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, November 10, 2025

To: Pavement Design Committee

From: Pavement Design Engineer

Project: J3-1963(004) J/P: 31963(04) Highway: US-69 County: Mayes
Description: US-69: Pavement Rehabilitation from SH-20 extend north 8 miles
Project Length: 7.804 miles

Scheduled Letting Date: ***FFY 2026***

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:	$28,641,858
Flexible:	$1,272,923

B. Pavement Design:
I. Rigid:

US-69 in Town Mainline – Typical 1-4 & 8

Mainline	Shoulder
13.0” Dowel Jointed PC Pavement	13.0” Tied PC Shoulder
3.0” AC Type S3 (PG 64-22OK) -Woven Geosynthetic Reinforcement Fabric*	3.0” AC Type S3 (PG 64-22OK) -Shoulder w/ TBSC Type E -Woven Geosynthetic Reinforcement Fabric* -Edge drains as shown on plans
8.0” Compacted Subgrade	8.0” Compacted Subgrade

*Project Special Provisions: SP 326-002(a-b)19_240315 & SP 712-001(a-b)19_241212

US-69 Southbound North of Town – Typical 5-7

Mainline	Shoulder
11.0” Dowel Jointed PC Pavement	11.0” Tied PC Shoulder
3.0” AC Type S3 (PG 64-22OK)	3.0” AC Type S3 (PG 64-22OK)
8.0” Aggregate Base Type A -Woven Geosynthetic Reinforcement Fabric*	8.0” Aggregate Base Type A -Shoulder w/ TBSC Type E (open graded) -Woven Geosynthetic Reinforcement Fabric*
8.0” Stabilized Subgrade	8.0” Stabilized Subgrade

*Project Special Provisions: SP 326-002(a-b)19_240315 & SP 712-001(a-b)19_241212

US-69 Northbound North of Town

Left Turn Lane	Shoulder
11.0" Dowel Jointed PC Pavement	11.0" Tied PC Shoulder
3.0" AC Type S3 (PG 64-22OK)	3.0" AC Type S3 (PG 64-22OK)
	8.0" Aggregate Base Type A -Shoulder w/ TBSC Type E (open graded) -Woven Geosynthetic Reinforcement Fabric*
8.0" Stabilized Subgrade	8.0" Stabilized Subgrade

II. Flexible:

US-69 – Northbound North of Town

Right Turn Lane	Shoulder
2.0" AC Type S4 (PG 70-28OK)	2.0" AC Type S4 (PG 64-22OK)
3.0" AC Type S3 (PG 70-28OK)	3.0" AC Type S3 (PG 64-22OK)
3.5" AC Type S3 (PG 64-22OK)	3.5" AC Type S3 (PG 64-22OK)
3.5" AC Type S3 (PG 64-22OK)	3.5" AC Type S3 (PG 64-22OK)
8.0" Stabilized Subgrade	8.0" Stabilized Subgrade

Section Line Road E/W 450 – Typical 16

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)
3.0" AC Type S3 (PG 64-22OK)	3.0" AC Type S3 (PG 64-22OK)
8.0" Stabilized Subgrade	8.0" Stabilized Subgrade

US-69 – Temporary Median Crossover

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)
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" Compacted Subgrade	8.0" Compacted Subgrade

US-69 – Northbound North of Town

Shoulder
2.0" AC Type S4 (PG 64-22OK)
2.0" Cold Milling

C. Project and Design Information:

Adjoining Pavement Type	ACC over PCC and PCC
Current Traffic Volume (ADT) - 2028	22,075 vehicles/ day
20 Year Projected Traffic Volume (ADT) - 2048	26,626 vehicles/ day
20 Year ESAL for Binder Grade Selection	N/A
Highway Type	Arterial
Heavy Truck Percentage	31%
Project Type	Full Depth, Turn lane Widening
Design Life Overlay (yrs)	N/A
Design Life Full Depth (yrs)	30
Design Life Temp Pavement (yrs)	N/A
Is the Project Federally Funded?	Yes
Pavement Design Methodology	Darwin
Project Soil Classifications	A-2-4, A-4, A-6, A-7-6
Design Resilient Modulus (psi)	3,800
Soluble Sulfate Concentrations > 3,000 ppm	No
Corrosive Soils Present?	No
Shallow Bedrock Present?	No
Rock Rippability Issues Expected?	No
Shallow Groundwater Present?	Yes[1]
Slope Stability Concerns?	No
Embankment Settlement Concerns?	No

Project and Design Information Comments and Details:

1. Water was encountered in boring IP-21 directly under the Portland cement concrete pavement. No water was encountered in the remaining boring.

Each Geotech report should be read in its entirety.

Existing Pavement Information:

The existing pavement of US 69 northbound shoulder along the project consisted of asphalt concrete over aggregate base or subgrade. The total thickness of the asphalt concrete in the roadway cores ranged between 8 to 17 inches. The total thickness of the aggregate base in the roadway cores ranged between 3 to 13.5 inches. Core C-1 was observed to be supported by 14 inches of cement stabilized subgrade.

Full depth pavement core samples were recovered from all coring locations. Within the asphalt concrete section, separation and stripping were observed in the majority of the cores along the project. Deterioration due to stripping was observed in cores C-3, C-19, and C-26. **Separation, stripping and/or deterioration are an indication of prolonged exposure to moisture. Drainage may be an issue in these areas of the project.**

D. Final Pavement Design Recommendation:

US-69 Mainline: Rigid & Flexible

Reason for Pavement Design Material Selection:

Consistent with existing.

Oklahoma Department of Transportation
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200 N.E. 21st Street
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Pavement Design Notes:

2. 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:

Janet Reed, P.E.
Pavement Design Engineer

Eduardo Elder
Eduardo Elder (Nov 10, 2025 11:02:13 CST)

CONCUR: Trapper Parks, P.E.
District 8 Engineer

for Eduardo Elder, 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

OKLAHOMA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISIONS
FOR
WOVEN GEOSYNTHETIC REINFORCEMENT FABRIC FOR PAVEMENT
PROJECT NUMBER, JP NO. 31963(04), MAYES COUNTY

This special provision amends, and where in conflict, supersedes applicable sections of the 2019 Standard Specifications for Highway Construction.

326.01 DESCRIPTION *(Add the following:)*

This work consists of installing woven geosynthetic reinforcement fabric for use in pavement construction. Provide a woven fabric capable of layer separation, water filtration, aggregate confinement, subgrade reinforcement, and subgrade stabilization.

326.02 MATERIALS *(Add the following:)*

Use woven geosynthetic reinforcement fabric that is an integrally-formed single layer structure.

Provide woven geosynthetic reinforcement fabric in accordance with Subsection 712.11, "Woven Geosynthetic Reinforcement Fabric for Pavement."

326.04 CONSTRUCTION METHODS *(Add the following:)*

A. General

Exercise caution when placing the woven geosynthetic reinforcement fabric. Ensure the fabric is free of holes, except in areas where guardrail posts or sign posts are needed. Repair damages to the fabric at no additional cost to the Department.

Ensure the seam is free of voids between the two layers of fabric material. Extend the fabric across the entire grading section of the roadway, or as specified in the typical section of the plans.

Ensure that all of the woven geosynthetic reinforcement fabric manufacturer's recommended installation practices are followed.

326.05 METHOD OF MEASUREMENT *(Add the following:)*

Measure and pay for accepted quantities of woven geosynthetic reinforcement fabric by the square yard in place with no allowance for laps.

326.06 BASIS OF PAYMENT *(Add the following:)*

The Department will pay for each pay item at the contract unit price per the specified pay unit as follows:

Pay Item:	Pay Unit:
(C) WOVEN GEOSYNTHETIC REINFORCEMENT FABRIC	Square Yard

Include the cost of preparing, grading, and rolling the site to be included in the contract unit price for *woven geosynthetic reinforcement fabric*. Payment is considered full compensation for furnishing all material, equipment, labor, and incidentals to complete the work as specified.

OKLAHOMA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISIONS
FOR
WOVEN GEOSYNTHETIC REINFORCEMENT FABRIC FOR PAVEMENT
PROJECT NUMBER, JP NO. 31963(04), MAYES COUNTY

These Special Provisions revise, amend, and where in conflict, supersede applicable sections of the 2019 Standard Specifications for Highway Construction.

(Add the following:)

712.11 WOVEN GEOSYNTHETIC REINFORCEMENT FABRIC FOR PAVEMENT

A. General

This subsection covers woven geosynthetic reinforcement fabrics for pavement structures.

B. Requirements

Provide a woven geosynthetic reinforcement fabric that meets the physical, index, and mechanical property requirements shown in Tables 712:5, 712:6, and 712:7.

Table 712:5
Physical Property Requirements for Woven Geosynthetic Reinforcement Fabric

Physical Properties	Minimum Average Roll Value
Mass / Area	9.0 oz/yd^2
Roll Length	300 feet
Roll Width	15 feet

Table 712:6
Index Property Requirements for Woven Geosynthetic Reinforcement Fabric

Index Properties	Test Method	Requirements
Maximum Apparent Opening Size	ASTM D 4751	40 US Sieve [0.425 mm]
Minimum Permittivity	ASTM D 4491	0.9 sec^{-1} [a]
Maximum Average Filtration Pore Size O_{95}	ASTM D 6767	460 microns
Maximum Average Filtration Pore Size O_{85}	ASTM D 6767	400 microns
Maximum Average Filtration Pore Size O_{60}	ASTM D 6767	340 microns
Maximum Average Filtration Pore Size O_{50}	ASTM D 6767	280 microns
Minimum UV Resistance at 500 Hours	ASTM D 4355	90% strength retained

[a] The permittivity of the *Woven Geosynthetic Reinforcement Fabric* should also be greater than that of the underlying soil.

Table 712:7 Mechanical Property Requirements for Woven Geosynthetic Reinforcement Fabric			
Mechanical Properties	Test Method	Requirements (Machine Direction & Cross-Machine Direction)	
		MD	CD
Minimum Tensile Strength @ 2% strain	ASTM D 4595	600 lb/ft	1,000 lb/ft
Minimum Tensile Strength @ 5%	ASTM D 4595	1,800 lb/ft	2,200 lb/ft
Minimum Grab Strength	ASTM D 4632	475 lbs	350 lbs
Minimum Strain at Rupture	ASTM D 4632	8%	7%
Minimum Trapezoidal Tear Strength	ASTM D 4533	120 lbs	130 lbs
Minimum Static Puncture Strength (50 mm Probe)	ASTM D 6241	1,750 lbs	

RED ROCK
CONSULTING

Pavement Design Report

US HIGHWAY 69
MAYES COUNTY, OKLAHOMA

31963(04)

Prepared For:

SRB
100 Northeast 5th Street
Oklahoma City, Oklahoma 73104
Attention: Mr. Greg Allen, PE

Prepared By:

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

June 5, 2025 – **REVISION 3**
Project No. 23037

RED ROCK
CONSULTING

June 5, 2025 – **REVISION 3**

SRB
100 Northeast 5th Street
Oklahoma City, Oklahoma 73104

Attention: Mr. Greg Allen, PE

Re: Pavement Design Report
US Highway 69
Mayes County, Oklahoma
31963(04)
RRC Project No. 23037

Dear Mr. Allen,

We are pleased to submit herewith this report entitled "Pavement Design Report, US Highway 69, Mayes County, Oklahoma, 31963(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. 06/30/27

Emma Coggin, EI
Project Specialist

Jeremy Basler, PE
Geotechnical Manager
Oklahoma PE No. 20233

PAVEMENT DESIGN REPORT

US HIGHWAY 69
MAYES COUNTY, OKLAHOMA

31963(04)

PROJECT NO. 23037

APPENDICES

PAVEMENT DESIGN REPORT

US HIGHWAY 69
MAYES COUNTY, OKLAHOMA

31963(04)

PROJECT NO. 23037

INTRODUCTION

General

This report presents the results for the typical concrete pavement section recommendations for the proposed reconstruction of the existing US 69 from State Highway 20 and extending north approximately 8.0 miles in Mayes County, Oklahoma.

Proposed Construction

The project includes the reconstruction of the existing US 69 from State Highway 20 and extending north approximately 8.0 miles in Mayes County, Oklahoma. Beginning at State Highway 20 and extending north approximately 0.75 miles through the City of Pryor, the existing pavement associated with the 5 lane curb and gutter section will be reconstructed. From 0.75 miles north of State Highway 20 and extending north for approximately 7.25 miles, the southbound lanes will be reconstructed. Also included in the project are the construction of northbound and southbound turn lanes, the mill and overlay of the northbound shoulder and a temporary median crossover.

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 In Place Soils Survey and Pavement and Subgrade/Shoulder Soils Survey.

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

PAVEMENT RECOMMENDATIONS

Recommendations for designing the new concrete pavement sections using a 30-year design life were requested. An asphalt concrete pavement section for a temporary median crossover was confirmed for a 2-year design life. The concrete and asphalt pavement design analysis were performed using the AASHTO 1993 DARWin Pavement Design 2.01 computer software. Information considered in the design is discussed briefly below.

The 2028 average daily traffic (ADT) by vehicle classification was provided by SRB to use to calculate the traffic data for the new concrete pavement design for this project. Summaries of the traffic data for US Highway 69 In Town and US Highway 69 North of Town are provided in Tables 1 and 2.

Table 1 – US Highway 69 In Town Traffic Data

Parameter	Value	Parameter	Value
ADT (2028):	22,075	Design Res. Mod. (psi):	3,800
ADT (2048):	26,326	Trucks (T):	31%
20 Year Rigid ESALs:	105,623,286	D (Directional Dist.):	59%
30 Year Rigid ESALs:	166,860,161	L (Lane Dist.):	80%

*ESALs determined by AASHTO 1993 DARWin Pavement Design 2.01 computer software

Table 2 – US Highway 69 North of Town Traffic Data

Parameter	Value	Parameter	Value
ADT (2028):	12,639	Design Res. Mod. (psi):	3,800
ADT (2048):	15,571	Trucks (T):	31%
20 Year Rigid ESALs:	55,891,467	D (Directional Dist.):	54%
30 Year Rigid ESALs:	88,771,591	L (Lane Dist.):	80%

*ESALs determined by AASHTO 1993 DARWin Pavement Design 2.01 computer software

The jointed plain concrete pavement (JPCP) should have 12 foot slabs with approximate 15 foot joints, 1 ½" diameter dowels and 12" dowel spacing. The material for the base course is assumed to be ODOT Type 'A' Aggregate Base. The hot mixed asphalt (HMA) courses include PG 70-28 OK and PG 64-22 OK binders.

Resilient modulus results from the In Place Survey associated with this project were used to determine the resilient modulus for the existing subgrade layer. A Mr value of 3,800 psi was used for the subgrade. Mix design and laboratory testing were not conducted for the stabilized subgrade or aggregate base layers. Mr values of 15,000 and 30,000 psi were assumed for the stabilized subgrade and aggregate base layers, respectively.

Based on the design traffic provided, the recommended concrete pavement sections for a 30-year design life are shown in Tables 3 to 5. All materials and construction procedures

should meet applicable Oklahoma Department of Transportation (ODOT) specifications. The AASHTO 1993 DARWin designs are provided in Appendix A.

Table 3 – US Highway 69 In Town Mainline Tied Concrete Pavement Section with S3

Material	Thickness
Portland Cement 1 ½" Dowel Jointed Concrete	13"
Superpave Type S3 (PG 64-22 OK)	3"
Compacted Subgrade	8"

Table 4 – US Highway 69 In Town Mainline Tied Concrete Pavement Section with Open Graded Aggregate Base

Material	Thickness
Portland Cement 1 ½" Dowel Jointed Concrete	13"
Open Graded Aggregate Base	3"
Mirafi RS 580i Geotextile Reinforcement	
Compacted Subgrade	8"

Table 5 – *US Highway 69 Southbound North of Town Tied Concrete Pavement Section Aggregate Base and Stabilized Subgrade

Material	Thickness
Portland Cement 1 ½" Dowel Jointed Concrete	11"
Superpave Type S3 (PG 64-22 OK)	3"
Aggregate Base	8"
Mirafi RS 380i Geotextile Reinforcement	
Stabilized Subgrade	8"

*This pavement section also represents the tied PC shoulders

Based on the design traffic provided, the recommended asphalt concrete pavement section for a temporary median crossover with a 2-year design life is shown in Table 6. All materials and construction procedures should meet applicable Oklahoma Department of Transportation (ODOT) specifications. The AASHTO 1993 DARWin design is provided in Appendix A.

Table 6 – US Highway 69 Temporary Median Crossover Full Depth Asphalt Concrete 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)	3”
Superpave Type S3 (PG 64-22 OK)	3"

Based on the design traffic provided, the recommended concrete pavement section for a 30-year design life is shown in Table 7. All materials and construction procedures should meet applicable Oklahoma Department of Transportation (ODOT) specifications. The AASHTO 1993 DARWin design is provided in Appendix A.

Table 7 – *US Highway 69 Northbound North of Town Left Turn Lane and Shoulder Tied Concrete Pavement Section

Material	Thickness
Portland Cement 1 ½” Dowel Jointed Concrete	11"
Superpave Type S3 (PG 64-22 OK)	3”
Aggregate Base	8”
Mirafi RS 380i Geotextile Reinforcement	
Stabilized Subgrade	8"

*This pavement section also represents the tied PC shoulders

The pavement section on the plans provided by SRB for the right turn lane and shoulder is shown in Table 8. Traffic data was not provided for the right turn lane and shoulder, but the ADT for the pavement section is estimated to be 1,900.

Table 8 – US Highway 69 Northbound North of Town Right Turn Lane and Shoulder Asphalt Concrete Pavement Section

Material	Thickness
Superpave Type S4 (PG 70-28 OK)	2"
Superpave Type S3 (PG 70-28 OK)	3”
Superpave Type S3 (PG 64-22 OK)	3.5”
Superpave Type S3 (PG 64-22 OK)	3.5”
Stabilized Subgrade	8"

The pavement section on the plans provided by SRB for the mill and overlay of the shoulder is shown in Table 9. Pavement design or confirmation of the following section was not performed due to traffic data not being available for the shoulder.

Table 9 – US Highway 69 Northbound North of Town Shoulder Mill and Overlay Pavement Section

Material	Thickness
Superpave Type S4 (PG 64-22 OK)	2"

The pavement section on the plans provided by SRB for the Section Line E/W 450 Road is shown in Table 10. Traffic data was not provided for the Section Line E/W 450 Road, but the ADT for the pavement section is estimated to be 280.

Table 10 – Section Line E/W 450 Road Asphalt Concrete Pavement Section

Material	Thickness
Superpave Type S4 (PG 64-22 OK)	2"
Superpave Type S3 (PG 64-22 OK)	3”
Superpave Type S3 (PG 64-22 OK)	3”
Stabilized Subgrade	8"

The subgrade preparation, compaction, aggregate base, geotextile reinforcement and stabilized subgrade 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. 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 include crowning the pavement subgrades 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. Shoulders at least 2 feet in width and/or curb and guttering along both sides of the roadway will prolong the life of the pavement by providing edge support and minimizing subgrade moisture intrusion. 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 SRB, 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.

APPENDIX A

1993 AASHTO Pavement Design

DARWin(tm) Pavement Design System

A Proprietary AASHTOWARE(tm)
Computer Software Product

Red Rock Consulting
PO Box 30591
Edmond, OK 73003
JWB

Rigid Structural Design Module

US 69 In Town Concrete with S3

Rigid Structural Design Module Data

Pavement type	JPCP
18-kip ESALs for initial performance period	166,860,161
Initial Serviceability	4.5
Terminal Serviceability	2
28-day mean PCC Modulus of Rupture (psi)	690
28-day mean Elastic Modulus of Slab (psi)	4,200,000
Mean Effective k-value (psi/in)	270
Reliability Level (%)	90
Overall Standard Deviation	.35
Load Transfer Coefficient, J	2.5
Overall Drainage Coefficient, Cd	1
Stage Construction	1

Calculated Design Thickness (in): 12.34

Transverse Joint Spacing

Joint Spacing (ft): 15.00

Tie Bar Steel Design

Steel Grade (ksi)	40
Distance to Free Edge (ft)	12
Slab Thickness (in)	12
Friction Factor	.9
Percent of yield strength	70
Bar Size	#4
Calculated Maximum Tie Bar Spacing (in)	42.4
Calculated Recommended Maximum Tie Bar Spacing (in)	42.4
Calculated Tie Bar Length (in)	23.0
Calculated Area of Steel (in^2/ft)	.056

Joint Load Transfer

Dowel Material	
Dowel Diameter (in)	1.5
Dowel Length (in)	18
Dowel Spacing (in)	12
Dowel Coating	

Joint Reservoir and Sealant Design

PCC Coefficient of Thermal Contraction (10^-6 in/in F)	3.8
Temperature Range From PCC Placement to Minimum Temperature (F)	67.7
Drying Shrinkage Coefficient of PCC Slab (in/in)	.0006
Adjustment Factor for Friction B/T Slab and Subbase	.65
Sealant Type	Bit.-Based
Allowable Sealant Strain	.25
Sealant Shape Factor (D/W)	.65
Calculated Joint Opening (in)	.100
Calculated Recommended Minimum Joint Reservoir Width (in)	.40
Calculated Joint Sealant Depth (in)	.26

Pavement Layer Information

Layer	Description	Thickness (in)	Width (ft)
1	JPCP	13.00	12.00
2	S3	3.00	12.00
Total		16.00	

Simple ESAL Calculation

Performance Period (years)	30
Two-Way Daily Traffic (ADT)	22,075
Percent Heavy Trucks (of ADT) FHWA Class 5 or Greater	31
Number of Lanes In Design Direction	2
Percent of All Trucks In Design Lane (%)	80
Percent Trucks In Design Direction (%)	59
Average Initial Truck Factor (ESALs/truck)	4.066
Annual Truck Factor Growth Rate (%)	0
Annual Truck Volume Growth Rate (%)	1
Growth	Compound

Total Calculated Cumulative Esals: 166,860,161

1993 AASHTO Pavement Design

DARWin(tm) Pavement Design System

A Proprietary AASHTOWARE(tm)
Computer Software Product

Red Rock Consulting
PO Box 30591
Edmond, OK 73003
JWB

Rigid Structural Design Module

US 69 In Town Concrete with Open Graded Aggregate Base

Rigid Structural Design Module Data

Pavement type	JPCP
18-kip ESALs for initial performance period	166,860,161
Initial Serviceability	4.5
Terminal Serviceability	2
28-day mean PCC Modulus of Rupture (psi)	690
28-day mean Elastic Modulus of Slab (psi)	4,200,000
Mean Effective k-value (psi/in)	200
Reliability Level (%)	90
Overall Standard Deviation	.35
Load Transfer Coefficient, J	2.5
Overall Drainage Coefficient, Cd	1
Stage Construction	1

Calculated Design Thickness (in): 12.51

Transverse Joint Spacing

Joint Spacing (ft): 15.00

Tie Bar Steel Design

Steel Grade (ksi)	40
Distance to Free Edge (ft)	12
Slab Thickness (in)	13
Friction Factor	1.5
Percent of yield strength	70
Bar Size	#4
Calculated Maximum Tie Bar Spacing (in)	23.5
Calculated Recommended Maximum Tie Bar Spacing (in)	23.5
Calculated Tie Bar Length (in)	23.0
Calculated Area of Steel (in^2/ft)	.100

Joint Load Transfer

Dowel Material	
Dowel Diameter (in)	1.5
Dowel Length (in)	18
Dowel Spacing (in)	12
Dowel Coating	

Joint Reservoir and Sealant Design

PCC Coefficient of Thermal Contraction (10^-6 in/in F)	3.8
Temperature Range From PCC Placement to Minimum Temperature (F)	67.7
Drying Shrinkage Coefficient of PCC Slab (in/in)	.0006
Adjustment Factor for Friction B/T Slab and Subbase	.8
Sealant Type	Bit.-Based
Allowable Sealant Strain	.25
Sealant Shape Factor (D/W)	.65
Calculated Joint Opening (in)	.123
Calculated Recommended Minimum Joint Reservoir Width (in)	.49
Calculated Joint Sealant Depth (in)	.32

Pavement Layer Information

Layer	Description	Thickness (in)	Width (ft)
1	JPCP	13.00	12.00
2	Open Graded Aggregate Base	3.00	12.00
Total		16.00	

Simple ESAL Calculation

Performance Period (years)	30
Two-Way Daily Traffic (ADT)	22,075
Percent Heavy Trucks (of ADT) FHWA Class 5 or Greater	31
Number of Lanes In Design Direction	2
Percent of All Trucks In Design Lane (%)	80
Percent Trucks In Design Direction (%)	59
Average Initial Truck Factor (ESALs/truck)	4.066
Annual Truck Factor Growth Rate (%)	0
Annual Truck Volume Growth Rate (%)	1
Growth	Compound
Total Calculated Cumulative Esals	166,860,161

1993 AASHTO Pavement Design

DARWin(tm) Pavement Design System

A Proprietary AASHTOWARE(tm)
Computer Software Product

Red Rock Consulting
PO Box 30591
Edmond, OK 73003
JWB

Rigid Structural Design Module

US 69 North of Town Stabilized Subgrade w Agg Base Concrete

Rigid Structural Design Module Data

Pavement type:	JPCP
18-kip ESALs for initial performance period:	88,771,591
Initial Serviceability:	4.5
Terminal Serviceability:	2
28-day mean PCC Modulus of Rupture (psi):	690
28-day mean Elastic Modulus of Slab (psi):	4,200,000
Mean Effective k-value (psi/in):	400
Reliability Level (%):	90
Overall Standard Deviation:	.35
Load Transfer Coefficient, J:	2.5
Overall Drainage Coefficient, Cd:	1
Stage Construction:	1

Calculated Design Thickness (in): 10.94

Transverse Joint Spacing

Joint Spacing (ft): 15.00

Tie Bar Steel Design

Steel Grade (ksi):	40
Distance to Free Edge (ft):	12
Slab Thickness (in):	12
Friction Factor:	1.8
Percent of yield strength:	70
Bar Size:	#4

Calculated Maximum Tie Bar Spacing (in): 21.2

Calculated Recommended Maximum Tie Bar Spacing (in): 21.2
Calculated Tie Bar Length (in): 23.0
Calculated Area of Steel (in^2/ft): .111

Joint Load Transfer

Dowel Material:
Dowel Diameter (in): 1.5
Dowel Length (in): 18
Dowel Spacing (in): 12
Dowel Coating:

Joint Reservoir and Sealant Design

PCC Coefficient of Thermal Contraction (10^-6 in/in F): 3.8
Temperature Range From PCC Placement to Minimum Temperature (F): 67.7
Drying Shrinkage Coefficient of PCC Slab (in/in): .0006
Adjustment Factor for Friction B/T Slab and Subbase: .65
Sealant Type: Bit.-Based
Allowable Sealant Strain: .25
Sealant Shape Factor (D/W): 1.5

Calculated Joint Opening (in): .100
Calculated Recommended Minimum Joint Reservoir Width (in): .40
Calculated Joint Sealant Depth (in): .60

Pavement Layer Information

Layer	Description	Thickness (in)	Width (ft)
1	JPCP	11.00	12.00
2	HMA	3.00	12.00
3	Crushed Rock	8.00	12.00
4	Stabilized Subgrade	8.00	12.00
Total		30.00	

Simple ESAL Calculation

Performance Period (years):	30
Two-Way Daily Traffic (ADT):	12,639
Percent Heavy Trucks (of ADT) FHWA Class 5 or Greater:	31
Number of Lanes In Design Direction:	2
Percent of All Trucks In Design Lane (%):	80
Percent Trucks In Design Direction (%):	54
Average Initial Truck Factor (ESALs/truck):	4.066
Annual Truck Factor Growth Rate (%):	0
Annual Truck Volume Growth Rate (%):	1.1
Growth:	Compound
Total Calculated Cumulative Esals:	88,771,591

1993 AASHTO Pavement Design

DARWin(tm) Pavement Design System

A Proprietary AASHTOWARE(tm)
Computer Software Product

Red Rock Consulting
PO Box 30591
Edmond, OK 73003
JWB

Flexible Structural Design Module

US 69 North of Town Temporary Median Crossover Asphalt

Flexible Structural Design Module Data

18-kip ESALs Over
Initial Performance Period: 2,956,462
Initial Serviceability: 4.2
Terminal Serviceability: 2
Reliability Level (%): 90
Overall Standard Deviation: .45
Roadbed Soil Resilient Modulus (PSI): 3,800
Stage Construction: 1

Calculated Design Structural Number: 4.86

Specified Layer Design

Layer	Material Description	Struct. Coef. (Ai)	Drain. Coef. (Mi)	Thickness (Di) (in)	Width (ft)	Calculated SN
1	Asphalt	.44	1	11	20	4.84
Total				11.00		4.84

Simple ESAL Calculation

Performance Period (years):	2
Two-Way Daily Traffic (ADT):	12,639
Percent Heavy Trucks (of ADT) FHWA Class 5 or Greater:	31
Number of Lanes In Design Direction:	2
Percent of All Trucks In Design Lane (%):	80
Percent Trucks In Design Direction (%):	54
Average Initial Truck Factor (ESALs/truck):	2.378
Annual Truck Factor Growth Rate (%):	0
Annual Truck Volume Growth Rate (%):	1.1
Growth:	Compound
Total Calculated Cumulative Esals:	2,956,462

1993 AASHTO Pavement Design

DARWin(tm) Pavement Design System

A Proprietary AASHTOWARE(tm)
Computer Software Product

Red Rock Consulting
PO Box 30591
Edmond, OK 73003
JWB

Flexible Structural Design Module

US 69 NB North of Town Right Turn Lane and Shoulder

Flexible Structural Design Module Data

18-kip ESALs Over
Initial Performance Period: 18,066,566
Initial Serviceability: 4.2
Terminal Serviceability: 2
Reliability Level (%): 90
Overall Standard Deviation: .45
Roadbed Soil Resilient Modulus (PSI): 3,800
Stage Construction: 1

Calculated Design Structural Number: 6.16

Specified Layer Design

Layer	Material Description	Struct. Coef. (Ai)	Drain. Coef. (Mi)	Thickness (Di) (in)	Width (ft)	Calculated SN
1	Asphalt	.44	1	12	12	5.28
2	Stabilized Subgrade	.11	1	8	12	.88
Total				20.00		6.16

Simple ESAL Calculation

Performance Period (years):	30
Two-Way Daily Traffic (ADT):	1,900
Percent Heavy Trucks (of ADT) FHWA Class 5 or Greater:	31
Number of Lanes In Design Direction:	1
Percent of All Trucks In Design Lane (%):	100
Percent Trucks In Design Direction (%):	100
Average Initial Truck Factor (ESALs/truck):	2.378
Annual Truck Factor Growth Rate (%):	0
Annual Truck Volume Growth Rate (%):	1.1
Growth:	Compound
Total Calculated Cumulative Esals:	18,066,566

1993 AASHTO Pavement Design

DARWin(tm) Pavement Design System

A Proprietary AASHTOWARE(tm)
Computer Software Product

Red Rock Consulting
PO Box 30591
Edmond, OK 73003
JWB

Flexible Structural Design Module

Section Line E/W 450 Road

Flexible Structural Design Module Data

18-kip ESALs Over
Initial Performance Period: 1,437,718
Initial Serviceability: 4.2
Terminal Serviceability: 2
Reliability Level (%): 90
Overall Standard Deviation: .45
Roadbed Soil Resilient Modulus (PSI): 3,800
Stage Construction: 1

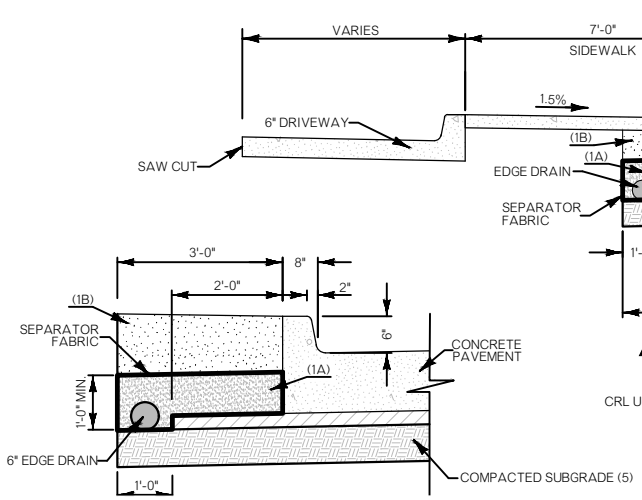
Calculated Design Structural Number: 4.40

Specified Layer Design

Layer	Material Description	Struct. Coef. (Ai)	Drain. Coef. (Mi)	Thickness (Di) (in)	Width (ft)	Calculated SN
1	Asphalt	.44	1	8	12	3.52
2	Stabilized Subgrade	.11	1	8	12	.88
Total				16.00		4.40

Simple ESAL Calculation

Performance Period (years):	30
Two-Way Daily Traffic (ADT):	280
Percent Heavy Trucks (of ADT) FHWA Class 5 or Greater:	31
Number of Lanes In Design Direction:	1
Percent of All Trucks In Design Lane (%):	100
Percent Trucks In Design Direction (%):	54
Average Initial Truck Factor (ESALs/truck):	2.378
Annual Truck Factor Growth Rate (%):	0
Annual Truck Volume Growth Rate (%):	1.1
Growth:	Compound
Total Calculated Cumulative Esals:	1,437,718



EDGE DRAIN & INTEGRAL CURB DETAIL

6" BARRIER

N.T.S.

TYPICAL SECTION 1

CRL US-69 STA. 1306+09.21 TO STA. 1308+78.09 (LT. SIDE) CRL US-69 STA. 1308+25.18 TO STA. 1308+78.09 (RT. SIDE)

PAVEMENT REQUIREMENT	
16" PAVT. STRUCTURE	LANES
SURFACE COURSE	13" DOWEL JOINTED PC CONCRETE
BASE COURSE	3" OPEN-GRADED PORTLAND CEMENT BASE

NOTE:
IN ACCORDANCE WITH ODOT STD. CSCD-6 (LATEST REV), ALL INTEGRAL CURBS REQUIRED TO CONSTRUCT DRIVEWAYS WILL BE CONSIDERED INCIDENTAL TO DRIVEWAY CONSTRUCTION AND IS TO BE INCLUDED IN THE PRICE BID FOR CONCRETE DRIVEWAY.

ALL CURBS OR SLOPED CONCRETE REQUIRED TO TIE SIDEWALKS TO ADJACENT FEATURES WILL BE CONSIDERED INCIDENTAL TO SIDEWALK CONSTRUCTION AND IS TO BE INCLUDED IN THE PRICE BID FOR 4" SIDEWALK.

(1A) BACKFILL NOTE:
TO BE BACKFILLED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN T.B.S.C. TYPE E. QUANTITY IS COMPUTED AT 0.32 TON PER LF (0.16 TON PER SIDE).

(1B) BACKFILL NOTE:
TO BE BACKFILLED AND COMPACTED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN UNCLASSIFIED BORROW.

(5) COMPACTED SUBGRADE NOTE:
TO BE COMPACTED TO AT LEAST 95% OF MAXIMUM DENSITY AND WITHIN 2% OF OPTIMUM MOISTURE CONTENT PER SECTION 202.04A.(5)(b)(2). MOISTURE CONTENT SHALL BE VERIFIED IMMEDIATELY PRIOR TO THE PLACEMENT OF THE PAVEMENT SECTION. COST TO BE INCLUDED IN OTHER ITEMS OF WORK.

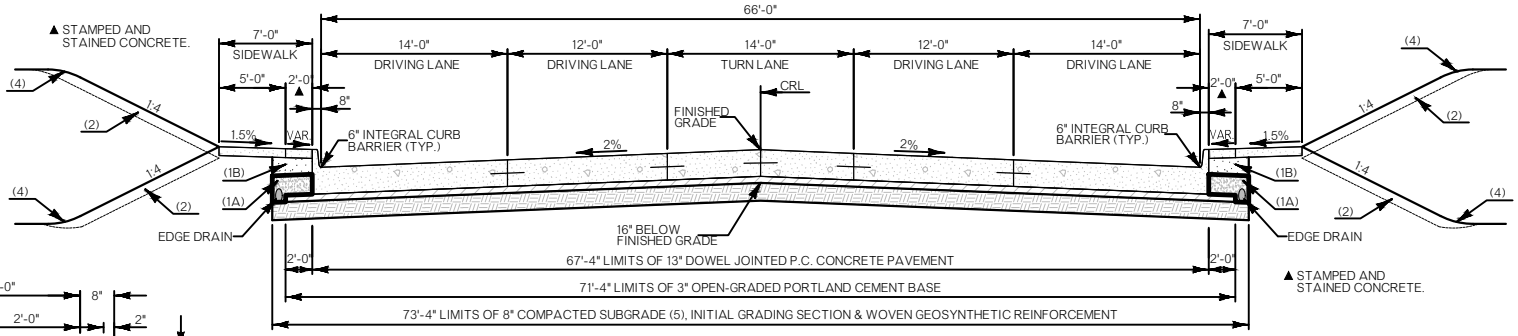
COUNTY: MAYES CO.
DESCRIPTION: US-69

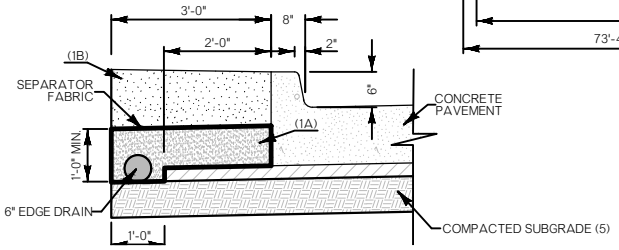
JP NO. 31963(04)
PROJECT NO. --
Date: 04/16/2025

PREPARED BY: SMITH ROBERTS BALDISCHWILER, LLC.

ITEM DESCRIPTION	UNIT	QUANTITY	LENGTH	PER FOOT QUANTITY	UNIT COST	PER FOOT COST
OPEN-GRADED PORTLAND CEMENT BASE	SY	188.57	268.88	0.701	$ 12.50	$ 8.77
SEPARATOR FABRIC	SY	478.01	268.88	1.778	$ 2.80	$ 4.98
(SP) WOVEN GEOSYNTHETIC REINFORCEMENT FABRIC	SY	228.21	268.88	0.849	$ 4.00	$ 3.39
TRAFFIC BOUND SURFACE COURSE TYPE E	TON	116.21	268.88	0.432	$ 30.00	$ 12.97
DOWEL JOINTED P.C.C. PAVT. (PLACEMENT	SY	108.28	268.88	0.403	$ 24.00	$ 9.66
FULL DEPTH P.C.C. PATCH (PLACEMENT)	SY	203.70	268.88	0.758	$ 142.50	$ 107.96
P.C. CONCRETE FOR PAVEMENT	CY	112.66	268.88	0.419	$ 188.25	$ 78.88
CONC. CURB (6" BARRIER-INTEGRAL)	LF	483.00	268.88	1.796	$ 9.00	$ 16.17
4" CONCRETE SIDEWALK	SY	239.10	268.88	0.889	$ 78.50	$ 69.81
(PL) STAMPED CONCRETE FINISH	SY	30.72	268.88	0.114	$ 130.00	$ 14.85
EDGE DRAIN CONDUIT-PERFORATED	LF	361.00	268.88	1.343	$ 13.50	$ 18.13
TOTAL COST PER FOOT						$ 345.55
COST PER FOOT X TOTAL FEET = SURFACE COST						$ 92,912.36

31963(04) ~ US-69 ~ MAYES CO.
PAVEMENT COST ESTIMATE
TYPICAL #1





EDGE DRAIN & INTEGRAL CURB DETAIL

6" BARRIER

N.T.S.

TYPICAL SECTION 2

CRL US-69 STA. 1308+78.09 TO STA. 1330+58.57

PAVEMENT REQUIREMENT	
16" PAVT. STRUCTURE	LANES
SURFACE COURSE	13" DOWEL JOINTED PC CONCRETE
BASE COURSE	3" OPEN-GRADED PORTLAND CEMENT BASE

(1A) BACKFILL NOTE:
TO BE BACKFILLED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN T.B.S.C. TYPE E. QUANTITY IS COMPUTED AT 0.32 TON PER LF (0.16 TON PER SIDE).

(1B) BACKFILL NOTE:
TO BE BACKFILLED AND COMPACTED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN UNCLASSIFIED BORROW.

(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.

(4) SEE ROUNDING DETAIL.

(5) COMPACTED SUBGRADE NOTE:
TO BE COMPACTED TO AT LEAST 95% OF MAXIMUM DENSITY AND WITHIN 2% OF OPTIMUM MOISTURE CONTENT PER SECTION 202.04A.(5)(b)(2). MOISTURE CONTENT SHALL BE VERIFIED IMMEDIATELY PRIOR TO THE PLACEMENT OF THE PAVEMENT SECTION. COST TO BE INCLUDED IN OTHER ITEMS OF WORK.

COUNTY: MAYES CO.

DESCRIPTION: US-69

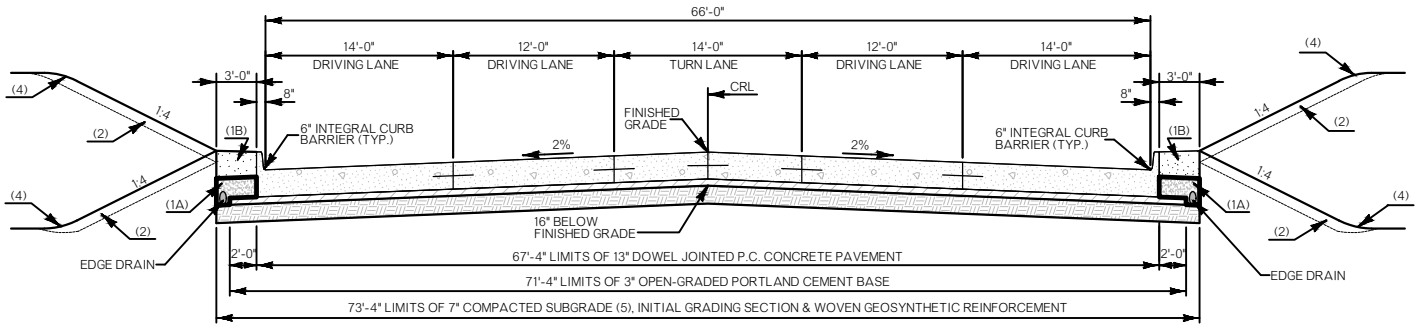
JP NO. 31963(04)

PROJECT NO. --

Date: 04/16/2025

PREPARED BY: SMITH ROBERTS BALDISCHWILER, LLC.

