7.41	6.00	5.41	0.59	0.0078	0.0071	0.0075	0.00093	5787
Sequence 4	6	8	99.35	89.30	10.05	7.91	7.11	0.80	0.0119	0.0106	0.0112	0.00140	5068
Sequence 5	6	10	125.10	113.17	11.93	9.96	9.01	0.95	0.0155	0.0140	0.0147	0.00184	4889
Sequence 6	4	2	25.25	22.48	2.76	2.01	1.79	0.22	0.0025	0.0023	0.0024	0.00030	6012
Sequence 7	4	4	50.49	45.34	5.15	4.02	3.61	0.41	0.0058	0.0053	0.0055	0.00069	5232
Sequence 8	4	6	75.86	68.08	7.79	6.04	5.42	0.62	0.0092	0.0082	0.0087	0.00108	5011
Sequence 9	4	8	100.23	90.06	10.17	7.98	7.17	0.81	0.0132	0.0121	0.0126	0.00158	4535
Sequence 10	4	10	125.85	113.17	12.69	10.02	9.01	1.01	0.0172	0.0153	0.0163	0.00203	4430
Sequence 11	2	2	24.87	22.61	2.26	1.98	1.80	0.18	0.0029	0.0026	0.0027	0.00034	5302
Sequence 12	2	4	49.86	45.09	4.77	3.97	3.59	0.38	0.0064	0.0057	0.0061	0.00076	4727
Sequence 13	2	6	75.99	67.95	8.04	6.05	5.41	0.64	0.0103	0.0093	0.0098	0.00123	4412
Sequence 14	2	8	100.73	90.18	10.55	8.02	7.18	0.84	0.0147	0.0133	0.0140	0.00175	4102
Sequence 15	2	10	125.35	113.04	12.31	9.98	9.00	0.98	0.0205	0.0187	0.0196	0.00245	3675

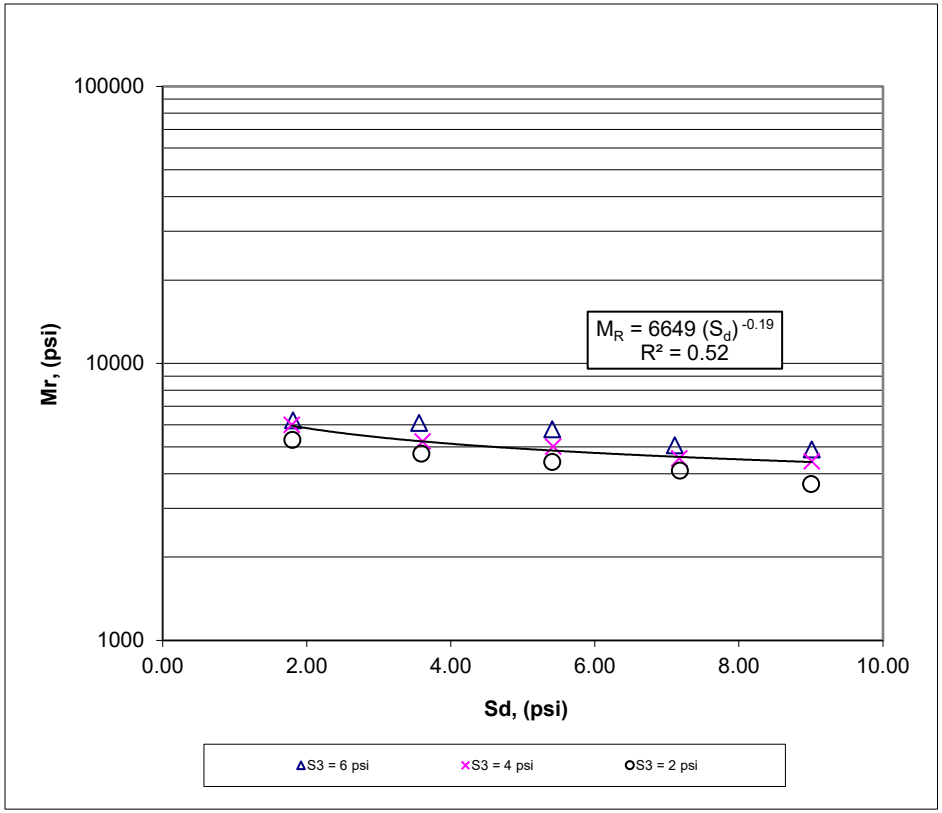
* Reported results are based on the average of the last 5 cycles of each load sequence

Resilient Modulus of Subgrade Soils (Recompacted Samples)

(Plot)

1. Sample Number	Bulk 3 (Compacted @ OMC +2%)
2. Material Type	Type 2
3. Soil Series	n/a
4. Horizon	n/a
5. Test Date	6/21/2023

Column #	1	**2**	3	4	**5**
Parameter	Chamber Confining Pressure	**Desired Applied Cyclic Stress**	Actual Applied Cyclic Stress	Actual Resilient Modulus	**Predicted Resilient Modulus***
Designation	S3	**Scyclic**	Scyclic	Mr	**Mr**
Unit	psi	**psi**	psi	psi	**psi**
Precision	—	**—**	—	—	**—**
Sequence 1	6	**1.80**	1.81	6229	**5956**
Sequence 2	6	**3.60**	3.56	6102	**5232**
Sequence 3	6	**5.40**	5.41	5787	**4849**
Sequence 4	6	**7.20**	7.11	5068	**4595**
Sequence 5	6	**9.00**	9.01	4889	**4407**
Sequence 6	4	**1.80**	1.79	6012	**5956**
Sequence 7	4	**3.60**	3.61	5232	**5232**
Sequence 8	4	**5.40**	5.42	5011	**4849**
Sequence 9	4	**7.20**	7.17	4535	**4595**
Sequence 10	4	**9.00**	9.01	4430	**4407**
Sequence 11	2	**1.80**	1.80	5302	**5956**
Sequence 12	2	**3.60**	3.59	4727	**5232**
Sequence 13	2	**5.40**	5.41	4412	**4849**
Sequence 14	2	**7.20**	7.18	4102	**4595**
Sequence 15	2	**9.00**	9.00	3675	**4407**
*Predicted Mr values at the desired applied cyclic stresses using Model #1					



Model #1; Mr = K1 x Sd ^{K2}

S3 (psi)	K1	K2	R^2
6	7112	-0.16	0.81
4	6730	-0.19	0.98
2	6130	-0.21	0.95
All	6649	-0.19	0.52

RED ROCK CONSULTING

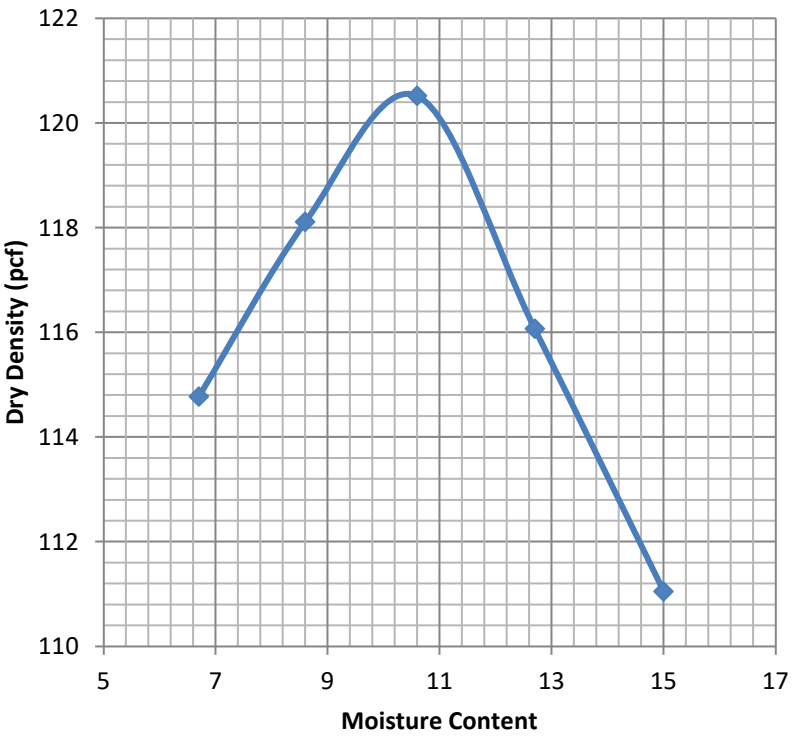
Proctor

Project #: 22117 Project Name: I-35 Shoulder Soils Survey 35589(04)

Tested By: CP Test Date: 6.12.23 Client: Olsson Associates

Weight of Hammer: 5.5 No. of Blows: 25

Bulk 4



Maximum Dry Density (pcf) 120.5

Optimum Moisture Content (%) 10.4

Liquid Limit: 21 USCS SC-SM

Plasticity Index: 4 AASHTO A-4(0)

Method: A Soil Classification: Silty, Clayey Sand

Resilient Modulus of Subgrade Soils (Recompacted Samples)

1. Project Number I-35 Shoulder Soils Survey 35589(04)
2. County//State Name McClain // Oklahoma
3. Test Date 6/21/2023

4.Sample Number Bulk 4 (Compacted @ OMC)
5. Material Type 2
6. Soil Series n/a
7. Horizon n/a

9. Soil Properties

Optimum Moisture Content, (%)	10.40
Maximum Dry Density, pcf	120.50
95% MDD (pcf)	114.48

8. Specimen Properties

Compaction Water content, wc, %	10.23
Compaction Dry Density, pcf	115.63
Moisture Content After Mr Test, w(%)	10.01
Permanent Deformation (in)	<1/16

10. Test Information

Preconditioning-Permanent Strain>5%	No
Testing-Permanent Strain >5%	No
Number of Load Sequences Completed	15
Quick Shear Test	No