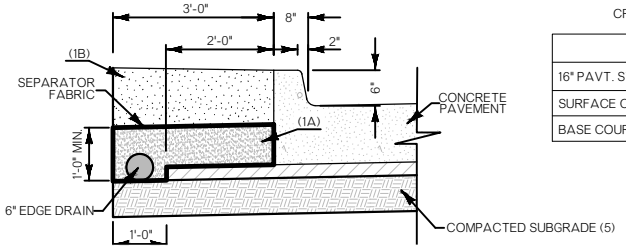
ITEM DESCRIPTION	UNIT	QUANTITY	LENGTH	PER FOOT QUANTITY	UNIT COST	PER FOOT COST
OPEN-GRADED PORTLAND CEMENT BASE	SY	17,282.33	2,180.48	7.926	$ 12.50	$ 99.07
SEPARATOR FABRIC	SY	3,876.41	2,180.48	1.778	$ 2.80	$ 4.98
(SP) WOVEN GEOSYNTHETIC REINFORCEMENT FABRIC	SY	17,766.88	2,180.48	8.148	$ 4.00	$ 32.59
TRAFFIC BOUND SURFACE COURSE TYPE E	TON	703.64	2,180.48	0.323	$ 30.00	$ 9.68
DOWEL JOINTED P.C.C. PAVT. (PLACEMENT	SY	16,313.23	2,180.48	7.481	$ 24.00	$ 179.56
FULL DEPTH P.C.C. PATCH (PLACEMENT)	SY	29.88	2,180.48	0.014	$ 142.50	$ 1.95
P.C. CONCRETE FOR PAVEMENT	CY	5,901.68	2,180.48	2.707	$ 188.25	$ 509.52
CONC. CURB (6" BARRIER-INTEGRAL)	LF	4,361.00	2,180.48	2.000	$ 9.00	$ 18.00
4" CONCRETE SIDEWALK	SY	3,391.86	2,180.48	1.556	$ 78.50	$ 122.11
(PL) STAMPED CONCRETE FINISH	SY	969.11	2,180.48	0.444	$ 130.00	$ 57.78
EDGE DRAIN CONDUIT-PERFORATED	LF	4,361.00	2,180.48	2.000	$ 13.50	$ 27.00
TOTAL COST PER FOOT						$ 1,062.24
COST PER FOOT X TOTAL FEET = SURFACE COST						$ 2,316,194.28



TYPICAL SECTION 3

CRL US-69 STA. 1330+58.57 TO STA. 1337+80.34

PAVEMENT REQUIREMENT	
16" PAVT. STRUCTURE	LANES
SURFACE COURSE	13" DOWEL JOINTED PC CONCRETE
BASE COURSE	3" OPEN-GRADED PORTLAND CEMENT BASE



EDGE DRAIN & INTEGRAL CURB DETAIL

6" BARRIER

N.T.S.

(1A) BACKFILL NOTE:
TO BE BACKFILLED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN T.B.S.C. TYPE E. QUANTITY IS COMPUTED AT 0.32 TON PER LF (0.16 TON PER SIDE).

(1B) BACKFILL NOTE:
TO BE BACKFILLED AND COMPACTED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN UNCLASSIFIED BORROW.

(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.

(4) SEE ROUNDING DETAIL.

(5) COMPACTED SUBGRADE NOTE:
TO BE COMPACTED TO AT LEAST 95% OF MAXIMUM DENSITY AND WITHIN 2% OF OPTIMUM MOISTURE CONTENT PER SECTION 202.04A.(5)(b)(2). MOISTURE CONTENT SHALL BE VERIFIED IMMEDIATELY PRIOR TO THE PLACEMENT OF THE PAVEMENT SECTION. COST TO BE INCLUDED IN OTHER ITEMS OF WORK.

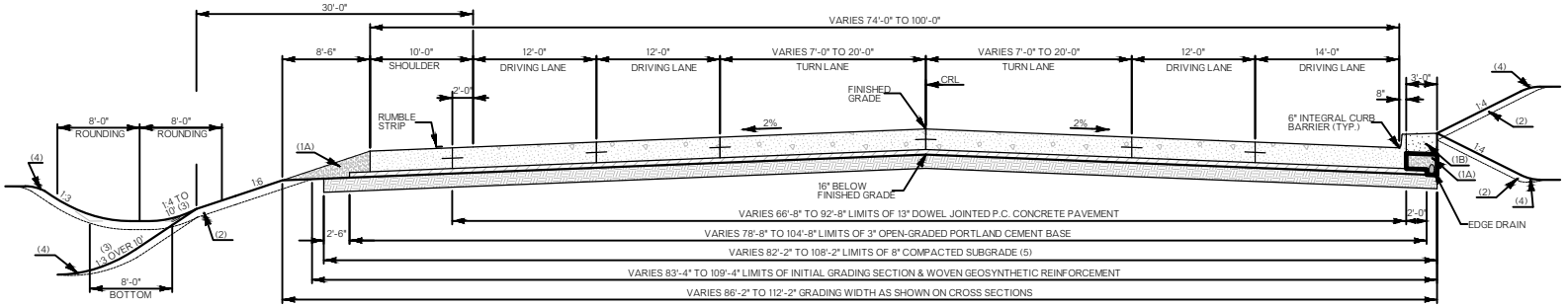
COUNTY: MAYES CO.
DESCRIPTION: US-69

JP NO. 31963(04)
PROJECT NO. --
Date: 04/16/2025

PREPARED BY: SMITH ROBERTS BALDISCHWILER, LLC.

ITEM DESCRIPTION	UNIT	QUANTITY	LENGTH	PER FOOT QUANTITY	UNIT COST	PER FOOT COST
OPEN-GRADED PORTLAND CEMENT BASE	SY	5,720.70	721.77	7.926	$ 12.50	$ 99.07
SEPARATOR FABRIC	SY	1,283.15	721.77	1.778	$ 2.80	$ 4.98
(SP) WOVEN GEOSYNTHETIC REINFORCEMENT FABRIC	SY	5,881.09	721.77	8.148	$ 4.00	$ 32.59
TRAFFIC BOUND SURFACE COURSE TYPE E	TON	232.92	721.77	0.323	$ 30.00	$ 9.68
DOWEL JOINTED P.C.C. PAVT. (PLACEMENT	SY	5,399.91	721.77	7.481	$ 24.00	$ 179.56
P.C. CONCRETE FOR PAVEMENT	CY	1,949.97	721.77	2.702	$ 188.25	$ 508.59
CONC. CURB (6" BARRIER-INTEGRAL)	LF	1,444.00	721.77	2.001	$ 9.00	$ 18.01
EDGE DRAIN CONDUIT-PERFORATED	LF	1,444.00	721.77	2.001	$ 13.50	$ 27.01
TOTAL COST PER FOOT						$ 879.48
COST PER FOOT X TOTAL FEET = SURFACE COST						$ 634,783.22

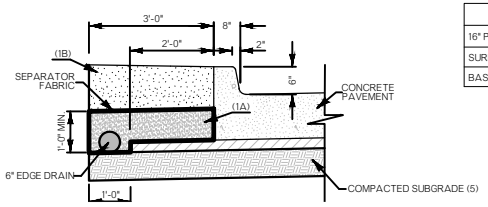
31963(04) ~ US-69 ~ MAYES CO.
PAVEMENT COST ESTIMATE
TYPICAL #3



TYPICAL SECTION 4

CRL US-69 STA. 1337+80.34 TO STA. 1344+13.06

PAVEMENT REQUIREMENT		
16" PAVT. STRUCTURE	LANES	10'-0" OUTSIDE SHOULDER
SURFACE COURSE	13" DOWEL JOINTED PC CONCRETE	13" PC CONCRETE
BASE COURSE	3" OPEN-GRADED PORTLAND CEMENT BASE	3" OPEN-GRADED PORTLAND CEMENT BASE



EDGE DRAIN & INTEGRAL CURB DETAIL

6" BARRIER

N.T.S.

(1A) BACKFILL NOTE:
TO BE BACKFILLED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN T.B.S.C. TYPE E. QUANTITY IS COMPUTED AT 0.50 TON PER LF (0.34 TON LEFT SIDE & 0.16 TON RIGHT SIDE).

(1B) BACKFILL NOTE:
TO BE BACKFILLED AND COMPACTED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN UNCLASSIFIED BORROW.

(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) DISTANCES ARE MEASURED VERTICALLY FROM EDGE OF FINISHED GRADE SHOULDER.

(4) SEE ROUNDING DETAIL.

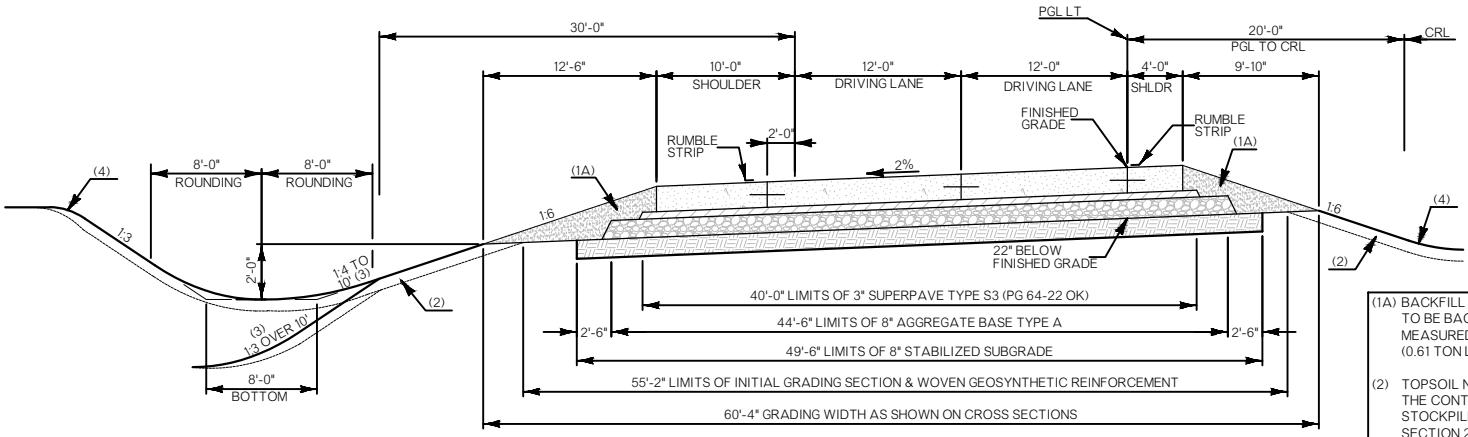
(5) COMPACTED SUBGRADE NOTE:
TO BE COMPACTED TO AT LEAST 95% OF MAXIMUM DENSITY AND WITHIN 2% OF OPTIMUM MOISTURE CONTENT PER SECTION 202.04A.(5)(b)(2). MOISTURE CONTENT SHALL BE VERIFIED IMMEDIATELY PRIOR TO THE PLACEMENT OF THE PAVEMENT SECTION. COST TO BE INCLUDED IN OTHER ITEMS OF WORK.

COUNTY: MAYES CO.
DESCRIPTION: US-69

JP NO. 31963(04)
PROJECT NO. --
Date: 04/16/2025

PREPARED BY: SMITH ROBERTS BALDISCHWILER, LLC.

ITEM DESCRIPTION	UNIT	QUANTITY	LENGTH	PER FOOT QUANTITY	UNIT COST	PER FOOT COST
OPEN-GRADED PORTLAND CEMENT BASE	SY	6,444.38	632.72	10.185	$ 12.50	$ 127.32
SEPARATOR FABRIC	SY	562.42	632.72	0.889	$ 2.80	$ 2.49
(SP) WOVEN GEOSYNTHETIC REINFORCEMENT FABRIC	SY	6,772.45	632.72	10.704	$ 4.00	$ 42.81
TRAFFIC BOUND SURFACE COURSE TYPE E	TON	316.23	632.72	0.500	$ 30.00	$ 14.99
P.C. CONCRETE PAVEMENT (PLACEMENT)	SY	562.42	632.72	0.889	$ 17.00	$ 15.11
DOWEL JOINTED P.C.C. PAVT. (PLACEMENT	SY	5,600.75	632.72	8.852	$ 24.00	$ 212.44
P.C. CONCRETE FOR PAVEMENT	CY	2,225.59	632.72	3.517	$ 188.25	$ 662.17
CONC. CURB (6" BARRIER-INTEGRAL)	LF	633.00	632.72	1.000	$ 9.00	$ 9.00
EDGE DRAIN CONDUIT-PERFORATED	LF	633.00	632.72	1.000	$ 13.50	$ 13.51
TOTAL COST PER FOOT						$ 1,099.85
COST PER FOOT X TOTAL FEET = SURFACE COST						$ 695,895.18



CRL US-69 SOUTHBOUND
STA. 1344+13.06 TO STA. 1350+76.04
STA. 1352+37.36 TO STA. 1372+70.10
STA. 1378+63.15 TO STA. 1413+07.68
STA. 1419+00.68 TO STA. 1431+49.96
STA. 1437+42.96 TO STA. 1452+19.21
STA. 1458+12.21 TO STA. 1469+27.54
STA. 1475+20.54 TO STA. 1495+64.59
STA. 1497+25.99 TO STA. 1508+99.42
STA. 1514+92.42 TO STA. 1529+21.35
STA. 1542+56.92 TO STA. 1547+23.72
STA. 1562+22.37 TO STA. 1585+75.80
STA. 1591+68.80 TO STA. 1614+79.93
STA. 1620+72.93 TO STA. 1642+79.30
STA. 1648+72.65 TO STA. 1674+06.51
STA. 1679+99.51 TO STA. 1698+06.48
STA. 1703+99.44 TO STA. 1725+31.62
STA. 1731+24.62 TO STA. 1734+00.00

TYPICAL SECTION 5

PAVEMENT REQUIREMENT		
14" PAVT. STRUCTURE	DRIVING LANES & INSIDE SHOUDER	8'-0" OUTSIDE SHOULDER
SURFACE COURSE	11" DOWEL JOINTED PC CONCRETE	11" PC CONCRETE
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

(1A) BACKFILL NOTE:
TO BE BACKFILLED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN T.B.S.C. TYPE E. QUANTITY IS COMPUTED AT 1.05 TON PER LF (0.61 TON LEFT SIDE & 0.44 TON RIGHT SIDE).

(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) DISTANCES ARE MEASURED VERTICALLY FROM EDGE OF FINISHED GRADE SHOULDER.

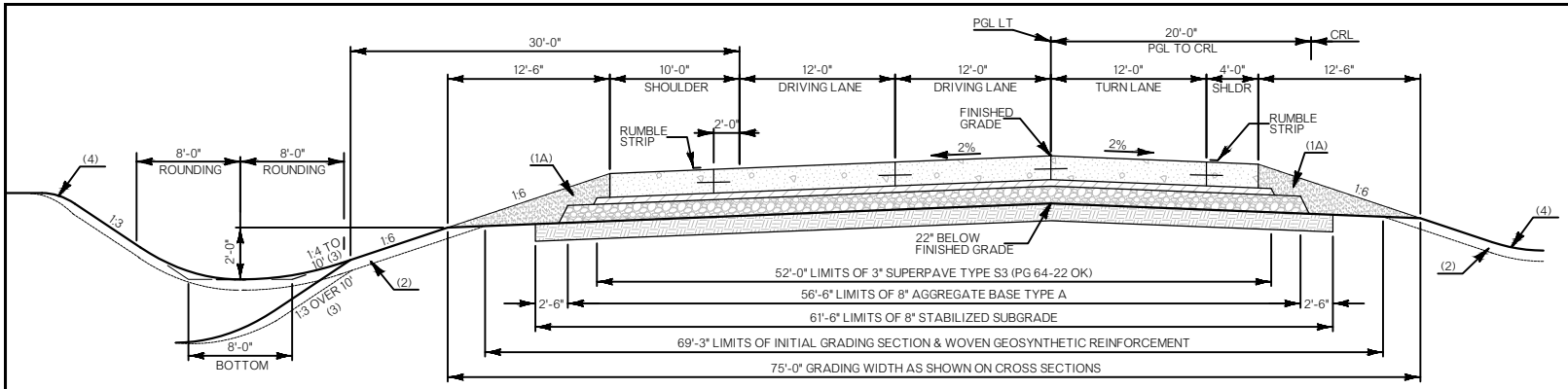
(4) SEE ROUNDING DETAIL.

COUNTY: MAYES CO.
DESCRIPTION: US-69

JP NO. 31963(04)
PROJECT NO. --
Date: 04/16/2025

PREPARED BY: SMITH ROBERTS BALDISCHWILER, LLC.

ITEM DESCRIPTION	UNIT	QUANTITY	LENGTH	PER FOOT QUANTITY	UNIT COST	PER FOOT COST
AGGREGATE BASE TYPE A	CY	32,022.21	28,713.64	1.115	$ 65.50	$ 73.05
STABILIZED SUBGRADE	SY	157,925.02	28,713.64	5.500	$ 6.35	$ 34.92
(SP) WOVEN GEOSYNTHETIC REINFORCEMENT FABRIC	SY	176,003.98	28,713.64	6.130	$ 4.00	$ 24.52
TRAFFIC BOUND SURFACE COURSE TYPE E	TON	30,390.51	28,713.64	1.058	$ 30.00	$ 31.75
SUPERPAVE, TYPE S3 (PG 64-22 OK)	TON	21,573.52	28,713.64	0.751	$ 96.00	$ 72.13
P.C. CONCRETE PAVEMENT (PLACEMENT)	SY	25,523.24	28,713.64	0.889	$ 17.00	$ 15.11
DOWEL JOINTED P.C.C. PAVT. (PLACEMENT	SY	95,712.14	28,713.64	3.333	$ 24.00	$ 80.00
P.C. CONCRETE FOR PAVEMENT	CY	37,044.15	28,713.64	1.290	$ 188.25	$ 242.87
TOTAL COST PER FOOT						$ 574.35
COST PER FOOT X TOTAL FEET = SURFACE COST						$ 16,491,615.45



CRL US-69 SOUTHBOUND
STA. 1372+70.10 TO STA. 1376+83.13
STA. 1413+07.68 TO STA. 1417+20.68
STA. 1431+49.96 TO STA. 1435+62.96
STA. 1452+19.21 TO STA. 1456+32.21
STA. 1469+27.54 TO STA. 1473+40.54
STA. 1508+99.42 TO STA. 1513+12.42
STA. 1529+21.35 TO STA. 1540+75.84
STA. 1547+23.72 TO STA. 1551+36.72
STA. 1585+75.80 TO STA. 1589+88.80
STA. 1614+79.93 TO STA. 1618+92.93
STA. 1642+79.30 TO STA. 1646+92.46
STA. 1674+06.51 TO STA. 1678+19.51
STA. 1698+06.48 TO STA. 1702+19.48
STA. 1725+31.62 TO STA. 1729+44.62

TYPICAL SECTION 6

PAVEMENT REQUIREMENT		
14" PAVT. STRUCTURE	DRIVING LANES & INSIDE SHOUDER	8'-0" OUTSIDE SHOULDER
SURFACE COURSE	11" DOWEL JOINTED PC CONCRETE	11" PC CONCRETE
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

(1A) BACKFILL NOTE:
TO BE BACKFILLED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN T.B.S.C. TYPE E. QUANTITY IS COMPUTED AT 1.22 TON PER LF (0.61 TON PER SIDE).

(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) DISTANCES ARE MEASURED VERTICALLY FROM EDGE OF FINISHED GRADE SHOULDER.

(4) SEE ROUNDING DETAIL.

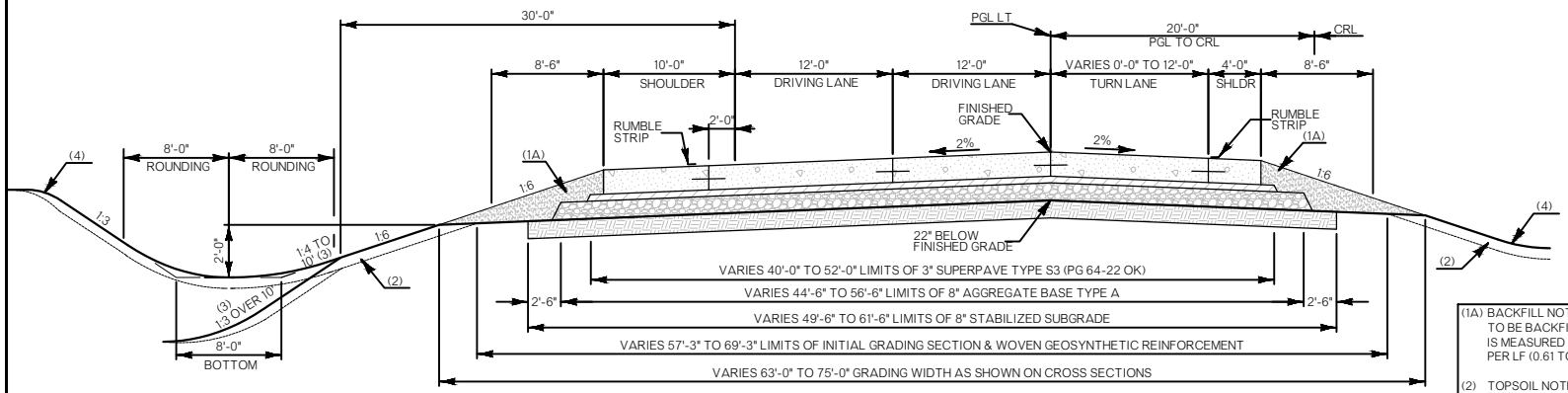
COUNTY: MAYES CO.
DESCRIPTION: US-69

JP NO. 31963(04)
PROJECT NO. --
Date: 04/16/2025

PREPARED BY: SMITH ROBERTS BALDISCHWILER, LLC.

ITEM DESCRIPTION	UNIT	QUANTITY	LENGTH	PER FOOT QUANTITY	UNIT COST	PER FOOT COST
AGGREGATE BASE TYPE A	CY	9,208.33	6,523.68	1.412	$ 65.50	$ 92.45
STABILIZED SUBGRADE	SY	44,578.48	6,523.68	6.833	$ 6.35	$ 43.39
(SP) WOVEN GEOSYNTHETIC REINFORCEMENT FABRIC	SY	50,196.10	6,523.68	7.694	$ 4.00	$ 30.78
TRAFFIC BOUND SURFACE COURSE TYPE E	TON	8,018.90	6,523.68	1.229	$ 30.00	$ 36.88
SUPERPAVE, TYPE S3 (PG 64-22 OK)	TON	6,362.77	6,523.68	0.975	$ 96.00	$ 93.63
P.C. CONCRETE PAVEMENT (PLACEMENT)	SY	5,798.83	6,523.68	0.889	$ 17.00	$ 15.11
DOWEL JOINTED P.C.C. PAVT. (PLACEMENT	SY	30,443.84	6,523.68	4.667	$ 24.00	$ 112.00
P.C. CONCRETE FOR PAVEMENT	CY	11,074.15	6,523.68	1.698	$ 188.25	$ 319.56
TOTAL COST PER FOOT						$ 743.80
COST PER FOOT X TOTAL FEET = SURFACE COST						$ 4,852,337.29

31963(04) ~ US-69 ~ MAYES CO.
PAVEMENT COST ESTIMATE
TYPICAL #6



CRL US-69 SOUTHBOUND
STA. 1376+83.13 TO STA. 1378+63.15
STA. 1417+20.68TO STA. 1419+00.68
STA. 1435+62.96TO STA. 1437+42.96
STA. 1456+32.21 TO STA. 1458+12.21
STA. 1473+40.54 TO STA. 1475+20.54
STA. 1513+12.42 TO STA. 1514+92.42
STA. 1540+75.84 TO STA. 1542+56.92
STA. 1551+36.72 TO STA. 1552+29.52
STA. 1589+88.80 TO STA. 1591+68.80
STA. 1618+92.93 TO STA. 1620+72.93
STA. 1646+92.46 TO STA. 1648+72.65
STA. 1678+19.51 TO STA. 1679+99.51
STA. 1702+19.48 TO STA. 1703+99.44
STA. 1729+44.62 TO STA. 1731+24.62

TYPICAL SECTION 7

PAVEMENT REQUIREMENT		
14" PAVT. STRUCTURE	DRIVING LANES & INSIDE SHOUDER	8'-0" OUTSIDE SHOULDER
SURFACE COURSE	11" DOWEL JOINTED PC CONCRETE	11" PC CONCRETE
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

(1A) BACKFILL NOTE:
TO BE BACKFILLED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN T.B.S.C. TYPE E. QUANTITY IS COMPUTED AT 1.22 TON PER LF (0.61 TON PER SIDE).

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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) DISTANCES ARE MEASURED VERTICALLY FROM EDGE OF FINISHED GRADE SHOULDER.

(4) SEE ROUNDING DETAIL.

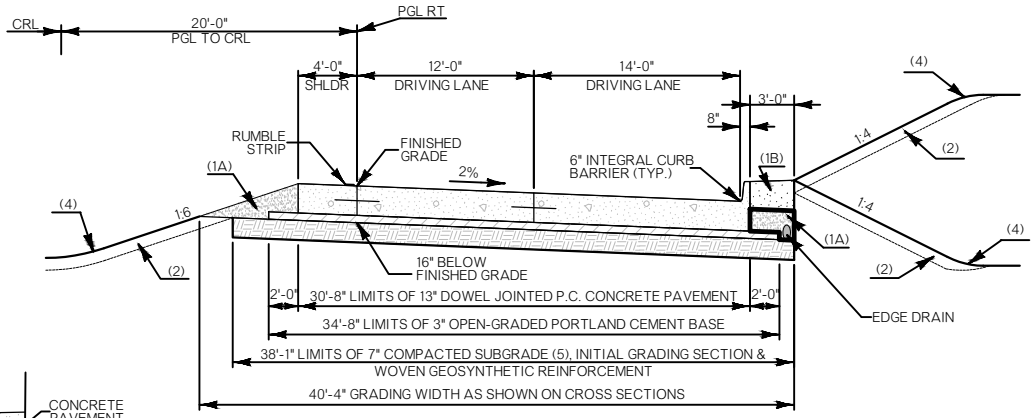
COUNTY: MAYES CO.
DESCRIPTION: US-69

JP NO. 31963(04)
PROJECT NO. --
Date: 04/16/2025

PREPARED BY: SMITH ROBERTS BALDISCHWILER, LLC.

ITEM DESCRIPTION	UNIT	QUANTITY	LENGTH	PER FOOT QUANTITY	UNIT COST	PER FOOT COST
AGGREGATE BASE TYPE A	CY	3,075.12	2,434.05	1.263	$ 65.50	$ 82.75
STABILIZED SUBGRADE	SY	15,009.98	2,434.05	6.167	$ 6.35	$ 39.16
(SP) WOVEN GEOSYNTHETIC REINFORCEMENT FABRIC	SY	17,105.97	2,434.05	7.028	$ 4.00	$ 28.11
TRAFFIC BOUND SURFACE COURSE TYPE E	TON	2,991.94	2,434.05	1.229	$ 30.00	$ 36.88
SUPERPAVE, TYPE S3 (PG 64-22 OK)	TON	2,101.40	2,434.05	0.863	$ 96.00	$ 82.88
P.C. CONCRETE PAVEMENT (PLACEMENT)	SY	2,163.60	2,434.05	0.889	$ 17.00	$ 15.11
DOWEL JOINTED P.C.C. PAVT. (PLACEMENT	SY	9,736.20	2,434.05	4.000	$ 24.00	$ 96.00
P.C. CONCRETE FOR PAVEMENT	CY	3,636.05	2,434.05	1.494	$ 188.25	$ 281.21
TOTAL COST PER FOOT						$ 662.10
COST PER FOOT X TOTAL FEET = SURFACE COST						$ 1,611,586.63

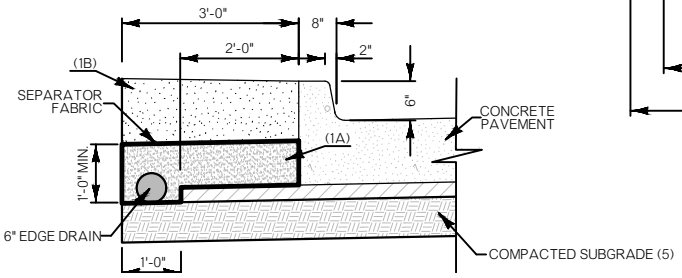
31963(04) ~ US-69 ~ MAYES CO.
PAVEMENT COST ESTIMATE
TYPICAL #7



TYPICAL SECTION 8

CRL US-69 NORTHBOUND
STA. 1344+13.06 TO STA. 1344+43.60

PAVEMENT REQUIREMENT	
16" PAVT. STRUCTURE	DRIVING LANES & SHOULDER
SURFACE COURSE	13" DOWEL JOINTED PC CONCRETE
BASE COURSE	3" OPEN-GRADED PORTLAND CEMENT BASE



EDGE DRAIN & INTEGRAL CURB DETAIL

6" BARRIER

N.T.S.

(1A) BACKFILL NOTE:
TO BE BACKFILLED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN T.B.S.C. TYPE E. QUANTITY IS COMPUTED AT 0.42 TON PER LF (0.26 TON LEFT SIDE & 0.16 TON RIGHT SIDE).

(1B) BACKFILL NOTE:
TO BE BACKFILLED AND COMPACTED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN UNCLASSIFIED BORROW.

(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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(4) SEE ROUNDING DETAIL.

(5) COMPACTED SUBGRADE NOTE:
TO BE COMPACTED TO AT LEAST 95% OF MAXIMUM DENSITY AND WITHIN 2% OF OPTIMUM MOISTURE CONTENT PER SECTION 202.04A.(5)(b)(2). MOISTURE CONTENT SHALL BE VERIFIED IMMEDIATELY PRIOR TO THE PLACEMENT OF THE PAVEMENT SECTION. COST TO BE INCLUDED IN OTHER ITEMS OF WORK.

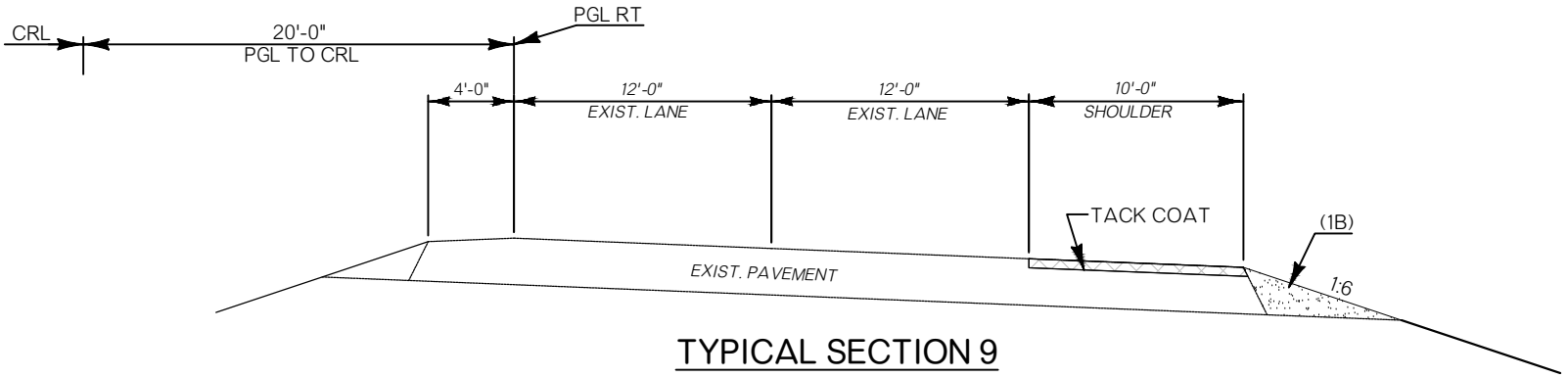
COUNTY: MAYES CO.
DESCRIPTION: US-69

JP NO. 31963(04)
PROJECT NO. --
Date: 04/16/2025

PREPARED BY: SMITH ROBERTS BALDISCHWILER, LLC.

ITEM DESCRIPTION	UNIT	QUANTITY	LENGTH	PER FOOT QUANTITY	UNIT COST	PER FOOT COST
OPEN-GRADED PORTLAND CEMENT BASE	SY	117.64	30.54	3.852	$ 12.50	$ 48.15
(SP) WOVEN GEOSYNTHETIC REINFORCEMENT FABRIC	SY	129.23	30.54	4.231	$ 4.00	$ 16.93
TRAFFIC BOUND SURFACE COURSE TYPE E	TON	12.81	30.54	0.419	$ 30.00	$ 12.58
DOWEL JOINTED P.C.C. PAVT. (PLACEMENT	SY	104.07	30.54	3.408	$ 24.00	$ 81.78
P.C. CONCRETE FOR PAVEMENT	CY	37.58	30.54	1.231	$ 188.25	$ 231.64
CONC. CURB (6" BARRIER-INTEGRAL)	LF	31.00	30.54	1.015	$ 9.00	$ 9.14
EDGE DRAIN CONDUIT-PERFORATED	LF	31.00	30.54	1.015	$ 13.50	$ 13.70
TOTAL COST PER FOOT						$ 413.93
COST PER FOOT X TOTAL FEET = SURFACE COST						$ 12,641.34

31963(04) ~ US-69 ~ MAYES CO.
PAVEMENT COST ESTIMATE
TYPICAL #8



TYPICAL SECTION 9

CRL US-69 NORTHBOUND (RT. SIDE)
STA. 1344+43.60 TO STA. 1350+73.06
STA. 1352+36.46 TO STA. 1495+63.48
STA. 1497+25.45 TO STA. 1518+71.90
STA. 1544+39.49 TO STA. 1552+98.92
STA. 1562+85.80 TO STA. 1736+92.72

PAVEMENT REQUIREMENT	
2" PAVT. STRUCTURE	SHOULDER
MILL	2"
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 64-22 OK)

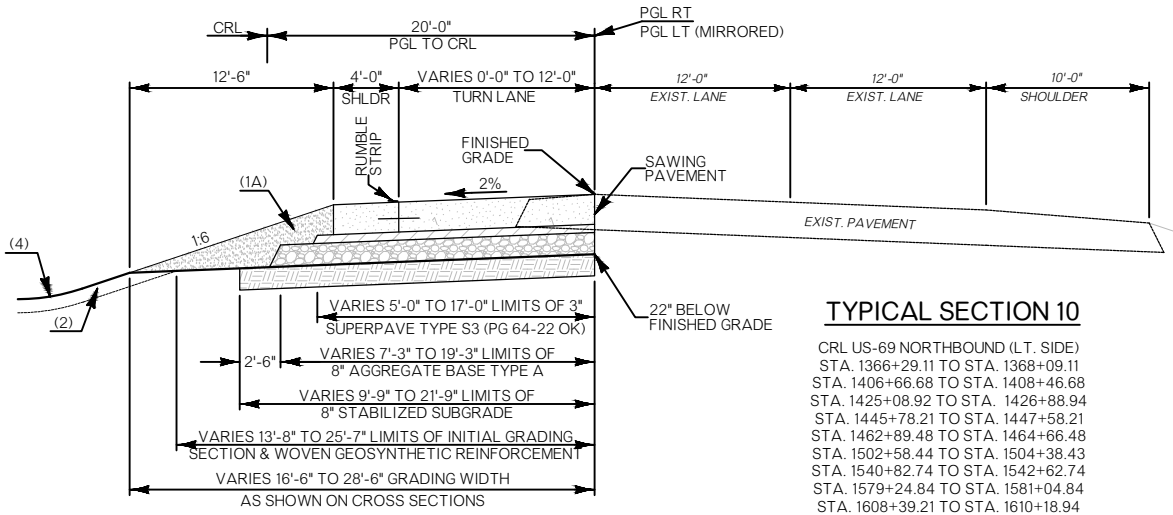
(1B) BACKFILL NOTE:
TO BE BACKFILLED AND COMPACTED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN UNCLASSIFIED BORROW.

COUNTY: MAYES CO.
DESCRIPTION: US-69

JP NO. 31963(04)
PROJECT NO. --
Date: 04/16/2025

PREPARED BY: SMITH ROBERTS BALDISCHWILER, LLC.

ITEM DESCRIPTION	UNIT	QUANTITY	LENGTH	PER FOOT QUANTITY	UNIT COST	PER FOOT COST
TACK COAT	GAL	2,947.44	35,369.28	0.083	$ 3.70	$ 0.31
SUPERPAVE, TYPE S4 (PG 64-22 OK)	TON	4,401.52	35,369.28	0.124	$ 125.50	$ 15.62
COLD MILLING PAVEMENT	SY	39,299.20	35,369.28	1.111	$ 4.25	$ 4.72
TOTAL COST PER FOOT						$ 20.65
COST PER FOOT X TOTAL FEET = SURFACE COST						$ 730,317.89



TYPICAL SECTION 10

CRL US-69 NORTHBOUND (LT. SIDE)
STA. 1366+29.11 TO STA. 1368+09.11
STA. 1406+66.68 TO STA. 1408+46.68
STA. 1425+08.92 TO STA. 1426+88.94
STA. 1445+78.21 TO STA. 1447+58.21
STA. 1462+89.48 TO STA. 1464+66.48
STA. 1502+58.44 TO STA. 1504+38.43
STA. 1540+82.74 TO STA. 1542+62.74
STA. 1579+24.84 TO STA. 1581+04.84
STA. 1608+39.21 TO STA. 1610+18.94
STA. 1636+38.27 TO STA. 1638+24.00
STA. 1667+65.51 TO STA. 1669+45.51
STA. 1691+65.48 TO STA. 1693+45.48
STA. 1716+61.42 TO STA. 1718+36.62

CRL US-69 SOUTHBOUND (RT. SIDE) (MIRRORED)
STA. 1552+29.52 TO STA. 1553+16.72

PAVEMENT REQUIREMENT	
14" PAVT. STRUCTURE	TURN LANE & SHOULDER
SURFACE COURSE	11" DOWEL JOINTED PC CONCRETE
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

(1A) BACKFILL NOTE:
TO BE BACKFILLED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN T.B.S.C. TYPE E. QUANTITY IS COMPUTED AT 0.42 TON PER LF (0.26 TON LEFT SIDE & 0.16 TON RIGHT SIDE).

(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.

(4) SEE ROUNDING DETAIL.

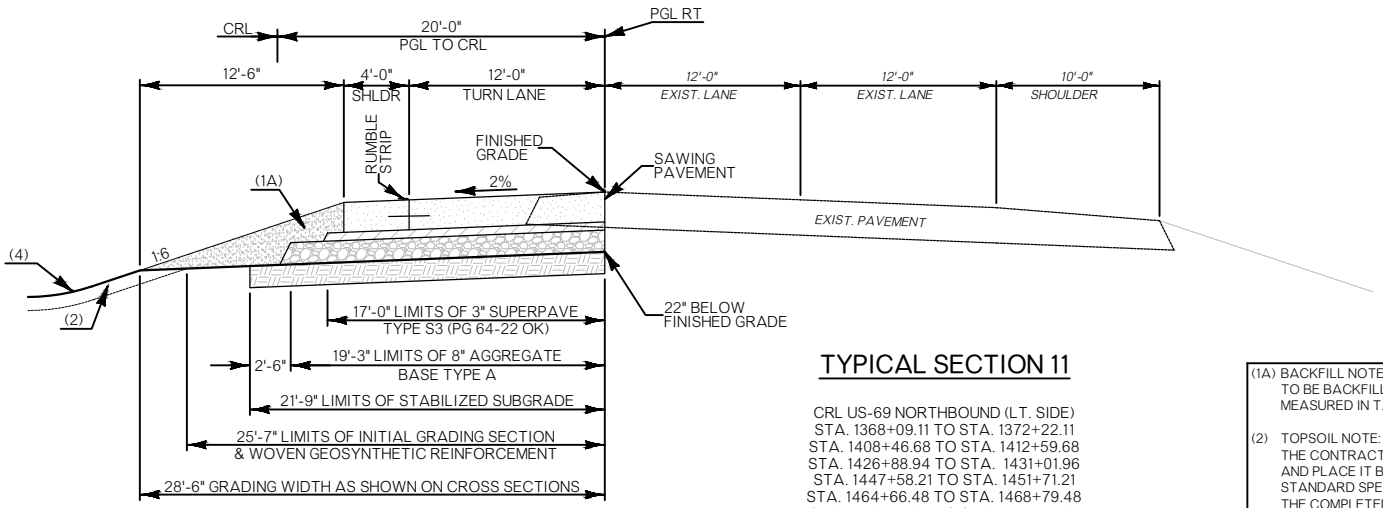
COUNTY: MAYES CO.
DESCRIPTION: US-69

JP NO. 31963(04)
PROJECT NO. --
Date: 04/16/2025

PREPARED BY: SMITH ROBERTS BALDISCHWILER, LLC.

ITEM DESCRIPTION	UNIT	QUANTITY	LENGTH	PER FOOT QUANTITY	UNIT COST	PER FOOT COST
AGGREGATE BASE TYPE A	CY	784.04	2,337.67	0.335	$ 65.50	$ 21.97
STABILIZED SUBGRADE	SY	4,090.93	2,337.67	1.750	$ 6.35	$ 11.11
(SP) WOVEN GEOSYNTHETIC REINFORCEMENT FABRIC	SY	5,097.42	2,337.67	2.181	$ 4.00	$ 8.72
TRAFFIC BOUND SURFACE COURSE TYPE E	TON	1,436.73	2,337.67	0.615	$ 30.00	$ 18.44
SUPERPAVE, TYPE S3 (PG 64-22 OK)	TON	485.46	2,337.67	0.208	$ 96.00	$ 19.94
DOWEL JOINTED P.C.C. PAVT. (PLACEMENT	SY	2,597.42	2,337.67	1.111	$ 24.00	$ 26.67
P.C. CONCRETE FOR PAVEMENT	CY	793.66	2,337.67	0.340	$ 188.25	$ 63.91
TOTAL COST PER FOOT						$ 170.76
COST PER FOOT X TOTAL FEET = SURFACE COST						$ 399,172.34

31963(04) ~ US-69 ~ MAYES CO.
PAVEMENT COST ESTIMATE
TYPICAL #10



TYPICAL SECTION 11

CRL US-69 NORTHBOUND (LT. SIDE)
STA. 1368+09.11 TO STA. 1372+22.11
STA. 1408+46.68 TO STA. 1412+59.68
STA. 1426+88.94 TO STA. 1431+01.96
STA. 1447+58.21 TO STA. 1451+71.21
STA. 1464+66.48 TO STA. 1468+79.48
STA. 1504+38.43 TO STA. 1508+51.42
STA. 1542+62.74 TO STA. 1546+75.74
STA. 1581+04.84 TO STA. 1585+17.84
STA. 1610+18.94 TO STA. 1614+31.94
STA. 1638+24.00 TO STA. 1642+31.27
STA. 1669+45.51 TO STA. 1673+58.51
STA. 1693+45.48 TO STA. 1697+58.48
STA. 1718+36.62 TO STA. 1724+83.62

PAVEMENT REQUIREMENT	
14" PAVT. STRUCTURE	TURN LANE & SHOULDER
SURFACE COURSE	11" DOWEL JOINTED PC CONCRETE
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

(1A) BACKFILL NOTE:
TO BE BACKFILLED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN T.B.S.C. TYPE E. QUANTITY IS COMPUTED AT 0.61 TON PER LF.