Column #	1	2	3	4	5	6	7	8	9	10	11	12	13
Parameter	Chamber Confining Pressure	Nominal Maximum Axial Stress	Actual Applied Max. Axial Load	Actual Applied Cyclic Load	Actual Applied Contact Load	Actual Applied Max. Axial Stress	Actual Applied Cyclic Stress	Actual Applied Contact Stress	Recov. Def. LVDT # 1 Reading	Recov. Def. LVDT # 2 Reading	Average Recov. Def. LVDT 1 & 2	Resilient Strain	Resilient Modulus
Designation	S3	Scyclic	Pmax	Pcyclic	Pcontact	Smax	Scyclic	Scontact	H1	H2	Havg	er	Mr
Unit	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in	in	in/in	psi
Precision	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequence 1	6	2	26.00	23.24	2.76	2.07	1.85	0.22	0.0011	0.0012	0.0011	0.00014	13086
Sequence 2	6	4	51.62	45.97	5.65	4.11	3.66	0.45	0.0023	0.0024	0.0023	0.00029	12573
Sequence 3	6	6	75.99	68.20	7.79	6.05	5.43	0.62	0.0035	0.0036	0.0036	0.00045	12127
Sequence 4	6	8	101.11	90.81	10.30	8.05	7.23	0.82	0.0049	0.0051	0.0050	0.00063	11553
Sequence 5	6	10	126.23	113.29	12.94	10.05	9.02	1.03	0.0063	0.0066	0.0065	0.00081	11147
Sequence 6	4	2	26.00	23.36	2.64	2.07	1.86	0.21	0.0012	0.0013	0.0013	0.00016	11727
Sequence 7	4	4	51.37	45.72	5.65	4.09	3.64	0.45	0.0026	0.0026	0.0026	0.00032	11203
Sequence 8	4	6	75.86	67.95	7.91	6.04	5.41	0.63	0.0040	0.0041	0.0040	0.00050	10728
Sequence 9	4	8	100.98	90.68	10.30	8.04	7.22	0.82	0.0055	0.0057	0.0056	0.00070	10342
Sequence 10	4	10	125.47	113.29	12.18	9.99	9.02	0.97	0.0070	0.0073	0.0071	0.00089	10102
Sequence 11	2	2	25.25	22.86	2.39	2.01	1.82	0.19	0.0014	0.0015	0.0014	0.00018	10138
Sequence 12	2	4	51.24	45.59	5.65	4.08	3.63	0.45	0.0029	0.0030	0.0029	0.00037	9891
Sequence 13	2	6	76.24	68.33	7.91	6.07	5.44	0.63	0.0045	0.0047	0.0046	0.00057	9505
Sequence 14	2	8	101.23	90.56	10.68	8.06	7.21	0.85	0.0059	0.0062	0.0061	0.00076	9486
Sequence 15	2	10	125.60	113.29	12.31	10.00	9.02	0.98	0.0075	0.0078	0.0076	0.00096	9444

* Reported results are based on the average of the last 5 cycles of each load sequence

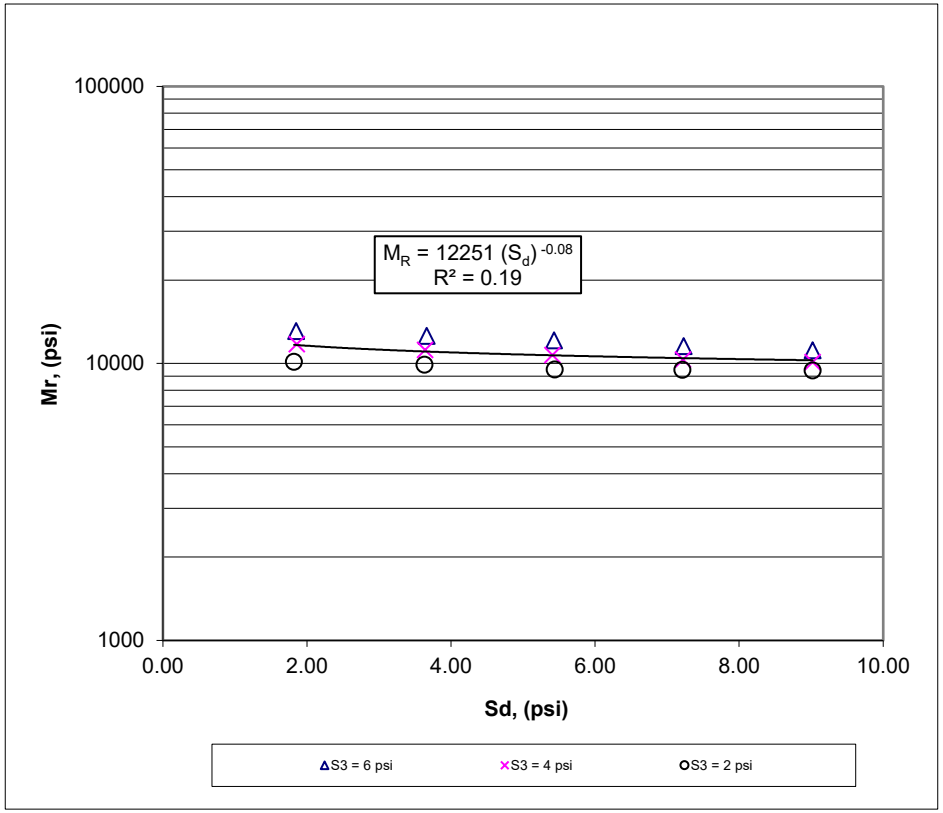
Resilient Modulus of Subgrade Soils (Recompacted Samples)

(Plot)

1. Sample Number	Bulk 4 (Compacted @ OMC)
2. Material Type	2
3. Soil Series	n/a
4. Horizon	n/a
5. Test Date	6/21/2023

Column #	1	**2**	3	4	**5**
Parameter	Chamber Confining Pressure	**Desired Applied Cyclic Stress**	Actual Applied Cyclic Stress	Actual Resilient Modulus	**Predicted Resilient Modulus***
Designation	S3	**Scyclic**	Scyclic	Mr	**Mr**
Unit	psi	**psi**	psi	psi	**psi**
Precision	—	**—**	—	—	**—**
Sequence 1	6	**1.80**	1.85	13086	**11686**
Sequence 2	6	**3.60**	3.66	12573	**11053**
Sequence 3	6	**5.40**	5.43	12127	**10699**
Sequence 4	6	**7.20**	7.23	11553	**10455**
Sequence 5	6	**9.00**	9.02	11147	**10269**
Sequence 6	4	**1.80**	1.86	11727	**11686**
Sequence 7	4	**3.60**	3.64	11203	**11053**
Sequence 8	4	**5.40**	5.41	10728	**10699**
Sequence 9	4	**7.20**	7.22	10342	**10455**
Sequence 10	4	**9.00**	9.02	10102	**10269**
Sequence 11	2	**1.80**	1.82	10138	**11686**
Sequence 12	2	**3.60**	3.63	9891	**11053**
Sequence 13	2	**5.40**	5.44	9505	**10699**
Sequence 14	2	**7.20**	7.21	9486	**10455**
Sequence 15	2	**9.00**	9.02	9444	**10269**

*Predicted Mr values at the desired applied cyclic stresses using Model #1



Model #1; Mr = K1 x Sd ^{K2}

S3 (psi)	K1	K2	R^2
6	14102	-0.10	0.94
4	12541	-0.10	0.98
2	10441	-0.05	0.94
All	12251	-0.08	0.19

Resilient Modulus of Subgrade Soils (Recompacted Samples)

1. Project Number I-35 Shoulder Soils Survey 35589(04)
2. County//State Name McClain // Oklahoma
3. Test Date 6/21/2023

4.Sample Number Bulk 4 (Compacted @ OMC +2%)
5. Material Type 2
6. Soil Series n/a
7. Horizon n/a

9. Soil Properties

Optimum Moisture Content, (%)	10.40
Maximum Dry Density, pcf	120.50
95% MDD (pcf)	114.48

8. Specimen Properties

Compaction Water content, wc, %	12.13
Compaction Dry Density, pcf	115,21
Moisture Content After Mr Test, w(%)	12
Permanent Deformation (in)	0.280

10. Test Information

Preconditioning-Permanent Strain>5%	No
Testing-Permanent Strain >5%	No
Number of Load Sequences Completed	15
Quick Shear Test	No

Column #	1	2	3	4	5	6	7	8	9	10	11	12	13
Parameter	Chamber Confining Pressure	Nominal Maximum Axial Stress	Actual Applied Max. Axial Load	Actual Applied Cyclic Load	Actual Applied Contact Load	Actual Applied Max. Axial Stress	Actual Applied Cyclic Stress	Actual Applied Contact Stress	Recov. Def. LVDT # 1 Reading	Recov. Def. LVDT # 2 Reading	Average Recov. Def. LVDT 1 & 2	Resilient Strain	Resilient Modulus
Designation	S3	Scyclic	Pmax	Pcyclic	Pcontact	Smax	Scyclic	Scontact	H1	H2	Havg	er	Mr
Unit	psi	psi	lbs	lbs	lbs	psi	psi	psi	in	in	in	in/in	psi
Precision	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequence 1	6	2	25.12	22.48	2.64	2.00	1.79	0.21	0.0019	0.0020	0.0020	0.00024	7323
Sequence 2	6	4	49.86	44.84	5.02	3.97	3.57	0.40	0.0041	0.0044	0.0042	0.00053	6757
Sequence 3	6	6	75.36	67.82	7.54	6.00	5.40	0.60	0.0065	0.0071	0.0068	0.00085	6343
Sequence 4	6	8	99.98	90.06	9.92	7.96	7.17	0.79	0.0099	0.0105	0.0102	0.00127	5637
Sequence 5	6	10	125.98	113.29	12.69	10.03	9.02	1.01	0.0129	0.0137	0.0133	0.00166	5432
Sequence 6	4	2	25.25	22.73	2.51	2.01	1.81	0.20	0.0022	0.0024	0.0023	0.00029	6323
Sequence 7	4	4	49.99	45.09	4.90	3.98	3.59	0.39	0.0046	0.0048	0.0047	0.00059	6102
Sequence 8	4	6	75.36	67.82	7.54	6.00	5.40	0.60	0.0076	0.0080	0.0078	0.00097	5544
Sequence 9	4	8	99.85	89.93	9.92	7.95	7.16	0.79	0.0109	0.0115	0.0112	0.00140	5123
Sequence 10	4	10	124.72	112.66	12.06	9.93	8.97	0.96	0.0142	0.0151	0.0147	0.00183	4898
Sequence 11	2	2	24.74	22.36	2.39	1.97	1.78	0.19	0.0023	0.0025	0.0024	0.00030	5898
Sequence 12	2	4	50.11	44.96	5.15	3.99	3.58	0.41	0.0050	0.0053	0.0051	0.00064	5575
Sequence 13	2	6	75.36	67.82	7.54	6.00	5.40	0.60	0.0079	0.0084	0.0081	0.00101	5323
Sequence 14	2	8	100.23	90.06	10.17	7.98	7.17	0.81	0.0117	0.0124	0.0120	0.00150	4774
Sequence 15	2	10	125.85	113.17	12.69	10.02	9.01	1.01	0.0153	0.0164	0.0158	0.00198	4554

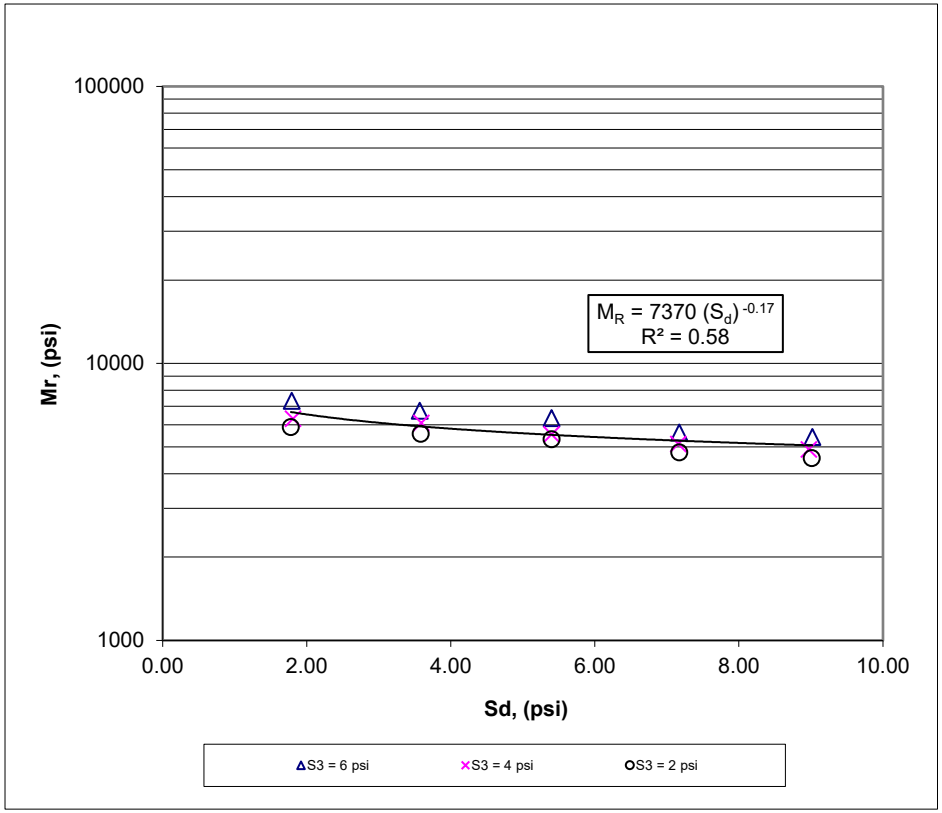
* Reported results are based on the average of the last 5 cycles of each load sequence

Resilient Modulus of Subgrade Soils (Recompacted Samples)

(Plot)

1. Sample Number	Bulk 4 (Compacted @ OMC +2%)
2. Material Type	Type 2
3. Soil Series	n/a
4. Horizon	n/a
5. Test Date	6/21/2023

Column #	1	**2**	3	4	**5**
Parameter	Chamber Confining Pressure	**Desired Applied Cyclic Stress**	Actual Applied Cyclic Stress	Actual Resilient Modulus	**Predicted Resilient Modulus***
Designation	S3	**Scyclic**	Scyclic	Mr	**Mr**
Unit	psi	**psi**	psi	psi	**psi**
Precision	—	**—**	—	—	**—**
Sequence 1	6	**1.80**	1.79	7323	**6665**
Sequence 2	6	**3.60**	3.57	6757	**5920**
Sequence 3	6	**5.40**	5.40	6343	**5523**
Sequence 4	6	**7.20**	7.17	5637	**5258**
Sequence 5	6	**9.00**	9.02	5432	**5061**
Sequence 6	4	**1.80**	1.81	6323	**6665**
Sequence 7	4	**3.60**	3.59	6102	**5920**
Sequence 8	4	**5.40**	5.40	5544	**5523**
Sequence 9	4	**7.20**	7.16	5123	**5258**
Sequence 10	4	**9.00**	8.97	4898	**5061**
Sequence 11	2	**1.80**	1.78	5898	**6665**
Sequence 12	2	**3.60**	3.58	5575	**5920**
Sequence 13	2	**5.40**	5.40	5323	**5523**
Sequence 14	2	**7.20**	7.17	4774	**5258**
Sequence 15	2	**9.00**	9.01	4554	**5061**
*Predicted Mr values at the desired applied cyclic stresses using Model #1					



Model #1; $Mr = K1 \times Sd^{K2}$

S3 (psi)	K1	K2	R^2
6	8372	-0.19	0.94
4	7195	-0.17	0.91
2	6645	-0.16	0.90
All	7370	-0.17	0.58

APPENDIX D

RED ROCK CONSULTING

GENERAL NOTES

SOIL PROPERTY ABBREVIATIONS

N	Uncorrected SPT Penetration, blows per foot
N_{60}	Corrected SPT Penetration, blows per foot
Q_u	Unconfined Compressive Strength, psf
Mc	Moisture Content, %
LL	Liquid Limit, %
PL	Plastic Limit, %
PI	Plasticity Index, %

DRILLING & SAMPLING ABBREVIATIONS

BS	Bag Sample
SPT	Split Spoon Sample
ST	Shelby Tube Sample
AU	Auger Sample
TC	Texas Cone Penetrometer
DCP	Dynamic Cone Penetrometer

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)
-- used to classify all soils unless otherwise noted --

Major Divisions			Group Symbol	Typical Names
Course-Grained Soils >50% retained on #200 sieve	**Gravels** 50% + of course fraction retained on #4 sieve	Clean Gravels	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines
		Gravels with Fines	GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	Sands 50% + of course fraction passes #4 sieve	Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines
			SP	Poorly graded sands and gravelly sands, little or no fines
		Sands with Fines	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
Fine-Grained Soils <50% passes #200 sieve	**Silts and Clays** Liquid Limit ≤ 50%		ML	Inorganic silts, very fine sands, rock four, silty or clayey fine sands
			CL	Inorganic clays of low to medium plasticity, gravelly/sandy/silty/lean clays
			OL	Organic silts and organic silty clays of low plasticity
	Silts and Clays Liquid Limit > 50%		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
			CH	Inorganic clays or high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
Highly Organic Soils			PT	Peat, muck, and other highly organic soils

Prefix: G = Gravel, S = Sand, M = Silt, C = Clay, O = Organic **Suffix:** W = Well Graded, P = Poorly Graded, M = Silty, L = Clay, LL < 50%, H = Clay, LL > 50%

PLASTICITY OF COHESIVE SOIL

Degree of Plasticity	Plasticity Index	Swell Potential
None	0 to 4	Very Low
Slight	5 to 9	Low
Medium	10 to 19	Low to Medium
High	20 to 39	Medium to High
Very High	40+	Very High

MOISTURE OF COHESIVE SOIL

Description	Condition	Moisture Content
Dry, Dusty	Dry	0 to 10%
Damp	Moist	10 to 30%
Free Water	Wet	30 to 70%

CONSISTENCY - COHESIVE SOILS

Consistency	SPT
Very Soft	<2
Soft	2 to 4
Medium Stiff	5 to 8
Stiff	9 to 14
Very Stiff	15 to 30
Hard	31+

DENSITY – COHESIONLESS SOILS

Relative Density	SPT
Very Loose	<4
Loose	4 to 10
Medium Dense	11 to 30
Dense	31 to 50
Very Dense	51+

ROCK HARDNESS

SPT (in/50)	TCP (in/100)	Rock Description
6+	6+	Very Soft / Very Poorly Cemented
5 - 6	3 - 6	Soft / Poorly Cemented
4 - 5	2 - 3	Moderately Hard / Cemented
3 - 4	1 - 2	Hard / Well Cemented
<3	<1	Very Hard / Very Well Cemented

ROCK CORE QUALITY

Core Quality	RQD
Excellent Quality	90 – 100%
Good Quality	75 – 90%
Fair Quality	50 – 75%
Poor Quality	25 – 50%
Very Poor Quality	<25%

OKLAHOMA DEPARTMENT OF TRANSPORTATION

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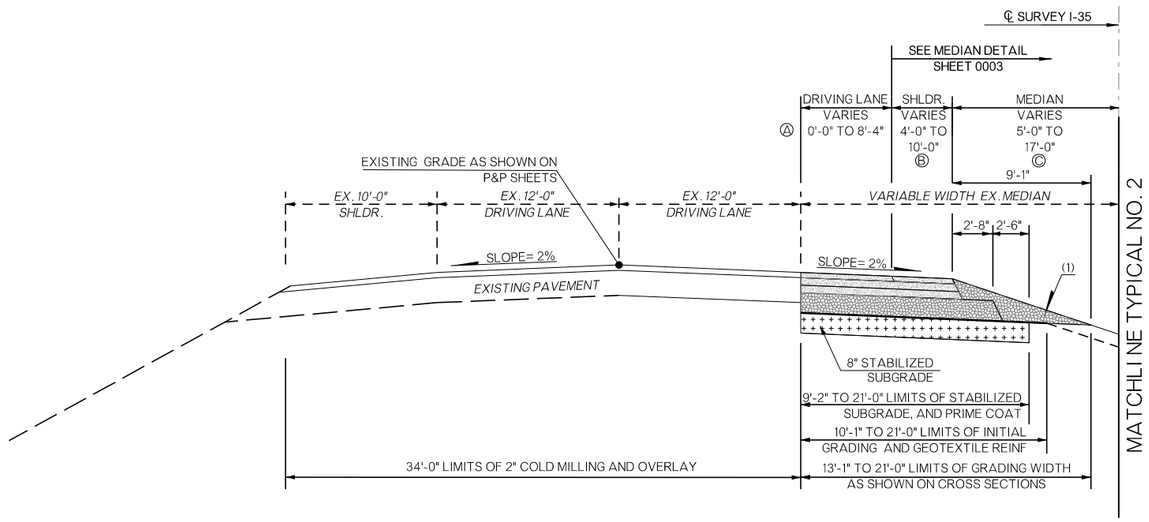
2/20/2024

OKLAHOMA DEPARTMENT OF TRANSPORTATION

FINAL FIELD MEETING

2/20/2024



PAVEMENT REQUIREMENT			
8" PAVT. STRUCTURE	OVERLAY SECTION	DRIVING LANES	INSIDE SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)
		3" SUPERPAVE TYPE S3 (PG 76-28 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
BASE COURSE	EXISTING SURFACE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

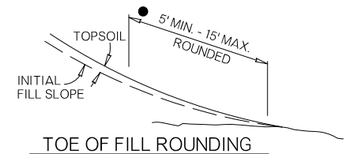
TYPICAL NO. 1

I-35 SB MILL/RESURFACE

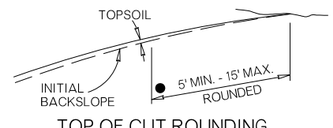
STA. 632+50.00 TO STA. 640+25.00

ROUNDING DETAIL

- INTERSECTION OF CUT AND/OR FILL SLOPES WITH GROUND LINE TO BE ROUNDED AS PART OF FINISHING OPERATIONS. ROUNDING SHALL BE 5' MINIMUM FOR SMALLER CUTS AND FILLS TO 15' MAXIMUM FOR LARGER CUTS AND FILLS OR AS DESIGNATED BY THE ENGINEER. COST OF ROUNDING TO BE INCLUDED IN PRICE BID FOR OTHER ITEMS OF WORK.