(2) TOPSOIL NOTE:
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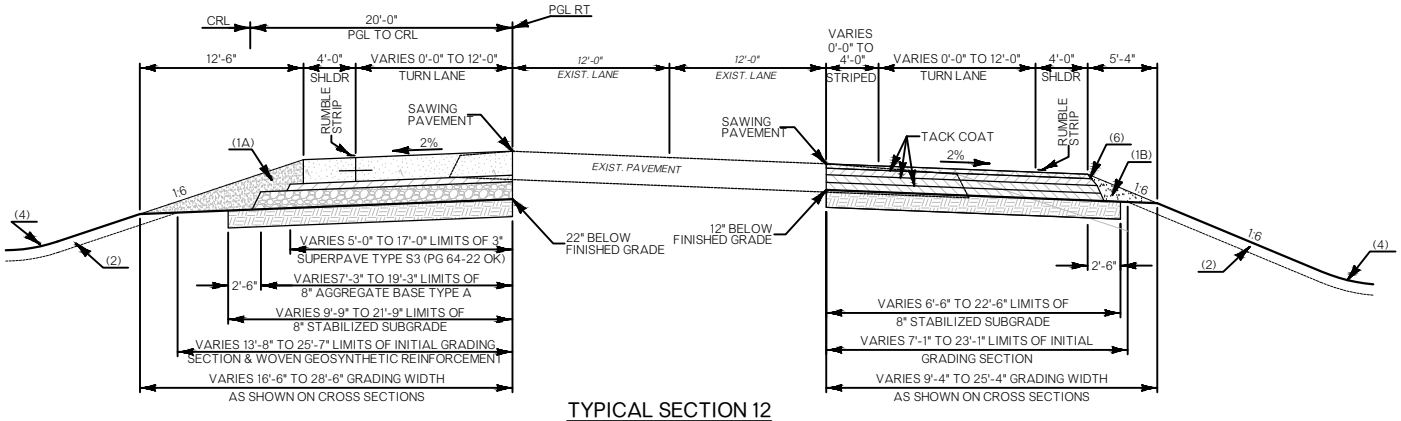
(4) SEE ROUNDING DETAIL.

COUNTY: MAYES CO.
DESCRIPTION: US-69

JP NO. 31963(04)
PROJECT NO. --
Date: 04/16/2025

PREPARED BY: SMITH ROBERTS BALDISCHWILER, LLC.

ITEM DESCRIPTION	UNIT	QUANTITY	LENGTH	PER FOOT QUANTITY	UNIT COST	PER FOOT COST
AGGREGATE BASE TYPE A	CY	2,706.51	5,597.28	0.484	$ 65.50	$ 31.67
STABILIZED SUBGRADE	SY	13,526.76	5,597.28	2.417	$ 6.35	$ 15.35
(SP) WOVEN GEOSYNTHETIC REINFORCEMENT FABRIC	SY	15,910.79	5,597.28	2.843	$ 4.00	$ 11.37
TRAFFIC BOUND SURFACE COURSE TYPE E	TON	3,440.09	5,597.28	0.615	$ 30.00	$ 18.44
SUPERPAVE, TYPE S3 (PG 64-22 OK)	TON	1,789.27	5,597.28	0.320	$ 96.00	$ 30.69
DOWEL JOINTED P.C.C. PAVT. (PLACEMENT	SY	9,950.72	5,597.28	1.778	$ 24.00	$ 42.67
P.C. CONCRETE FOR PAVEMENT	CY	3,040.50	5,597.28	0.543	$ 188.25	$ 102.26
TOTAL COST PER FOOT						$ 252.44
COST PER FOOT X TOTAL FEET = SURFACE COST						$ 1,412,978.52



TYPICAL SECTION 12

CRL US-69 NORTHBOUND
STA. 1518+71.90 TO STA. 1521+11.90 (RT. SIDE)
STA. 1522+70.28 TO STA. 1524+50.28 (LT. SIDE)

PAVEMENT REQUIREMENT			
14" PAVT. STRUCTURE	LEFT TURN LANE & SHOULDER	12" PAVT. STRUCTURE	RIGHT TURN LANE & SHOULDER
SURFACE COURSE	11" DOWEL JOINTED PC CONCRETE	SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 70-28 OK)
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	BASE COURSE	3" SUPERPAVE TYPE S3 (PG 70-28 OK)
			3.5" SUPERPAVE TYPE S3 (PG 64-22 OK)
			3.5" SUPERPAVE TYPE S3 (PG 64-22 OK)

(1A) BACKFILL NOTE:
TO BE BACKFILLED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN T.B.S.C. TYPE E. QUANTITY IS COMPUTED AT 0.61 TON PER LF.

(1B) BACKFILL NOTE:
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(4) SEE ROUNDING DETAIL.

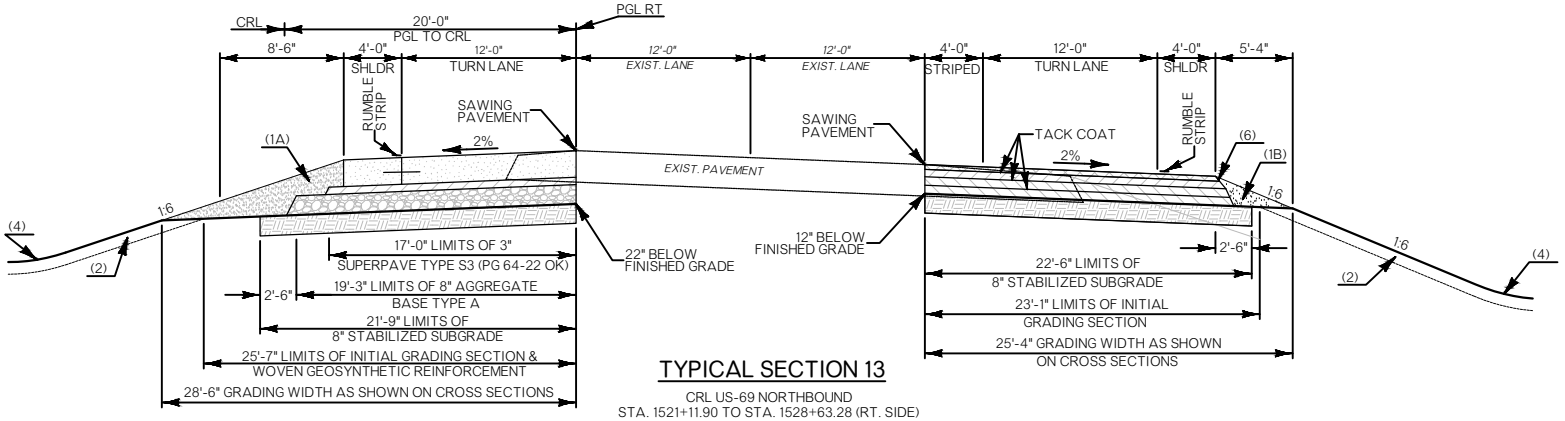
(6) SAFETY EDGE TO BE USED INSTEAD OF TRADITIONAL 1:1 SLOPE AND COST TO BE INCLUDED IN OTHER ITEMS OF WORK, AS NO ADDITIONAL QUANTITY HAS BEEN INCLUDED.

COUNTY: MAYES CO.
DESCRIPTION: US-69

JP NO. 31963(04)
PROJECT NO. --
Date: 04/16/2025

PREPARED BY: SMITH ROBERTS BALDISCHWILER, LLC.

ITEM DESCRIPTION	UNIT	QUANTITY	LENGTH	PER FOOT QUANTITY	UNIT COST	PER FOOT COST
AGGREGATE BASE TYPE A	CY	60.38	420.00	0.144	$ 65.50	$ 9.42
STABILIZED SUBGRADE	SY	701.67	420.00	1.671	$ 6.35	$ 10.61
(SP) WOVEN GEOSYNTHETIC REINFORCEMENT FABRIC	SY	392.50	420.00	0.935	$ 4.00	$ 3.74
TRAFFIC BOUND SURFACE COURSE TYPE E	TON	110.63	420.00	0.263	$ 30.00	$ 7.90
TACK COAT	GAL	74.63	420.00	0.178	$ 3.70	$ 0.66
SUPERPAVE, TYPE S3 (PG70-28 OK)	TON	55.07	420.00	0.131	$ 152.50	$ 20.00
SUPERPAVE, TYPE S3 (PG 64-22 OK)	TON	170.23	420.00	0.405	$ 96.00	$ 38.91
SUPERPAVE, TYPE S4 (PG70-28 OK)	TON	36.09	420.00	0.086	$ 176.00	$ 15.12
DOWEL JOINTED P.C.C. PAVT. (PLACEMENT	SY	200.00	420.00	0.476	$ 24.00	$ 11.43
P.C. CONCRETE FOR PAVEMENT	CY	61.12	420.00	0.146	$ 188.25	$ 27.39
TOTAL COST PER FOOT						$ 145.17
COST PER FOOT X TOTAL FEET = SURFACE COST						$ 60,973.46



TYPICAL SECTION 13

CRL US-69 NORTHBOUND
STA. 1521+11.90 TO STA. 1528+63.28 (RT. SIDE)
STA. 1524+50.28 TO STA. 1528+63.28 (LT. SIDE)

PAVEMENT REQUIREMENT			
14" PAVT. STRUCTURE	LEFT TURN LANE & SHOULDER	12" PAVT. STRUCTURE	RIGHT TURN LANE & SHOULDER
SURFACE COURSE	11" DOWEL JOINTED PC CONCRETE	SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 70-28 OK)
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	BASE COURSE	3" SUPERPAVE TYPE S3 (PG 70-28 OK)
			3.5" SUPERPAVE TYPE S3 (PG 64-22 OK)
			3.5" SUPERPAVE TYPE S3 (PG 64-22 OK)

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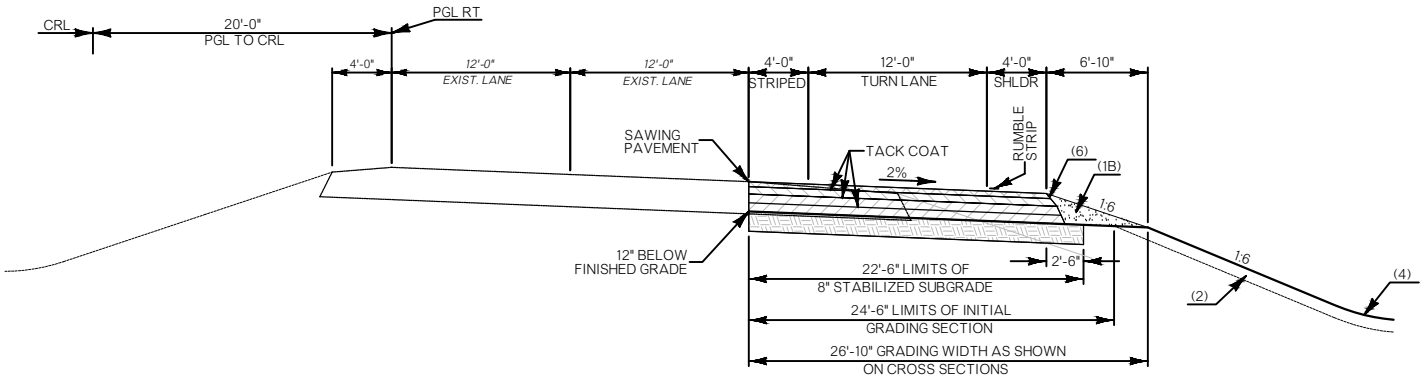
COUNTY: MAYES CO.
DESCRIPTION: US-69

JP NO. 31963(04)
PROJECT NO. --
Date: 04/16/2025

PREPARED BY: SMITH ROBERTS BALDISCHWILER, LLC.

ITEM DESCRIPTION	UNIT	QUANTITY	LENGTH	PER FOOT QUANTITY	UNIT COST	PER FOOT COST
AGGREGATE BASE TYPE A	CY	199.71	1,164.38	0.172	$ 65.50	$ 11.23
STABILIZED SUBGRADE	SY	2,876.55	1,164.38	2.470	$ 6.35	$ 15.69
(SP) WOVEN GEOSYNTHETIC REINFORCEMENT FABRIC	SY	1,174.00	1,164.38	1.008	$ 4.00	$ 4.03
TRAFFIC BOUND SURFACE COURSE TYPE E	TON	253.83	1,164.38	0.218	$ 30.00	$ 6.54
TACK COAT	GAL	383.91	1,164.38	0.330	$ 3.70	$ 1.22
SUPERPAVE, TYPE S3 (PG70-28 OK)	TON	284.61	1,164.38	0.244	$ 152.50	$ 37.28
SUPERPAVE, TYPE S3 (PG 64-22 OK)	TON	809.75	1,164.38	0.695	$ 96.00	$ 66.76
SUPERPAVE, TYPE S4 (PG70-28 OK)	TON	187.79	1,164.38	0.161	$ 176.00	$ 28.39
DOWEL JOINTED P.C.C. PAVT. (PLACEMENT	SY	734.23	1,164.38	0.631	$ 24.00	$ 15.13
P.C. CONCRETE FOR PAVEMENT	CY	224.35	1,164.38	0.193	$ 188.25	$ 36.27
TOTAL COST PER FOOT						$ 222.54
COST PER FOOT X TOTAL FEET = SURFACE COST						$ 259,123.94

31963(04) ~ US-69 ~ MAYES CO.
PAVEMENT COST ESTIMATE
TYPICAL #13



TYPICAL SECTION 14

CRL US-69 NORTHBOUND (RT. SIDE)
STA. 1528+63.28 TO STA. 1541+46.04

PAVEMENT REQUIREMENT	
12" PAVT. STRUCTURE	RIGHT TURN LANE & SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 70-28 OK)
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 70-28 OK)
	3.5" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3.5" SUPERPAVE TYPE S3 (PG 64-22 OK)

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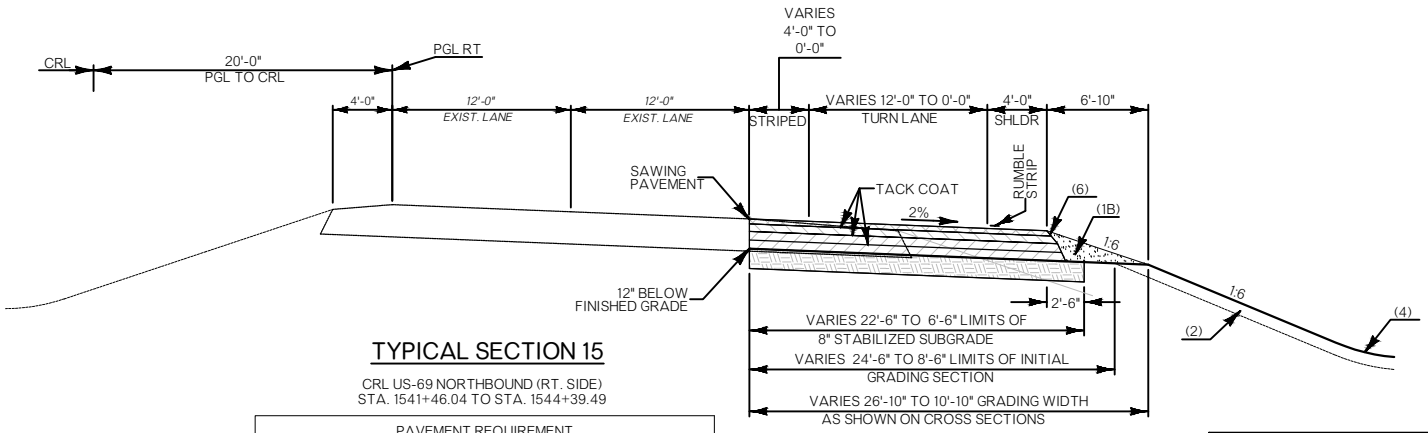
COUNTY: MAYES CO.
DESCRIPTION: US-69

JP NO. 31963(04)
PROJECT NO. --
Date: 04/16/2025

PREPARED BY: SMITH ROBERTS BALDISCHWILER, LLC.

ITEM DESCRIPTION	UNIT	QUANTITY	LENGTH	PER FOOT QUANTITY	UNIT COST	PER FOOT COST
STABILIZED SUBGRADE	SY	3,206.91	1,282.76	2.500	$ 6.35	$ 15.88
TACK COAT	GAL	655.42	1,282.76	0.511	$ 3.70	$ 1.89
SUPERPAVE, TYPE S3 (PG70-28 OK)	TON	485.89	1,282.76	0.379	$ 152.50	$ 57.76
SUPERPAVE, TYPE S3 (PG 64-22 OK)	TON	1,157.01	1,282.76	0.902	$ 96.00	$ 86.59
SUPERPAVE, TYPE S4 (PG70-28 OK)	TON	320.60	1,282.76	0.250	$ 176.00	$ 43.99
TOTAL COST PER FOOT						$ 206.11
COST PER FOOT X TOTAL FEET = SURFACE COST						$ 264,385.72

31963(04) ~ US-69 ~ MAYES CO.
PAVEMENT COST ESTIMATE
TYPICAL #14



TYPICAL SECTION 15

CRL US-69 NORTHBOUND (RT. SIDE)
STA. 1541+46.04 TO STA. 1544+39.49

PAVEMENT REQUIREMENT	
12" PAVT. STRUCTURE	RIGHT TURN LANE & SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 70-28 OK)
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 70-28 OK)
	3.5" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3.5" SUPERPAVE TYPE S3 (PG 64-22 OK)

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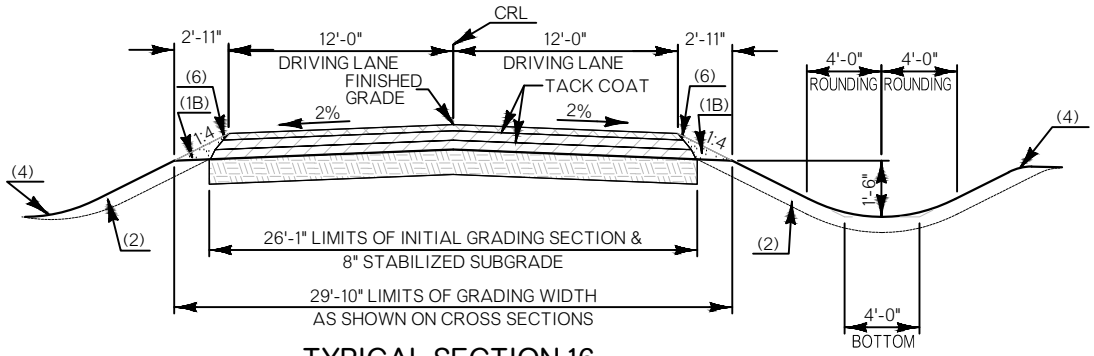
COUNTY: MAYES CO.
DESCRIPTION: US-69

JP NO. 31963(04)
PROJECT NO. --
Date: 04/16/2025

PREPARED BY: SMITH ROBERTS BALDISCHWILER, LLC.

ITEM DESCRIPTION	UNIT	QUANTITY	LENGTH	PER FOOT QUANTITY	UNIT COST	PER FOOT COST
STABILIZED SUBGRADE	SY	472.79	293.45	1.611	$ 6.35	$ 10.23
TACK COAT	GAL	91.25	293.45	0.311	$ 3.70	$ 1.15
SUPERPAVE, TYPE S3 (PG70-28 OK)	TON	67.34	293.45	0.229	$ 152.50	$ 35.00
SUPERPAVE, TYPE S3 (PG 64-22 OK)	TON	162.44	293.45	0.554	$ 96.00	$ 53.14
SUPERPAVE, TYPE S4 (PG70-28 OK)	TON	44.13	293.45	0.150	$ 176.00	$ 26.47
TOTAL COST PER FOOT						$ 125.99
COST PER FOOT X TOTAL FEET = SURFACE COST						$ 36,970.31



TYPICAL SECTION 16

CRL W 450
STA. 10+90.24 TO STA. 13+82.12

PAVEMENT REQUIREMENT	
8" PAVT. STRUCTURE	DRIVING LANES
SURFACE COURSE	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)

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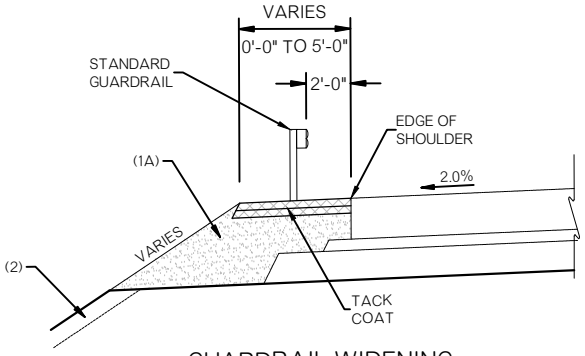
COUNTY: MAYES CO.
DESCRIPTION: US-69

JP NO. 31963(04)
PROJECT NO. --
Date: 04/16/2025

PREPARED BY: SMITH ROBERTS BALDISCHWILER, LLC.

ITEM DESCRIPTION	UNIT	QUANTITY	LENGTH	PER FOOT QUANTITY	UNIT COST	PER FOOT COST
STABILIZED SUBGRADE	SY	859.43	291.88	2.944	$ 6.35	$ 18.70
TACK COAT	GAL	119.59	291.88	0.410	$ 3.70	$ 1.52
SUPERPAVE, TYPE S3 (PG 64-22 OK)	TON	270.62	291.88	0.927	$ 96.00	$ 89.01
SUPERPAVE, TYPE S4 (PG 64-22 OK)	TON	87.79	291.88	0.301	$ 125.50	$ 37.75
TOTAL COST PER FOOT						$ 146.97
COST PER FOOT X TOTAL FEET = SURFACE COST						$ 42,897.03



GUARDRAIL WIDENING

CRL US-69 SOUTHBOUND
STA. 1352+37.36 TO STA. 1355+67.38 (LT. SIDE)
STA. 1352+37.36 TO STA. 1356+29.88 (RT. SIDE)
STA. 1497+25.98 TO STA. 1500+56.00 (LT. SIDE)
STA. 1497+25.98 TO STA. 1501+18.51 (RT. SIDE)

PAVEMENT REQUIREMENT	
4" PAVT. STRUCTURE	GUARDRAIL WIDENING
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 64-22 OK)
BASE COURSE	2" SUPERPAVE TYPE S4 (PG 64-22 OK)

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COUNTY: MAYES CO.
DESCRIPTION: US-69

JP NO. 31963(04)
PROJECT NO. --
Date: 04/16/2025

PREPARED BY: SMITH ROBERTS BALDISCHWILER, LLC.

ITEM DESCRIPTION	UNIT	QUANTITY	LENGTH	PER FOOT QUANTITY	UNIT COST	PER FOOT COST
TRAFFIC BOUND SURFACE COURSE TYPE E	TON	110.10	1,445.09	0.076	$ 30.00	$ 2.29
TACK COAT	GAL	58.40	1,445.09	0.040	$ 3.70	$ 0.15
SUPERPAVE, TYPE S4 (PG 64-22 OK)	TON	174.42	1,445.09	0.121	$ 125.50	$ 15.15
TOTAL COST PER FOOT						$ 17.58
COST PER FOOT X TOTAL FEET = SURFACE COST						$ 25,408.79

RED ROCK
CONSULTING

Pavement Design Report

US HIGHWAY 69
MAYES COUNTY, OKLAHOMA

31963(04)

Prepared For:

SRB
100 Northeast 5th Street
Oklahoma City, Oklahoma 73104
Attention: Mr. Greg Allen, PE

Prepared By:

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

December 10, 2024 – **REVISED**
Project No. 23037

RED ROCK
CONSULTING

December 10, 2024 – **REVISED**

SRB
100 Northeast 5th Street
Oklahoma City, Oklahoma 73104

Attention: Mr. Greg Allen, PE

Re: Pavement Design Report
US Highway 69
Mayes County, Oklahoma
31963(04)
RRC Project No. 23037

Dear Mr. Allen,

We are pleased to submit herewith this report entitled "Pavement Design Report, US Highway 69, Mayes County, Oklahoma, 31963(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

Emma Coggin, EI
Project Specialist

Jeremy Basler, PE
Geotechnical Manager
Oklahoma PE No. 20233

PAVEMENT DESIGN REPORT

US HIGHWAY 69
MAYES COUNTY, OKLAHOMA

31963(04)

PROJECT NO. 23037

APPENDICES

PAVEMENT DESIGN REPORT

US HIGHWAY 69
MAYES COUNTY, OKLAHOMA

31963(04)

PROJECT NO. 23037

INTRODUCTION

General

This report presents the results for the typical concrete pavement section recommendations for the proposed reconstruction of the existing US 69 from State Highway 20 and extending north approximately 8.0 miles in Mayes County, Oklahoma.

Proposed Construction

The project includes the reconstruction of the existing US 69 from State Highway 20 and extending north approximately 8.0 miles in Mayes County, Oklahoma. Beginning at State Highway 20 and extending north approximately 0.75 miles through the City of Pryor, the existing pavement associated with the 5 lane curb and gutter section will be reconstructed. From 0.75 miles north of State Highway 20 and extending north for approximately 7.25 miles, the southbound lanes will be reconstructed. Also included in the project are the construction of northbound and southbound turn lanes, the mill and overlay of the northbound shoulder and a temporary median crossover.

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 In Place Soils Survey and Pavement and Subgrade/Shoulder Soils Survey.

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

PAVEMENT RECOMMENDATIONS

Recommendations for designing the new concrete pavement sections using a 30-year design life were requested. An asphalt concrete pavement section for a temporary median crossover was confirmed for a 2-year design life. The concrete and asphalt pavement design analysis were performed using the AASHTO 1993 DARWin Pavement Design 2.01 computer software. Information considered in the design is discussed briefly below.

The 2028 average daily traffic (ADT) by vehicle classification was provided by SRB to use to calculate the traffic data for the new concrete pavement design for this project. Summaries of the traffic data for US Highway 69 In Town and US Highway 69 North of Town are provided in Tables 1 and 2.

Table 1 – US Highway 69 In Town Traffic Data

Parameter	Value	Parameter	Value
ADT (2028):	22,075	Design Res. Mod. (psi):	3,800
ADT (2048):	26,326	Trucks (T):	31%
20 Year Rigid ESALs:	105,623,286	D (Directional Dist.):	59%
30 Year Rigid ESALs:	166,860,161	L (Lane Dist.):	80%

*ESALs determined by AASHTO 1993 DARWin Pavement Design 2.01 computer software

Table 2 – US Highway 69 North of Town Traffic Data

Parameter	Value	Parameter	Value
ADT (2028):	12,639	Design Res. Mod. (psi):	3,800
ADT (2048):	15,571	Trucks (T):	31%
20 Year Rigid ESALs:	55,891,467	D (Directional Dist.):	54%
30 Year Rigid ESALs:	88,771,591	L (Lane Dist.):	80%

*ESALs determined by AASHTO 1993 DARWin Pavement Design 2.01 computer software

The jointed plain concrete pavement (JPCP) should have 12 foot slabs with approximate 15 foot joints, 1 ½" diameter dowels and 12" dowel spacing. The material for the base course is assumed to be ODOT Type 'A' Aggregate Base. The hot mixed asphalt (HMA) courses include PG 70-28 OK and PG 64-22 OK binders.

Resilient modulus results from the In Place Survey associated with this project were used to determine the resilient modulus for the existing subgrade layer. A Mr value of 3,800 psi was used for the subgrade. Mix design and laboratory testing were not conducted for the stabilized subgrade or aggregate base layers. Mr values of 15,000 and 30,000 psi were assumed for the stabilized subgrade and aggregate base layers, respectively.

Based on the design traffic provided, the recommended concrete pavement sections for a 30-year design life are shown in Tables 3 to 6. All materials and construction procedures

should meet applicable Oklahoma Department of Transportation (ODOT) specifications. The AASHTO 1993 DARWin designs are provided in Appendix A.

Table 3 – US Highway 69 In Town Mainline Tied Concrete Pavement Section with S3

Material	Thickness
Portland Cement 1 ½" Dowel Jointed Concrete	13"
Superpave Type S3 (PG 64-22 OK)	3"
Compacted Subgrade	8"

Table 4 – US Highway 69 In Town Mainline Tied Concrete Pavement Section with Open Graded Aggregate Base

Material	Thickness
Portland Cement 1 ½" Dowel Jointed Concrete	13"
Open Graded Aggregate Base	3"
Mirafi RS 580i Geotextile Reinforcement	
Compacted Subgrade	8"

Table 5 – *US Highway 69 Southbound North of Town Tied Concrete Pavement Section Stabilized Subgrade

Material	Thickness
Portland Cement 1 ½" Dowel Jointed Concrete	12"
Superpave Type S3 (PG 64-22 OK)	3"
Stabilized Subgrade	8"

*This pavement section also represents the tied PC shoulders

Table 6 – *US Highway 69 Southbound North of Town Tied Concrete Pavement Section Aggregate Base and Stabilized Subgrade

Material	Thickness
Portland Cement 1 ½" Dowel Jointed Concrete	11"
Superpave Type S3 (PG 64-22 OK)	3"
Aggregate Base	8"
Mirafi RS 380i Geotextile Reinforcement	
Stabilized Subgrade	8"

*This pavement section also represents the tied PC shoulders

Based on the design traffic provided, the recommended asphalt concrete pavement section for a temporary median crossover with a 2-year design life is shown in Table 7. All materials and construction procedures should meet applicable Oklahoma Department of Transportation (ODOT) specifications. The AASHTO 1993 DARWin design is provided in Appendix A.

Table 7 – US Highway 69 Temporary Median Crossover Full Depth Asphalt Concrete 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)	3”
Superpave Type S3 (PG 64-22 OK)	3"

The pavement section on the plans provided by SRB for the left turn lane and shoulder is shown in Table 8. Pavement design or confirmation of the following section was not performed due to traffic data not being available for the left turn lane and shoulder.

Table 8 – *US Highway 69 Northbound North of Town Left Turn Lane and Shoulder Tied Concrete Pavement Section

Material	Thickness
Portland Cement 1 ½” Dowel Jointed Concrete	12"
Superpave Type S3 (PG 64-22 OK)	3”
Stabilized Subgrade	8"

*This pavement section also represents the tied PC shoulders

The pavement section on the plans provided by SRB for the right turn lane and shoulder is shown in Table 9. Pavement design or confirmation of the following section was not performed due to traffic data not being available for the right turn lane and shoulder.

Table 9 – US Highway 69 Northbound North of Town Right Turn Lane and Shoulder Asphalt Concrete Pavement Section

Material	Thickness
Superpave Type S4 (PG 70-28 OK)	2"
Superpave Type S3 (PG 70-28 OK)	3”
Superpave Type S3 (PG 64-22 OK)	3.5”
Superpave Type S3 (PG 64-22 OK)	3.5”
Stabilized Subgrade	8"

The pavement section on the plans provided by SRB for the mill and overlay of the shoulder is shown in Table 10. Pavement design or confirmation of the following section was not performed due to traffic data not being available for the shoulder.

Table 10 – US Highway 69 Northbound North of Town Shoulder Mill and Overlay Pavement Section

Material	Thickness
Superpave Type S4 (PG 64-22 OK)	2"

The pavement section on the plans provided by SRB for the Section Line E/W 450 Road is shown in Table 11. Pavement design or confirmation of the following section was not performed due to traffic data not being available for the road.

Table 11 – Section Line E/W 450 Road Asphalt Concrete Pavement Section

Material	Thickness
Superpave Type S4 (PG 64-22 OK)	2"
Superpave Type S3 (PG 64-22 OK)	3”
Superpave Type S3 (PG 64-22 OK)	3”
Stabilized Subgrade	8"

The subgrade preparation, compaction, aggregate base, geotextile reinforcement and stabilized subgrade 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. 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 include crowning the pavement subgrades 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. Shoulders at least 2 feet in width and/or curb and guttering along both sides of the roadway will prolong the life of the pavement by providing edge support and minimizing subgrade moisture intrusion. 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 SRB, 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.

APPENDIX A

1993 AASHTO Pavement Design

DARWin(tm) Pavement Design System

A Proprietary AASHTOWARE(tm)
Computer Software Product

Red Rock Consulting
PO Box 30591
Edmond, OK 73003
JWB

Rigid Structural Design Module

US 69 In Town Concrete with S3

Rigid Structural Design Module Data

Pavement type	JPCP
18-kip ESALs for initial performance period	166,860,161
Initial Serviceability	4.5
Terminal Serviceability	2
28-day mean PCC Modulus of Rupture (psi)	690
28-day mean Elastic Modulus of Slab (psi)	4,200,000
Mean Effective k-value (psi/in)	270
Reliability Level (%)	90
Overall Standard Deviation	.35
Load Transfer Coefficient, J	2.5
Overall Drainage Coefficient, Cd	1
Stage Construction	1

Calculated Design Thickness (in): 12.34

Transverse Joint Spacing

Joint Spacing (ft): 15.00

Tie Bar Steel Design

Steel Grade (ksi)	40
Distance to Free Edge (ft)	12
Slab Thickness (in)	12
Friction Factor	.9
Percent of yield strength	70
Bar Size	#4
Calculated Maximum Tie Bar Spacing (in)	42.4
Calculated Recommended Maximum Tie Bar Spacing (in)	42.4
Calculated Tie Bar Length (in)	23.0
Calculated Area of Steel (in^2/ft)	.056

Joint Load Transfer

Dowel Material	
Dowel Diameter (in)	1.5
Dowel Length (in)	18
Dowel Spacing (in)	12
Dowel Coating	

Joint Reservoir and Sealant Design

PCC Coefficient of Thermal Contraction (10^-6 in/in F)	3.8
Temperature Range From PCC Placement to Minimum Temperature (F)	67.7
Drying Shrinkage Coefficient of PCC Slab (in/in)	.0006
Adjustment Factor for Friction B/T Slab and Subbase	.65
Sealant Type	Bit.-Based
Allowable Sealant Strain	.25
Sealant Shape Factor (D/W)	.65
Calculated Joint Opening (in)	.100
Calculated Recommended Minimum Joint Reservoir Width (in)	.40
Calculated Joint Sealant Depth (in)	.26

Pavement Layer Information

Layer	Description	Thickness (in)	Width (ft)
1	JPCP	13.00	12.00
2	S3	3.00	12.00
Total		16.00	

Simple ESAL Calculation

Performance Period (years)	30
Two-Way Daily Traffic (ADT)	22,075
Percent Heavy Trucks (of ADT) FHWA Class 5 or Greater	31
Number of Lanes In Design Direction	2
Percent of All Trucks In Design Lane (%)	80
Percent Trucks In Design Direction (%)	59
Average Initial Truck Factor (ESALs/truck)	4.066
Annual Truck Factor Growth Rate (%)	0
Annual Truck Volume Growth Rate (%)	1
Growth	Compound

Total Calculated Cumulative Esals: 166,860,161

1993 AASHTO Pavement Design

DARWin(tm) Pavement Design System

A Proprietary AASHTOWARE(tm)
Computer Software Product

Red Rock Consulting
PO Box 30591
Edmond, OK 73003
JWB

Rigid Structural Design Module

US 69 In Town Concrete with Open Graded Aggregate Base

Rigid Structural Design Module Data

Pavement type	JPCP
18-kip ESALs for initial performance period	166,860,161
Initial Serviceability	4.5
Terminal Serviceability	2
28-day mean PCC Modulus of Rupture (psi)	690
28-day mean Elastic Modulus of Slab (psi)	4,200,000
Mean Effective k-value (psi/in)	200
Reliability Level (%)	90
Overall Standard Deviation	.35
Load Transfer Coefficient, J	2.5
Overall Drainage Coefficient, Cd	1
Stage Construction	1

Calculated Design Thickness (in): 12.51

Transverse Joint Spacing

Joint Spacing (ft): 15.00

Tie Bar Steel Design

Steel Grade (ksi)	40
Distance to Free Edge (ft)	12
Slab Thickness (in)	13
Friction Factor	1.5
Percent of yield strength	70
Bar Size	#4
Calculated Maximum Tie Bar Spacing (in)	23.5
Calculated Recommended Maximum Tie Bar Spacing (in)	23.5
Calculated Tie Bar Length (in)	23.0
Calculated Area of Steel (in^2/ft)	.100

Joint Load Transfer

Dowel Material	
Dowel Diameter (in)	1.5
Dowel Length (in)	18
Dowel Spacing (in)	12
Dowel Coating	

Joint Reservoir and Sealant Design

PCC Coefficient of Thermal Contraction (10^-6 in/in F)	3.8
Temperature Range From PCC Placement to Minimum Temperature (F)	67.7
Drying Shrinkage Coefficient of PCC Slab (in/in)	.0006
Adjustment Factor for Friction B/T Slab and Subbase	.8
Sealant Type	Bit.-Based
Allowable Sealant Strain	.25
Sealant Shape Factor (D/W)	.65
Calculated Joint Opening (in)	.123
Calculated Recommended Minimum Joint Reservoir Width (in)	.49
Calculated Joint Sealant Depth (in)	.32

Pavement Layer Information

Layer	Description	Thickness (in)	Width (ft)
1	JPCP	13.00	12.00
2	Open Graded Aggregate Base	3.00	12.00
Total		16.00	

Simple ESAL Calculation

Performance Period (years)	30
Two-Way Daily Traffic (ADT)	22,075
Percent Heavy Trucks (of ADT) FHWA Class 5 or Greater	31
Number of Lanes In Design Direction	2
Percent of All Trucks In Design Lane (%)	80
Percent Trucks In Design Direction (%)	59
Average Initial Truck Factor (ESALs/truck)	4.066
Annual Truck Factor Growth Rate (%)	0
Annual Truck Volume Growth Rate (%)	1
Growth	Compound
Total Calculated Cumulative Esals	166,860,161

1993 AASHTO Pavement Design

DARWin(tm) Pavement Design System

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Computer Software Product

Red Rock Consulting
PO Box 30591
Edmond, OK 73003
JWB

Rigid Structural Design Module

US 69 North of Town Stabilized Subgrade Concrete

Rigid Structural Design Module Data

Pavement type:	JPCP
18-kip ESALs for initial performance period:	88,771,591
Initial Serviceability:	4.5
Terminal Serviceability:	2
28-day mean PCC Modulus of Rupture (psi):	690
28-day mean Elastic Modulus of Slab (psi):	4,200,000
Mean Effective k-value (psi/in):	200
Reliability Level (%):	90
Overall Standard Deviation:	.35
Load Transfer Coefficient, J:	2.5
Overall Drainage Coefficient, Cd:	1
Stage Construction:	1

Calculated Design Thickness (in): 11.35

Transverse Joint Spacing

Joint Spacing (ft): 15.00

Tie Bar Steel Design

Steel Grade (ksi):	40
Distance to Free Edge (ft):	12
Slab Thickness (in):	12
Friction Factor:	1.8
Percent of yield strength:	70
Bar Size:	#4

Calculated Maximum Tie Bar Spacing (in): 21.2

Calculated Recommended Maximum
Tie Bar Spacing (in): 21.2
Calculated Tie Bar Length (in): 23.0
Calculated Area of Steel (in^2/ft): .111

Joint Load Transfer

Dowel Material:
Dowel Diameter (in): 1.5
Dowel Length (in): 18
Dowel Spacing (in): 12
Dowel Coating:

Joint Reservoir and Sealant Design

PCC Coefficient of Thermal
Contraction (10^-6 in/in F): 3.8
Temperature Range From PCC Placement
to Minimum Temperature (F): 67.7
Drying Shrinkage Coefficient
of PCC Slab (in/in): .0006
Adjustment Factor for Friction
B/T Slab and Subbase: .65
Sealant Type: Bit.-Based
Allowable Sealant Strain: .25
Sealant Shape Factor (D/W): 1.5

Calculated Joint Opening (in): .100
Calculated Recommended Minimum
Joint Reservoir Width (in): .40
Calculated Joint Sealant Depth (in): .60

Pavement Layer Information

Layer	Description	Thickness (in)	Width (ft)
1	JPCP	12.00	12.00
2	HMA	3.00	12.00
3	Stabilized Subgrade	8.00	12.00
Total		23.00	

Simple ESAL Calculation

Performance Period (years): 30

Two-Way Daily Traffic (ADT):	12,639
Percent Heavy Trucks (of ADT) FHWA Class 5 or Greater:	31
Number of Lanes In Design Direction:	2
Percent of All Trucks In Design Lane (%):	80
Percent Trucks In Design Direction (%):	54
Average Initial Truck Factor (ESALs/truck):	4.066
Annual Truck Factor Growth Rate (%):	0
Annual Truck Volume Growth Rate (%):	1.1
Growth:	Compound

Total Calculated Cumulative Esals: 88,771,591

1993 AASHTO Pavement Design

DARWin(tm) Pavement Design System

A Proprietary AASHTOWARE(tm)
Computer Software Product

Red Rock Consulting
PO Box 30591
Edmond, OK 73003
JWB

Rigid Structural Design Module

US 69 North of Town Stabilized Subgrade w Agg Base Concrete

Rigid Structural Design Module Data

Pavement type:	JPCP
18-kip ESALs for initial performance period:	88,771,591
Initial Serviceability:	4.5
Terminal Serviceability:	2
28-day mean PCC Modulus of Rupture (psi):	690
28-day mean Elastic Modulus of Slab (psi):	4,200,000
Mean Effective k-value (psi/in):	400
Reliability Level (%):	90
Overall Standard Deviation:	.35
Load Transfer Coefficient, J:	2.5
Overall Drainage Coefficient, Cd:	1
Stage Construction:	1

Calculated Design Thickness (in): 10.94

Transverse Joint Spacing

Joint Spacing (ft): 15.00

Tie Bar Steel Design

Steel Grade (ksi):	40
Distance to Free Edge (ft):	12
Slab Thickness (in):	12
Friction Factor:	1.8
Percent of yield strength:	70
Bar Size:	#4

Calculated Maximum Tie Bar Spacing (in): 21.2

Calculated Recommended Maximum Tie Bar Spacing (in): 21.2
Calculated Tie Bar Length (in): 23.0
Calculated Area of Steel (in^2/ft): .111

Joint Load Transfer

Dowel Material:
Dowel Diameter (in): 1.5
Dowel Length (in): 18
Dowel Spacing (in): 12
Dowel Coating:

Joint Reservoir and Sealant Design

PCC Coefficient of Thermal Contraction (10^-6 in/in F): 3.8
Temperature Range From PCC Placement to Minimum Temperature (F): 67.7
Drying Shrinkage Coefficient of PCC Slab (in/in): .0006
Adjustment Factor for Friction B/T Slab and Subbase: .65
Sealant Type: Bit.-Based
Allowable Sealant Strain: .25
Sealant Shape Factor (D/W): 1.5

Calculated Joint Opening (in): .100
Calculated Recommended Minimum Joint Reservoir Width (in): .40
Calculated Joint Sealant Depth (in): .60

Pavement Layer Information

Layer	Description	Thickness (in)	Width (ft)
1	JPCP	11.00	12.00
2	HMA	3.00	12.00
3	Crushed Rock	8.00	12.00
4	Stabilized Subgrade	8.00	12.00
Total		30.00	

Simple ESAL Calculation

Performance Period (years):	30
Two-Way Daily Traffic (ADT):	12,639
Percent Heavy Trucks (of ADT) FHWA Class 5 or Greater:	31
Number of Lanes In Design Direction:	2
Percent of All Trucks In Design Lane (%):	80
Percent Trucks In Design Direction (%):	54
Average Initial Truck Factor (ESALs/truck):	4.066
Annual Truck Factor Growth Rate (%):	0
Annual Truck Volume Growth Rate (%):	1.1
Growth:	Compound
Total Calculated Cumulative Esals:	88,771,591

1993 AASHTO Pavement Design

DARWin(tm) Pavement Design System

A Proprietary AASHTOWARE(tm)
Computer Software Product

Red Rock Consulting
PO Box 30591
Edmond, OK 73003
JWB

Flexible Structural Design Module

US 69 North of Town Temporary Median Crossover Asphalt

Flexible Structural Design Module Data

18-kip ESALs Over
Initial Performance Period: 2,956,462
Initial Serviceability: 4.2
Terminal Serviceability: 2
Reliability Level (%): 90
Overall Standard Deviation: .45
Roadbed Soil Resilient Modulus (PSI): 3,800
Stage Construction: 1

Calculated Design Structural Number: 4.86

Specified Layer Design

Layer	Material Description	Struct. Coef. (Ai)	Drain. Coef. (Mi)	Thickness (Di) (in)	Width (ft)	Calculated SN
1	Asphalt	.44	1	11	20	4.84
Total				11.00		4.84

Simple ESAL Calculation

Performance Period (years):	2
Two-Way Daily Traffic (ADT):	12,639
Percent Heavy Trucks (of ADT) FHWA Class 5 or Greater:	31
Number of Lanes In Design Direction:	2
Percent of All Trucks In Design Lane (%):	80
Percent Trucks In Design Direction (%):	54
Average Initial Truck Factor (ESALs/truck):	2.378
Annual Truck Factor Growth Rate (%):	0
Annual Truck Volume Growth Rate (%):	1.1
Growth:	Compound
Total Calculated Cumulative Esals:	2,956,462

RED ROCK
CONSULTING

Report of Geotechnical Investigation

OF THE

US 69 PAVEMENT AND SUBGRADE/SHOULDER SOILS SURVEY (NORTHBOUND SHOULDER)

MAYES COUNTY, OKLAHOMA

31963(04)

Prepared For:

SRB
100 NE 5th Street
Oklahoma City, Oklahoma 73104
Attention: Mr. Greg Allen, PE

Prepared By:

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

October 27, 2023
Project No. 23036

RED ROCK
CONSULTING

October 27, 2023

SRB
100 NE 5th Street
Oklahoma City, Oklahoma 73104

Attention: Mr. Greg Allen, PE

Re: Report of Geotechnical Investigation
US 69 Pavement and Subgrade/Shoulder Soils Survey
(Northbound Shoulder)
31963(04)
Mayes County, Oklahoma
Project No. 23036

Dear Mr. Allen:

I am pleased to submit herewith this report entitled "Geotechnical Investigation, US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder), 31963(04), Mayes 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. 06/30/25

Dawson Wiseman, EI
Project Specialist

REGISTERED PROFESSIONAL ENGINEER
JEREMY BASLER
10-27-2023
20233
OKLAHOMA

Jeremy Basler, PE
Geotechnical Manager
Oklahoma PE No. 20233

REPORT OF GEOTECHNICAL INVESTIGATION

US 69 PAVEMENT AND SUBGRADE/SHOULDER SOILS SURVEY (NORTHBOUND SHOULDER) MAYES COUNTY, OKLAHOMA

31963(04)

PROJECT NO. 23036

APPENDICES

REPORT OF GEOTECHNICAL INVESTIGATION

US 69 PAVEMENT AND SUBGRADE/SHOULDER SOILS SURVEY (NORTHBOUND SHOULDER) MAYES COUNTY, OKLAHOMA

31963(04)

PROJECT NO. 23036

INTRODUCTION

General

This report presents the results of the geotechnical investigation performed for the possible overlay or reconstruction of the existing pavement of the US 69 northbound shoulder along the current alignment beginning 0.75 miles north of SH 20 and extending north 7.25 miles in Mayes County, Oklahoma.