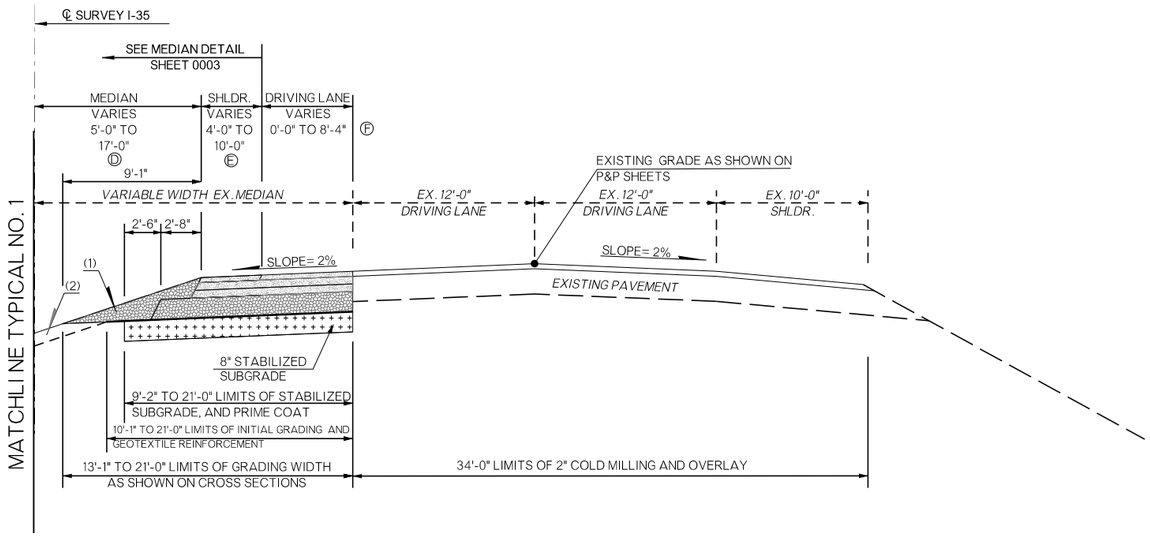


TOE OF FILL ROUNDING



TOP OF CUT ROUNDING

VARIABLE WIDTH TABLE			
TYPICAL SECTION	SEGMENT	WIDTH	STATION EXTENT
1	A	0'-0"	632+50.00 TO 635+25.00
1	A	0'-0" TO 8'-4"	635+25.00 TO 640+25.00
1	B	4'-0" TO 10'-0"	632+50.00 TO 635+25.00
1	B	10-0"	635+25.00 TO 638+84.63
1	B	14'-0" TO 11'-8"	638+84.63 TO 640+25.00
1	C	17'-0" TO 5'-0"	632+50.00 TO 638+84.63
1	C	15'-0" TO 12'-8"	638+84.63 TO 640+25.00
2	D	17'-0" TO 5'-0"	632+50.00 TO 638+84.63
2	D	15'-0" TO 12'-8"	638+84.63 TO 640+25.00
2	E	4'-0" TO 10'-0"	632+50.00 TO 635+24.29
2	E	10-0"	635+25.00 TO 638+84.63
2	E	14'-0" TO 11'-8"	638+84.63 TO 640+25.00
2	F	0'-0"	632+50.00 TO 635+25.00
2	F	0'-0" TO 8'-4"	635+25.00 TO 640+25.00



PAVEMENT REQUIREMENT			
8" PAVT. STRUCTURE	OVERLAY SECTION	DRIVING LANES	INSIDE SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)
		3" SUPERPAVE TYPE S3 (PG 76-28 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
BASE COURSE	EXISTING SURFACE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

TYPICAL NO. 2

I-35 NB MILL/RESURFACE

STA. 632+50.00 TO STA. 640+25.00

(1) BACKFILL NOTE:
TO BE BACKFILLED AND COMPACTED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN TBSC.

(2) TOPSOIL NOTE:
THE CONTRACTOR SHALL STRIP ALL OF THE AVAILABLE TOPSOIL, STOCKPILE IT, AND PLACE IT BACK ON THE SECTION IN ACCORDANCE WITH SECTION 205 OF THE STANDARD SPECIFICATIONS. RESERVED TOPSOIL SHALL BE SPREAD FIRST ON THE COMPLETED SLOPES OF THE CUT SECTIONS AND THE REMAINDER ON COMPLETED FILL SLOPES OR OTHER PRIORITY AREAS LOCATED BY THE ENGINEER. ALL ADDITIONAL COSTS ASSOCIATED WITH OPERATIONS SHALL BE INCLUDED IN THE PAY ITEM FOR SALVAGED TOPSOIL, LUMP SUM.

THE GRADING LINE AS SHOWN ON THE TYPICAL AND CROSS SECTIONS IS TO THE TOP OF THE TOPSOIL. EARTHWORK QUANTITIES WERE NOT ADJUSTED FOR SALVAGE AND THE TOPSOIL QUANTITY IS INCLUDED IN THE MASS LINE BALANCE.

(3) PAVEMENT EDGE DRAIN:
SEE "ODOT STD. DRAWING PED_3"
EDGE DRAINS SHALL BE PLACED AT LOW LOCATIONS IN THE TYPICAL PAVING SECTION.
LATERALS FOR EDGE DRAINS DAYLIGHTED THROUGH THE FILL SLOPES AT LOW POINTS AND AT 300'+ INTERVALS.
EDGE DRAINS NOT DRAWN TO SCALE.

ASSUMED PAVEMENT DESIGN

DESIGN			OKLAHOMA DEPARTMENT OF TRANSPORTATION ROADWAY DESIGN DIVISION
DRAWN			
CHECKED			TYPICAL SECTION (SHEET 1 OF 6)
APPROVED			
SQUAD			

COUNTY MCCLAIN HIGHWAY I-35 STATE JOB NO. 35589(04) SHEET NO. 0003

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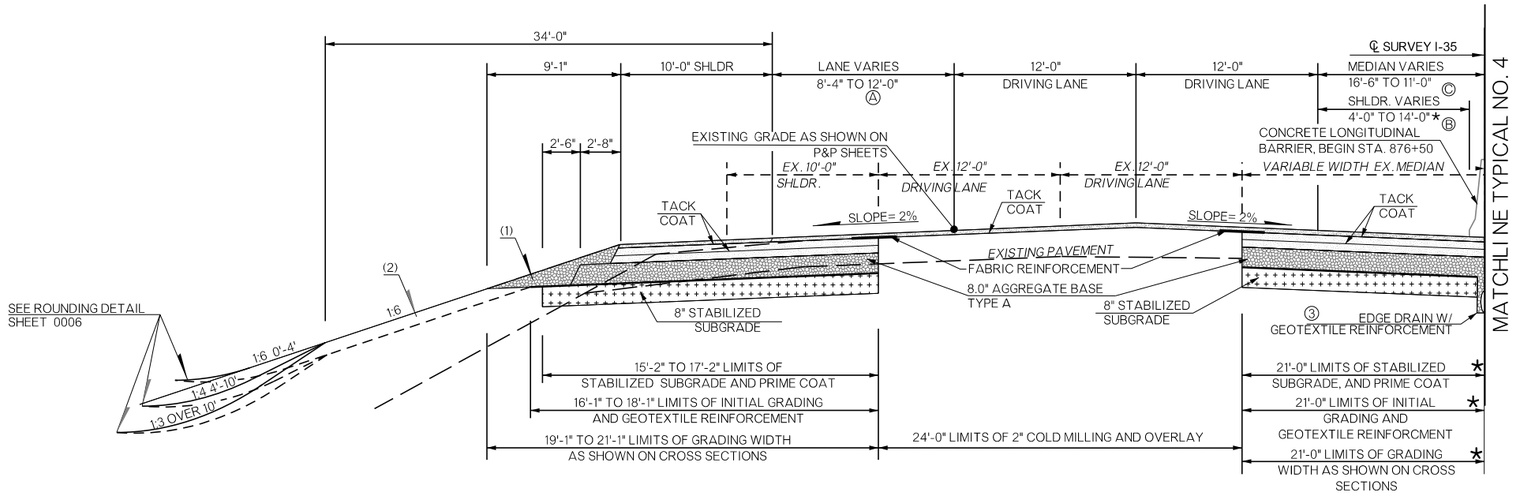
2/20/2024