Proposed Construction

The proposed project will include the possible overlay or reconstruction of the existing pavement of the US 69 northbound shoulder. The project is associated with the reconstruction of the existing pavement of the 5-lane curb and gutter section beginning at SH 20 and extending north 0.75 miles through the City of Pryor. The associated project also includes the reconstruction of the existing US 69 southbound lanes from 0.75 miles north of SH 20 extending north approximately 7.25 miles.

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. Investigation of the subsurface soils of the northbound shoulder pavement by coring, drilling, sampling and testing a total of 26 boreholes within the planned project area

3. Investigation of the in-place strength of the subsurface soils by performing Dynamic Cone Penetration (DCP) tests in each core

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

5. Presentation of laboratory test data

FIELD AND LABORATORY INVESTIGATIONS

Field Exploration

The subsurface exploration was performed by Red Rock Consulting on July 5th and 11th, 2023. The cores/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 SRB. The locations of the cores/borings should be considered accurate only to the degree implied by the methods used to define them.

The pavement at each core location was cored with a 4-inch barrel using a coring machine which was mounted on the back of a trailer. Measured pavement thicknesses are shown on the Pavement Core Data and Subgrade Soils Chart in Appendix B. Following coring, Dynamic Cone Penetration (DCP) tests were conducted continuously to depths of 3 feet or refusal in each core. The DCP test data and CBR approximations from the DCP data are shown on the DCP Data Sheets in Appendix E. Photographs of the cores and existing pavement are included on the Core Logs and Pavement Photographs in Appendix C.

DCP testing was conducted using a KSE K-100 model dynamic cone penetrometer which meets the standard of ASTM D6951. The tests were conducted following the procedures described in the K-100 Models User's Manual. From the test data, a DCP Index for each interval was calculated and then a tabulated correlation was used to approximate the CBR value. The tabulated correlation of CBR versus DCP Index was found in the K-100 Models User's Manual.

Following DCP testing, the roadway boring locations were then drilled to depths of approximately 36 inches, or until refusal, beneath the existing pavement. The borings were drilled using a truck mounted CME 55 drill rig. 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 D.

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 northbound shoulder of US 69 was paved with asphalt concrete. The project area consisted primarily of agricultural fields, residential, and commercial properties. Railroad tracks paralleled the west side of US 69. 4.5 miles north of SH 20 the railroad tracks crossed US 69 and paralleled the east side of highway. The town of Pryor was located at the beginning of the project. The town of Adair was located 1.3 miles north of the project.

Traffic was moderate during drilling operations. Approximately 50 percent of the traffic was comprised of large trucks. Traffic control was required to advance the borings.

The existing shoulder pavement was generally in poor condition. Minor to major severity fatigue and transverse cracking, moderate severity longitudinal cracking, and light severity asphalt bleeding were observed across the project.

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 Eight Engineering Classification of Geological Materials”, published by the Oklahoma Department of Transportation (ODOT) and the Geologic Map of the “Hydrologic Atlas 2 of Oklahoma,” Reconnaissance of the Water Resources of the Tulsa quadrangle, northeastern Oklahoma,” by Melvin V. Marcher and Roy H. Bingham, U.S. Geological Survey, 1971.

ODOT PUBLICATION

Division Eight of the “Engineering Classification of Geological Materials”, published by the Oklahoma Department of Transportation (ODOT) indicates that, beneath Alluvium (Qts) and Terrace Deposits (Qas), the project site consists of the Hartshorne-Atoka Unit (IPha) and McAlester Unit (IPma).

Alluvium consists of sand, silt, clay, gravel, and/or combinations of materials. Alluvium is found along the flood plains (bottom land) of streams and is normally present

at places along all streams. The geologic unit maps outline many deposits, but all of these deposits are not shown.

Terrace deposits consist of sand, silt, clay, gravel, and/or mixtures of these. Terrace materials occur adjacent to or near streams at higher elevations than the flood plain (bottom land). Like alluvium, these deposits are not all shown on the geologic unit maps. Most terrace deposits will have seepage where the underlying geologic material is less pervious.

The Hartshorne-Atoka unit consists of shale with some sandstone and siltstone. The shale is black and fissile, and the sandstone is soft to moderately hard, and generally brownish in color, thin-bedded to massive, and less than 10 feet thick. In Ottawa County, this unit is approximately 36 feet thick and is almost entirely shale with a one-foot bed of limestone conglomerate at the base. The unit is approximately 35 to 50 feet thick in Craig County. In Mayes County, it ranges from 35 feet in the north to about 90 feet in the southern portion.

In Division 8, the Hartshorne-Atoka outcrops in Craig, Mayes, and Ottawa Counties. In southern Mayes County, it is exposed along the Grand River, capping the cliffs along the river.

The McAlester unit consists predominantly of shale and a 10-to-20-foot bed of sandstone at the base. The shale is black, fissile, and attains a thickness of 80 feet locally. The sandstone is brown in color, soft to hard, and massive bedded. The total thickness of the McAlester varies from about 50 feet in southern Mayes County to about 100 feet in Craig County, and about 50 feet in Ottawa County.

The McAlester outcrops in Craig, Mayes, Ottawa, and Rogers Counties of Division 8. The topography is flat to slightly rolling with a slight scarp formed by the basal (Warner) sandstone.

USGS MAP

According to the USGS geologic map, beneath Alluvium, the project consists of the Atoka Formation and a combination of the Savanna, McAlester, Hartshorne, and Atoka Formations.

Alluvium consists of gravel, sand, silt, and clay. It yields moderate to large amounts of fair to good-quality water along the Arkansas River and small to moderate amounts of fair to good quality water locally along the Verdigris and Neosho Rivers.

The Atoka Formation consists of shale, siltstone, sandstone, and thin limestone. The units yields only small amounts of fair to poor quality water.

The Savanna, McAlester, Hartshorne, and Atoka Formations consists of shale, sandstone, siltstone, limestone, and coal. Except for the Warner Sandstone Member at the base of the McAlester Formation. These units yield only small amounts of fair to poor quality water. The Warner Sandstone probably will yield small to moderate amounts of fair-quality water locally.

Subsurface Conditions

Information collected from the core locations explored indicates that the existing pavement of US 69 northbound shoulder along the project consisted of asphalt concrete over aggregate base or subgrade. The total thickness of the asphalt concrete in the roadway cores ranged between 8 to 17 inches. The total thickness of the aggregate base in the roadway cores ranged between 3 to 13.5 inches. Core C-1 was observed to be supported by 14 inches of cement stabilized subgrade.

Full depth pavement core samples were recovered from all coring locations. Within the asphalt concrete section, separation and stripping were observed in the majority of the cores along the project. Deterioration due to stripping was observed in cores C-3, C-19, and C-26. **Separation, stripping and/or deterioration are an indication of prolonged exposure to moisture. Drainage may be an issue in these areas of the project.**

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 sand with various amounts of gravel, clayey sand with various amounts of gravel, and lean clay with various amounts of sand. The subgrade materials encountered in the borings classified as A-2-4, A-4, A-6, and A-7-6 soils. The subgrade materials extended 36 inches below the pavement. Auger refusal was observed in core C-23 at 43 inches. The subgrade materials appeared to be native to the site. 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.

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.

Dynamic Cone Penetrometer (DCP) Test Results

DCP testing was conducted using a KSE K-100 model dynamic cone penetrometer which meets the standard of ASTM D6951. The tests were conducted following the procedures described in the K-100 Models User's Manual. From the test data, a DCP Index for each interval was calculated and then a tabulated correlation was used to approximate the CBR value. The tabulated correlation of CBR versus DCP Index was found in the K-100 Models User's Manual.

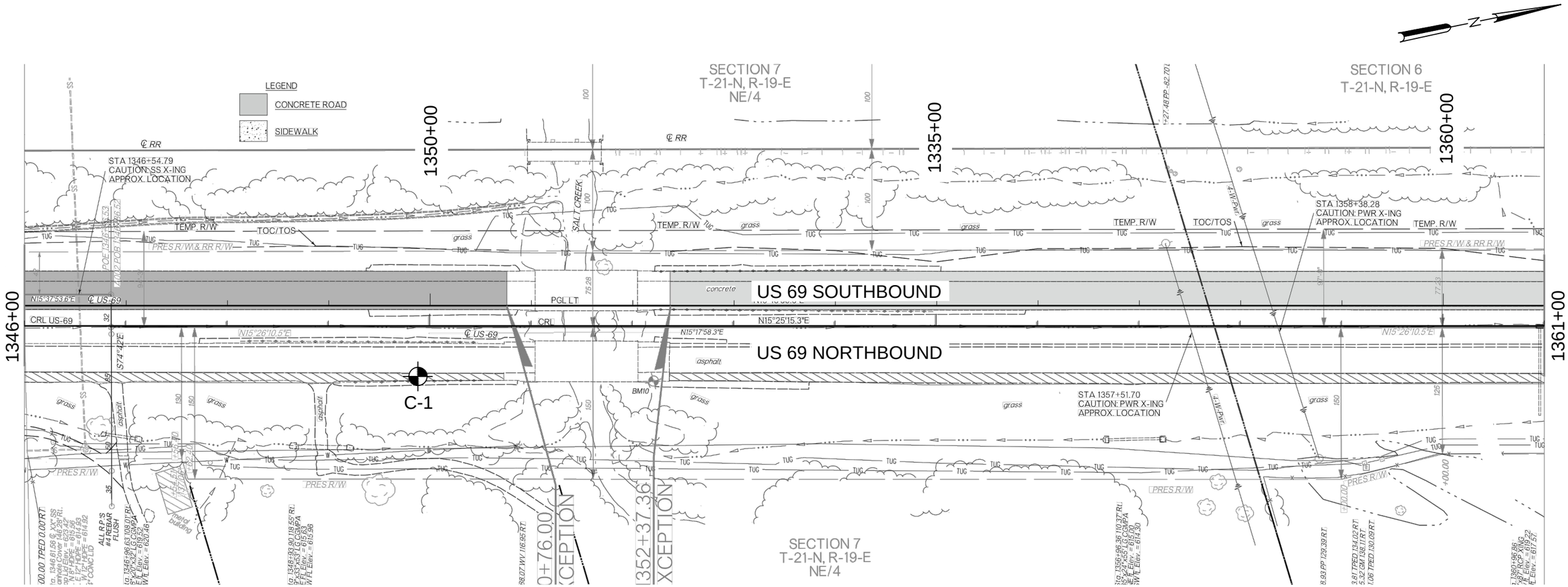
The approximate average CBR values ranged between 1.4 and 100 in the borings. The approximate CBR values are shown in entirety on the DCP Data Sheets in Appendix E.

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 SRB, 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 A



Boring	Station	US 69 CL Survey
C-1	1349+90	48' right

Stations and offsets estimated from plans provided by SRB.

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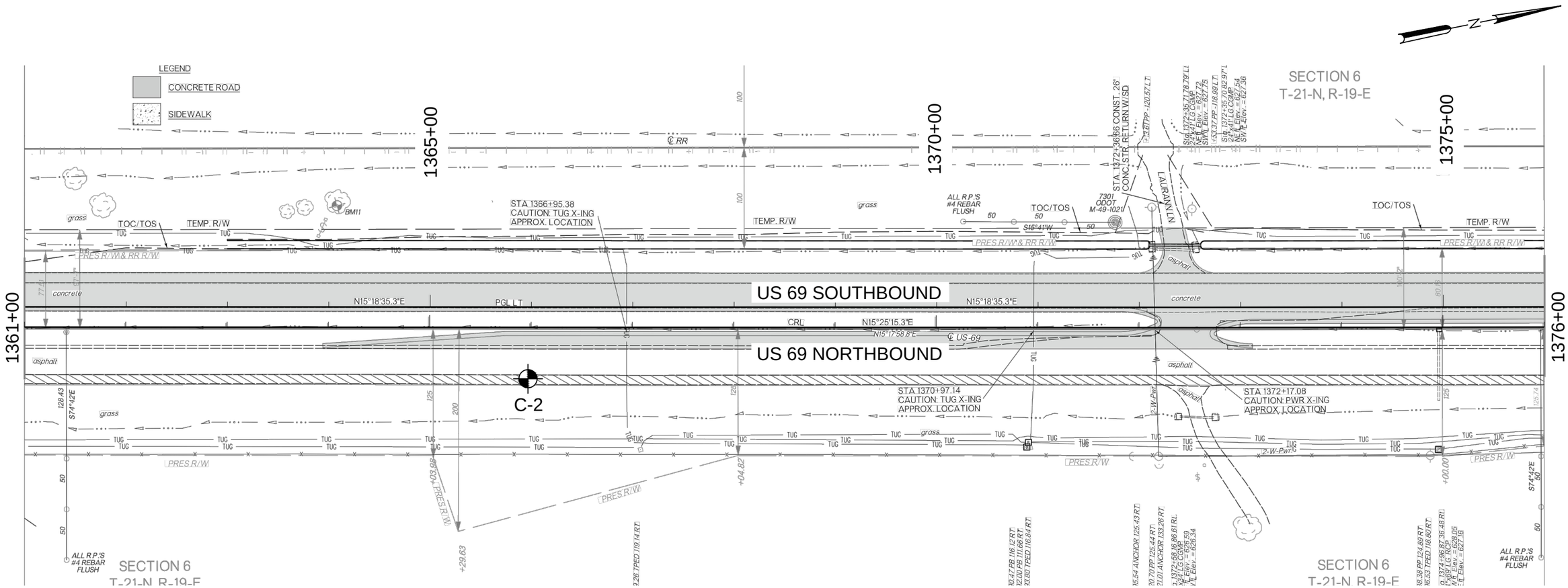
BORING LOCATION DIAGRAM
US 69 PAVEMENT AND SUBGRADE/
SHOULDER SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23036
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	10/9/2023
Approved By:	JWB	Page No:	1/26



Boring	Station	US 69 CL Survey
C-2	1365+98	49' right

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BORING LOCATION DIAGRAM
US 69 PAVEMENT AND SUBGRADE/ SHOULDER SURVEY (NORTHBOUND SHOULDER)
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23036
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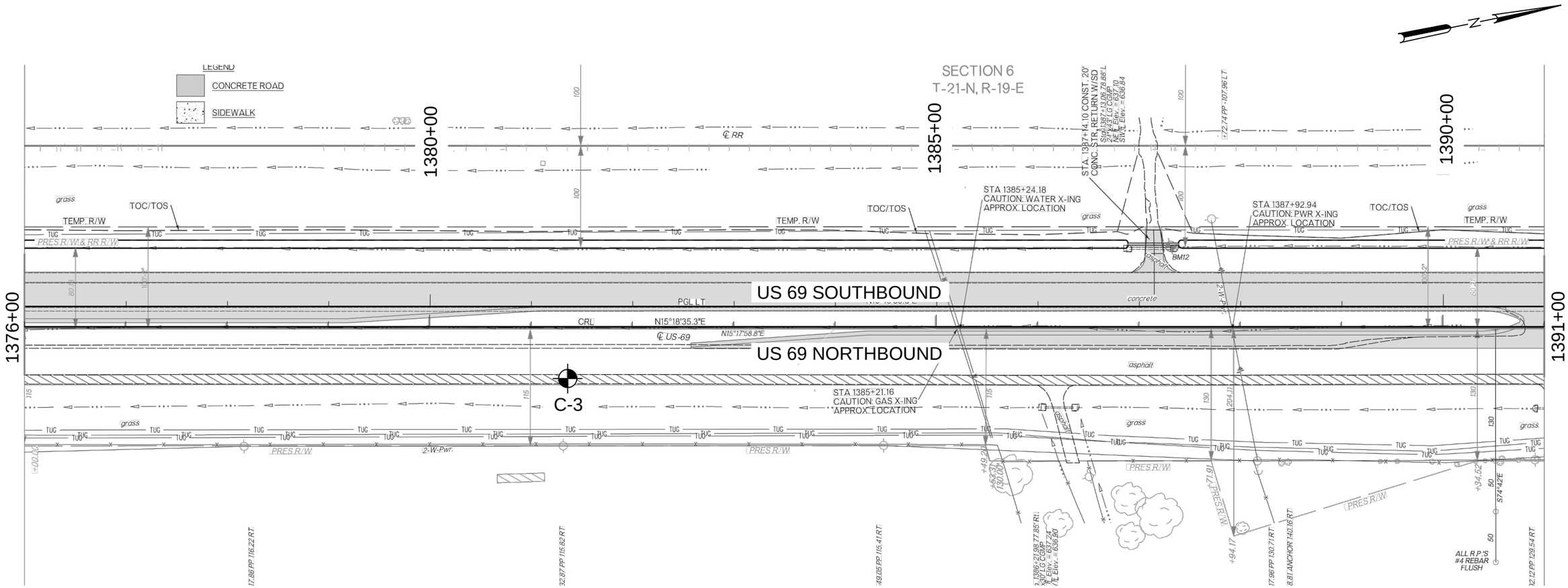
Checked By:	JWB	Date:	10/9/2023
Approved By:	JWB	Page No:	2/26



Boring	Station	US 69 CL Survey
C-3	1381+37	49' right

Stations and offsets estimated from plans provided by SRB.

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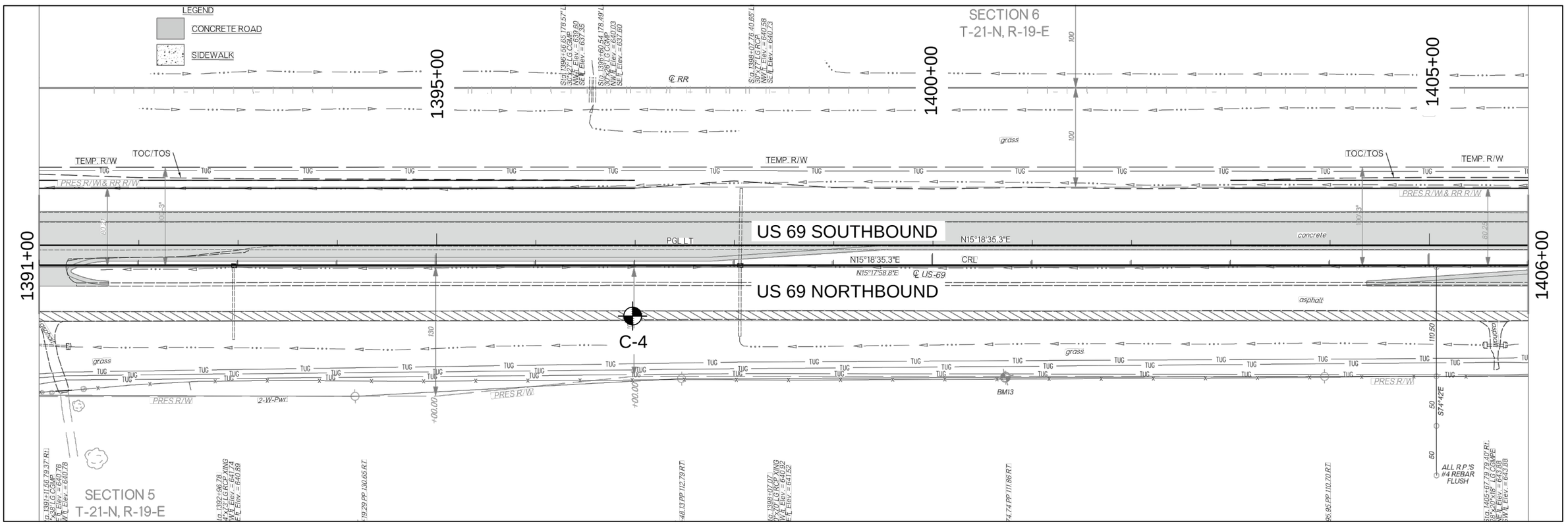
BORING LOCATION DIAGRAM
US 69 PAVEMENT AND SUBGRADE/ SHOULDER SOILS SURVEY (NORTHBOUND SHOULDER)
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23036
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	10/9/2023
Approved By:	JWB	Page No:	3/26



Boring	Station	US 69 CL Survey
C-4	1396+99	49' right

Stations and offsets estimated from plans provided by SRB.

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US 69 PAVEMENT AND SUBGRADE/ SHOULDER SOILS SURVEY (NORTHBOUND SHOULDER)
MAYES COUNTY, OKLAHOMA
31963(04)

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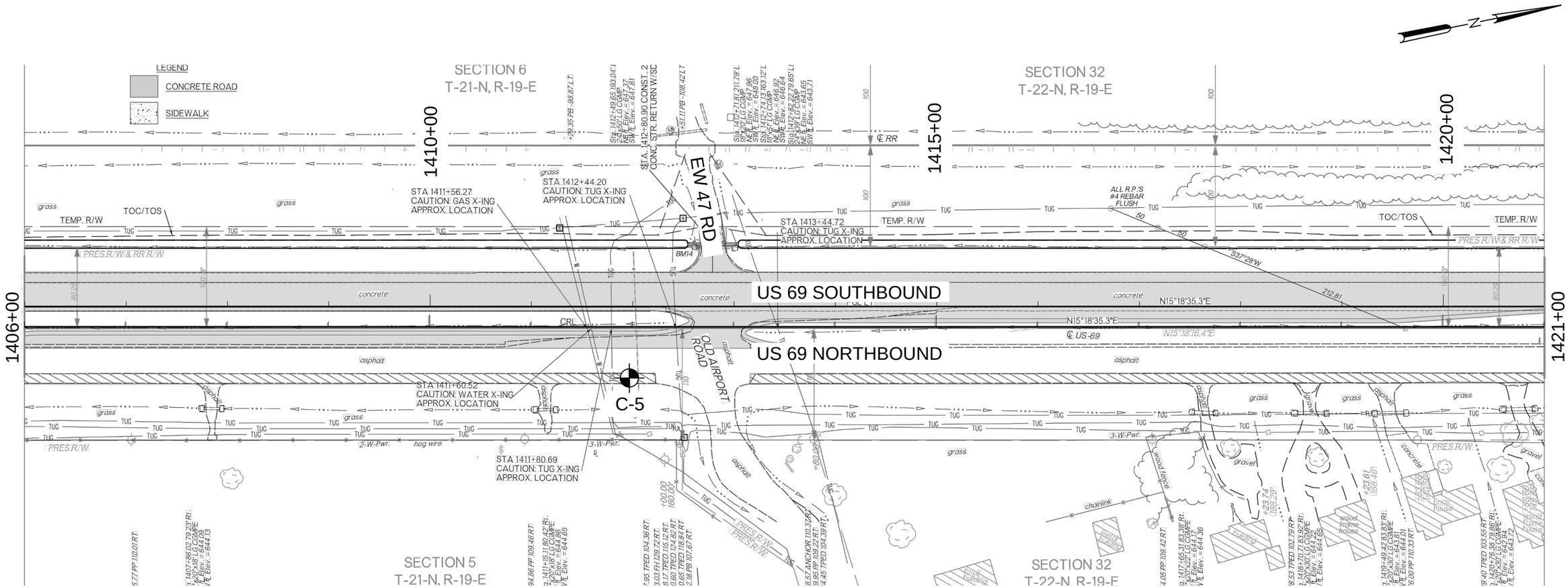
Approved By:	JWB	Page No:	4/26



Boring	Station	US 69 CL Survey
C-5	1411+98	48' right

Stations and offsets estimated from plans provided by SRB.

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US 69 PAVEMENT AND SUBGRADE/ SHOULDER SOILS SURVEY (NORTHBOUND SHOULER)
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23036
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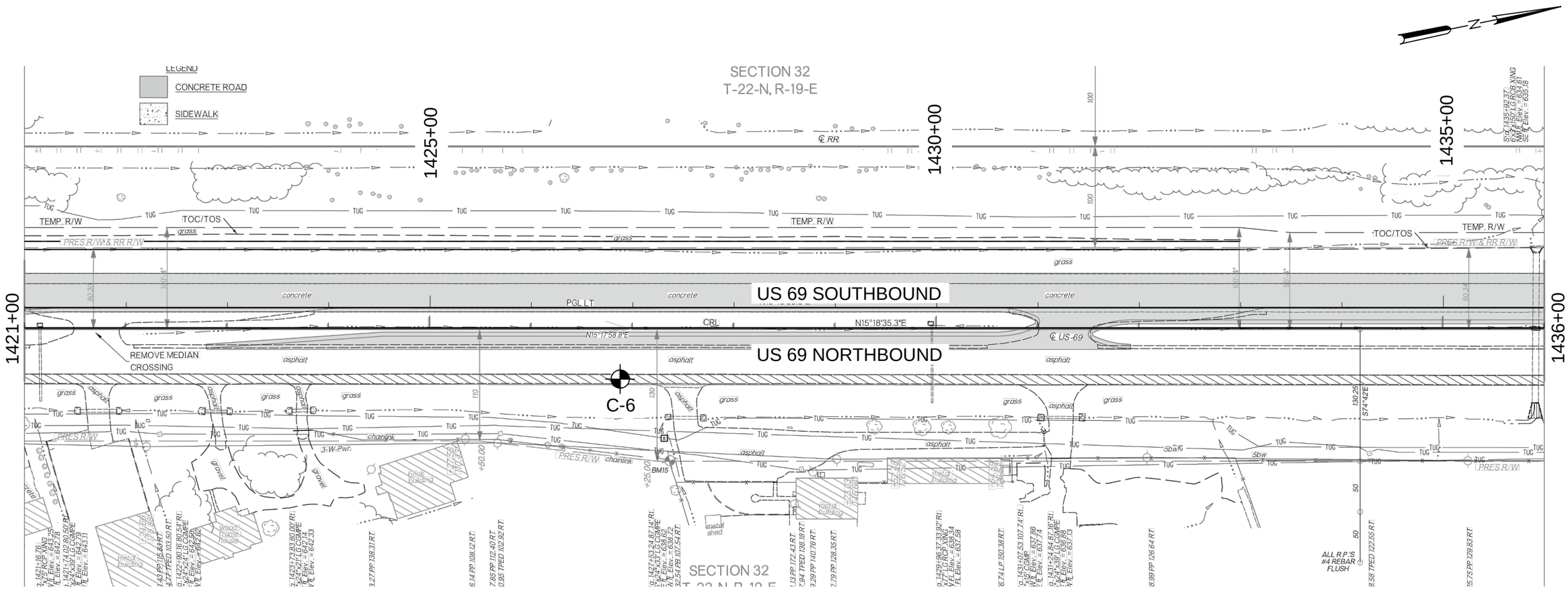
Approved By:	JWB	Page No:	5/26



Boring	Station	US 69 CL Survey
C-6	1426+89	49' right

Stations and offsets estimated from plans provided by SRB.

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31963(04)

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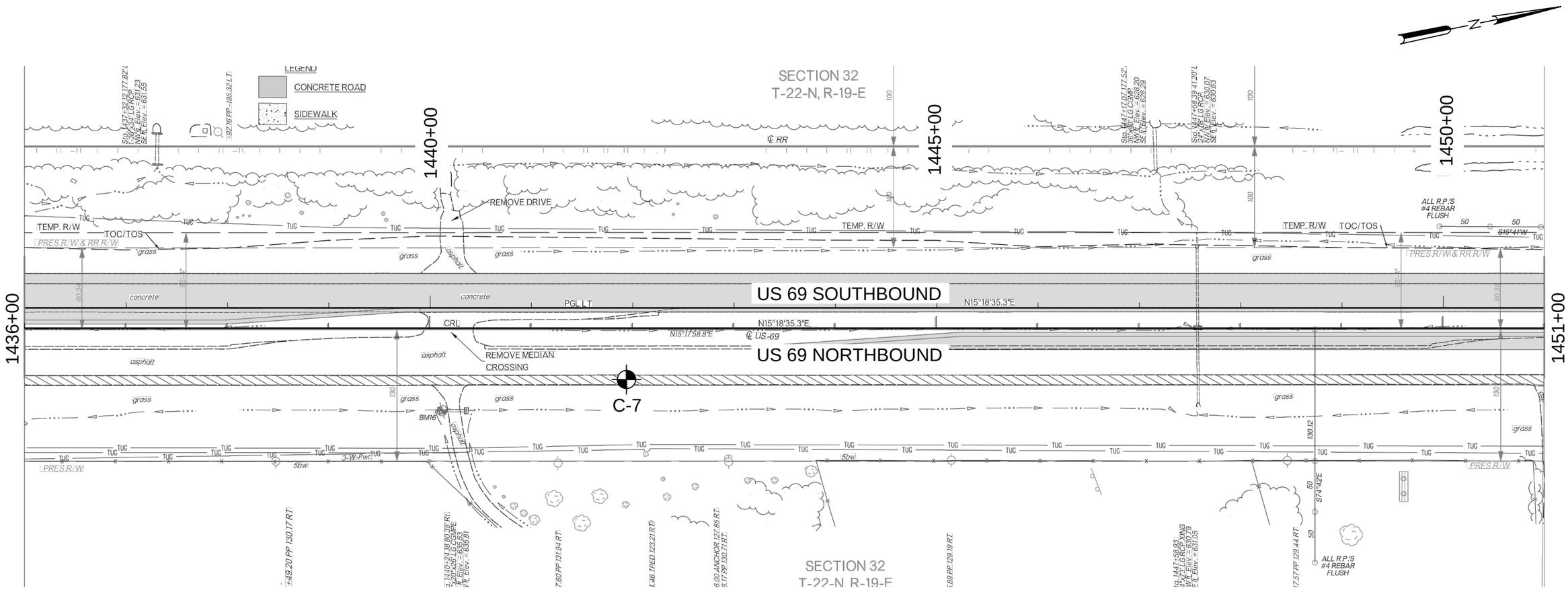
Approved By:	JWB	Page No:	6/26



Boring	Station	US 69 CL Survey
C-7	1441+95	49' right

Stations and offsets estimated from plans provided by SRB.

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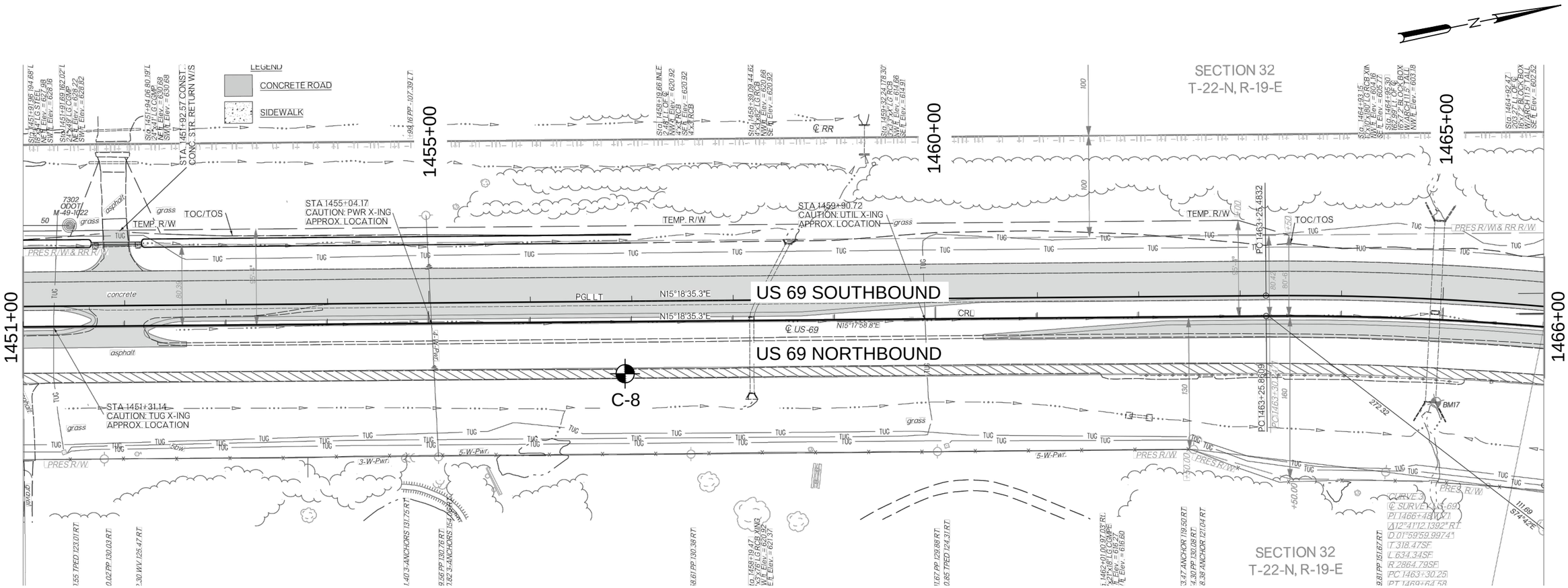
Approved By:	JWB	Page No:	7/26



Boring	Station	US 69 CL Survey
C-8	1456+95	50' right

Stations and offsets estimated from plans provided by SRB.

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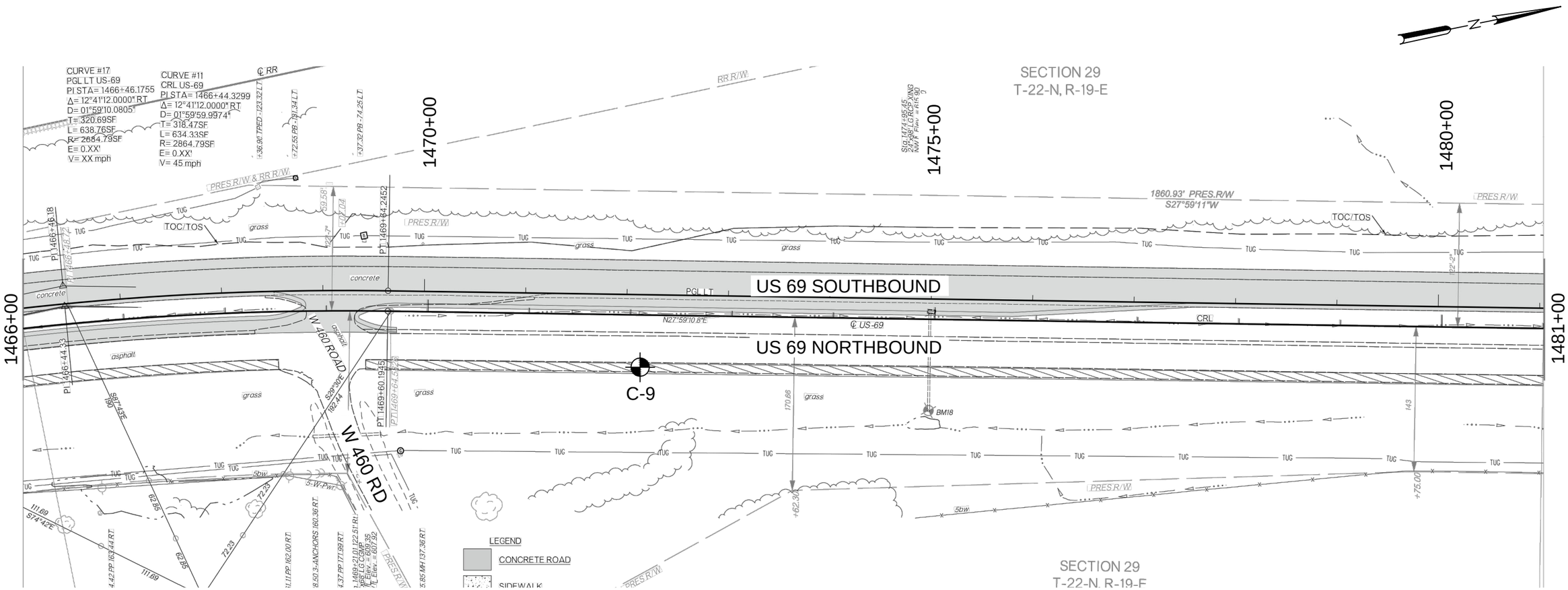
Checked By:	JWB	Date:	10/9/2023
Approved By:	JWB	Page No:	8/26



Boring	Station	US 69 CL Survey
C-9	1472+10	51' right

Stations and offsets estimated from plans provided by SRB.

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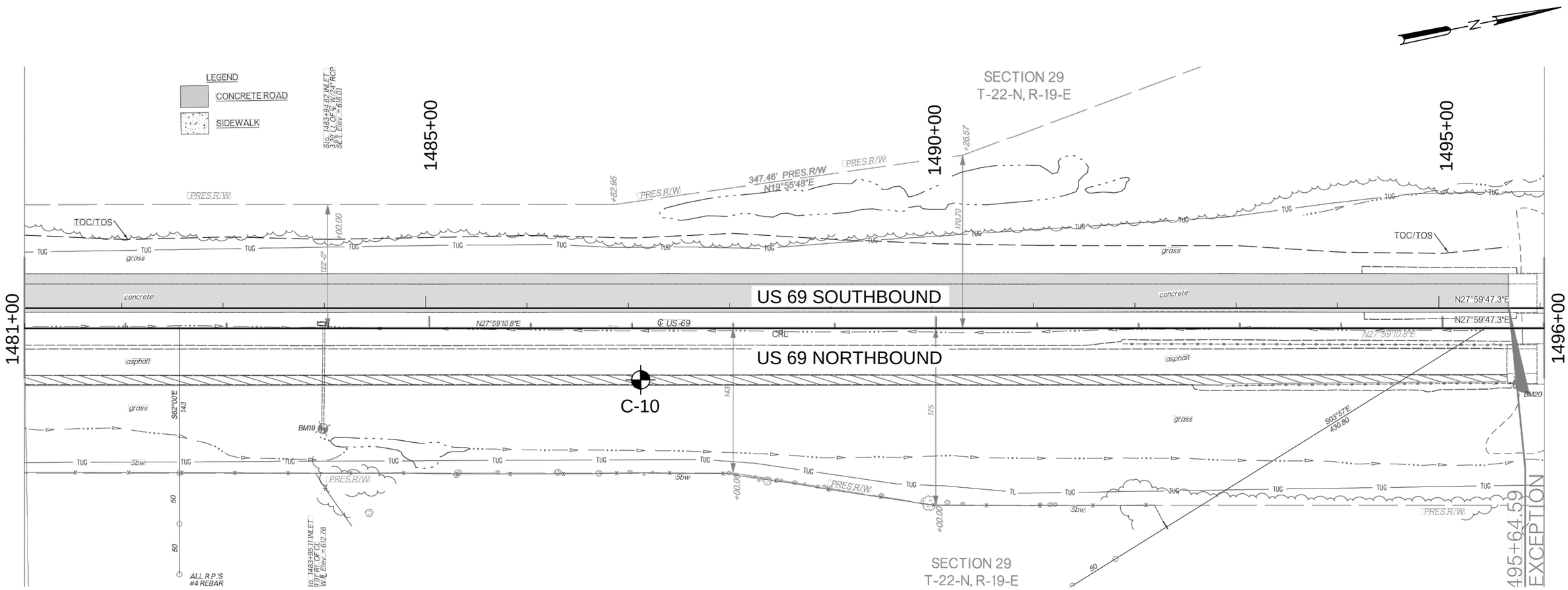
Checked By:	JWB	Date:	10/9/2023
Approved By:	JWB	Page No:	9/26



Boring	Station	US 69 CL Survey
C-10	1487+09	50' right

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MAYES COUNTY, OKLAHOMA
31963(04)

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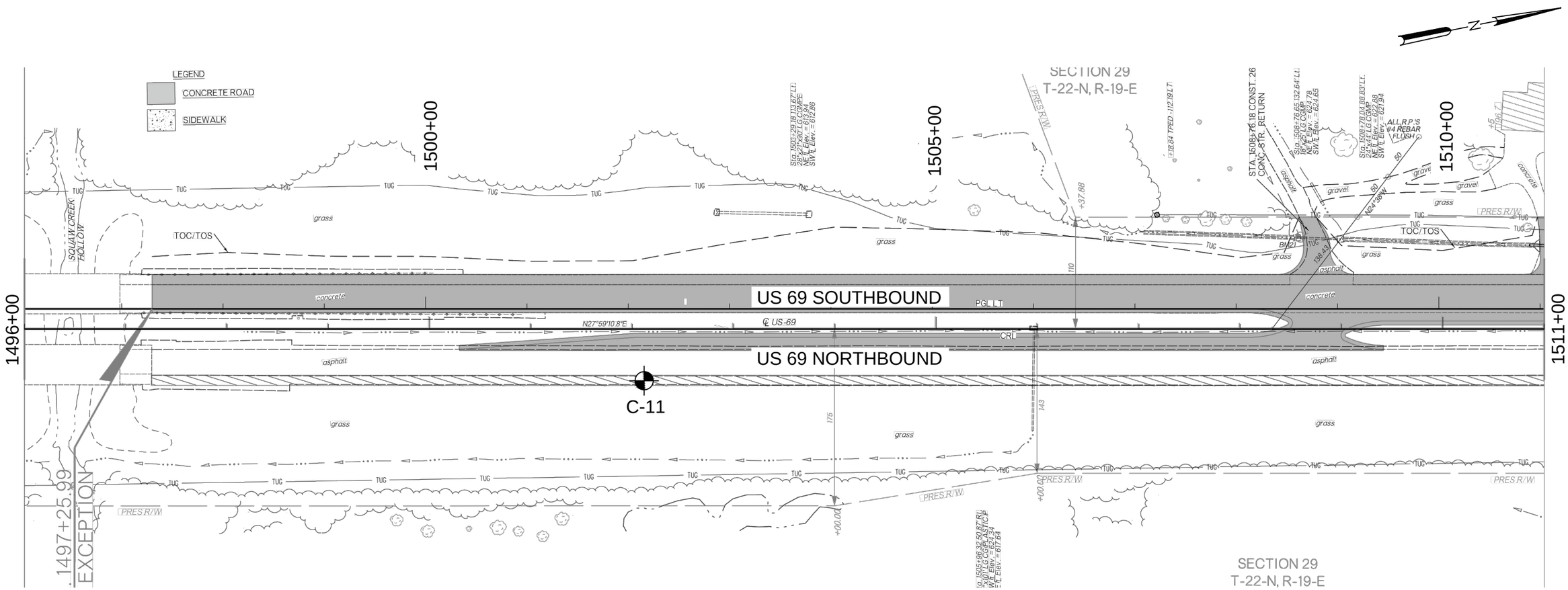
Approved By:	JWB	Page No:	10/26



Boring	Station	US 69 CL Survey
C-11	1502+13	51' right

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31963(04)

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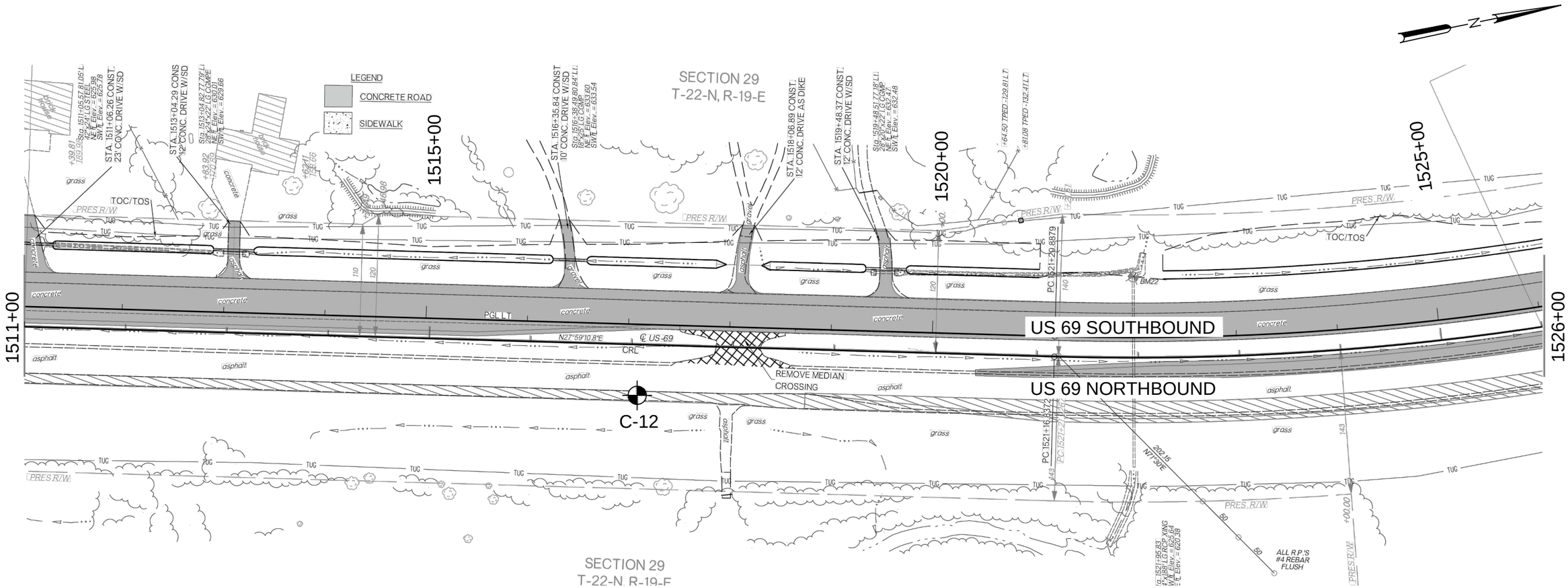

Boring	Station	US 69 CL Survey
C-12	1517+05	50' right

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US 69 PAVEMENT AND SUBGRADE/ SHOULDER SOILS SURVEY (NORTHBOUND SHOULDER)
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31963(04)

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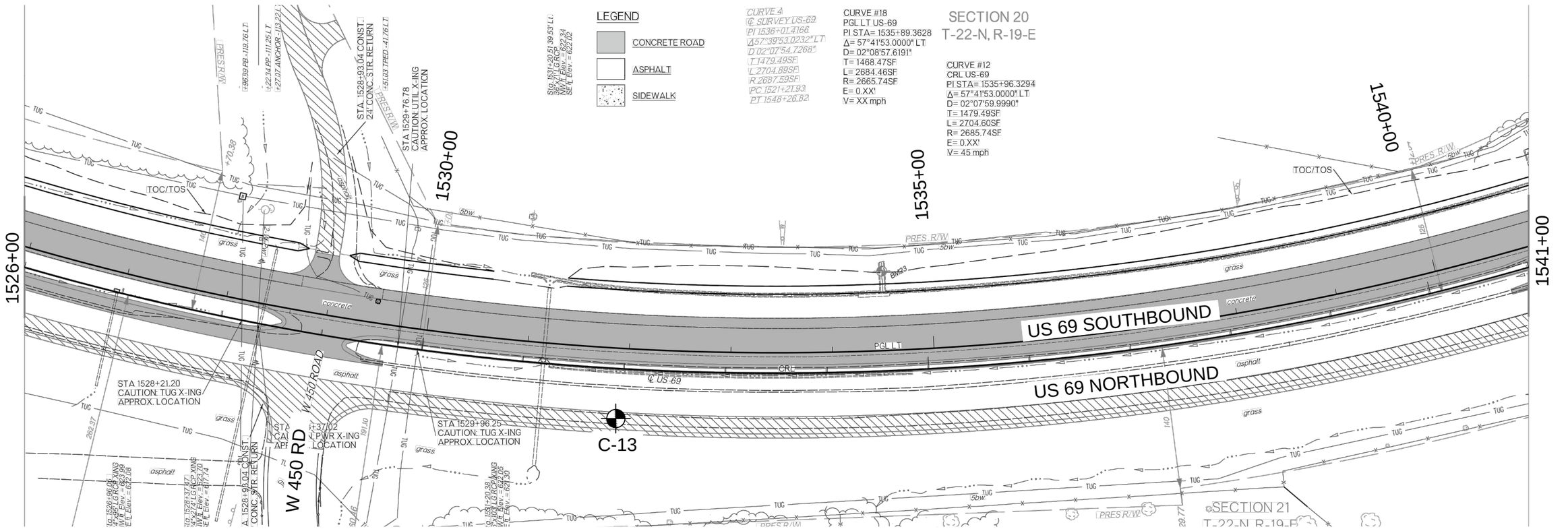

Boring	Station	US 69 CL Survey
C-13	1531+96	48' right

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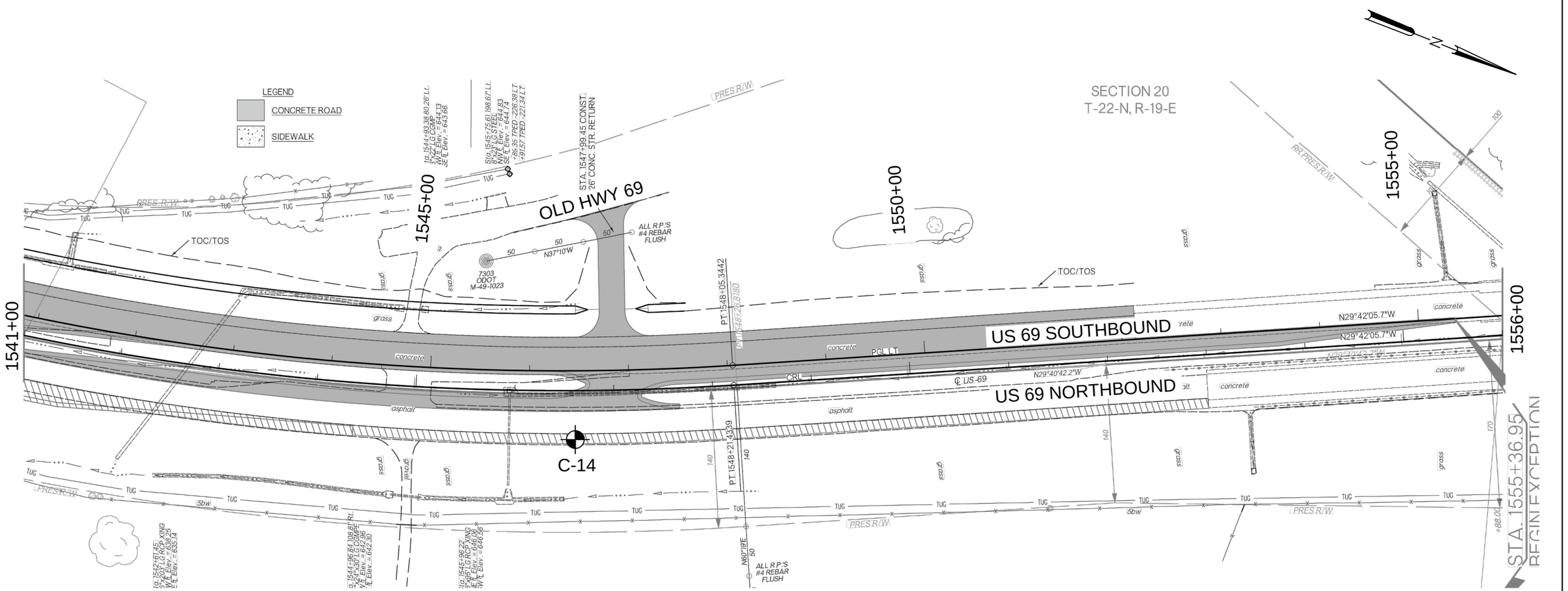

Boring	Station	US 69 CL Survey
C-14	1546+63	46' right

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MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23036
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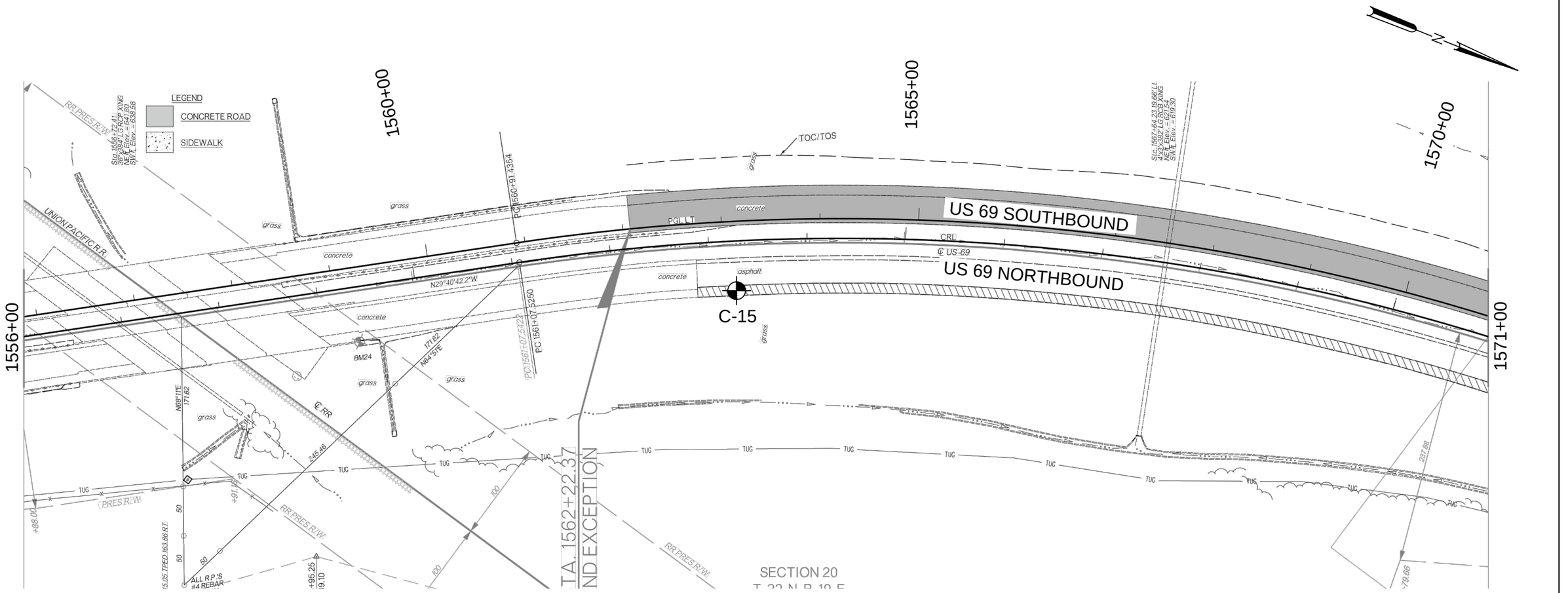
Checked By:	JWB	Date:	10/9/2023
Approved By:	JWB	Page No:	14/26



Boring	Station	US 69 CL Survey
C-15	1563+28	46' right

Stations and offsets estimated from plans provided by SRB.

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US 69 PAVEMENT AND SUBGRADE/ SHOULDER SOILS SURVEY (NORTHBOUND SHOULDER)
MAYES COUNTY, OKLAHOMA
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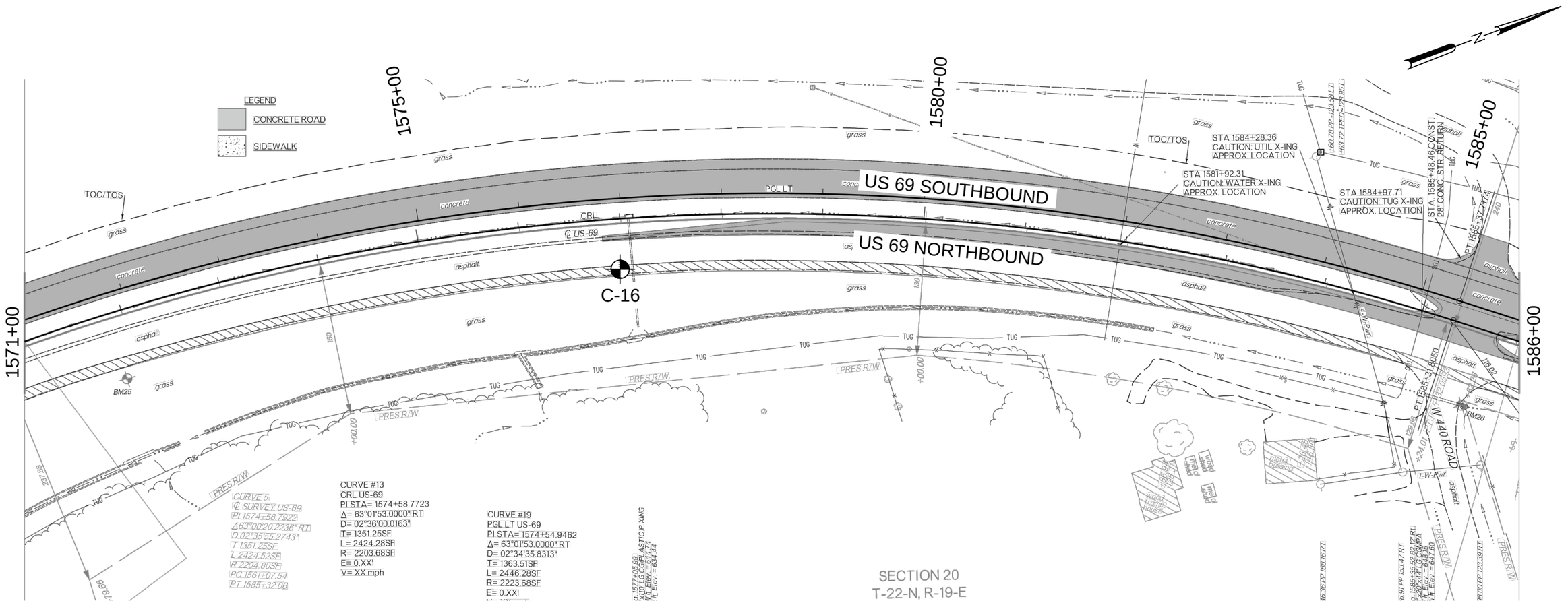

Boring	Station	US 69 CL Survey
C-16	1576+96	45' right

Stations and offsets estimated from plans provided by SRB.

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US 69 PAVEMENT AND SUBGRADE/ SHOULDER SOILS SURVEY (NORTHBOUND SHOULDER)
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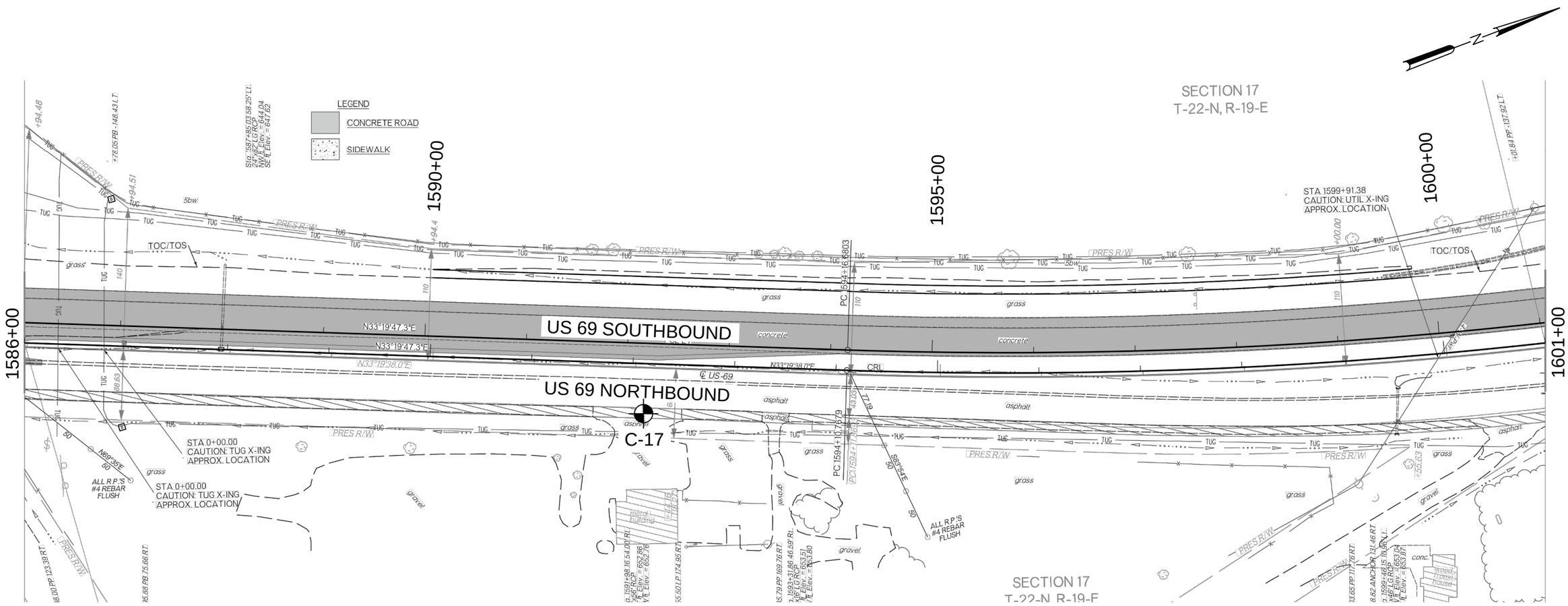
Approved By:	JWB	Page No:	16/26



Boring	Station	US 69 CL Survey
C-17	1592+08	45' right

Stations and offsets estimated from plans provided by SRB.

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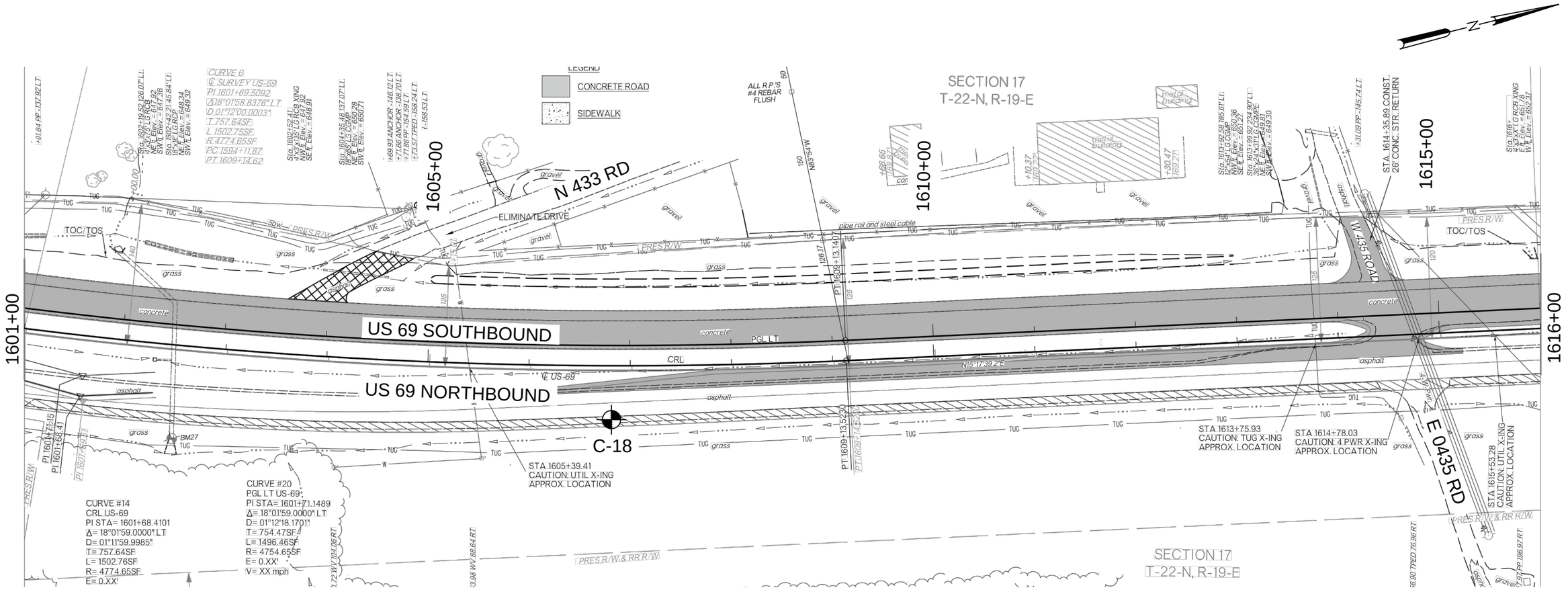

Boring	Station	US 69 CL Survey
C-18	1606+80	48' right

Stations and offsets estimated from plans provided by SRB.

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MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23036
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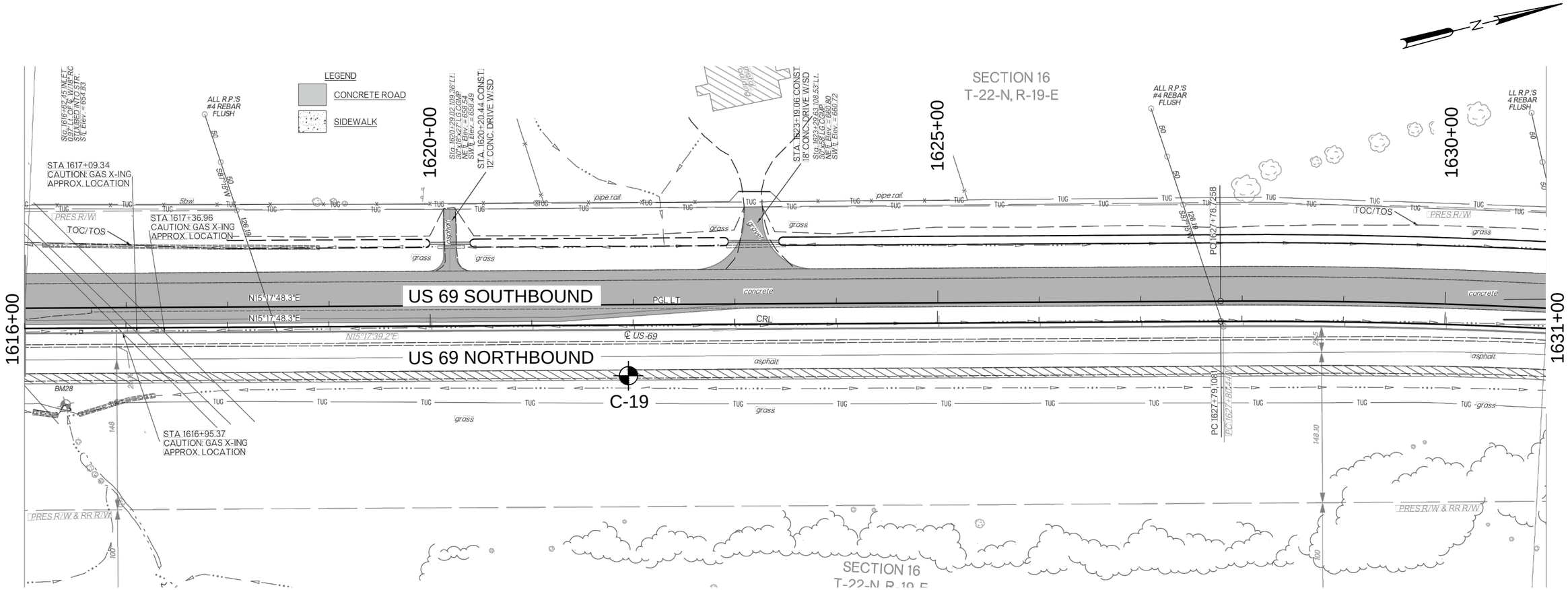

Boring	Station	US 69 CL Survey
C-19	1621+94	45' right

Stations and offsets estimated from plans provided by SRB.

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US 69 SHOULDER SOILS SURVEY/
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MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23036
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	10/9/2023
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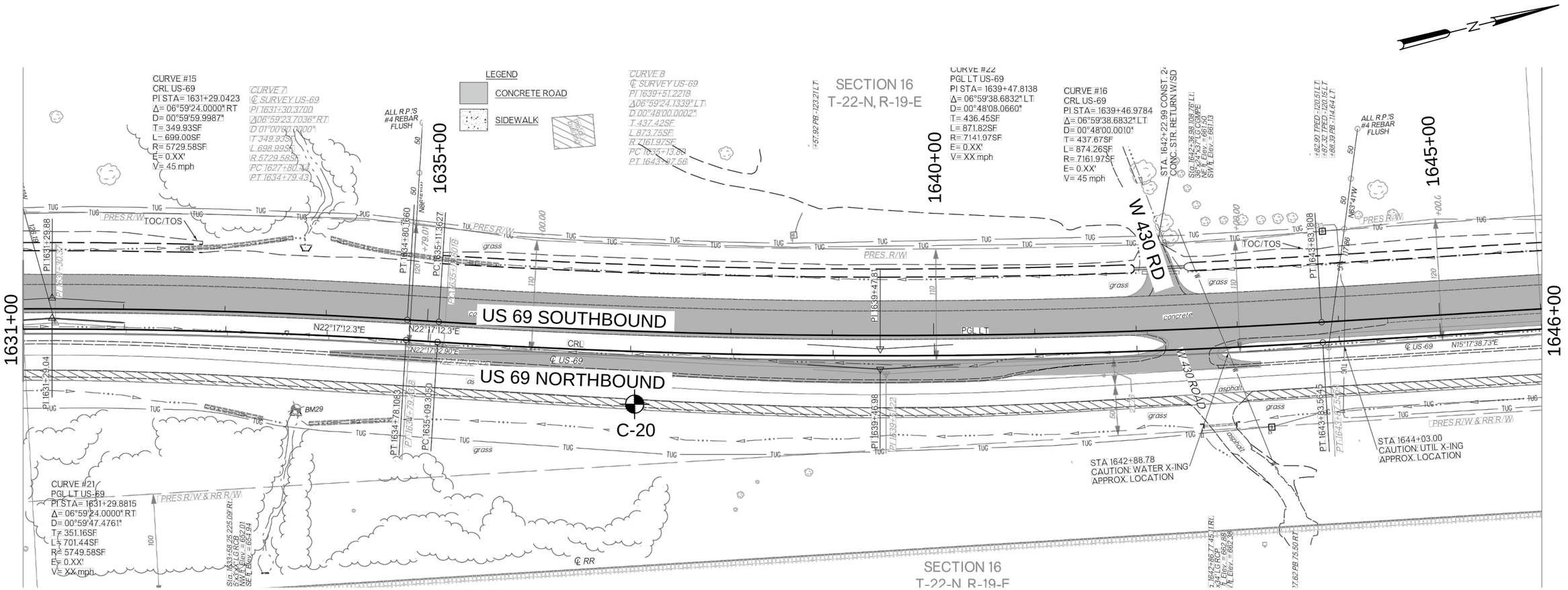

Boring	Station	US 69 CL Survey
C-20	1637+04	47' right

Stations and offsets estimated from plans provided by SRB.

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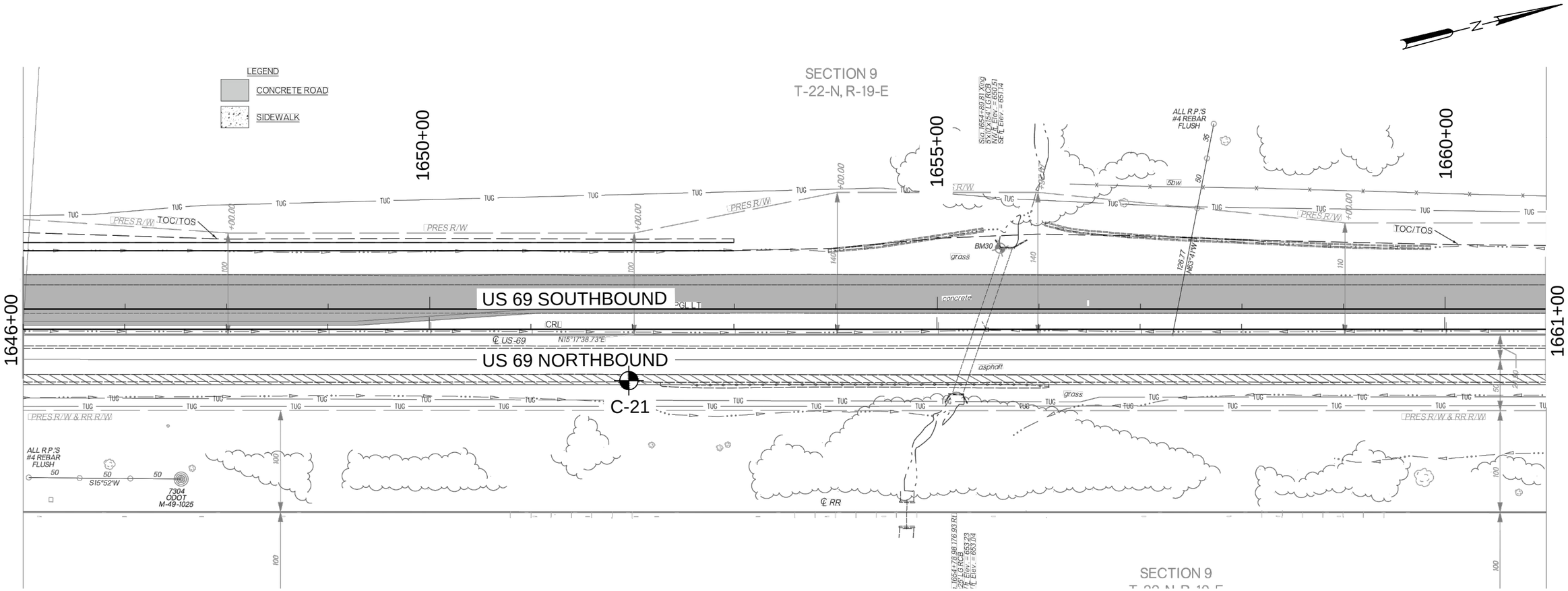

Boring	Station	US 69 CL Survey
C-21	1651+95	45' right

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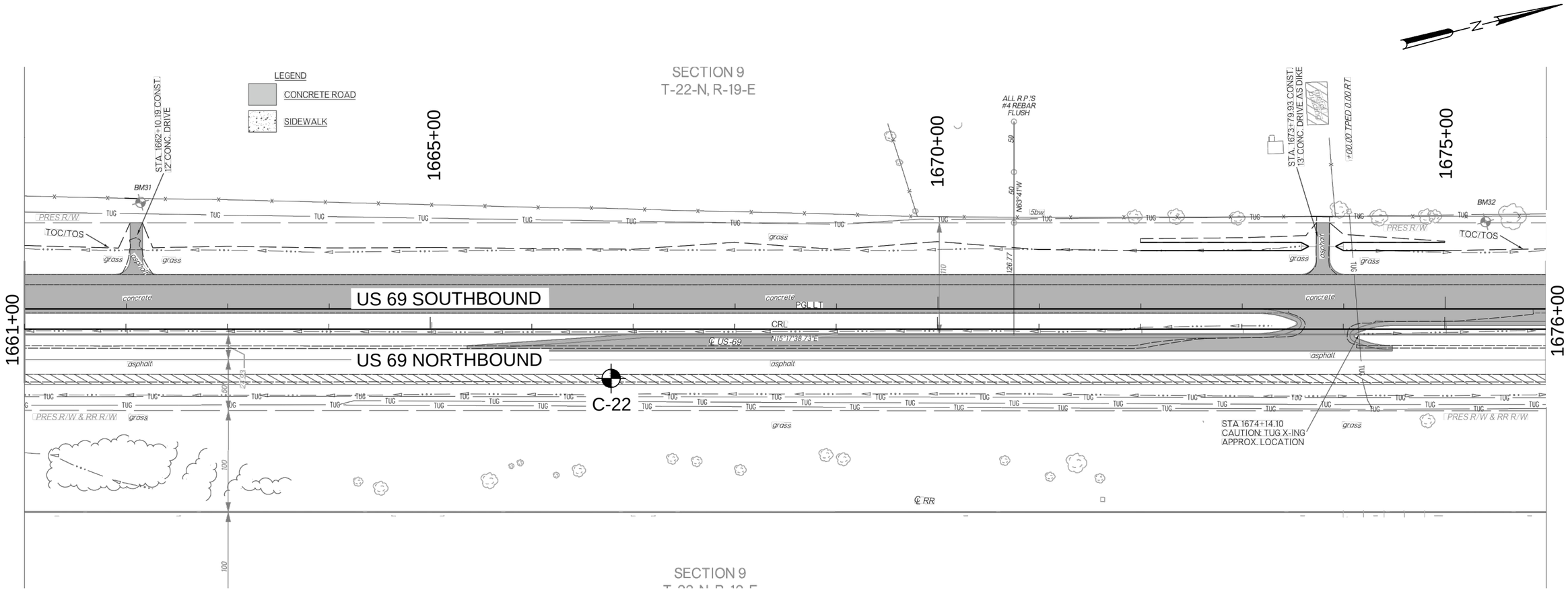
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	10/9/2023
Approved By:	JWB	Page No:	21/26



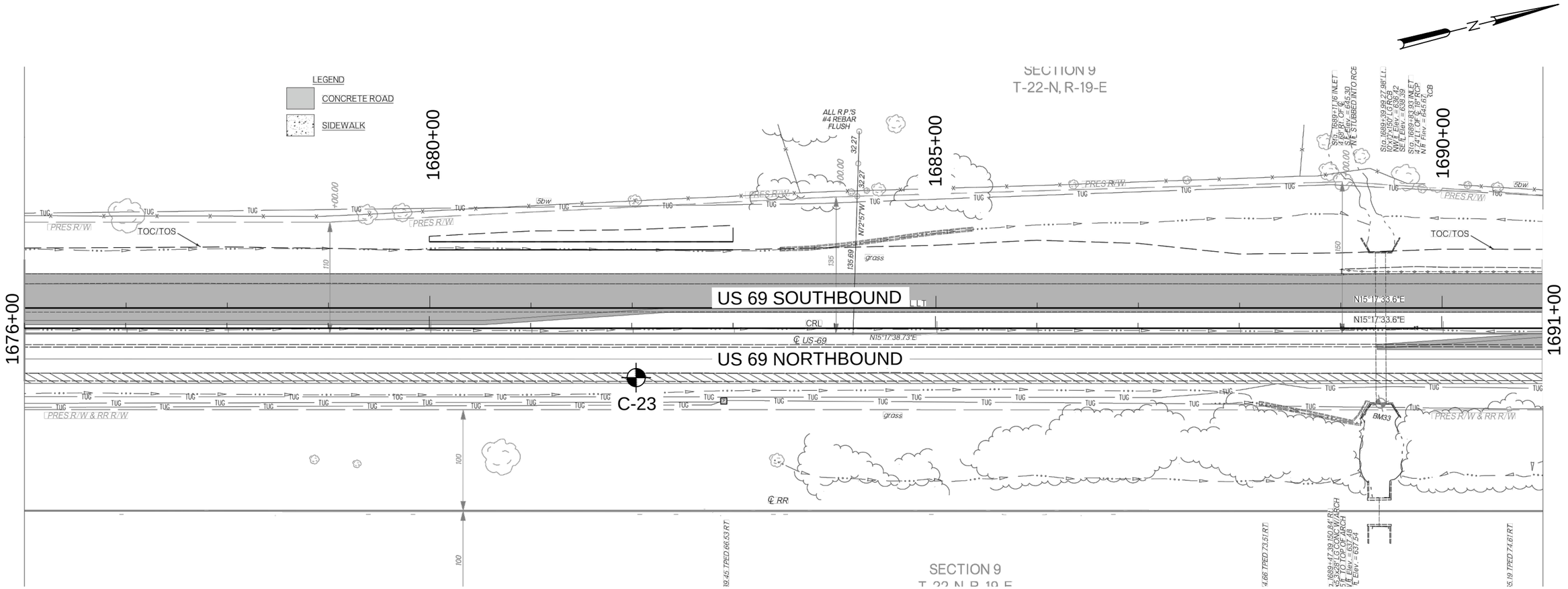
Boring	Station	US 69 CL Survey
C-22	1666+77	43' right

Stations and offsets estimated from plans provided by SRB.

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

BORING LOCATION DIAGRAM
US 69 PAVEMENT AND SUBGRADE/ SHOULDER SOILS SURVEY (NORTHBOUND SHOULDER)
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23036
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	10/9/2023
Approved By:	JWB	Page No:	22/26



Boring	Station	US 69 CL Survey
C-23	1682+03	43' right

Stations and offsets estimated from plans provided by SRB.

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Edmond, Oklahoma 73003
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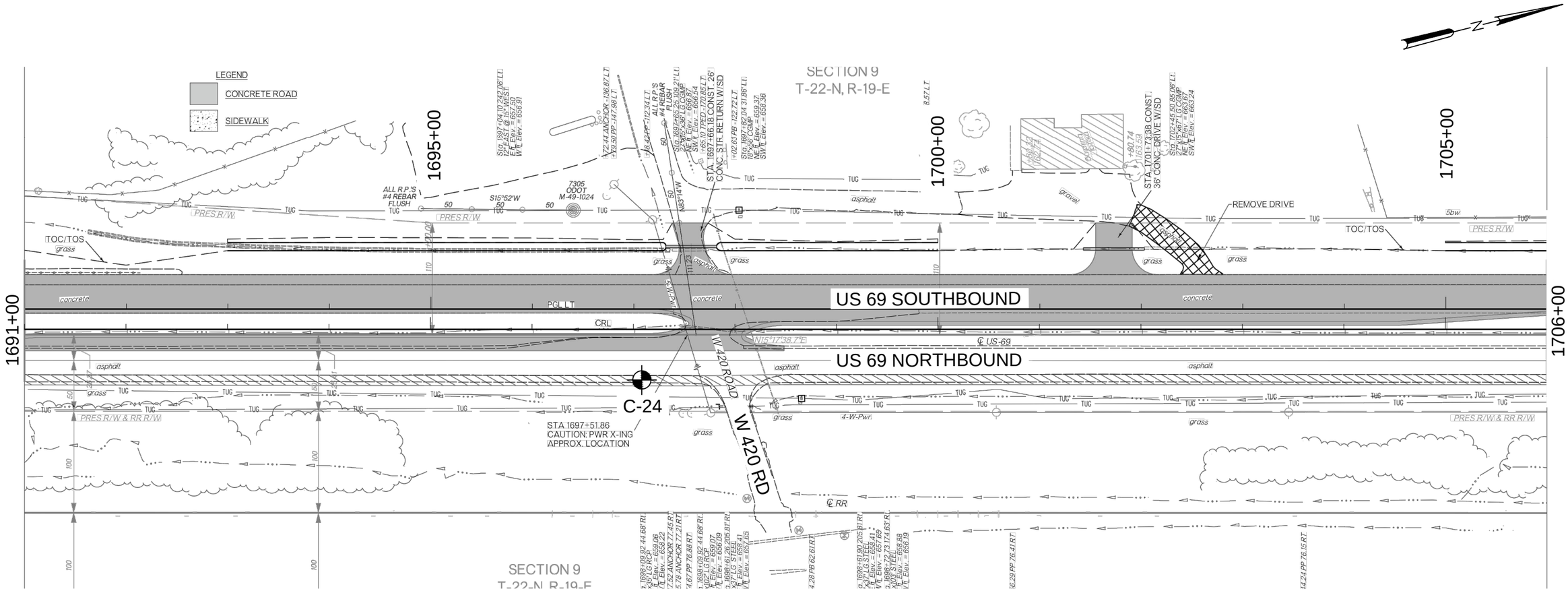
BORING LOCATION DIAGRAM
US 69 PAVEMENT AND SUBGRADE/ SHOULDER SOILS SURVEY (NORTHBOUND SHOULDER)
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23036
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	10/9/2023
Approved By:	JWB	Page No:	23/26



Boring	Station	US 69 CL Survey
C-24	1697+07	44' right

Stations and offsets estimated from plans provided by SRB.