OKLAHOMA DEPARTMENT OF TRANSPORTATION

FINAL FIELD MEETING

2/20/2024



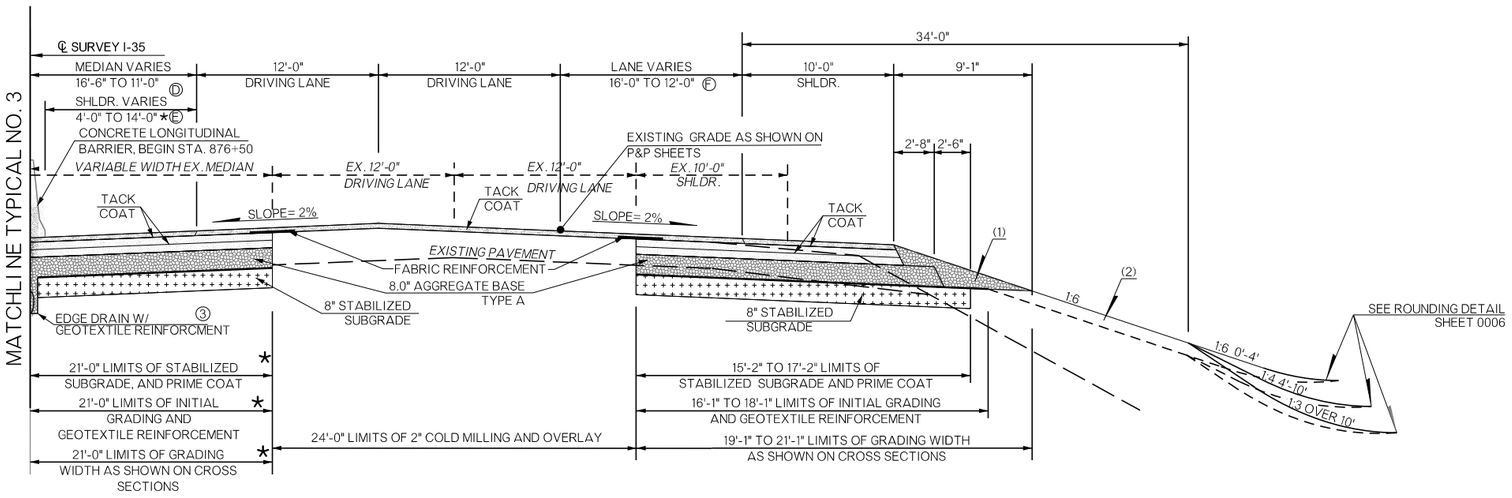
PAVEMENT REQUIREMENT				
8" PAVT. STRUCTURE	OVERLAY SECTION	DRIVING LANES	INSIDE SHOULDER	OUTSIDE SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)
		3" SUPERPAVE TYPE S3 (PG 76-28 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
BASE COURSE	EXISTING SURFACE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

TYPICAL NO. 3

I-35 SB MILL/RESURFACE

STA. 640+25.00 TO STA. 641+25.00

VARIABLE WIDTH TABLE			
TYPICAL SECTION	SEGMENT	WIDTH	STATION EXTENT
3	A	8'-4" TO 12'-0"	640+25.00 TO 641+25.00
3	B	11'-8" TO 10'-0"	640+25.00 TO 641+25.00
3	C	12'-8" TO 11'-0"	640+25.00 TO 641+25.00
4	D	12'-8" TO 11'-0"	640+25.00 TO 641+25.00
4	E	11'-8" TO 10'-0"	640+25.00 TO 641+25.00
4	F	8'-4" TO 12'-0"	640+25.00 TO 641+25.00



PAVEMENT REQUIREMENT				
8" PAVT. STRUCTURE	OVERLAY SECTION	DRIVING LANES	INSIDE SHOULDER	OUTSIDE SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)
		3" SUPERPAVE TYPE S3 (PG 76-28 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
BASE COURSE	EXISTING SURFACE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

TYPICAL NO. 4

I-35 NB MILL/RESURFACE

STA. 640+25.00 TO STA. 641+25.00

(1) BACKFILL NOTE:
TO BE BACKFILLED AND COMPACTED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN TBSC.

(2) TOPSOIL NOTE:
THE CONTRACTOR SHALL STRIP ALL OF THE AVAILABLE TOPSOIL, STOCKPILE IT, AND PLACE IT BACK ON THE SECTION IN ACCORDANCE WITH SECTION 205 OF THE STANDARD SPECIFICATIONS. RESERVED TOPSOIL SHALL BE SPREAD FIRST ON THE COMPLETED SLOPES OF THE CUT SECTIONS AND THE REMAINDER ON COMPLETED FILL SLOPES OR OTHER PRIORITY AREAS LOCATED BY THE ENGINEER. ALL ADDITIONAL COSTS ASSOCIATED WITH OPERATIONS SHALL BE INCLUDED IN THE PAY ITEM FOR SALVAGED TOPSOIL, LUMP SUM.

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(3) DISTANCE MEASURED VERTICALLY FROM EDGE OF FINISHED GRADE SHOULDER.

ASSUMED PAVEMENT DESIGN

DESIGN			OKLAHOMA DEPARTMENT OF TRANSPORTATION ROADWAY DESIGN DIVISION
DRAWN			
CHECKED			TYPICAL SECTION
APPROVED			(SHEET 2 OF 6)
SQUAD			

COUNTY MCCLAIN HIGHWAY I-35 STATE JOB NO. 35589(04) SHEET NO. 0004

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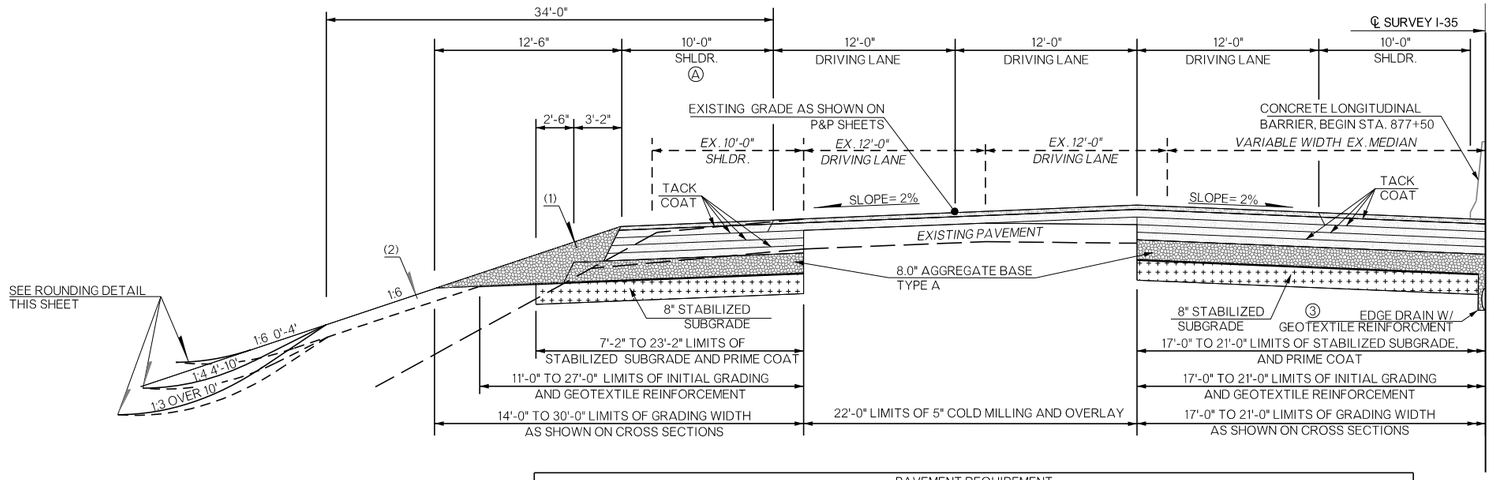
OKLAHOMA DEPARTMENT OF TRANSPORTATION

FINAL FIELD MEETING

2/20/2024



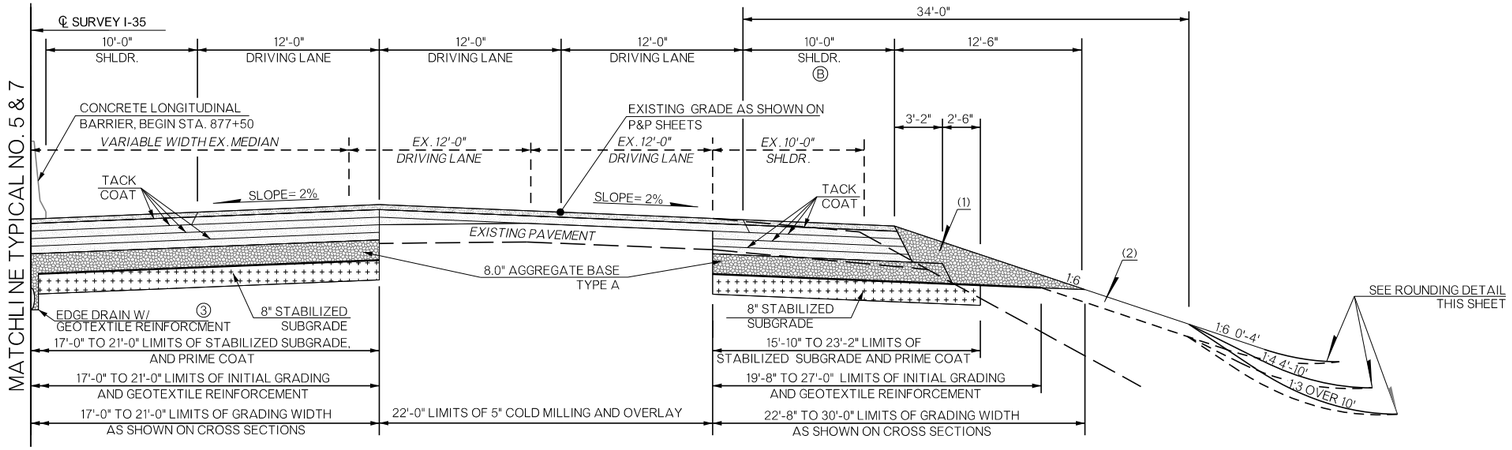
VARIABLE WIDTH TABLE			
TYPICAL SECTION	SEGMENT	WIDTH	STATION EXTENT
5	A	10'-0"	641+25.00 TO 849+66.10
5	A	2'-2"	849+66.10 TO 850+60.80
5	A	2'-2" TO 10'-0"	850+60.80 TO 852+94.68
5	A	10'-0"	852+94.68 TO 858+12.02
6	B	10'-0"	641+25.00 TO 682+04.35
6	B	10'-0" TO 2'-9"	848+60.35 TO 850+78.48
6	B	2'-9"	850+78.48 TO 851+70.00
6	B	10'-0"	851+70.00 TO 864+00.70

PAVEMENT REQUIREMENT			
14" PAVT. STRUCTURE	DRIVING LANES	INSIDE SHOULDER	OUTSIDE SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 76-28 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

TYPICAL NO. 5

I-35 SB FULL DEPTH

STA. 641+25.00 TO STA. 673+43.35
STA. 691+42.88 TO STA. 693+66.04
STA. 703+16.35 TO STA. 821+51.60
STA. 837+49.78 TO STA. 841+29.72
STA. 849+68.05 TO STA. 858+12.02



PAVEMENT REQUIREMENT			
14" PAVT. STRUCTURE	DRIVING LANES	INSIDE SHOULDER	OUTSIDE SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 76-28 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

TYPICAL NO. 6

I-35 NB FULL DEPTH

STA. 641+25.00 TO STA. 682+04.35
STA. 691+52.07 TO STA. 693+80.38
STA. 711+33.35 TO STA. 851+51.60
STA. 860+67.40 TO STA. 864+00.70

(1) BACKFILL NOTE:
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(2) TOPSOIL NOTE:
THE CONTRACTOR SHALL STRIP ALL OF THE AVAILABLE TOPSOIL, STOCKPILE IT, AND PLACE IT BACK ON THE SECTION IN ACCORDANCE WITH SECTION 205 OF THE STANDARD SPECIFICATIONS. RESERVED TOPSOIL SHALL BE SPREAD FIRST ON THE COMPLETED SLOPES OF THE CUT SECTIONS AND THE REMAINDER ON COMPLETED FILL SLOPES OR OTHER PRIORITY AREAS LOCATED BY THE ENGINEER. ALL ADDITIONAL COSTS ASSOCIATED WITH OPERATIONS SHALL BE INCLUDED IN THE PAY ITEM FOR SALVAGED TOPSOIL, LUMP SUM.