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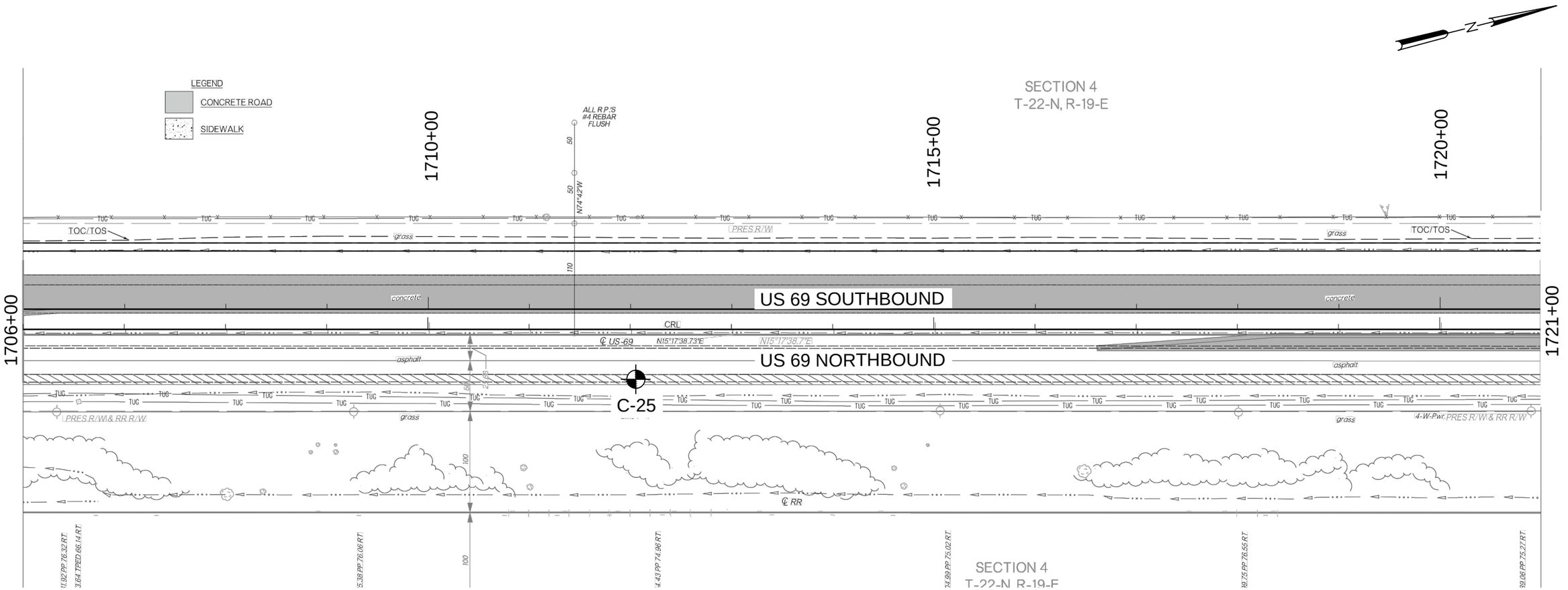
BORING LOCATION DIAGRAM
US 69 PAVEMENT AND SUBGRADE/ SHOULDER SOILS SURVEY (NORTHBOUND SHOULDER)
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23036
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	10/9/2023
Approved By:	JWB	Page No:	24/26



Boring	Station	US 69 CL Survey
C-25	1712+04	43' right

Stations and offsets estimated from plans provided by SRB.

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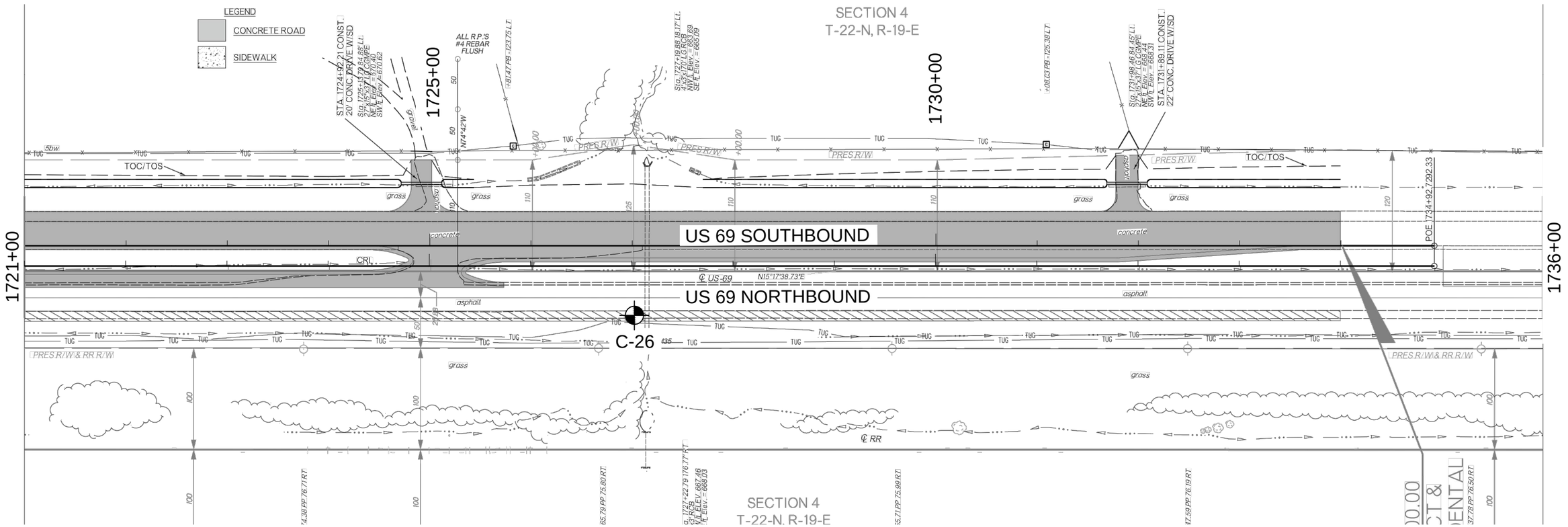
BORING LOCATION DIAGRAM
US 69 PAVEMENT AND SUBGRADE/ SHOULDER SOILS SURVEY (NORTHBOUND SHOULDER)
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23036
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	10/9/2023
Approved By:	JWB	Page No:	25/26



Boring	Station	US 69 CL Survey
C-26	1727+02	43' right

Stations and offsets estimated from plans provided by SRB.

RED ROCK CONSULTING

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

BORING LOCATION DIAGRAM
US 69 PAVEMENT AND SUBGRADE/ SHOULDER SOILS SURVEY (NORTHBOUND SHOULDER)
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23036
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	10/9/2023
Approved By:	JWB	Page No:	26/26

APPENDIX B

Surveyed By: Dawson Wiseman
Date Surveyed: July 5 and 11, 2023

RED ROCK CONSULTING

RRC Project No: 23036
J/P No: 31963(04)
Location: Mayes County, Oklahoma

Pavement Core Data and Subgrade Soils Chart

Boring	Field No.	Soil Group	US 69 CL	Station	Description	Depth (in)	LL	PI	Percent Passing				OSI	MC %	Notes
									# 4	# 10	# 40	# 200			
C-1			48' right	1349+90	**7 1/2" ASPHALT CONCRETE**	0-7.5	Type B, separation at 2 and 5 inches								
					5 1/2" ASPHALT CONCRETE	7.5-13	Type A								
					14" CEMENT STABILIZED SUBGRADE	13-27									●Major severity fatigue and transverse cracking
	1A	A-6(9)			**SANDY LEAN CLAY (CL),** brown	27-63	33	19	96	93	90	64.9	12.5	19	
C-2			49' right	1365+98	**11 1/2" ASPHALT CONCRETE**	0-11.5	Type B, separation and stripping through entire core								
					5 1/2" ASPHALT CONCRETE	11.5-17	Type A, minor stripping through entire core								
					4" AGGREGATE BASE	17-21									●Major severity fatigue cracking
	2A	A-6(2)			**CLAYEY SAND (SC),** yellowish brown	21-33	21	15	94	90	86	41.3	6.0	13	
	2B				**SANDY LEAN CLAY (CL),** brown	33-57								18	
C-3			49' right	1381+37	**17" ASPHALT CONCRETE**	0-17	Type B, separation at 3 to 14 inches, stripping through entire core, stripping/deterioration at 13 to 17 inches								
					7" AGGREGATE BASE	17-24									●Major severity fatigue cracking
	3A	A-6(12)			**SANDY LEAN CLAY (CL),** brown to gray	24-60	35	23	93	92	90	67.2	14.8	19	
C-4			49' right	1396+99	**8 1/2" ASPHALT CONCRETE**	0-8.5	Type B, separation at 3, 4.5, and 8.5 inches, stripping at 0 to 6 inches								
					7" ASPHALT CONCRETE	8.5-15.5	Type A								●Moderate severity fatigue cracking
	4A	A-2-4			**SILTY SAND with GRAVEL (SM),** brown	15.5-51.5	NV	NP	77	72	70	25.2	0.0	14	
C-5			48' right	1411+98	**8 1/2" ASPHALT CONCRETE**	0-8.5	Type B, separation at 3 and 7 inches, minor stripping at 0 to 8.5 inches								
					7" ASPHALT CONCRETE	8.5-15.5	Type A								●Moderate to major severity fatigue cracking
	5A	A-6(9)			**SANDY LEAN CLAY (CL),** dark gray	15.5-51.5	31	17	94	90	87	68.8	12.0	18	
C-6			49' right	1426+89	**8" ASPHALT CONCRETE**	0-8	Type B, separation at 3, 4.5, 6, and 8 inches, minor stripping from 0 to 8 inches								
					7 1/2" ASPHALT CONCRETE	8-15.5	Type A								●Minor to moderate severity transverse cracking
	6A				**SILTY SAND with GRAVEL (SM),** brown	15.5-33.5								12	●Light severity asphalt bleeding
	6B	A-6(4)			**SANDY LEAN CLAY (CL),** dark gray	33.5-51.5	27	12	93	86	83	55.3	7.5	17	
C-7			49' right	1441+95	**8 1/2" ASPHALT CONCRETE**	0-8.5	Type B, separation at 3.5, 6, and 8.5 inches, minor stripping at 0 to 7 inches								
					7 3/4" ASPHALT CONCRETE	8.5-16.25	Type A								●Minor to moderate severity transverse cracking
	7A	A-6(2)			**CLAYEY SAND (SC),** yellowish brown	16.25-52.25	27	11	92	85	81	45.8	5.8	14	

Surveyed By: Dawson Wiseman
Date Surveyed: July 5 and 11, 2023

RED ROCK CONSULTING

RRC Project No: 23036
J/P No: 31963(04)
Location: Mayes County, Oklahoma

Pavement Core Data and Subgrade Soils Chart

Boring	Field No.	Soil Group	US 69 CL	Station	Description	Depth (in)	LL	PI	Percent Passing				OSI	MC %	Notes
									# 4	# 10	# 40	# 200			
C-8			50' right	1456+95	**9 1/4" ASPHALT CONCRETE**	0-9.25	Type B, separation at 3.5, 5, and 9.5 inches								
					7 1/4" ASPHALT CONCETE	9.25-16.5	Type A								●Minor to moderate severity transverse cracking ●Light severity asphalt bleeding
	8A	A-6(9)			**SANDY LEAN CLAY (CL),** grayish brown	16.5-52.5	34	17	90	84	80	65.5	12.0	17	
C-9			51' right	1472+10	**8 1/2" ASPHALT CONCRETE**	0-8.5	Type B, separation at 1.5, 5, and 7 inches, stripping at 0 to 8 inches								
					5 1/2" ASPHALT CONCRETE	8.5-14	Type A, minor stripping at 8.5 to 14.5 inches								●Moderate severity fatigue and transverse cracking ●Light severity asphalt bleeding
	9A				**SANDY LEAN CLAY (CL),** yellowish brown	14-32								12	
	9B	A-6(12)			**LEAN CLAY with SAND (CL),** dark gray	32-50	37	19	93	88	84	73.6	14.7	22	
C-10			50' right	1487+09	**11" ASPHALT CONCRETE**	0-11	Type B, stripping at 0 to 11 inches, separation at 3 and 8.5 inches								
					5" ASPHALT CONCRETE	11-16	Type A								●Moderate severity fatigue cracking ●Light severity asphalt bleeding
					4" AGGREGATE BASE	16-20									
	10A	A-2-4			**SILTY SAND with GRAVEL (SM),** yellowish brown	20-26	NV	NP	84	77	75	34.6	0.0	12	
	10B				**SANDY LEAN CLAY (CL),** yellowish brown	26-56								19	
C-11			51' right	1502+13	**7" ASPHALT CONCRETE**	0-7	Type B, minor stripping at 0 to 9 inches, separation at 1.5, 3, and 5.5 inches								
					5 1/2" ASPHALT CONCRETE	7-12.5	Type A, minor stripping at 7 to 9 inches								●Moderate severity longitudinal and transverse cracking ●Light severity asphalt bleeding
	11A	A-4(0)			**SILTY SAND (SM),** brown	12.5-42.5	NV	NP	86	82	79	38.8	0.0	13	
	11B				**SANDY LEAN CLAY (CL),** dark gray	42.5-48.5								19	
C-12			50' right	1517+05	**6 1/2" ASPHALT CONCRETE**	0-6.5	Type B, minor stripping at 0 to 6.5 inches, separation at 1.5, 3, and 5 inches								
					5 3/4" ASPHALT CONCRETE	6.5-12.25	Type A								●Moderate severity transverse cracking ●Light severity asphalt bleeding
	12A				**SILTY SAND (SM),** yellowish brown	12.25-42.25								11	
	12B	A-6(12)			**SANDY LEAN CLAY (CL),** grayish brown	42.25-48.25	37	20	94	90	85	69.3	14.3	19	
C-13			48' right	1531+96	**7 1/2" ASPHALT CONCRETE**	0-7.5	Type B, stripping at 0 to 6 inches, separation at 2, 3.25, and 6 inches								
					6" ASPHALT CONCRETE	7.5-13.5	Type A								
					4" AGGREGATE BASE	13.5-17.5									●Minor to moderate severity transverse cracking ●Light severity asphalt bleeding
	13A	A-2-4			**SILTY SAND (SM),** yellowish brown	17.5-47.5	NV	NP	88	79	75	25.6	0.0	11	
	13B				**SANDY LEAN CLAY (CL),** dark gray	47.5-53.5								17	

Surveyed By: Dawson Wiseman
Date Surveyed: July 5 and 11, 2023

RED ROCK CONSULTING

RRC Project No: 23036
J/P No: 31963(04)
Location: Mayes County, Oklahoma

Pavement Core Data and Subgrade Soils Chart

Boring	Field No.	Soil Group	US 69 CL	Station	Description	Depth (in)	LL	PI	Percent Passing				OSI	MC %	Notes
									# 4	# 10	# 40	# 200			
C-14			46' right	1546+63	**8 1/2" ASPHALT CONCRETE**	0-8.5	Type B, stripping at 0 to 9 inches, separation at 2.5, 4.5, and 6.5 inches								
					3 1/2" ASPHALT CONCRETE	8.5-12	Type A								●Minor to moderate severity transverse cracking ●Light severity asphalt bleeding
					3" AGGREGATE BASE	12-15									
	14A	A-2-4			**SILTY SAND with GRAVEL (SM),** yellowish brown	15-45	NV	NP	59	54	53	19.2	0.0	11	
	14B				**CLAYEY SAND (SC),** dark gray	45-51								17	
C-15			46' right	1563+28	**4" ASPHALT CONCRETE**	0-4	Type B, separation at 2.5 and 4 inches								
					7 1/2" ASPHALT CONCRETE	4-11.5	Type A								
					4" ASPHALT CONCRETE	11.5-15.5	Type B								●Minor to moderate severity fatigue and transverse cracking ●Light severity asphalt bleeding
	15A				**SILTY SAND with GRAVEL (SM),** yellowish brown	15.5-45.5								17	
	15B	A-6(11)			**LEAN CLAY with SAND (CL),** brown	45.5-51.5	34	18	93	88	83	70.9	13.3	20	
C-16			45' right	1576+96	**8" ASPHALT CONCRETE**	0-8	Type B, minor stripping at 0 to 7 inches, separation at 2 and 6.25 inches								
					7" ASPHALT CONCRETE	8-15	Type A								●Moderate severity fatigue and transverse cracking ●Light severity asphalt bleeding
	16A	A-2-4			**SILTY SAND with GRAVEL (SM),** yellowish brown	15-39	NV	NP	76	70	64	28.2	0	9.2	
	16B				**LEAN CLAY with SAND (CL),** grayish brown	39-51								21	
C-17			45' right	1592+08	**8" ASPHALT CONCRETE**	0-8	Type B, separation at 2 inches, tack layer at 3 and 6 inches								
					10" AGGREGATE BASE	8-18									●Minor severity transverse cracking
	17A				**SANDY LEAN CLAY (CL),** brown	18-36								13	
	17B	A-6(12)			**LEAN CLAY with SAND (CL),** yellowish red	36-54	35	18	97	94	90	77.4	14.2	22	
C-18			48' right	1606+80	**8 1/2" ASPHALT CONCRETE**	0-8.5	Type B, minor stripping at 0 to 4.5 inches, separation at 1.75 inches, tack layer at 4 inches								
					12" AGGREGATE BASE	8.5-20.5									●Moderate severity transverse cracking ●Light severity asphalt bleeding
	18A	A-7-6(19)			**LEAN CLAY with SAND (CL),** brown	20.5-44.5	42	26	94	93	90	78.4	18.8	24	
	18B				**LEAN CLAY with SAND (CL),** yellowish red	44.5-56.5								24	
C-19			45' right	1621+94	**9" ASPHALT CONCRETE**	0-9	Type B, stripping through entire core, stripping/deterioration at 2 to 3.5 inches, tack layer at 7.5 inches								
					10 1/2" AGGREGATE BASE	9-19.5									●Moderate severity transverse cracking ●Light severity asphalt bleeding
	19A				**LEAN CLAY with SAND (CL),** brown	19.5-43.5								19	
	19B	A-6(12)			**LEAN CLAY with SAND (CL),** yellowish red	43.5-55.5	35	19	97	93	89	73.7	14.4	19	

Surveyed By: Dawson Wiseman
Date Surveyed: July 5 and 11, 2023

RED ROCK CONSULTING

RRC Project No: 23036
J/P No: 31963(04)
Location: Mayes County, Oklahoma

Pavement Core Data and Subgrade Soils Chart

Boring	Field No.	Soil Group	US 69 CL	Station	Description	Depth (in)	LL	PI	Percent Passing				OSI	MC %	Notes
									# 4	# 10	# 40	# 200			
C-20			47' right	1637+04	**8 1/2" ASPHALT CONCRETE**	0-8.5	Type B, minor stripping through entire core, separation at 2 inches, tack layer at 3.5 inches								●Minor to moderate severity transverse cracking ●Light severity asphalt bleeding
					10" AGGREGATE BASE	8.5-18.5									
	20A	A-4(1)			**SANDY LEAN CLAY (CL),** brown	18.5-54.5	45	27	95	91	87	52.1	5.1	21	
C-21			45' right	1651+95	**8" ASPHALT CONCRETE**	0-8	Type B, minor stripping through entire core, separation at 2 inches, tack layer at 4 inches								
					11" AGGREGATE BASE	8-19									●Moderate severity transverse cracking ●Light severity asphalt bleeding
	21A				**CLAYEY SAND (SC),** brown	19-49								13	
	21B	A-4(0)			**CLAYEY SAND (SC),** yellowish brown	49-55	25	8	87	77	72	37.4	2.1	10	
C-22			43' right	1666+77	**8 1/2" ASPHALT CONCRETE**	0-8.5	Type B, stripping through entire core, separation at 1.5 and 5.75 inches								
					13 1/2" AGGREGATE BASE	8.5-22									●Moderate severity transverse cracking ●Light severity asphalt bleeding
	22A	A-7-6(27)			**LEAN CLAY (CL),** brown	22-58	49	30	98	96	93	87.7	21.8	28	
C-23			43' right	1682+03	**8" ASPHALT CONCRETE**	0-8	Type B, minor stripping through entire core, separation at 2 and 4.5 inches								
					11" AGGREGATE BASE	8-19									●Moderate severity transverse cracking
	23A	A-2-4			**CLAYEY SAND with GRAVEL (SC),** yellowish brown	19-43	24	8	59	49	46	31.4	1.3	8	
					***Auger refusal at 43 inches**										
C-24			44' right	1697+07	**9 1/2" ASPHALT CONCRETE**	0-9.5	Type B, minor stripping through entire core, separation at 2.5 inches, tack layer at 4.75 inches								●Moderate severity transverse cracking ●Light severity asphalt bleeding
					12 1/2" AGGREGATE BASE	9.5-22									
	24A	A-7-6(20)			**LEAN CLAY with SAND (CL),** brown	22-58	42	26	99	97	94	80.2	18.8	21	
C-25			43' right	1712+04	**8 1/2" ASPHALT CONCRETE**	0-8.5	Type B, separation at 2 and 7 inches, minor stripping at 0 to 4 inches								
					10 1/2" AGGREGATE BASE	8.5-19									●Moderate severity transverse cracking
	25A	A-6(5)			**SANDY LEAN CLAY (CL),** dark gray	19-55	29	12	91	83	78	62.9	8.8	18	
C-26			43' right	1727+02	**8 1/2" ASPHALT CONCRETE**	0-8.5	Type B, stripping/deterioration at 2 to 4 inches, separation at 5.5 inches								
					13" AGGREGATE BASE	8.5-21.5									●Moderate severity longitudinal and transverse cracking
	26A	A-7-6(22)			**LEAN CLAY (CL),** dark gray	21.5-57.5	46	26	100	97	94	85.9	18.8	21	

APPENDIX C

Top

Coring
C-1

Surveyed By: Dawson Wiseman

Date Surveyed: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	48' right
Core	C-1
Station	1349+90
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.319694
Longitude	-95.314111

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	
1	Asphalt Concrete	7 1/2	Type B, separation at 2 and 5 inches	
	Asphalt Concrete	5 1/2	Type A	
	Total Core Thickness	13		
			AASHTO	OSI
2	CEMENT STABILIZED SUBGRADE	14		
3	SANDY LEAN CLAY (CL), brown	36	A-6(9)	12.5

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: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	49' right
Core	C-2
Station	1365+98
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.323917
Longitude	-95.312528

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	11 1/2	Type B, separation and stripping through entire core		
	Asphalt Concrete	5 1/2	Type A, minor stripping through entire core		
	Total Core Thickness	17			
2	AGGREGATE BASE	4			
3	CLAYEY SAND (SC), yellowish brown	12		A-6(2)	6
4	SANDY LEAN CLAY (CL), 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-3

Surveyed By: Dawson Wiseman

Date Surveyed: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	49' right
Core	C-3
Station	1381+37
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.327944
Longitude	-95.311000

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	17	Type B, separation at 3 to 14 inches, stripping through entire core, stripping/deterioration at 13 to 17 inches		
	Total Core Thickness	17			
				AASHTO	OSI
2	AGGREGATE BASE	7			
3	SANDY LEAN CLAY (CL), grayish brown	36		A-6(12)	14.8

*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-4

Surveyed By: Dawson Wiseman

Date Surveyed: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	49' right
Core	C-4
Station	1396+99
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.332056
Longitude	-95.309444

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 3, 4.5, and 8.5 inches, stripping at 0 to 6 inches		
	Asphalt Concrete	7	Type A		
	Total Core Thickness	15 1/2			
				AASHTO	OSI
2	SILTY SAND with GRAVEL (SM), brown	36		A-2-4	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-5

Surveyed By: Dawson Wiseman

Date Surveyed: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	48' right
Core	C-5
Station	1411+98
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.336000
Longitude	-95.307972

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 3 and 7 inches, minor stripping at 0 to 8.5 inches		
	Asphalt Concrete	7	Type A		
	Total Core Thickness	15 1/2			
				AASHTO	OSI
2	SANDY LEAN CLAY (CL), dark gray	36		A-6(9)	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-6

Surveyed By: Dawson Wiseman

Date Surveyed: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	49' right
Core	C-6
Station	1426+89
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.339944
Longitude	-95.306500

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	8	Type B, separation at 3, 4.5, 6, and 8 inches, minor stripping from 0 to 8 inches		
	Asphalt Concrete	7 1/2	Type A		
	Total Core Thickness	15 1/2			
				AASHTO	OSI
2	SILTY SAND with GRAVEL (SM), brown	18			
3	SANDY LEAN CLAY (CL), dark gray	18		A-6(4)	7.5

*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: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	49' right
Core	C-7
Station	1441+95
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.343889
Longitude	-95.305028

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	8 1/2	Type B, separation at 3.5, 6, and 8.5 inches, minor stripping at 0 to 7 inches		
	Asphalt Concrete	7 3/4	Type A		
	Total Core Thickness	16 1/4			
2	CLAYEY SAND (SC), yellowish brown	36		A-6(2)	5.8

*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-8

Surveyed By: Dawson Wiseman

Date Surveyed: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	50' right
Core	C-8
Station	1456+95
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.347833
Longitude	-95.303528

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	9 1/4	Type B, separation at 3.5, 5, and 9.5 inches		
	Asphalt Concrete	7 1/4	Type A		
	Total Core Thickness	16 1/2			
				AASHTO	OSI
2	SANDY LEAN CLAY (CL), grayish brown	36		A-6(9)	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-9

Surveyed By: Dawson Wiseman

Date Surveyed: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	51' right
Core	C-9
Station	1472+10
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.351639
Longitude	-95.301667

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 1.5, 5, and 7 inches, stripping at 0 to 8 inches		
	Asphalt Concrete	5 1/2	Type A, minor stripping at 8.5 to 14.5 inches		
	Total Core Thickness	14			
				AASHTO	OSI
2	SANDY LEAN CLAY (CL), yellowish brown	18			
3	LEAN CLAY with SAND (CL), dark gray	18		A-6(12)	14.7

*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-10

Surveyed By: Dawson Wiseman

Date Surveyed: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	50' right
Core	C-10
Station	1487+09
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.355222
Longitude	-95.299139

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	11	Type B, stripping at 0 to 11 inches, separation at 3 and 8.5 inches.		
	Asphalt Concrete	5	Type A		
	Total Core Thickness	16			
2	AGGREGATE BASE	4			
3	SILTY SAND with GRAVEL (SM), yellowish brown	6		A-2-4	0
4	SANDY LEAN CLAY (CL), yellowish brown	30			

*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: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	51' right
Core	C-11
Station	1502+13
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.358833
Longitude	-95.296639

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	7	Type B, minor stripping at 0 to 9 inches, separation at 1.5, 3, and 5.5 inches		
	Asphalt Concrete	5 1/2	Type A, minor stripping at 7 to 9 inches		
	Total Core Thickness	12 1/2			
2	SILTY SAND (SM), brown	30		A-4(0)	0
3	SANDY LEAN CLAY (CL), dark gray	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-12

Surveyed By: Dawson Wiseman

Date Surveyed: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	50' right
Core	C-12
Station	1517+05
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.362389
Longitude	-95.294111

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	6 1/2	Type B, minor stripping at 0 to 6.5 inches, separation at 1.5, 3, and 5 inches		
	Asphalt Concrete	5 3/4	Type A		
	Total Core Thickness	12 1/4			
				AASHTO	OSI
2	SILTY SAND (SM), yellowish brown	30			
3	SANDY LEAN CLAY (CL), grayish brown	6		A-6(12)	14.3

*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-13

Surveyed By: Dawson Wiseman

Date Surveyed: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	48' right
Core	C-13
Station	1531+96
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.366222
Longitude	-95.292278

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	7 1/2	Type B, stripping at 0 to 6 inches, separation at 2, 3.25, and 6 inches		
	Asphalt Concrete	6	Type A		
	Total Core Thickness	13 1/2			
2	AGGREGATE BASE	4			
3	SILTY SAND (SM), yellowish brown	30		A-2-4	0
4	SANDY LEAN CLAY (CL), dark gray	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-14

Surveyed By: Dawson Wiseman

Date Surveyed: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	46' right
Core	C-14
Station	1546+63
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.370250
Longitude	-95.293083

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	8 1/2	Type B, stripping at 0 to 9 inches, separation at 2.5, 4.5, and 6.5 inches		
	Asphalt Concrete	3 1/2	Type A		
	Total Core Thickness	12			
				AASHTO	OSI
2	AGGREGATE BASE	3			
3	SILTY SAND with GRAVEL (SM), yellowish brown	30		A-2-4	0
4	CLAYEY SAND (SC), dark gray	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-15

Surveyed By: Dawson Wiseman

Date Surveyed: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	46' right
Core	C-15
Station	1563+28
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.374278
Longitude	-95.295694

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	4	Type B, separation at 2.5 and 4 inches		
	Asphalt Concrete	7 1/2	Type A		
	Asphalt Concrete	4	Type B		
	Total Core Thickness	15 1/2			
				AASHTO	OSI
2	SILTY SAND with GRAVEL (SM), yellowish brown	30			
3	LEAN CLAY with SAND (CL), brown	6		A-6(11)	13.3

*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-16

Surveyed By: Dawson Wiseman

Date Surveyed: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	45' right
Core	C-16
Station	1576+96
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.377889
Longitude	-95.296028

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	8	Type B, minor stripping at 0 to 7 inches, separation at 2 and 6.25 inches		
	Asphalt Concrete	7	Type A		
	Total Core Thickness	15			
				AASHTO	OSI
2	SILTY SAND with GRAVEL (SM), yellowish brown	24		A-2-4	0
3	LEAN CLAY with SAND (CL), grayish 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-17

Surveyed By: Dawson Wiseman

Date Surveyed: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	45' right
Core	C-17
Station	1592+08
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.381472
Longitude	-95.293611

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	
1	Asphalt Concrete	8	Type B, separation at 2 inches, tack layer at 3 and 6 inches	
	Total Core Thickness	8		
			AASHTO	OSI
2	AGGREGATE BASE	10		
3	SANDY LEAN CLAY (CL), brown	18		
4	LEAN CLAY with SAND (CL), yellowish red	18	A-6(12)	14.2

*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: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	48' right
Core	C-18
Station	1606+80
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.385056
Longitude	-95.291194

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	8 1/2	Type B, minor stripping at 0 to 4.5 inches, separation at 1.75 inches, tack layer at 4 inches		
	Total Core Thickness	8 1/2			
				AASHTO	OSI
2	AGGREGATE BASE	12			
3	LEAN CLAY with SAND (CL), brown	24		A-7-6(19)	18.8
4	LEAN CLAY with SAND (CL), yellowish 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-19

Surveyed By: Dawson Wiseman

Date Surveyed: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	45' right
Core	C-19
Station	1621+94
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.389028
Longitude	-95.289694

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	9	Type B, stripping through entire core, stripping/deterioration at 2 to 3.5 inches, tack layer at 7.5 inches		
	Total Core Thickness	9			
				AASHTO	OSI
2	AGGREGATE BASE	10 1/2			
3	LEAN CLAY with SAND (CL), brown	24			
4	LEAN CLAY with SAND (CL), yellowish red	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-20

Surveyed By: Dawson Wiseman

Date Surveyed: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	47' right
Core	C-20
Station	1637+04
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.392889
Longitude	-95.288000

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics	AASHTO	OSI
1	Asphalt Concrete	8 1/2	Type B, minor stripping through entire core, separation at 2 inches, tack layer at 3.5 inches		
	Total Core Thickness	8 1/2			
2	AGGREGATE BASE	10			
3	SANDY LEAN CLAY (CL), brown	36		A-4(1)	5.1

*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: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	45' right
Core	C-21
Station	1651+95
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.396806
Longitude	-95.286417

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	8	Type B, minor stripping through entire core, separation at 2 inches, tack layer at 4 inches		
	Total Core Thickness	8			
				AASHTO	OSI
2	AGGREGATE BASE	11			
3	CLAYEY SAND (SC), brown	30			
4	CLAYEY SAND (SC), yellowish brown	6		A-4(0)	2.1

*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: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	43' right
Core	C-22
Station	1666+77
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.400750
Longitude	-95.284944

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	8 1/2	Type B, stripping through entire core, separation at 1.5 and 5.75 inches		
	Total Core Thickness	8 1/2			
				AASHTO	OSI
2	AGGREGATE BASE	13 1/2			
3	LEAN CLAY (CL), brown	36		A-7-6(27)	21.8

*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-23

Surveyed By: Dawson Wiseman

Date Surveyed: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	43' right
Core	C-23
Station	1682+03
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.404722
Longitude	-95.283444

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	8	Type B, minor stripping through entire core, separation at 2 and 4.5 inches		
	Total Core Thickness	8			
				AASHTO	OSI
2	AGGREGATE BASE	11			
3	CLAYEY SAND with GRAVEL (SC), yellowish brown	24		A-2-4	1.3
	*Auger refusal at 43 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: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	44' right
Core	C-24
Station	1697+07
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.408667
Longitude	-95.281972

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	9 1/2	Type B, minor stripping though entire core, separation at 2.5 inches, tack layer at 4.75 inches		
	Total Core Thickness	9 1/2			
				AASHTO	OSI
2	AGGREGATE BASE	12 1/2			
3	LEAN CLAY with SAND (CL), brown	36		A-7-6(20)	18.8

*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-25

Surveyed By: Dawson Wiseman

Date Surveyed: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	43' right
Core	C-25
Station	1712+04
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.412611
Longitude	-95.280500

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 and 7 inches, minor stripping at 0 to 4 inches		
	Total Core Thickness	8 1/2			
				AASHTO	OSI
2	AGGREGATE BASE	10 1/2			
3	SANDY LEAN CLAY (CL), dark gray	36		A-6(5)	8.8

*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

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Coring
C-26

Top

Surveyed By: Dawson Wiseman

Date Surveyed: July 5 and 11, 2023

CORE LOG

RRC No.	23036
State Aid Project No.	31963(04)
Location	US 69
County	Mayes
US 69 CL	43' right
Core	C-26
Station	1727+02
Coring Location	Center Shoulder
Lane Direction	NB
Latitude	36.416556
Longitude	-95.279000

CORE LAYER DATA (FROM TOP TO BOTTOM)

Sample No.	Layer Type	Layer Thickness (in.)	Layer Characteristics		
1	Asphalt Concrete	8 1/2	Type B, stripping/deterioration at 2 to 4 inches, separation at 5.5 inches		
	Total Core Thickness	8 1/2			
				AASHTO	OSI
2	AGGREGATE BASE	13			
3	LEAN CLAY (CL), dark gray	36		A-7-6(22)	18.8

*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

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Pavement Photographs

Photo #1 Major severity fatigue and transverse cracking near C-1.

Photo #2 Major severity fatigue cracking near C-2.

Photo #3 Moderate to major severity fatigue cracking near C-3.

Photo #4 Moderate severity fatigue cracking near C-4.

Photo #5 Moderate to major severity fatigue cracking near C-5.

Photo #6 Minor to moderate severity transverse cracking near C-6. Also note the light severity asphalt bleeding.

Photo #7 Minor to moderate severity transverse cracking near C-7.

Photo #8 Minor to moderate severity transverse cracking near C-8. Also note the light severity asphalt bleeding.

Photo #9 Moderate severity fatigue and transverse cracking near C-9. Also note the light severity asphalt bleeding.

Photo #10 Moderate severity fatigue cracking near C-10. Also note the light severity asphalt bleeding.

Photo #11 Minor to moderate severity longitudinal and transverse cracking near C-11. Also note the light severity asphalt bleeding.

Photo #12 Moderate severity transverse cracking near C-12. Also note the light severity asphalt bleeding.

Photo #13 Minor to moderate severity transverse cracking near C-13. Also note the light severity asphalt bleeding.

Photo #14 Minor to moderate severity transverse cracking near C-14. Also note the light severity asphalt bleeding.

Photo #15 Minor to moderate severity fatigue and transverse cracking near C-15. Also note the light severity asphalt bleeding.

Photo #16 Moderate severity fatigue and transverse cracking near C-16. Also note the light severity asphalt bleeding.

Photo #17 Minor severity transverse cracking near C-17.

Photo #18 Moderate severity transverse cracking near C-18. Also note the light severity asphalt bleeding.

Photo #19 Moderate severity transverse cracking near C-19. Also note the light severity asphalt bleeding.

Photo #20 Minor to moderate severity transverse cracking near C-20. Also note the light severity asphalt bleeding.

Photo #21 Moderate severity transverse cracking near C-21. Also note the light severity asphalt bleeding.

Photo #22 Moderate severity transverse cracking near C-22. Also note the light severity asphalt bleeding.

Photo #23 Moderate severity transverse cracking near C-23.

Photo #24 Moderate severity transverse cracking near C-24. Also note the light severity asphalt bleeding.

Photo #25 Moderate severity transverse cracking near C-25.

Photo #26 Moderate severity longitudinal and transverse cracking near C-26.