THE GRADING LINE AS SHOWN ON THE TYPICAL AND CROSS SECTIONS IS TO THE TOP OF THE TOPSOIL. EARTHWORK QUANTITIES WERE NOT ADJUSTED FOR SALVAGE AND THE TOPSOIL QUANTITY IS INCLUDED IN THE MASS LINE BALANCE.

(3) DISTANCE MEASURED VERTICALLY FROM EDGE OF FINISHED GRADE SHOULDER.

ASSUMED PAVEMENT DESIGN

DESIGN			OKLAHOMA DEPARTMENT OF TRANSPORTATION ROADWAY DESIGN DIVISION
DRAWN			
CHECKED			TYPICAL SECTION (SHEET 3 OF 6)
APPROVED			
SQUAD			

COUNTY MCCLAIN HIGHWAY I-35 STATE JOB NO. 35589(04) SHEET NO. 0005

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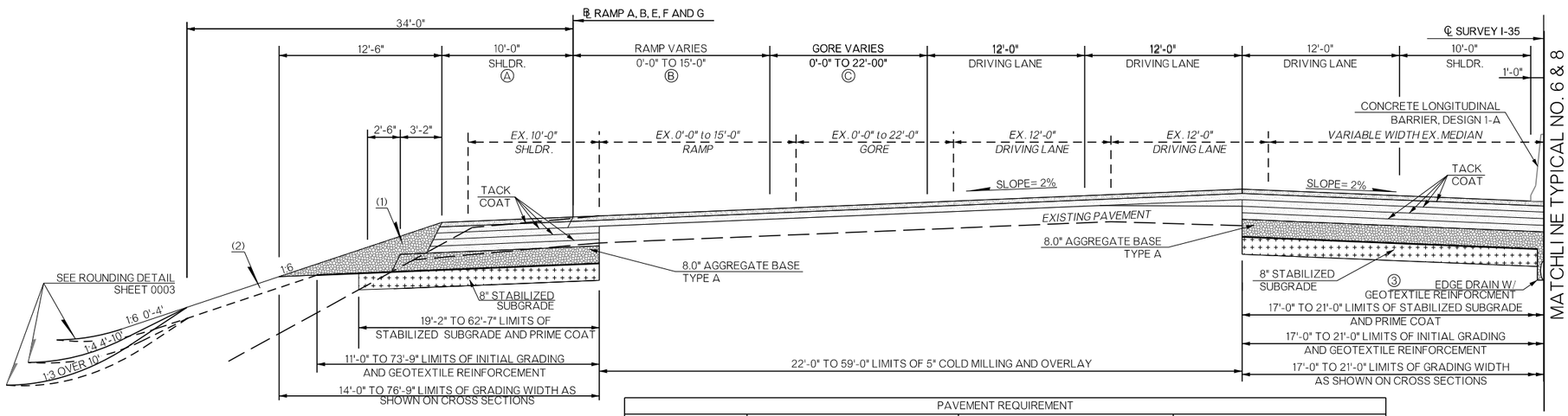
OKLAHOMA DEPARTMENT OF TRANSPORTATION

FINAL FIELD MEETING

2/20/2024



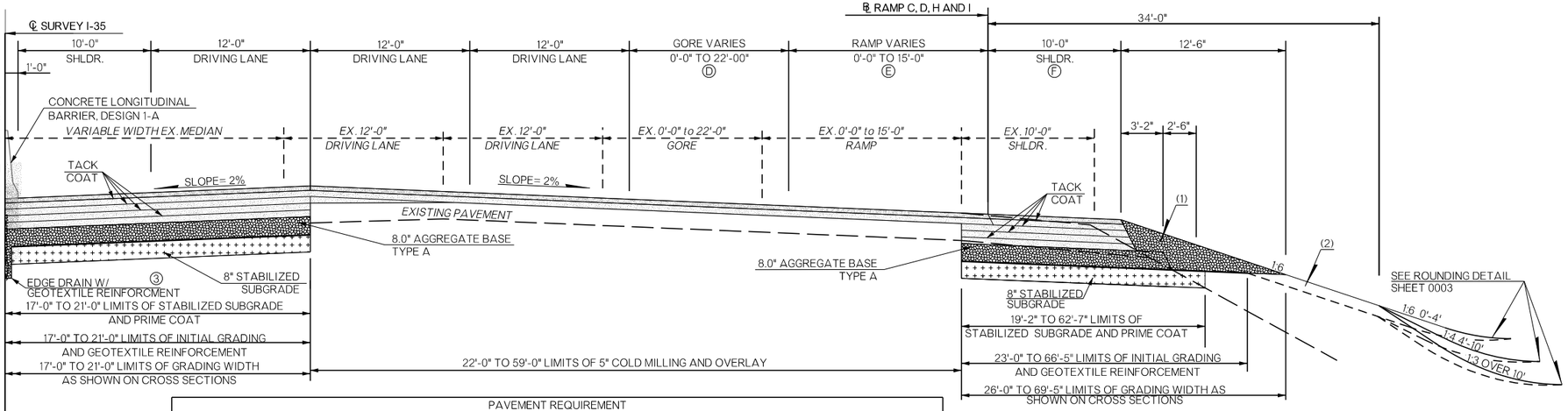
PAVEMENT REQUIREMENT			
14" PAVT. STRUCTURE	DRIVING LANES	INSIDE SHOULDER	OUTSIDE SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 76-28 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

VARIABLE WIDTH TABLE			
TYPICAL SECTION	SEGMENT	WIDTH	STATION EXTENT
7	A	10'-0"	673+43.35 TO 691+20.44
7	A	10'-0" TO 9'-3"	691+20.44 TO 691+42.88
7	B	0'-0" TO 12'-0"	673+43.35 TO 676+43.34
7	B	12'-0"	676+43.34 TO 690+59.36
7	B	12'-0" TO 15'-0"	690+59.36 TO 691+20.44
7	B	15'-0"	691+20.44 TO 691+42.88
7	C	0'-0" TO 22'-0"	690+59.36 TO 691+42.88
7	A	8'-8" TO 10'-0"	693+66.04 TO 693+96.73
7	A	10'-0"	693+96.73 TO 703+16.35
7	B	17'-7" TO 12'-0"	693+66.04 TO 695+12.39
7	B	12'-0"	695+12.39 TO 701+16.35
7	B	12'-0" TO 0'-0"	701+16.35 TO 703+16.35
7	C	28'-0" TO 0'-0"	693+66.04 TO 695+12.39
7	A	10'-0"	821+51.60 TO 837+17.72
7	A	10'-0" TO 8'-9"	837+17.72 TO 837+49.78
7	B	0'-0" TO 12'-0"	821+51.60 TO 824+51.60
7	B	12'-0"	824+51.60 TO 836+32.62
7	B	12'-0" TO 15'-0"	836+32.62 TO 837+17.72
7	B	15'-0"	837+17.72 TO 837+49.78
7	C	0'-0" TO 22'-0"	836+32.62 TO 837+49.78
7	A	10'-0"	841+29.72 TO 847+68.05
7	A	10'-0" TO 2'-2"	847+68.05 TO 849+66.10
7	A	2'-2"	489+66.10 TO 849+68.05
7	B	18'-0" TO 12'-0"	841+29.72 TO 842+45.91
7	B	12'-0"	842+45.91 TO 847+68.05
7	B	12'-0" TO 0'-0"	847+68.05 TO 849+68.05
7	C	22'-0" TO 0'-0"	841+29.72 TO 842+45.91
7	A	19'-0" TO 10'-0"	858+12.02 TO 858+27.94
7	A	10'-0"	858+27.94 TO 863+00.00
7	B	15'-0" TO 0'-0"	858+12.02 TO 863+00.00
7	C	24'-3" TO 0'-0"	858+12.02 TO 860+49.74

TYPICAL NO. 7

I-35 SB FULL DEPTH

STA. 673+43.35 TO STA. 691+42.88
STA. 693+66.04 TO STA. 703+16.35
STA. 821+51.60 TO STA. 837+49.78
STA. 841+29.72 TO STA. 849+68.05
STA. 858+12.02 TO STA. 863+00.00



PAVEMENT REQUIREMENT			
14" PAVT. STRUCTURE	DRIVING LANES	INSIDE SHOULDER	OUTSIDE SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 76-28 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 76-28 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