APPENDIX D

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

SUMMARY OF LABORATORY RESULTS

CLIENT SRB **PROJECT NAME** US 69 Pavement and Subgrade-Shoulder Survey (NB)

PROJECT NUMBER 23036 **PROJECT LOCATION** Mayes 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	27-63	19.2	33	14	19	100	100	100	96	93	90	64.9
C-02	21-33	12.7	21	15	6	100	100	100	94	90	86	41.3
C-02	33-57	18.1										
C-03	24-60	18.8	35	12	23	100	100	100	93	92	90	67.2
C-04	16-52	13.7	NV	NP	NP	100	100	100	77	72	70	25.2
C-05	16-52	18.1	31	14	17	100	100	100	94	90	87	68.8
C-06	16-34	12.4										
C-06	34-52	17.4	27	15	12	100	100	100	93	86	83	55.3
C-07	16-52	13.9	27	16	11	100	100	100	92	85	81	45.8
C-08	17-53	17.3	34	17	17	100	100	100	90	84	80	65.5
C-09	14-32	11.8										
C-09	32-50	22.0	37	18	19	100	100	100	93	88	84	73.6
C-10	20-26	12.0	NV	NP	NP	100	100	100	84	77	75	34.6
C-10	26-56	19.3										
C-11	13-43	12.7	NV	NP	NP	100	100	100	86	82	79	38.8
C-11	43-49	19.3										
C-12	12-42	11.1										
C-12	42-48	18.8	37	17	20	100	100	100	94	90	85	69.3
C-13	18-48	10.6	NV	NP	NP	100	100	100	88	79	75	25.6
C-13	48-54	17.0										
C-14	15-45	10.8	NV	NP	NP	100	86	79	59	54	53	19.2
C-14	45-51	16.6										
C-15	16-46	16.5										
C-15	46-52	19.6	34	16	18	100	100	100	93	88	83	70.9
C-16	15-39	9.2	NV	NP	NP	100	100	100	76	70	64	28.2
C-16	39-51	21.0										
C-17	18-36	13.0										
C-17	36-54	22.1	35	17	18	100	100	100	97	94	90	77.4
C-18	21-45	24.4	42	16	26							
C-18	45-57	24.2				100	100	100	94	93	90	78.4
C-19	20-44	19.3										
C-19	44-56	19.1	35	16	19	100	100	100	97	93	89	73.7
C-20	19-55	20.5	45	18	27	100	100	100	95	91	87	52.1
C-21	19-49	12.8										
C-21	49-55	10.0	25	17	8	100	100	100	87	77	72	37.4
C-22	22-58	28.2	49	19	30	100	100	100	98	96	93	87.7
C-23	19-43	7.7	24	16	8	100	100	100	59	49	46	31.4
C-24	22-58	21.0	42	16	26	100	100	100	99	97	94	80.2
C-25	19-55	17.5	29	17	12	100	100	100	91	83	78	62.9
C-26	22-58	20.9	42	16	26	100	100	100	100	97	94	85.9

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DCP Data Sheet

Project: US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder)

Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-1							
27	17	685.8	50.8	3.0	2	6	50
29	19	736.6	50.8	2.7	2	5	50
31	6	787.4	50.8	8.5	2	17	13
33	5	838.2	50.8	10.2	2	20	10
35	5	889	50.8	10.2	2	20	10
37	5	939.8	50.8	10.2	2	20	10
39	6	990.6	50.8	8.5	2	17	13
41	5	1041.4	50.8	10.2	2	20	10
43	8	1092.2	50.8	6.4	2	13	20
45	10	1143	50.8	5.1	2	10	25
47	11	1193.8	50.8	4.6	2	9	25
49	12	1244.6	50.8	4.2	2	8	30
51	14	1295.4	50.8	3.6	2	7	35
53	13	1346.2	50.8	3.9	2	8	35
55	15	1397	50.8	3.4	2	7	40
57	16	1447.8	50.8	3.2	2	6	40

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DCP Data Sheet

Project: US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder)

Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-2							
21	19	533.4	50.8	2.7	2	5	50
23	16	584.2	50.8	3.2	2	6	40
25	13	635	50.8	3.9	2	8	35
27	13	685.8	50.8	3.9	2	8	35
29	13	736.6	50.8	3.9	2	8	35
31	36	787.4	50.8	1.4	2	3	100
33	19	838.2	50.8	2.7	2	5	50
35	12	889	50.8	4.2	2	8	30
37	13	939.8	50.8	3.9	2	8	35
39	18	990.6	50.8	2.8	2	6	50
41	10	1041.4	50.8	5.1	2	10	25
43	5	1092.2	50.8	10.2	2	20	10
45	5	1143	50.8	10.2	2	20	10
47	5	1193.8	50.8	10.2	2	20	10
49	8	1244.6	50.8	6.4	2	13	20
51	10	1295.4	50.8	5.1	2	10	25
53	11	1346.2	50.8	4.6	2	9	25
55	13	1397	50.8	3.9	2	8	35

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DCP Data Sheet

Project: US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder)

Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-3							
24	6	609.6	50.8	8.5	2	17	13
26	7	660.4	50.8	7.3	2	15	15
28	13	711.2	50.8	3.9	2	8	35
30	14	762	50.8	3.6	2	7	35
32	12	812.8	50.8	4.2	2	8	30
34	6	863.6	50.8	8.5	2	17	13
36	13	914.4	50.8	3.9	2	8	35
38	9	965.2	50.8	5.6	2	11	20
40	8	1016	50.8	6.4	2	13	20
42	5	1066.8	50.8	10.2	2	20	10
44	4	1117.6	50.8	12.7	2	25	8
46	5	1168.4	50.8	10.2	2	20	10
48	7	1219.2	50.8	7.3	2	15	15
50	8	1270	50.8	6.4	2	13	20
52	9	1320.8	50.8	5.6	2	11	20
54	12	1371.6	50.8	4.2	2	8	30
56	13	1422.4	50.8	3.9	2	8	35
58	14	1473.2	50.8	3.6	2	7	35

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DCP Data Sheet

Project: US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder)

Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-4							
15.5	6	393.7	50.8	8.5	2	17	13
17.5	8	444.5	50.8	6.4	2	13	20
19.5	6	495.3	50.8	8.5	2	17	13
21.5	6	546.1	50.8	8.5	2	17	13
23.5	8	596.9	50.8	6.4	2	13	20
25.5	8	647.7	50.8	6.4	2	13	20
27.5	7	698.5	50.8	7.3	2	15	15
29.5	7	749.3	50.8	7.3	2	15	15
31.5	12	800.1	50.8	4.2	2	8	30
33.5	6	850.9	50.8	8.5	2	17	13
35.5	6	901.7	50.8	8.5	2	17	13
37.5	5	952.5	50.8	10.2	2	20	10
39.5	5	1003.3	50.8	10.2	2	20	10
41.5	6	1054.1	50.8	8.5	2	17	13
43.5	7	1104.9	50.8	7.3	2	15	15
45.5	10	1155.7	50.8	5.1	2	10	25
47.5	12	1206.5	50.8	4.2	2	8	30
49.5	13	1257.3	50.8	3.9	2	8	35

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DCP Data Sheet

Project: US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder)

Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-5							
15.5	11	393.7	50.8	4.6	2	9	25
17.5	16	444.5	50.8	3.2	2	6	40
19.5	9	495.3	50.8	5.6	2	11	20
21.5	8	546.1	50.8	6.4	2	13	20
23.5	8	596.9	50.8	6.4	2	13	20
25.5	9	647.7	50.8	5.6	2	11	20
27.5	8	698.5	50.8	6.4	2	13	20
29.5	9	749.3	50.8	5.6	2	11	20
31.5	14	800.1	50.8	3.6	2	7	35
33.5	8	850.9	50.8	6.4	2	13	20
35.5	8	901.7	50.8	6.4	2	13	20
37.5	6	952.5	50.8	8.5	2	17	13
39.5	5	1003.3	50.8	10.2	2	20	10
41.5	5	1054.1	50.8	10.2	2	20	10
43.5	5	1104.9	50.8	10.2	2	20	10
45.5	5	1155.7	50.8	10.2	2	20	10
47.5	7	1206.5	50.8	7.3	2	15	15
49.5	9	1257.3	50.8	5.6	2	11	20

RED ROCK CONSULTING

DCP Data Sheet

Project: US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder)

Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-6							
15.5	22	393.7	50.8	2.3	2	5	60
17.5	24	444.5	50.8	2.1	2	4	60
19.5	31	495.3	50.8	1.6	2	3	80
21.5	22	546.1	50.8	2.3	2	5	60
23.5	17	596.9	50.8	3.0	2	6	50
25.5	12	647.7	50.8	4.2	2	8	30
27.5	20	698.5	50.8	2.5	2	5	50
29.5	13	749.3	50.8	3.9	2	8	35
31.5	10	800.1	50.8	5.1	2	10	25
33.5	5	850.9	50.8	10.2	2	20	10
35.5	5	901.7	50.8	10.2	2	20	10
37.5	6	952.5	50.8	8.5	2	17	13
39.5	7	1003.3	50.8	7.3	2	15	15
41.5	10	1054.1	50.8	5.1	2	10	25
43.5	10	1104.9	50.8	5.1	2	10	25
45.5	7	1155.7	50.8	7.3	2	15	15
47.5	5	1206.5	50.8	10.2	2	20	10
49.5	6	1257.3	50.8	8.5	2	17	13

RED ROCK CONSULTING

DCP Data Sheet

Project: US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder)

Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-7							
16.25	2	412.75	50.8	25.4	2	51	3.7
18.25	7	463.55	50.8	7.3	2	15	15
20.25	8	514.35	50.8	6.4	2	13	20
22.25	8	565.15	50.8	6.4	2	13	20
24.25	6	615.95	50.8	8.5	2	17	13
26.25	7	666.75	50.8	7.3	2	15	15
28.25	10	717.55	50.8	5.1	2	10	25
30.25	7	768.35	50.8	7.3	2	15	15
32.25	6	819.15	50.8	8.5	2	17	13
34.25	35	869.95	50.8	1.5	2	3	100
36.25	50	920.75	50.8	1.0	2	2	100

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DCP Data Sheet

Project: US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder)

Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-8							
16.5	3	419.1	50.8	16.9	2	34	6
18.5	3	469.9	50.8	16.9	2	34	6
20.5	3	520.7	50.8	16.9	2	34	6
22.5	4	571.5	50.8	12.7	2	25	8
24.5	6	622.3	50.8	8.5	2	17	13
26.5	7	673.1	50.8	7.3	2	15	15
28.5	6	723.9	50.8	8.5	2	17	13
30.5	6	774.7	50.8	8.5	2	17	13
32.5	4	825.5	50.8	12.7	2	25	8
34.5	7	876.3	50.8	7.3	2	15	15
36.5	11	927.1	50.8	4.6	2	9	25
38.5	7	977.9	50.8	7.3	2	15	15
40.5	6	1028.7	50.8	8.5	2	17	13
42.5	5	1079.5	50.8	10.2	2	20	10
44.5	6	1130.3	50.8	8.5	2	17	13
46.5	5	1181.1	50.8	10.2	2	20	10
48.5	4	1231.9	50.8	12.7	2	25	8
50.5	5	1282.7	50.8	10.2	2	20	10

RED ROCK CONSULTING

DCP Data Sheet

Project: US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder)

Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-9							
14	14	355.6	50.8	3.6	2	7	35
16	5	406.4	50.8	10.2	2	20	10
18	5	457.2	50.8	10.2	2	20	10
20	6	508	50.8	8.5	2	17	13
22	5	558.8	50.8	10.2	2	20	10
24	4	609.6	50.8	12.7	2	25	8
26	6	660.4	50.8	8.5	2	17	13
28	10	711.2	50.8	5.1	2	10	25
30	10	762	50.8	5.1	2	10	25
32	7	812.8	50.8	7.3	2	15	15
34	3	863.6	50.8	16.9	2	34	6
36	3	914.4	50.8	16.9	2	34	6
38	2	965.2	50.8	25.4	2	51	3.7
40	2	1016	50.8	25.4	2	51	3.7
42	3	1066.8	50.8	16.9	2	34	6
44	4	1117.6	50.8	12.7	2	25	8
46	6	1168.4	50.8	8.5	2	17	13
48	8	1219.2	50.8	6.4	2	13	20

RED ROCK CONSULTING

DCP Data Sheet

Project: US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder)

Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-10							
20	8	508	50.8	6.4	2	13	20
22	14	558.8	50.8	3.6	2	7	35
24	11	609.6	50.8	4.6	2	9	25
26	6	660.4	50.8	8.5	2	17	13
28	6	711.2	50.8	8.5	2	17	13
30	7	762	50.8	7.3	2	15	15
32	8	812.8	50.8	6.4	2	13	20
34	14	863.6	50.8	3.6	2	7	35
36	9	914.4	50.8	5.6	2	11	20
38	8	965.2	50.8	6.4	2	13	20
40	4	1016	50.8	12.7	2	25	8
42	3	1066.8	50.8	16.9	2	34	6
44	5	1117.6	50.8	10.2	2	20	10
46	4	1168.4	50.8	12.7	2	25	8
48	9	1219.2	50.8	5.6	2	11	20
50	9	1270	50.8	5.6	2	11	20
52	8	1320.8	50.8	6.4	2	13	20
54	9	1371.6	50.8	5.6	2	11	20

RED ROCK CONSULTING

DCP Data Sheet

Project: US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder)

Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-11							
12.5	6	317.5	50.8	8.5	2	17	13
14.5	9	368.3	50.8	5.6	2	11	20
16.5	13	419.1	50.8	3.9	2	8	35
18.5	20	469.9	50.8	2.5	2	5	50
20.5	14	520.7	50.8	3.6	2	7	35
22.5	15	571.5	50.8	3.4	2	7	40
24.5	10	622.3	50.8	5.1	2	10	25
26.5	9	673.1	50.8	5.6	2	11	20
28.5	4	723.9	50.8	12.7	2	25	8
30.5	2	774.7	50.8	25.4	2	51	3.7
32.5	3	825.5	50.8	16.9	2	34	6
34.5	5	876.3	50.8	10.2	2	20	10
36.5	5	927.1	50.8	10.2	2	20	10
38.5	5	977.9	50.8	10.2	2	20	10
40.5	5	1028.7	50.8	10.2	2	20	10
42.5	7	1079.5	50.8	7.3	2	15	15
44.5	7	1130.3	50.8	7.3	2	15	15
46.5	8	1181.1	50.8	6.4	2	13	20

RED ROCK CONSULTING

DCP Data Sheet

Project: US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder)

Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-12							
12.25	17	311.15	50.8	3.0	2	6	50
14.25	25	361.95	50.8	2.0	2	4	60
16.25	40	412.75	50.8	1.3	2	3	100
18.25	32	463.55	50.8	1.6	2	3	80
20.25	38	514.35	50.8	1.3	2	3	100
22.25	43	565.15	50.8	1.2	2	2	100
24.25	50	615.95	50.8	1.0	2	2	100

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DCP Data Sheet

Project: US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder)

Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-13							
17.5	22	444.5	50.8	2.3	2	5	60
19.5	30	495.3	50.8	1.7	2	3	80
21.5	28	546.1	50.8	1.8	2	4	80
23.5	13	596.9	50.8	3.9	2	8	35
25.5	12	647.7	50.8	4.2	2	8	30
27.5	10	698.5	50.8	5.1	2	10	25
29.5	23	749.3	50.8	2.2	2	4	60
31.5	14	800.1	50.8	3.6	2	7	35
33.5	7	850.9	50.8	7.3	2	15	15
35.5	6	901.7	50.8	8.5	2	17	13
37.5	7	952.5	50.8	7.3	2	15	15
39.5	8	1003.3	50.8	6.4	2	13	20
41.5	6	1054.1	50.8	8.5	2	17	13
43.5	7	1104.9	50.8	7.3	2	15	15
45.5	13	1155.7	50.8	3.9	2	8	35
47.5	17	1206.5	50.8	3.0	2	6	50
49.5	10	1257.3	50.8	5.1	2	10	25
51.5	6	1308.1	50.8	8.5	2	17	13

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DCP Data Sheet

Project: US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder)

Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-14							
15	12	381	50.8	4.2	2	8	30
17	20	431.8	50.8	2.5	2	5	50
19	21	482.6	50.8	2.4	2	5	60
21	37	533.4	50.8	1.4	2	3	100
23	40	584.2	50.8	1.3	2	3	100
25	48	635	50.8	1.1	2	2	100
27	48	685.8	50.8	1.1	2	2	100
29	29	736.6	50.8	1.8	2	4	80
31	33	787.4	50.8	1.5	2	3	80
33	19	787.4	50.8	2.7	2	5	50
35	6	838.2	50.8	8.5	2	17	13
37	7	889	50.8	7.3	2	15	15
39	8	939.8	50.8	6.4	2	13	20
41	6	990.6	50.8	8.5	2	17	13
43	7	1041.4	50.8	7.3	2	15	15
45	4	1092.2	50.8	12.7	2	25	8
47	3	1143	50.8	16.9	2	34	6
49	4	1193.8	50.8	12.7	2	25	8

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DCP Data Sheet

Project: US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder)

Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-15							
15.5	5	393.7	50.8	10.2	2	20	10
17.5	5	444.5	50.8	10.2	2	20	10
19.5	4	495.3	50.8	12.7	2	25	8
21.5	5	546.1	50.8	10.2	2	20	10
23.5	21	596.9	50.8	2.4	2	5	60
25.5	9	647.7	50.8	5.6	2	11	20
27.5	2	698.5	50.8	25.4	2	51	3.7
29.5	2	749.3	50.8	25.4	2	51	3.7
31.5	3	800.1	50.8	16.9	2	34	6
33.5	3	850.9	50.8	16.9	2	34	6
35.5	6	901.7	50.8	8.5	2	17	13
37.5	5	952.5	50.8	10.2	2	20	10
39.5	5	1003.3	50.8	10.2	2	20	10
41.5	4	1054.1	50.8	12.7	2	25	8
43.5	6	1104.9	50.8	8.5	2	17	13
45.5	8	1155.7	50.8	6.4	2	13	20
47.5	5	1206.5	50.8	10.2	2	20	10
49.5	6	1257.3	50.8	8.5	2	17	13

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DCP Data Sheet

Project: US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder)

Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-16							
15	9	381	50.8	5.6	2	11	20
17	17	431.8	50.8	3.0	2	6	50
19	18	482.6	50.8	2.8	2	6	50
21	18	533.4	50.8	2.8	2	6	50
23	5	584.2	50.8	10.2	2	20	10
25	2	635	50.8	25.4	2	51	3.7
27	1	685.8	50.8	50.8	2	102	1.7
29	2	736.6	50.8	25.4	2	51	3.7
31	2	787.4	50.8	25.4	2	51	3.7
33	2	838.2	50.8	25.4	2	51	3.7
35	3	889	50.8	16.9	2	34	6
37	3	939.8	50.8	16.9	2	34	6
39	4	990.6	50.8	12.7	2	25	8
41	4	1041.4	50.8	12.7	2	25	8
43	5	1092.2	50.8	10.2	2	20	10
45	10	1143	50.8	5.1	2	10	25
47	14	1193.8	50.8	3.6	2	7	35
49	10	1244.6	50.8	5.1	2	10	25

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DCP Data Sheet

Project: US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder)

Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-17							
18	12	457.2	54.8	4.6	2	9	25
20	10	508	50.8	5.1	2	10	25
22	11	558.8	50.8	4.6	2	9	25
24	8	609.6	50.8	6.4	2	13	20
26	8	660.4	50.8	6.4	2	13	20
28	12	711.2	50.8	4.2	2	8	30
30	14	762	50.8	3.6	2	7	35
32	17	812.8	50.8	3.0	2	6	50
34	10	863.6	50.8	5.1	2	10	25
36	14	914.4	50.8	3.6	2	7	35
38	7	965.2	50.8	7.3	2	15	15
40	5	1016	50.8	10.2	2	20	10
42	6	1066.8	50.8	8.5	2	17	13
44	10	1117.6	50.8	5.1	2	10	25
46	8	1168.4	50.8	6.4	2	13	20
48	8	1219.2	50.8	6.4	2	13	20
50	11	1270	50.8	4.6	2	9	25
52	7	1320.8	50.8	7.3	2	15	15

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DCP Data Sheet

Project: US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder)

Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-18							
20.5	3	520.7	55.8	18.6	2	37	5
22.5	3	571.5	50.8	16.9	2	34	6
24.5	2	622.3	50.8	25.4	2	51	3.7
26.5	4	673.1	50.8	12.7	2	25	8
28.5	2	723.9	50.8	25.4	2	51	3.7
30.5	4	774.7	50.8	12.7	2	25	8
32.5	6	825.5	50.8	8.5	2	17	13
34.5	9	876.3	50.8	5.6	2	11	20
36.5	9	927.1	50.8	5.6	2	11	20
38.5	9	977.9	50.8	5.6	2	11	20
40.5	10	1028.7	50.8	5.1	2	10	25
42.5	13	1079.5	50.8	3.9	2	8	35
44.5	14	1130.3	50.8	3.6	2	7	35
46.5	12	1181.1	50.8	4.2	2	8	30
48.5	13	1231.9	50.8	3.9	2	8	35
50.5	14	1282.7	50.8	3.6	2	7	35
52.5	15	1333.5	50.8	3.4	2	7	40
54.5	13	1384.3	50.8	3.9	2	8	35

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DCP Data Sheet

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Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-19							
19.5	10	495.3	56.8	5.7	2	11	20
21.5	10	546.1	50.8	5.1	2	10	25
23.5	6	596.9	50.8	8.5	2	17	13
25.5	5	647.7	50.8	10.2	2	20	10
27.5	6	698.5	50.8	8.5	2	17	13
29.5	7	749.3	50.8	7.3	2	15	15
31.5	7	800.1	50.8	7.3	2	15	15
33.5	8	850.9	50.8	6.4	2	13	20
35.5	9	901.7	50.8	5.6	2	11	20
37.5	9	952.5	50.8	5.6	2	11	20
39.5	9	1003.3	50.8	5.6	2	11	20
41.5	13	1054.1	50.8	3.9	2	8	35
43.5	12	1104.9	50.8	4.2	2	8	30
45.5	14	1155.7	50.8	3.6	2	7	35
47.5	18	1206.5	50.8	2.8	2	6	50
49.5	19	1257.3	50.8	2.7	2	5	50
51.5	15	1308.1	50.8	3.4	2	7	40
53.5	9	1358.9	50.8	5.6	2	11	20

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DCP Data Sheet

Project: US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder)

Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-20							
18.5	1	469.9	57.8	57.8	2	116	1.4
20.5	4	520.7	50.8	12.7	2	25	8
22.5	5	571.5	50.8	10.2	2	20	10
24.5	7	622.3	50.8	7.3	2	15	15
26.5	6	673.1	50.8	8.5	2	17	13
28.5	4	723.9	50.8	12.7	2	25	8
30.5	5	774.7	50.8	10.2	2	20	10
32.5	5	825.5	50.8	10.2	2	20	10
34.5	8	876.3	50.8	6.4	2	13	20
36.5	9	927.1	50.8	5.6	2	11	20
38.5	7	977.9	50.8	7.3	2	15	15
40.5	9	1028.7	50.8	5.6	2	11	20
42.5	23	1079.5	50.8	2.2	2	4	60
44.5	36	1130.3	50.8	1.4	2	3	100
46.5	42	1181.1	50.8	1.2	2	2	100
48.5	50	1231.9	50.8	1.0	2	2	100

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DCP Data Sheet

Project: US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder)

Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-21							
19	4	482.6	58.8	14.7	2	29	8
21	10	533.4	50.8	5.1	2	10	25
23	10	584.2	50.8	5.1	2	10	25
25	8	635	50.8	6.4	2	13	20
27	11	685.8	50.8	4.6	2	9	25
29	12	736.6	50.8	4.2	2	8	30
31	15	787.4	50.8	3.4	2	7	40
33	45	838.2	50.8	1.1	2	2	100
35	50	889	50.8	1.0	2	2	100

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DCP Data Sheet

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Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-22							
22	2	558.8	59.8	29.9	2	60	3
24	6	609.6	50.8	8.5	2	17	13
26	3	660.4	50.8	16.9	2	34	6
28	2	711.2	50.8	25.4	2	51	3.7
30	3	762	50.8	16.9	2	34	6
32	3	812.8	50.8	16.9	2	34	6
34	4	863.6	50.8	12.7	2	25	8
36	5	914.4	50.8	10.2	2	20	10
38	7	965.2	50.8	7.3	2	15	15
40	7	1016	50.8	7.3	2	15	15
42	10	1066.8	50.8	5.1	2	10	25
44	11	1117.6	50.8	4.6	2	9	25
46	12	1168.4	50.8	4.2	2	8	30
48	15	1219.2	50.8	3.4	2	7	40
50	16	1270	50.8	3.2	2	6	40
52	15	1320.8	50.8	3.4	2	7	40
54	14	1371.6	50.8	3.6	2	7	35
56	16	1422.4	50.8	3.2	2	6	40

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DCP Data Sheet

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Location: Mayes County, Oklahoma

RRC Project No: 23036

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Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-23							
19	13	482.6	60.8	4.7	2	9	25
21	15	533.4	50.8	3.4	2	7	40
23	50	584.2	50.8	1.0	2	2	100

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DCP Data Sheet

Project: US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder)

Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-24							
22	4	558.8	61.8	15.5	2	31	8
24	8	609.6	50.8	6.4	2	13	20
26	8	660.4	50.8	6.4	2	13	20
28	6	711.2	50.8	8.5	2	17	13
30	5	762	50.8	10.2	2	20	10
32	7	812.8	50.8	7.3	2	15	15
34	8	863.6	50.8	6.4	2	13	20
36	8	914.4	50.8	6.4	2	13	20
38	7	965.2	50.8	7.3	2	15	15
40	3	1016	50.8	16.9	2	34	6
42	11	1066.8	50.8	4.6	2	9	25
44	15	1117.6	50.8	3.4	2	7	40
46	11	1168.4	50.8	4.6	2	9	25
48	19	1219.2	50.8	2.7	2	5	50
50	22	1270	50.8	2.3	2	5	60
52	20	1320.8	50.8	2.5	2	5	50
54	22	1371.6	50.8	2.3	2	5	60
56	17	1422.4	50.8	3.0	2	6	50

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DCP Data Sheet

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Location: Mayes County, Oklahoma

RRC Project No: 23036

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Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-25							
19	8	482.6	62.8	7.9	2	16	14
21	6	533.4	50.8	8.5	2	17	13
23	3	584.2	50.8	16.9	2	34	6
25	5	635	50.8	10.2	2	20	10
27	4	685.8	50.8	12.7	2	25	8
29	6	736.6	50.8	8.5	2	17	13
31	5	787.4	50.8	10.2	2	20	10
33	5	838.2	50.8	10.2	2	20	10
35	5	889	50.8	10.2	2	20	10
37	6	939.8	50.8	8.5	2	17	13
39	7	990.6	50.8	7.3	2	15	15
41	11	1041.4	50.8	4.6	2	9	25
43	10	1092.2	50.8	5.1	2	10	25
45	7	1143	50.8	7.3	2	15	15
47	8	1193.8	50.8	6.4	2	13	20
49	8	1244.6	50.8	6.4	2	13	20
51	9	1295.4	50.8	5.6	2	11	20
53	10	1346.2	50.8	5.1	2	10	25

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DCP Data Sheet

Project: US 69 Pavement and Subgrade/Shoulder Soils Survey (Northbound Shoulder)

Location: Mayes County, Oklahoma

RRC Project No: 23036

Testing Date: July 5, 2023

Engineer/Driller: Dawson Wiseman

Depth (in)	Number of Blows	Cumulative Pentration (mm)	Penetration Between Readings (mm)	Penetration per Blow (mm)	Hammer Blow Factor	DCP Index (mm/blow)	CBR (%)
C-26							
21.5	5	546.1	63.8	12.8	2	26	8
23.5	8	596.9	50.8	6.4	2	13	20
25.5	3	647.7	50.8	16.9	2	34	6
27.5	4	698.5	50.8	12.7	2	25	8
29.5	5	749.3	50.8	10.2	2	20	10
31.5	4	800.1	50.8	12.7	2	25	8
33.5	4	850.9	50.8	12.7	2	25	8
35.5	6	901.7	50.8	8.5	2	17	13
37.5	5	952.5	50.8	10.2	2	20	10
39.5	5	1003.3	50.8	10.2	2	20	10
41.5	6	1054.1	50.8	8.5	2	17	13
43.5	6	1104.9	50.8	8.5	2	17	13
45.5	7	1155.7	50.8	7.3	2	15	15
47.5	7	1206.5	50.8	7.3	2	15	15
49.5	8	1257.3	50.8	6.4	2	13	20
51.5	8	1308.1	50.8	6.4	2	13	20
53.5	6	1358.9	50.8	8.5	2	17	13
55.5	5	1409.7	50.8	10.2	2	20	10

APPENDIX E

APPENDIX F

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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%

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Report of Geotechnical Investigation

OF THE

US 69 IN PLACE SOILS SURVEY

MAYES COUNTY, OKLAHOMA

31963(04)

Prepared For:

SRB
100 NE 5th Street
Oklahoma City, Oklahoma 73104
Attention: Mr. Greg Allen, PE

Prepared By:

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

December 4, 2023
Project No. 23035

RED ROCK
CONSULTING

December 4, 2023

SRB
100 NE 5th Street
Oklahoma City, Oklahoma 73104

Attention: Mr. Greg Allen, PE

Re: Report of Geotechnical Investigation
US 69 In Place Soils Survey
31963(04)
Mayes County, Oklahoma
Project No. 23035

Dear Mr. Allen:

I am pleased to submit herewith this report entitled "Geotechnical Investigation, US 69 In Place Soils Survey, 31963(04), Mayes 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. 06/30/25

Dawson Wiseman, EI
Project Specialist

REGISTERED PROFESSIONAL ENGINEER
JEREMY BASLER
12-4-2023
20233
OKLAHOMA

Jeremy Basler, PE
Geotechnical Manager
Oklahoma PE No. 20233

REPORT OF GEOTECHNICAL INVESTIGATION

US 69 IN PLACE SOILS SURVEY
MAYES COUNTY, OKLAHOMA

31963(04)

PROJECT NO. 23035

APPENDICES

REPORT OF GEOTECHNICAL INVESTIGATION

US 69 IN PLACE SOILS SURVEY
MAYES COUNTY, OKLAHOMA

31963(04)

PROJECT NO. 23035

INTRODUCTION

General

This report presents the results of the geotechnical investigation performed for the full depth reconstruction of the existing pavement of US 69 from SH 20 extending north 8.0 miles in Mayes County, Oklahoma.

Proposed Construction

The proposed project includes the full depth reconstruction of the 5-lane curb and gutter section beginning at SH 20 and extending north approximately 0.75 miles through the City of Pryor. The project also includes the full depth reconstruction of the southbound lane of US 69 from 0.75 miles north of SH 20 extending north approximately 7.25 miles. The project is associated with the possible overlay or reconstruction of the existing pavement of the US 69 northbound shoulder beginning 0.75 miles north of SH 20 extending 7.25 miles.

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 46 boreholes within the planned project area.

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

4. Presentation of laboratory data

FIELD AND LABORATORY INVESTIGATIONS

Field Exploration

Subsurface exploration was performed on July 12th and 13th, 2023. 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 SRB. 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 46 borings under the full-time supervision of an engineer. All of the borings were advanced within the existing US 69 roadway. Traffic control was utilized to drill the roadway borings. One boring, located at station 1320+00, 26' left, was removed on the day of exploration at the request of the City of Pryor due to the uncertainty of the size and location of the water main. The water main was believed to be running parallel to the roadway in the outside lane. The boring locations are shown on the Boring Location Diagram, which is included in Appendix A.

The pavement and subgrade soils at each boring location were drilled using a truck mounted CME 55 drill rig. The borings were advanced to 36 inches below the existing pavement. The thickness of the pavement at each boring location was measured with a tape measure. Representative samples of the borings were obtained from the auger cuttings. Measured pavement thicknesses and the depths at which the soil samples were obtained are shown on the Pavement and In Place Soils Survey chart in Appendix B. Five bulk samples were obtained and were representative of the dominant overburden soils encountered along the project length.

Samples were collected and transported back to the lab for further classification and testing. The final Pavement and In Place 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 Pavement and In Place Soils Survey chart, presenting conditions encountered at each location explored, is 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)
- Particle size analysis of soils (AASHTO T88)
- Liquid limit (AASHTO T 89)
- Plastic limit (AASHTO T90)
- Standard Proctor (AASHTO T99)
- Resilient modulus tests (AASHTO T307)

The results of the physical laboratory tests conducted are shown on the In Place Soils Survey chart in Appendix B and 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 investigation, the 0.75 mile section through the City of Pryor was a 5-lane curb and gutter corridor. At 0.75 miles north of SH 20, US 69 expanded to a four-lane divided highway. The project area consisted primarily of agricultural fields, residential, and commercial properties. Within the City of Pryor, the area consisted primarily of commercial and industrial properties. Railroad tracks paralleled the west side of US 69. At 4.5 miles north of SH 20 the railroad tracks crossed US 69 and paralleled the east side of the highway. From SH 20, Rocklahoma was located 4.2 miles north, the MidAmerica Industrial Park was located 4.3 miles south, and the town of Adair was located 9.2 miles north. Traffic was moderate during drilling operations. Large trucks consisted of an estimated 50% of the traffic.

The 5-lane curb and gutter surface pavement consisted of Asphalt Concrete. The existing asphalt pavement was in poor condition with moderate transverse and longitudinal cracking. The surface pavement of the US 69 southbound lanes consisted of Portland cement concrete. Moderate transverse cracking and moderate to major edge cracking were observed in the Portland cement concrete existing pavement as well as previously replaced panels.

Site Geology

The geology of the project site was researched using the “Division Eight Engineering Classification of Geological Materials”, published by the Oklahoma Department of Transportation (ODOT) and the Geologic Map of the “Hydrologic Atlas 2 of Oklahoma,” Reconnaissance of the Water Resources of the Tulsa quadrangle, northeastern Oklahoma,” by Melvin V. Marcher and Roy H. Bingham, U.S. Geological Survey, 1971.

ODOT PUBLICATION

Division Eight of the “Engineering Classification of Geological Materials”, published by the Oklahoma Department of Transportation (ODOT) indicates that, beneath Alluvium (Qts) and Terrace Deposits (Qas), the project site consists of the Hartshorne-Atoka Unit (IPha) and McAlester Unit (IPma).

Alluvium consists of sand, silt, clay, gravel, and/or combinations of materials. Alluvium is found along the flood plains (bottom land) of streams and is normally present at places along all streams. The geologic unit maps outline many deposits, but all of these deposits are not shown.

Terrace deposits consist of sand, silt, clay, gravel, and/or mixtures of these. Terrace materials occur adjacent to or near streams at higher elevations than the flood plain (bottom land). Like alluvium, these deposits are not all shown on the geologic unit maps. Most terrace deposits will have seepage where the underlying geologic material is less pervious.

The Hartshorne-Atoka unit consists of shale with some sandstone and siltstone. The shale is black and fissile, and the sandstone is soft to moderately hard, and generally brownish in color, thin-bedded to massive, and less than 10 feet thick. In Ottawa County, this unit is approximately 36 feet thick and is almost entirely shale with a one-foot bed of limestone conglomerate at the base. The unit is approximately 35 to 50 feet thick in Craig County. In Mayes County, it ranges from 35 feet in the north to about 90 feet in the southern portion.

In Division 8, the Hartshorne-Atoka outcrops in Craig, Mayes, and Ottawa Counties. In southern Mayes County, it is exposed along the Grand River, capping the cliffs along the river.

The McAlester unit consists predominantly of shale and a 10-to-20-foot bed of sandstone at the base. The shale is black, fissile, and attains a thickness of 80 feet locally. The sandstone is brown in color, soft to hard, and massive bedded. The total thickness of the McAlester varies from about 50 feet in southern Mayes County to about 100 feet in Craig County, and about 50 feet in Ottawa County.

The McAlester outcrops in Craig, Mayes, Ottawa, and Rogers Counties of Division 8. The topography is flat to slightly rolling with a slight scarp formed by the basal (Warner) sandstone.

USGS MAP

According to the USGS geologic map, beneath Alluvium, the project consists of the Atoka Formation and a combination of the Savanna, McAlester, Hartshorne, and Atoka Formations.

Alluvium consists of gravel, sand, silt, and clay. It yields moderate to large amounts of fair to good-quality water along the Arkansas River and small to moderate amounts of fair to good quality water locally along the Verdigris and Neosho Rivers.

The Atoka Formation consists of shale, siltstone, sandstone, and thin limestone. The units yields only small amounts of fair to poor quality water.

The Savanna, McAlester, Hartshorne, and Atoka Formations consists of shale, sandstone, siltstone, limestone, and coal. Except for the Warner Sandstone Member

at the base of the McAlester Formation. These units yield only small amounts of fair to poor quality water. The Warner Sandstone probably will yield small to moderate amounts of fair-quality water locally.

Subsurface Conditions

Information collected during the field investigation indicates that the existing pavement of the 5-lane curb and gutter section through the City of Pryor generally consisted of asphalt concrete over Portland cement concrete supported on subgrade. The asphalt overly was approximately 2 inches in thickness and the Portland cement concrete ranged between 8 to 10 inches. At 0.75 miles north of SH 20, the southbound lanes of US 69 generally consisted of Portland cement concrete supported on subgrade and ranged between 8 to 12 inches in thickness.

Beneath the pavement section, the subgrade materials consisted of silty sand with various amounts of gravel, clayey sand with various amounts of silt and gravel, and lean clay with various amounts of sand. Sandy silt was observed in boring IP-10 and fat clay was observed in boring IP-40. The subgrade materials encountered in the borings consisted of A-2-4, A-4, A-6, and A-7-6 soils.

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

Groundwater Conditions

Groundwater conditions were monitored in the borings during and immediately after drilling operations. Groundwater was not encountered in the majority of the borings during these times. In boring IP-21, water was observed directly under the Portland cement concrete pavement.

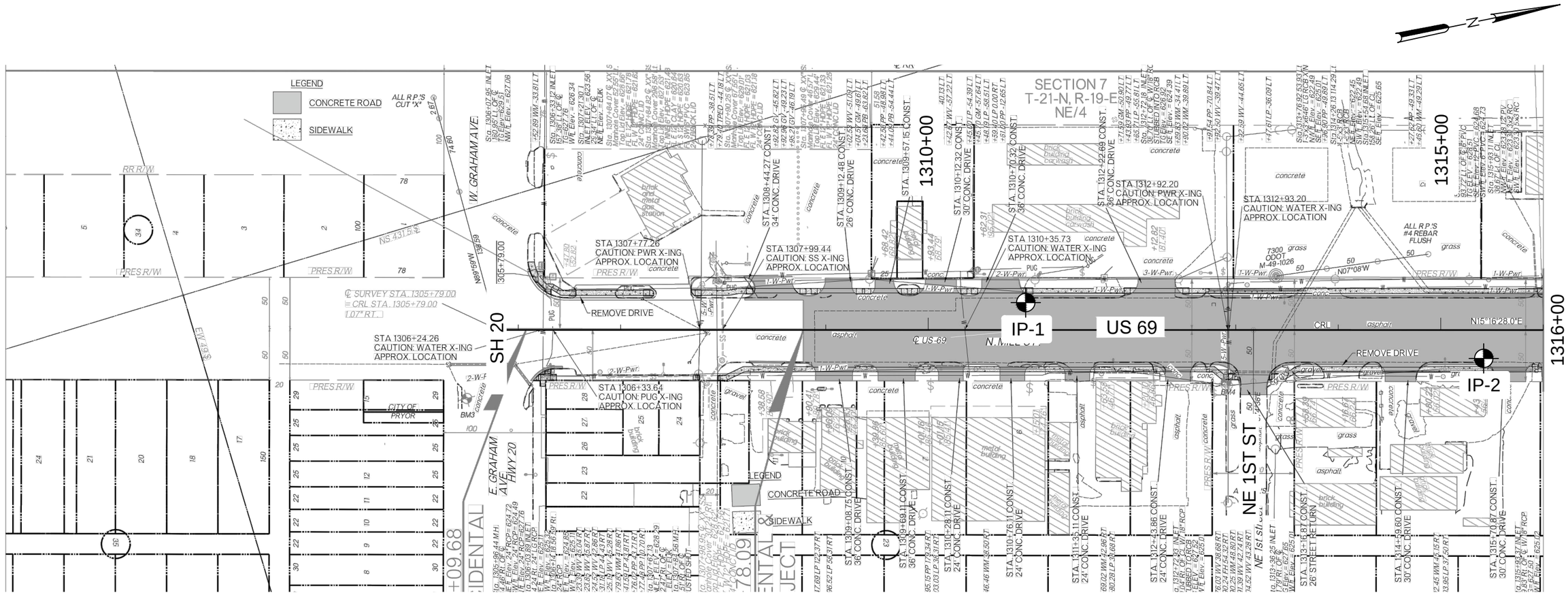
To obtain more accurate groundwater level information, long-term observations in a well or piezometer that is sealed from the influence of surface water would be needed. Fluctuations in groundwater levels can occur due to seasonal variations in the amount of rainfall, runoff, altered drainage paths, 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 representative subsurface conditions within the study area.

This report was prepared for the exclusive use of SRB, 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 and In Place Soils Survey chart or discussions presented herein.

APPENDIX A



Boring	Station	US 69 CL Survey
IP-1	1310+95	27' left
IP-2	1315+42	27' right

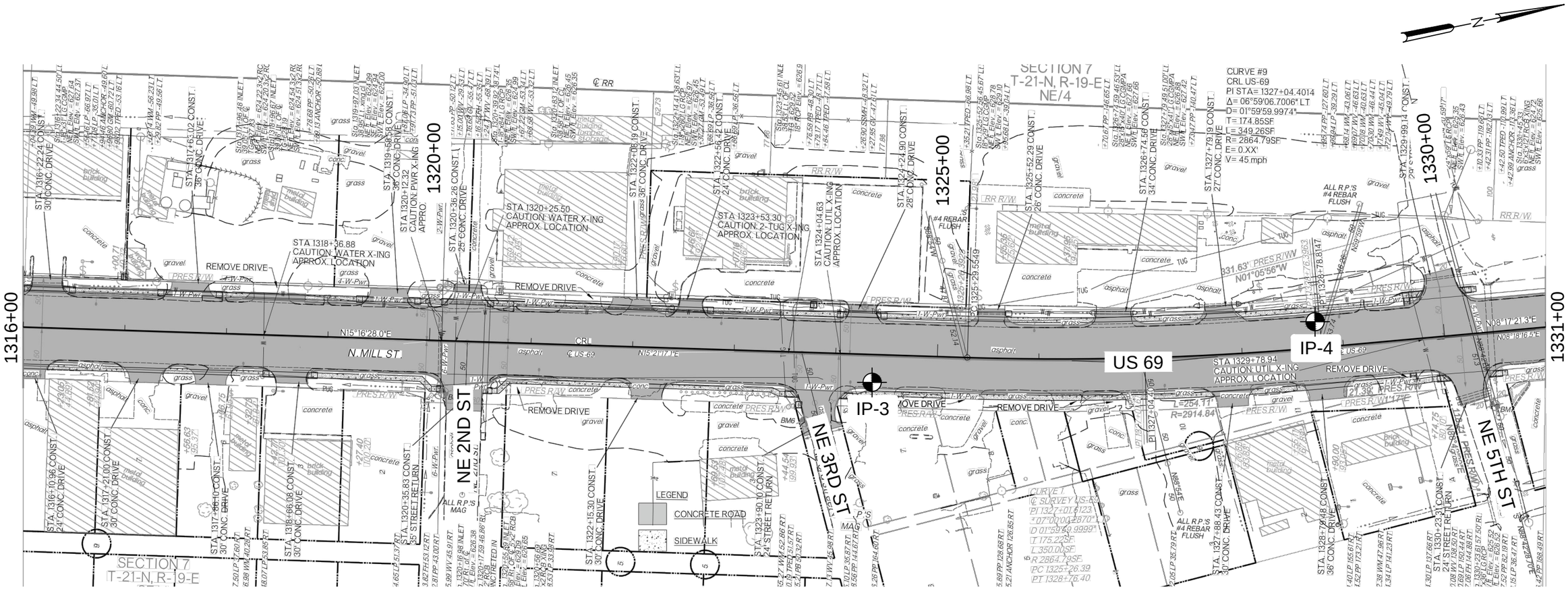
Stations and offsets estimated from plans provided by SRB.

RED ROCK CONSULTING

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

BORING LOCATION DIAGRAM
US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/13/2023
Approved By:	JWB	Page No:	1/29



Boring	Station	US 69 CL Survey
IP-3	1324+37	27' right
IP-4	1328+75	26' left

Stations and offsets estimated from plans provided by SRB.

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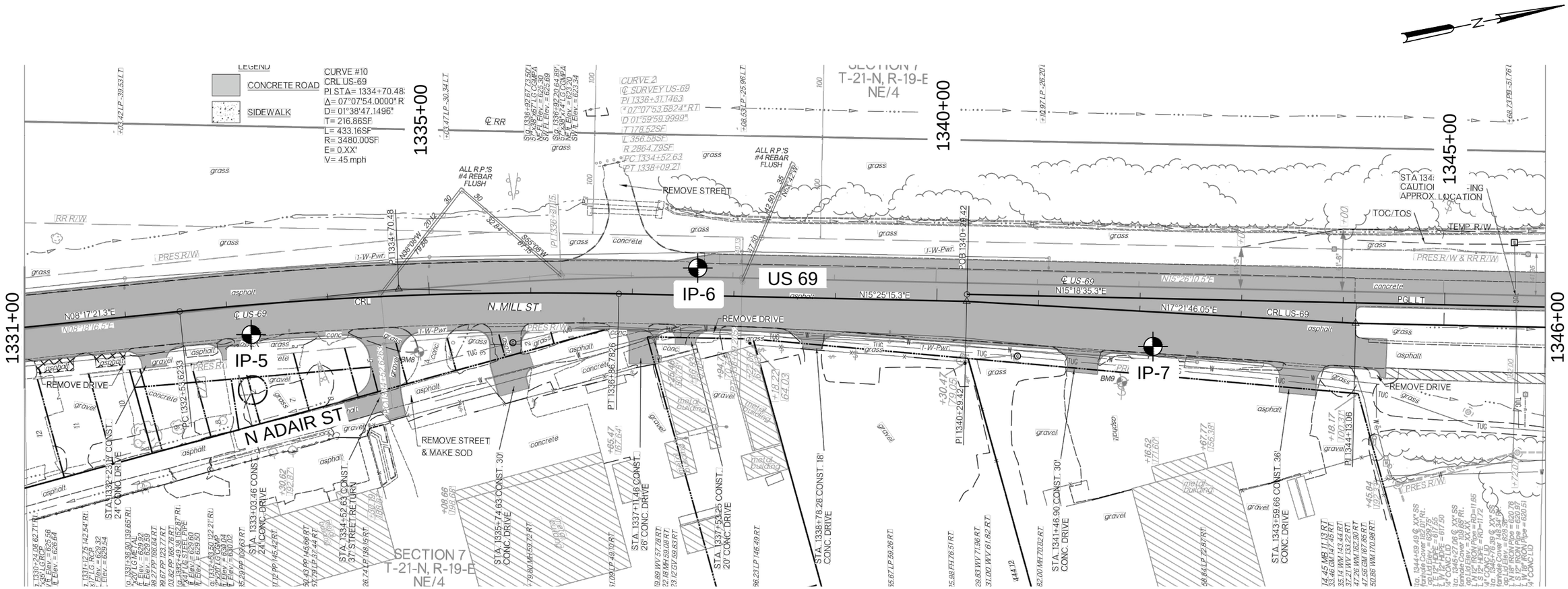
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/13/2023
Approved By:	JWB	Page No:	2/29



Boring	Station	US 69 CL Survey
IP-5	1333+24	26' right
IP-6	1337+66	10' left
IP-7	1342+16	58' right

Stations and offsets estimated from plans provided by SRB.