VARIABLE WIDTH TABLE			
TYPICAL SECTION	SEGMENT	WIDTH	STATION EXTENT
8	D	0'-0" TO 22'-0"	690+64.35 TO 691+52.07
8	E	0'-0" TO 12'-0"	682+04.35 TO 684+04.44
8	E	12'-0"	684+04.44 TO 690+64.35
8	E	12'-0" TO 18'-3"	690+64.35 TO 691+52.07
8	F	10'-0"	682+04.35 TO 691+40.62
8	F	10'-0" TO 9'-7"	691+40.62 TO 691+52.07
8	D	22'-0" TO 0'-0"	693+80.38 TO 695+00.69
8	E	15'-0"	693+80.38 TO 694+20.62
8	E	15'-0" TO 12'-0"	694+20.62 TO 695+00.69
8	E	12'-0"	695+00.69 TO 708+33.35
8	E	12'-0" TO 0'-0"	708+33.35 TO 711+33.35
8	F	8'-8" TO 10'-0"	694+13.34 TO 708+33.35
8	F	10'-0"	708+33.35 TO 711+33.35
8	D	0'-0" TO 22'-0"	859+50.27 TO 860+67.40
8	E	0'-0" TO 12'-0"	851+70.00 TO 853+70.00
8	E	12'-0"	853+70.00 TO 859+50.27
8	E	12'-0" TO 17'-11"	859+50.27 TO 860+67.40
8	F	2'-9" TO 10'-0"	851+70.00 TO 853+70.00
8	F	10'-0"	853+70.00 TO 860+67.40
8	D	22'-0" TO 0'-0"	864+00.70 TO 865+10.13
8	E	15'-0"	864+00.70 TO 864+30.56
8	E	15'-0" TO 12'-0"	864+30.56 TO 865+10.13
8	E	12'-0"	865+10.13 TO 877+50.00
8	E	12'-0" TO 0'-0"	877+50.00 TO 880+50.00
8	F	10'-0"	864+00.70 TO 880+50.00

TYPICAL NO. 8

I-35 NB FULL DEPTH

STA. 682+04.35 TO STA. 691+52.07
STA. 693+80.38 TO STA. 711+33.35
STA. 851+51.60 TO STA. 860+67.40
STA. 864+00.70 TO STA. 880+50.00

(1) BACKFILL NOTE:
TO BE BACKFILLED AND COMPACTED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN TBSC.

(2) TOPSOIL NOTE:
THE CONTRACTOR SHALL STRIP ALL OF THE AVAILABLE TOPSOIL, STOCKPILE IT, AND PLACE IT BACK ON THE SECTION IN ACCORDANCE WITH SECTION 205 OF THE STANDARD SPECIFICATIONS. RESERVED TOPSOIL SHALL BE SPREAD FIRST ON THE COMPLETED SLOPES OF THE CUT SECTIONS AND THE REMAINDER ON COMPLETED FILL SLOPES OR OTHER PRIORITY AREAS LOCATED BY THE ENGINEER. ALL ADDITIONAL COSTS ASSOCIATED WITH OPERATIONS SHALL BE INCLUDED IN THE PAY ITEM FOR SALVAGED TOPSOIL, LUMP SUM.

THE GRADING LINE AS SHOWN ON THE TYPICAL AND CROSS SECTIONS IS TO THE TOP OF THE TOPSOIL. EARTHWORK QUANTITIES WERE NOT ADJUSTED FOR SALVAGE AND THE TOPSOIL QUANTITY IS INCLUDED IN THE MASS LINE BALANCE.

(3) DISTANCE MEASURED VERTICALLY FROM EDGE OF FINISHED GRADE SHOULDER.

ASSUMED PAVEMENT DESIGN

DESIGN			OKLAHOMA DEPARTMENT OF TRANSPORTATION ROADWAY DESIGN DIVISION
DRAWN			
CHECKED			TYPICAL SECTION (SHEET 4 OF 6)
APPROVED			
SQUAD			

COUNTY MCCLAIN HIGHWAY I-35 STATE JOB NO. 35589(04) SHEET NO. 0006

2/20/2024 F:\2022\00001-00500\022-00235\40-Design\Microstation\ODOT\DGN\35589(04)_SOUTHCUP-35589-TYPICAL03.dgn

OKLAHOMA DEPARTMENT OF TRANSPORTATION

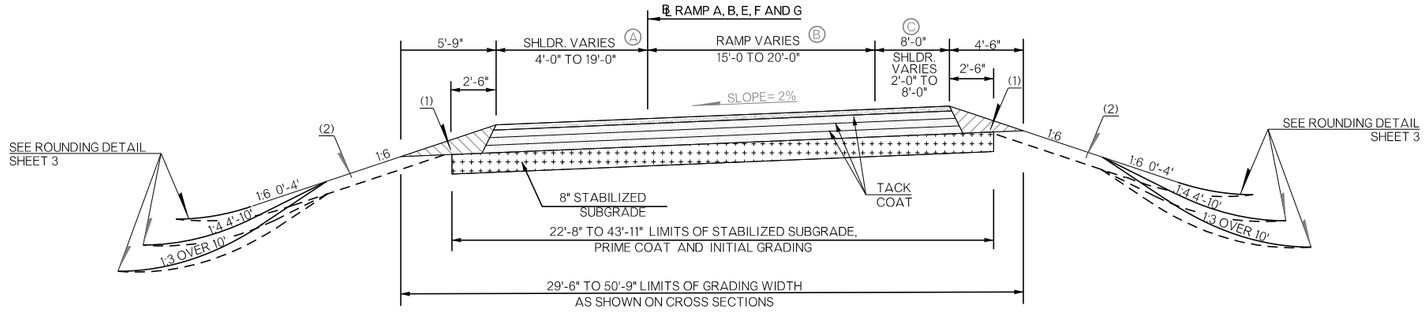
THIS DOCUMENT IS PRELIMINARY IN NATURE AND IS NOT A FINAL, SIGNED AND SEALED DOCUMENT.

2/20/2024

OKLAHOMA DEPARTMENT OF TRANSPORTATION

FINAL FIELD MEETING

2/20/2024



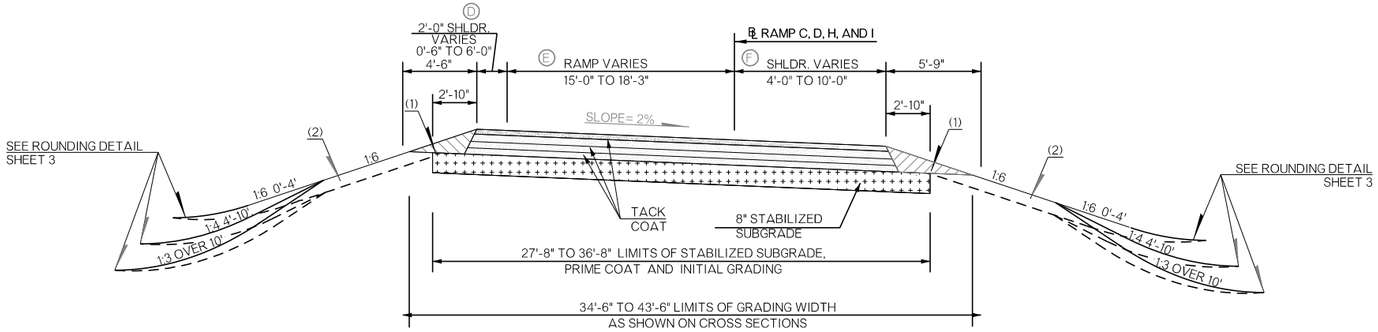
PAVEMENT REQUIREMENT			
11" PAVT. STRUCTURE	DRIVING LANES	INSIDE SHOULDER	OUTSIDE SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 64-22 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	2.5" SUPERPAVE TYPE S3 (PG 64-22 OK)	2.5" SUPERPAVE TYPE S3 (PG 64-22 OK)	2.5" SUPERPAVE TYPE S3 (PG 64-22 OK)
	2.5" SUPERPAVE TYPE S3 (PG 64-22 OK)	2.5" SUPERPAVE TYPE S3 (PG 64-22 OK)	2.5" SUPERPAVE TYPE S3 (PG 64-22 OK)

TYPICAL NO. 9

RAMP A, B, E, F, G

RAMP A - STA. 691+38.09 TO STA. 692+71.21
RAMP B - STA. 682+18.98 TO STA. 684+13.53
RAMP E - STA. 837+46.39 TO STA. 839+22.28
RAMP F - STA. 839+50.00 TO STA. 841+34.37
RAMP G - STA. 857+16.83 TO STA. 858+13.24

VARIABLE WIDTH TABLE				
TYPICAL SECTION	RAMP	SEGMENT	WIDTH	STATION EXTENT
9	A	A	9'-3" TO 4'-0"	691+38.09 TO 692+71.21
9	A	B	15'-0"	691+38.09 TO 692+71.21
9	A	C	2'-0"	691+38.09 TO 692+71.21
9	B	A	2'-0" TO 8'-8"	682+18.98 TO 684+13.53
9	B	B	20'-0" TO 17'-7"	682+18.98 TO 684+13.53
9	B	C	8'-0"	682+18.98 TO 684+13.53
9	E	A	8'-9" TO 4'-0"	837+46.39 TO 839+22.28
9	E	B	15'-0"	837+46.39 TO 839+22.28
9	E	C	2'-0"	837+46.39 TO 839+22.28
9	F	A	10'-0"	839+50.00 TO 841+34.37
9	F	B	15'-0" TO 18'-0"	839+50.00 TO 841+34.37
9	F	C	2'-0"	839+50.00 TO 841+34.37
9	G	A	0'-0" TO 19'-0"	857+16.83 TO 858+13.24
9	G	B	15'-0"	857+16.83 TO 858+13.24
9	G	C	2'-0" TO 4'-3"	857+16.83 TO 858+13.24



PAVEMENT REQUIREMENT			
10" PAVT. STRUCTURE	DRIVING LANES	INSIDE SHOULDER	OUTSIDE SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 64-22 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)	2" SUPERPAVE TYPE S4 (PG 64-22 OK)
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)
	2.5" SUPERPAVE TYPE S3 (PG 64-22 OK)	2.5" SUPERPAVE TYPE S3 (PG 64-22 OK)	2.5" SUPERPAVE TYPE S3 (PG 64-22 OK)
	2.5" SUPERPAVE TYPE S3 (PG 64-22 OK)	2.5" SUPERPAVE TYPE S3 (PG 64-22 OK)	2.5" SUPERPAVE TYPE S3 (PG 64-22 OK)

TYPICAL NO. 10

RAMP C, D, H, I

RAMP C - STA. 401+83.39 TO STA. 403+16.35
RAMP D - STA. 392+52.15 TO STA. 393+82.67
RAMP H - STA. 862+12.02 TO STA. 861+03.61
RAMP I - STA. 862+12.02 TO STA. 864+04.32

VARIABLE WIDTH TABLE				
TYPICAL SECTION	RAMP	SEGMENT	WIDTH	STATION EXTENT
10	C	D	2'-0"	401+72.71 TO 403+16.35
10	C	E	18'-3" TO 15'-0"	401+72.71 TO 703+16.35
10	C	F	10'-0" TO 4'-0"	401+72.71 TO 703+16.35
10	D	D	0'-6" TO 2'-0"	393+52.15 TO 394+83.67
10	D	E	15'-0"	393+52.15 TO 394+83.67
10	D	F	0'-6" TO 8'-8"	393+52.15 TO 394+83.67
10	H	D	2'-0" TO 3'-6"	860+44.44 TO 861+03.60
10	H	E	17'-11" TO 15'-0"	860+44.44 TO 861+03.60
10	H	F	10'-0"	860+44.44 TO 861+03.60
10	I	D	6'-0" TO 2'-0"	862+12.02 TO 862+55.03
10	I	D	2'-0"	862+55.03 TO 864+04.32
10	I	E	15'-0"	862+12.02 TO 864+04.32
11	I	F	10'-0"	862+12.02 TO 864+04.32

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(2) TOPSOIL NOTE:
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(3) DISTANCE MEASURED VERTICALLY FROM EDGE OF FINISHED GRADE SHOULDER.

ASSUMED PAVEMENT DESIGN

DESIGN		OKLAHOMA DEPARTMENT OF TRANSPORTATION ROADWAY DESIGN DIVISION
DRAWN		
CHECKED		TYPICAL SECTION (SHEET 5 OF 6)
APPROVED		
SQUAD		

COUNTY MCCLAIN HIGHWAY I-35 STATE JOB NO. 35589(04) SHEET NO. 0007

2/20/2024 F:\2022\00001-00500\0022-00235\40-Design\Microstation\ODOT\DGN\35589(04)_SOUTH\CJP-35589-TYPICAL04.dgn

OKLAHOMA DEPARTMENT OF TRANSPORTATION

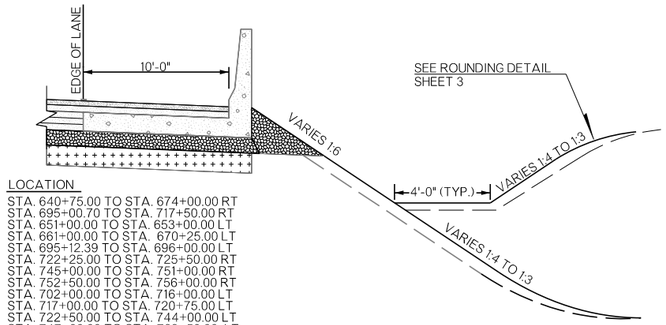
THIS DOCUMENT IS PRELIMINARY IN NATURE AND IS NOT A FINAL, SIGNED AND SEALED DOCUMENT.

2/20/2024

OKLAHOMA DEPARTMENT OF TRANSPORTATION

FINAL FIELD MEETING

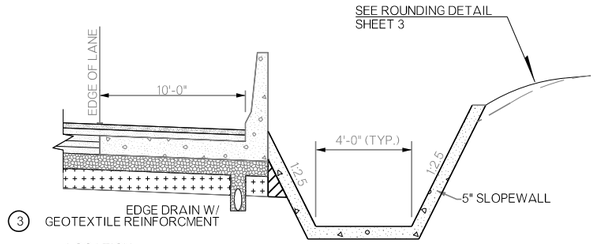
2/20/2024



LOCATION

STA. 640+75.00 TO STA. 674+00.00 RT
STA. 695+00.70 TO STA. 717+50.00 RT
STA. 651+00.00 TO STA. 653+00.00 LT
STA. 661+00.00 TO STA. 670+25.00 LT
STA. 695+12.39 TO STA. 696+00.00 LT
STA. 722+25.00 TO STA. 725+50.00 RT
STA. 745+00.00 TO STA. 751+00.00 RT
STA. 752+50.00 TO STA. 756+00.00 RT
STA. 702+00.00 TO STA. 716+00.00 LT
STA. 717+00.00 TO STA. 720+75.00 LT
STA. 722+50.00 TO STA. 744+00.00 LT
STA. 747+00.00 TO STA. 763+50.00 LT
STA. 764+00.00 TO STA. 769+50.00 RT
STA. 765+00.00 TO STA. 784+00.00 LT
STA. 794+00.00 TO STA. 798+50.00 LT
STA. 810+00.00 TO STA. 813+50.00 LT
STA. 816+00.00 TO STA. 836+32.63 LT
STA. 809+50.00 TO STA. 815+00.00 RT
STA. 866+00.00 TO STA. 880+50.00 RT
STA. 851+50.00 TO STA. 854+25.00 LT

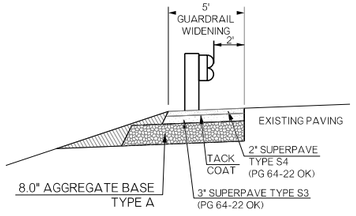
END CONDITION
DETAIL 1



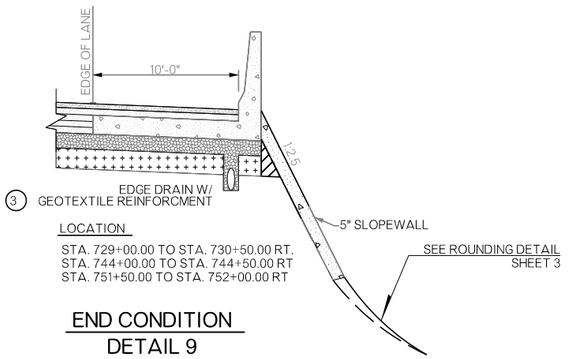
LOCATION

STA. 729+00.00 TO STA. 730+50.00 RT.
STA. 744+00.00 TO STA. 744+50.00 RT
STA. 751+50.00 TO STA. 752+00.00 RT

END CONDITION
DETAIL 8



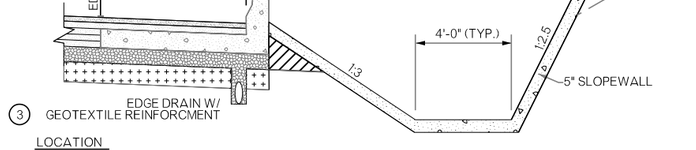
GUARDRAIL WIDENING
TYPICAL SECTION



LOCATION

STA. 729+00.00 TO STA. 730+50.00 RT.
STA. 744+00.00 TO STA. 744+50.00 RT
STA. 751+50.00 TO STA. 752+00.00 RT

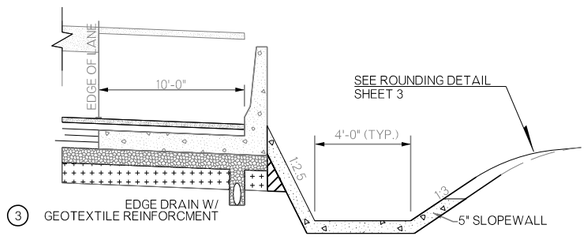
END CONDITION
DETAIL 9



LOCATION

STA. 676+75.00 TO STA. 679+25.00 RT
STA. 727+00.00 TO STA. 728+00.00 RT
STA. 731+00.00 TO STA. 732+50.00 RT

END CONDITION
DETAIL 4

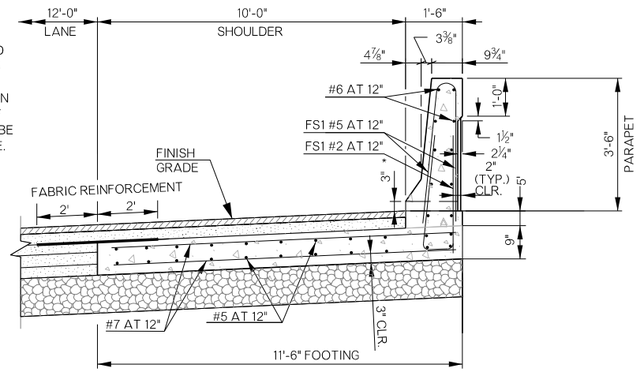


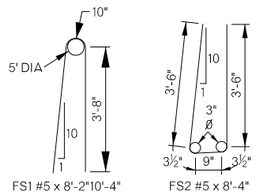
LOCATION

STA. 729+00.00 TO STA. 730+50.00 RT.
STA. 744+00.00 TO STA. 744+50.00 RT
STA. 751+50.00 TO STA. 752+00.00 RT
STA. 698+00.00 TO STA. 699+50.00 LT

END CONDITION
DETAIL 7

CONTRACTOR SHALL LOCATE AND CONSTRUCT 3"x6" SLOTTED DRAIN OPENINGS BETWEEN #5 BARS AT 2'-0" CENTERS. SEE ROADWAY PLAN SHEETS FOR LOCATIONS. COST OF SLOTTED DRAIN OPENINGS SHALL BE INCLUDED IN CLASS AA CONCRETE.





NOTE:
FS1 AND FS2 BARS, AND ALL MOMENT SLAB REINFORCING STEEL TO BE PAID FOR IN LB OF "REINFORCING STEEL". CONCRETE FOR 5" PEDESTAL AND MOMENT SLAB TO BE PAID FOR IN CY OF "CLASS AA CONCRETE". ALL OTHER MATERIALS TO BE UNCLUDED IN LINEAR FOOT COST OF "42" F-SHAPED PARAPET".

MOMENT SLAB DETAIL

SEE BARRIER SUMMARY FOR EXTENTS AND QUANTITITES

MOMENT SLAB QUANTITIES		
ITEM	UNIT	PER LINEAR FOOT
CLASS AA CONCRETE	CY	0.40
REIN FORCING STEEL	LB	90.00

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(3) DISTANCE MEASURED VERTICALLY FROM EDGE OF FINISHED GRADE SHOULDER.

ASSUMED PAVEMENT DESIGN

DESIGN			OKLAHOMA DEPARTMENT OF TRANSPORTATION ROADWAY DESIGN DIVISION
DRAWN			
CHECKED			TYPICAL SECTION (SHEET 6 OF 6)
APPROVED			
SQUAD			

COUNTY MCCLAIN HIGHWAY I-35 STATE JOB NO. 35589(04) SHEET NO. 0008

2/20/2024 F:\2022\00001-00500\022-00235\40-Design\Microstation\ODOT\DGN\35589(04)_SOUTH\CUP-35589-TYPICAL05.dgn