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BORING LOCATION DIAGRAM
US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
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Project Mngr:	DLW	RRC Project No.	23035
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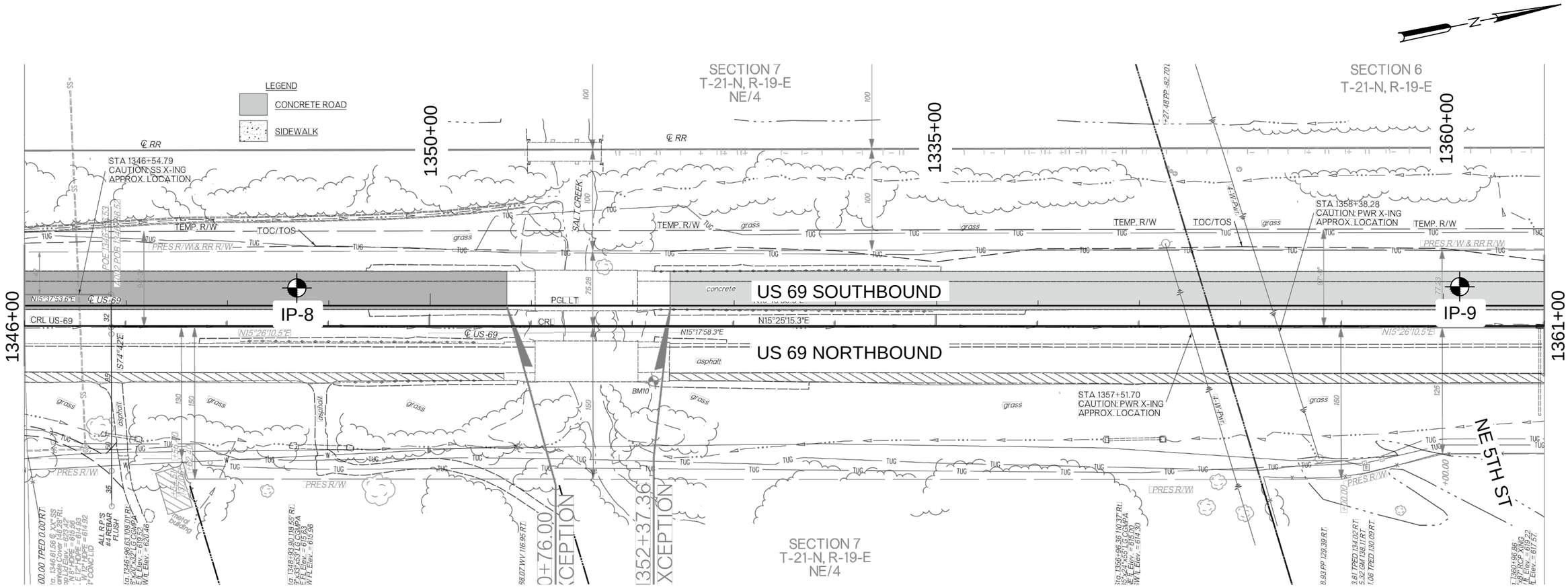

Boring	Station	US 69 CL Survey
IP-8	1348+70	39' left
IP-9	1360+18	40' left

Stations and offsets estimated from plans provided by SRB.

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BORING LOCATION DIAGRAM
US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23035
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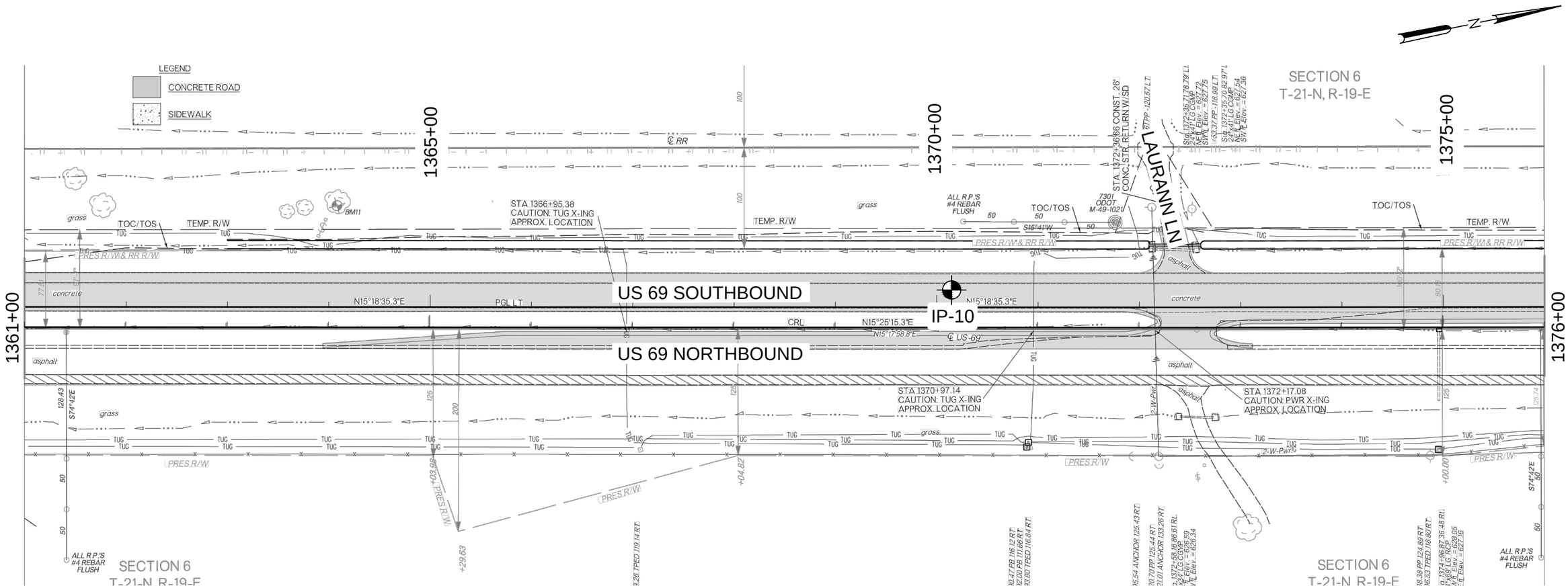
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	4/29



Boring	Station	US 69 CL Survey
IP-10	1370+16	40' left

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US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23035
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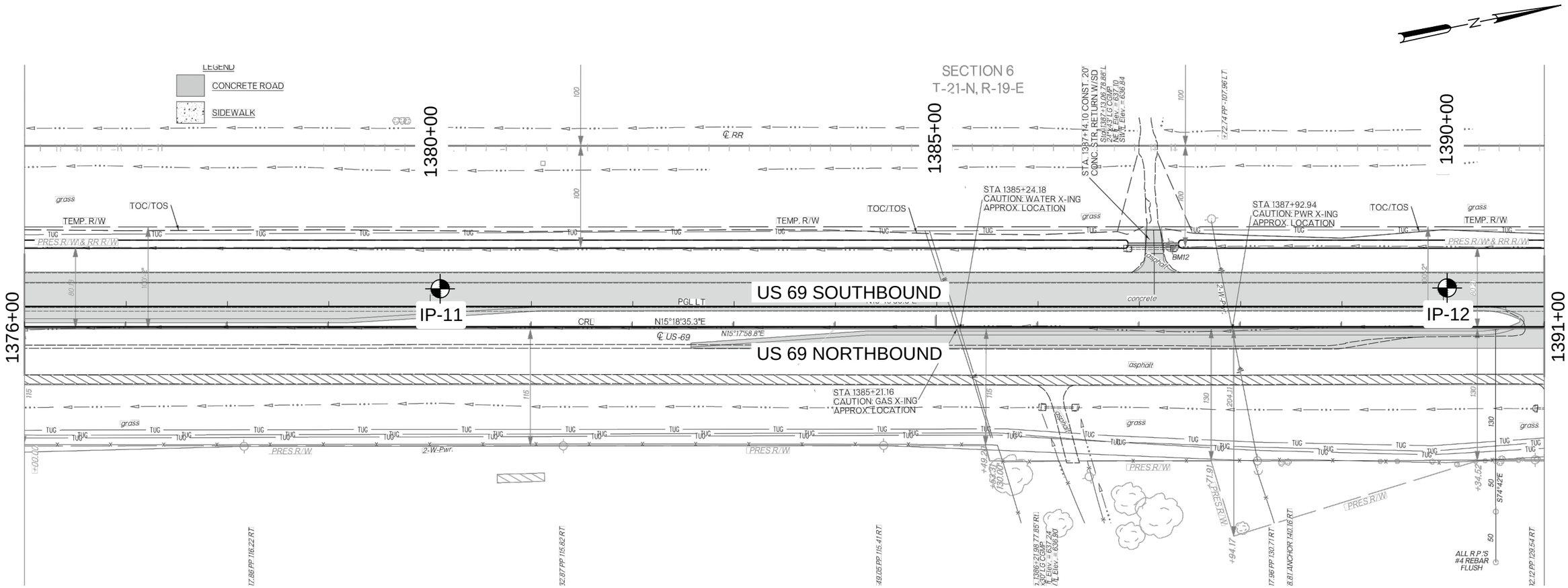
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	5/29



Boring	Station	US 69 CL Survey
IP-11	1380+11	40' left
IP-12	1390+06	40' left

Stations and offsets estimated from plans provided by SRB.

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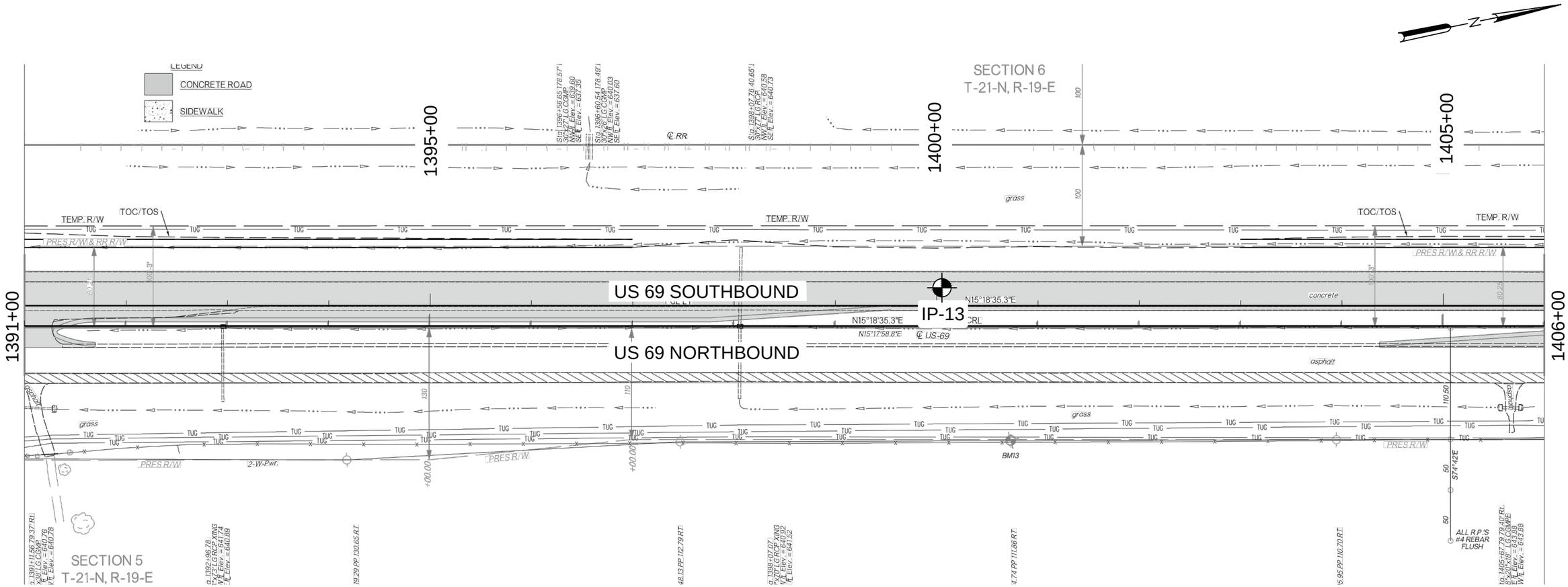
US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	6/29



Boring	Station	US 69 CL Survey
IP-13	1400+07	40' left

Stations and offsets estimated from plans provided by SRB.

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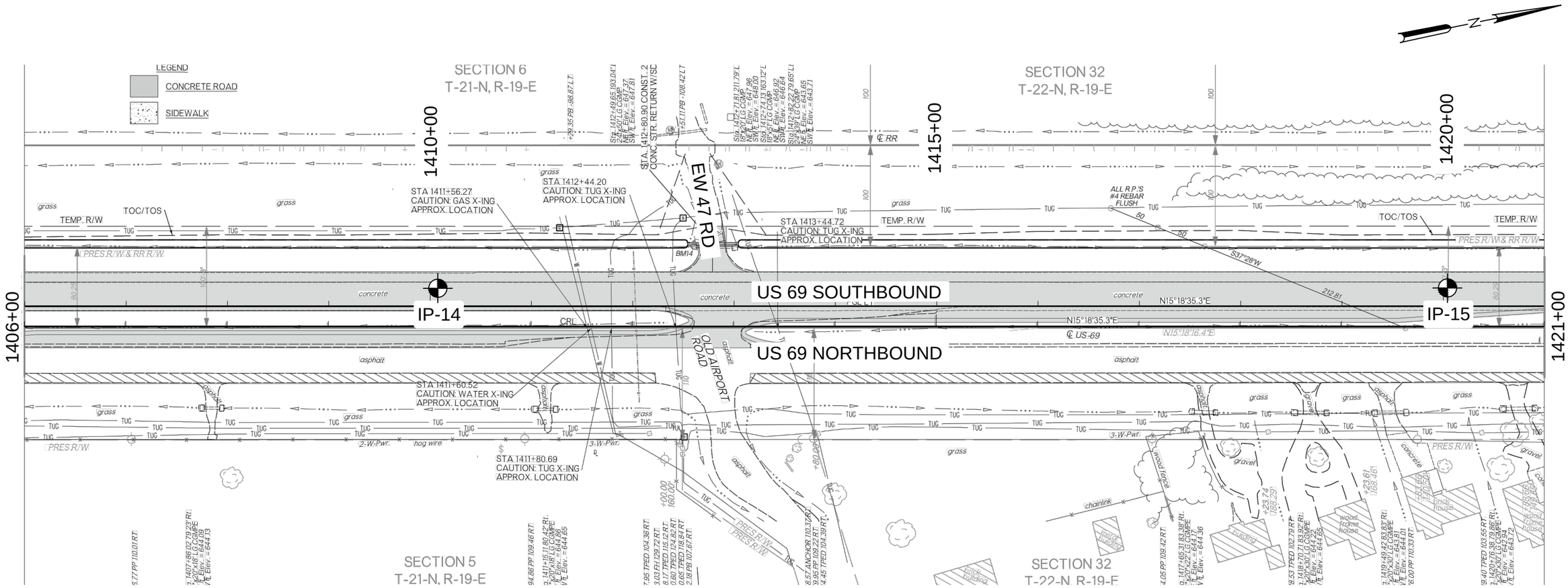
BORING LOCATION DIAGRAM
US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	7/29



Boring	Station	US 69 CL Survey
IP-14	1410+10	39' left
IP-15	1420+06	39' left

Stations and offsets estimated from plans provided by SRB.

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31963(04)

Project Mngr:	DLW	RRC Project No.	23035
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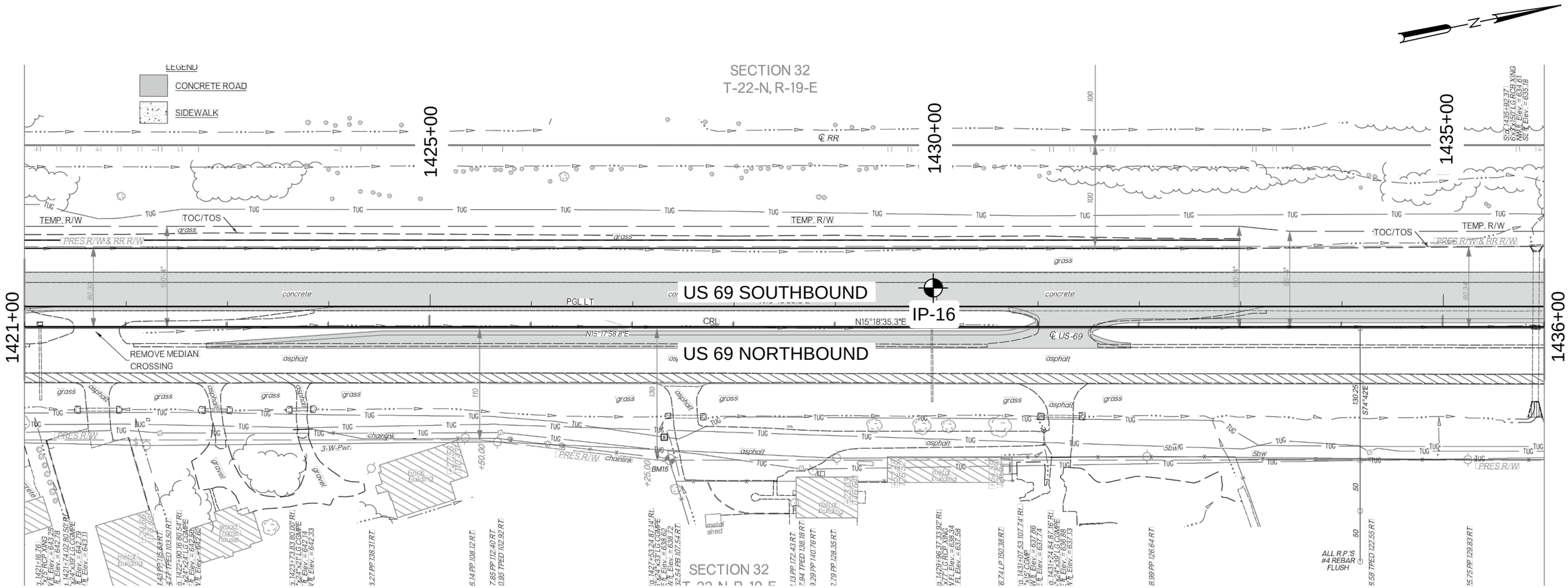
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	8/29



Boring	Station	US 69 CL Survey
IP-16	1429+98	40' left

Stations and offsets estimated from plans provided by SRB.

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Edmond, Oklahoma 73003
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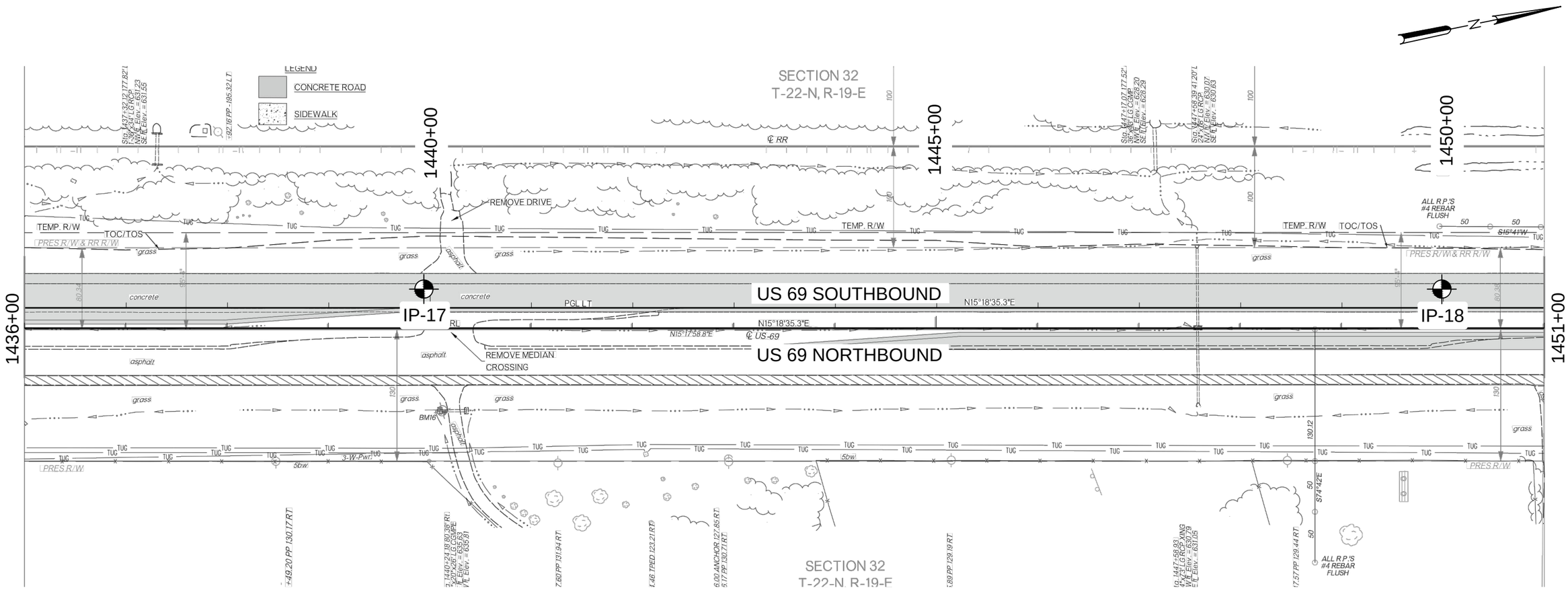
BORING LOCATION DIAGRAM
US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	9/29



Boring	Station	US 69 CL Survey
IP-17	1439+96	40' left
IP-18	1450+00	40' left

Stations and offsets estimated from plans provided by SRB.

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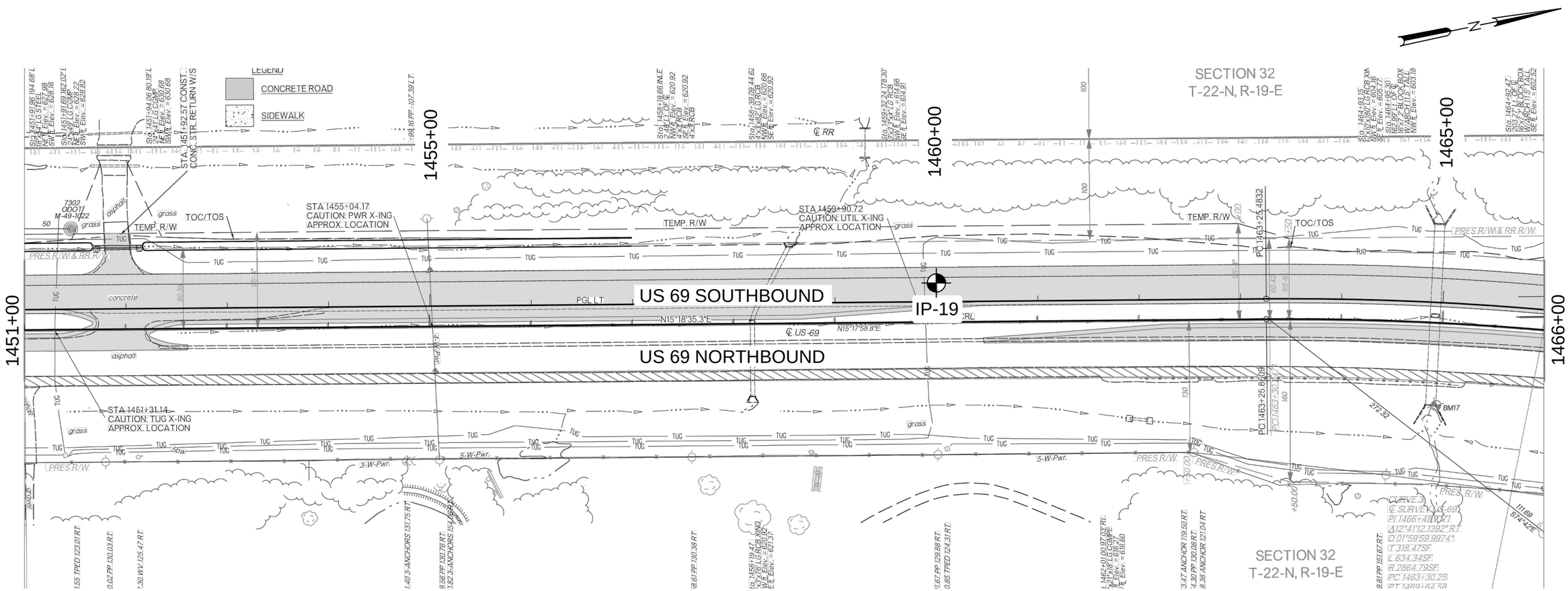
BORING LOCATION DIAGRAM
US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	10/29



Boring	Station	US 69 CL Survey
IP-19	1460+01	40' left

Stations and offsets estimated from plans provided by SRB.

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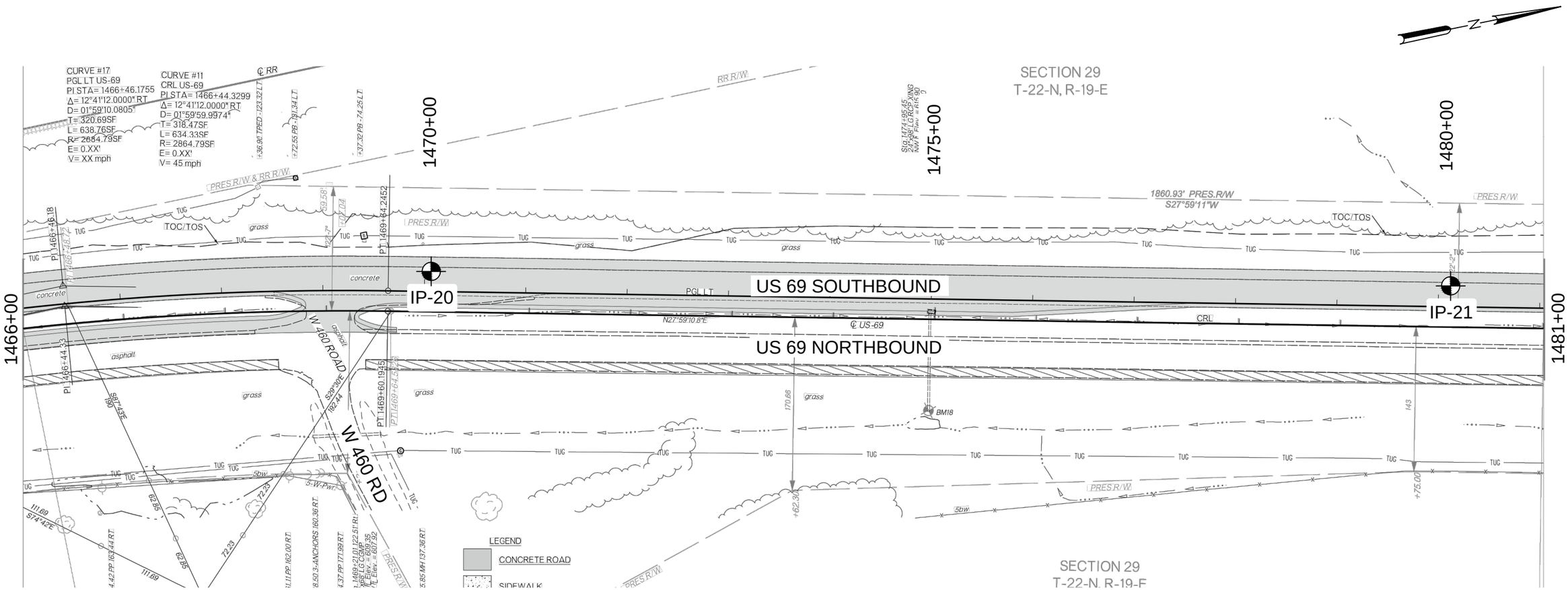
BORING LOCATION DIAGRAM
US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	11/29



Boring	Station	US 69 CL Survey
IP-20	1470+04	40' left
IP-21	1480+10	40' left

Stations and offsets estimated from plans provided by SRB.

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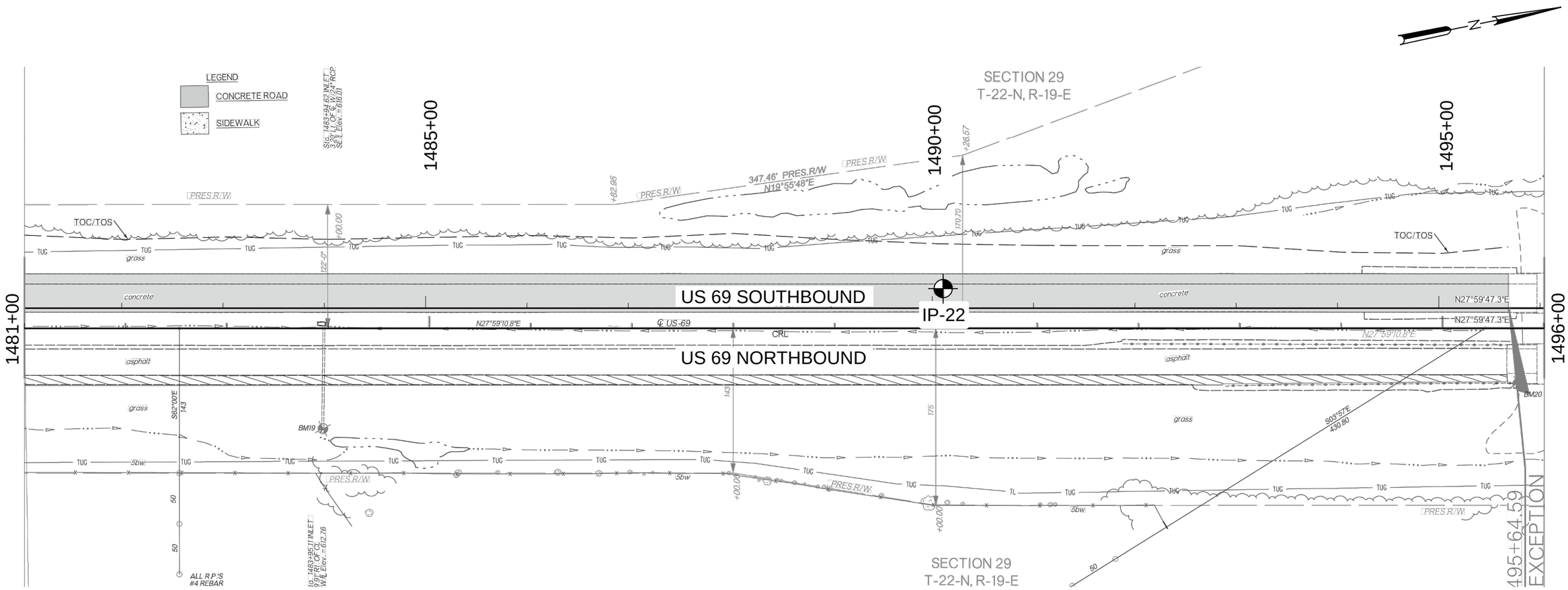
US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	12/29



Boring	Station	US 69 CL Survey
IP-22	1490+08	39' left

Stations and offsets estimated from plans provided by SRB.

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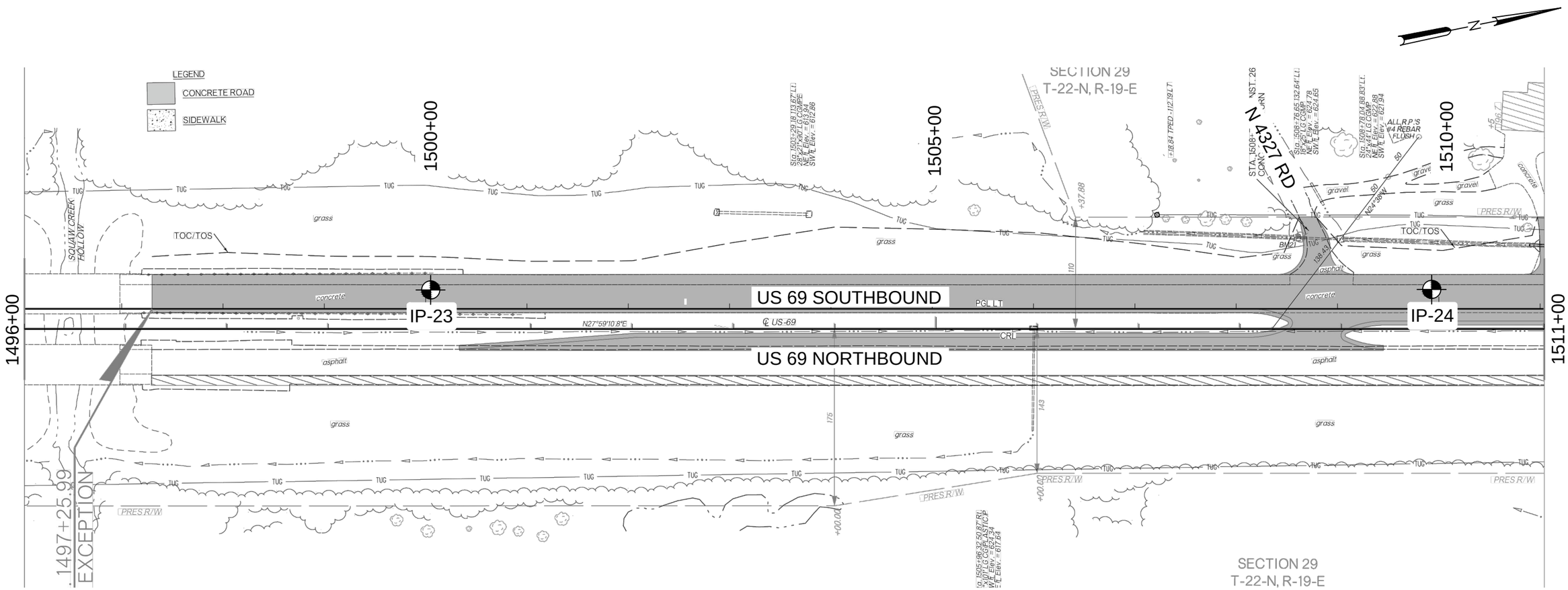
US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	13/29



Boring	Station	US 69 CL Survey
IP-23	1500+02	39' left
IP-24	1509+90	39' left

Stations and offsets estimated from plans provided by SRB.

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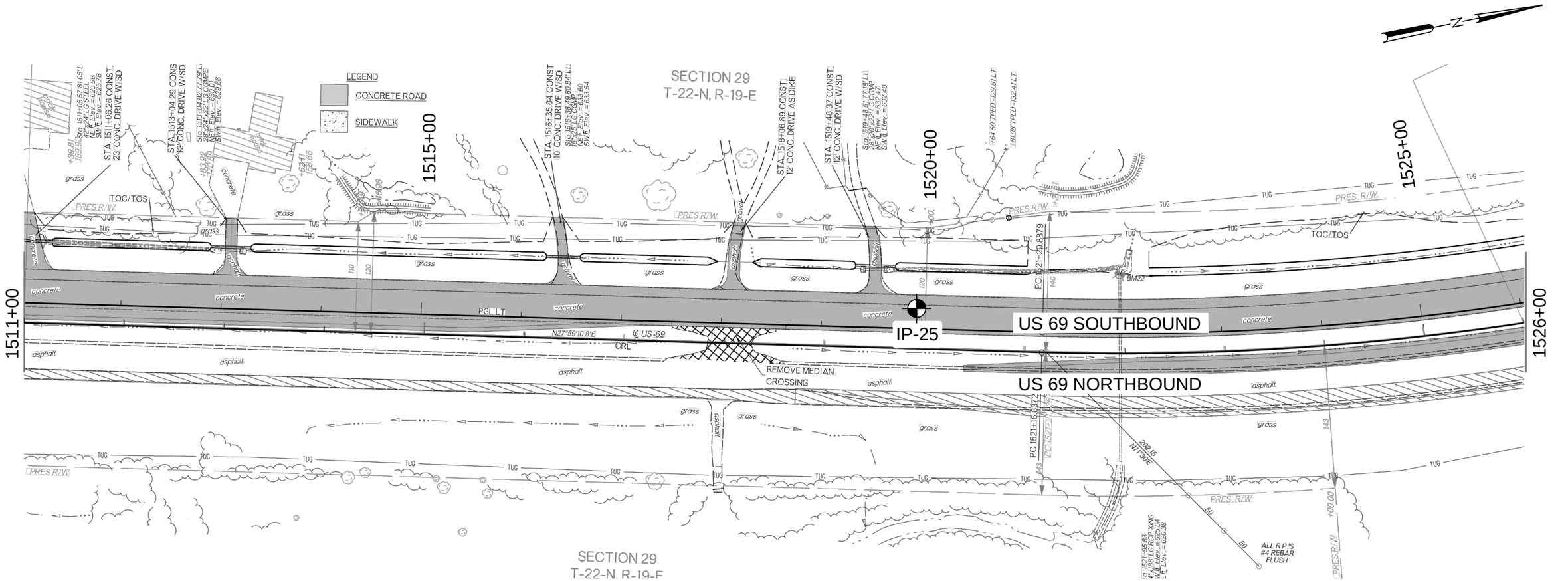
BORING LOCATION DIAGRAM
US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	14/29



Boring	Station	US 69 CL Survey
IP-25	1519+92	39' left

Stations and offsets estimated from plans provided by SRB.

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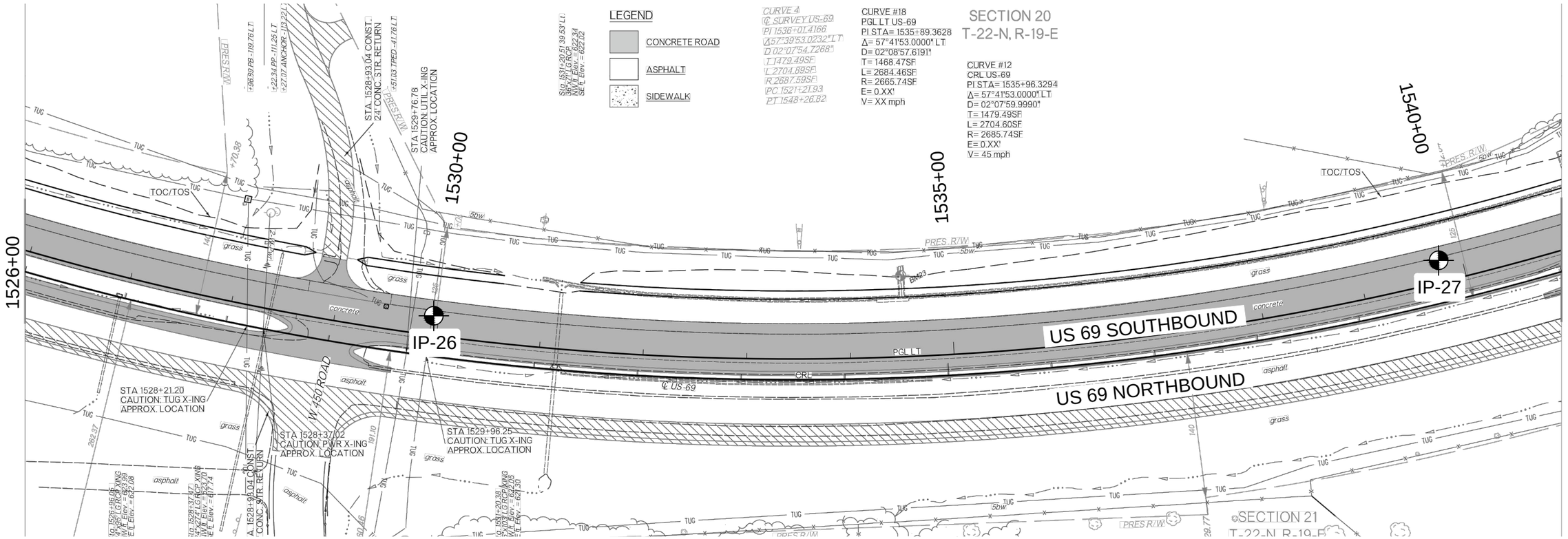
BORING LOCATION DIAGRAM
US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	15/29



Boring	Station	US 69 CL Survey
IP-26	1529+98	39' left
IP-27	1539+89	43' left

Stations and offsets estimated from plans provided by SRB.

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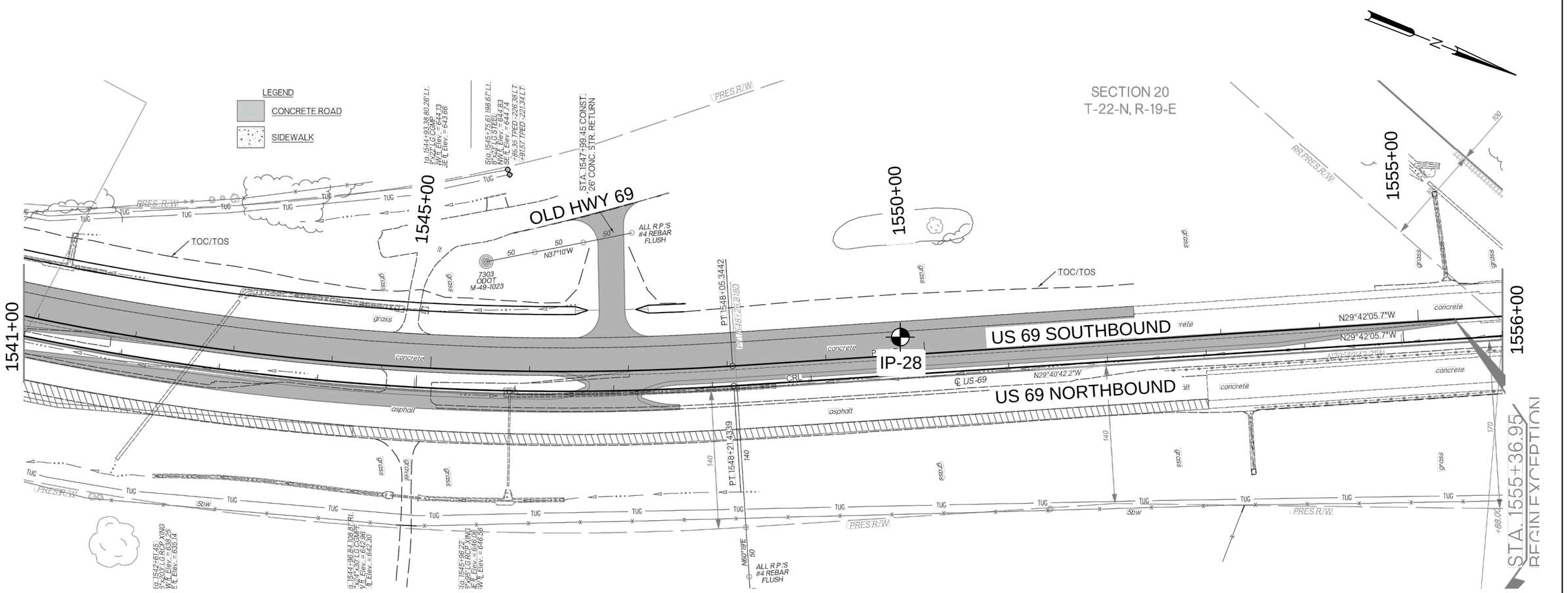
BORING LOCATION DIAGRAM
US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	16/29



Boring	Station	US 69 CL Survey
IP-28	1549+95	42' left

Stations and offsets estimated from plans provided by SRB.

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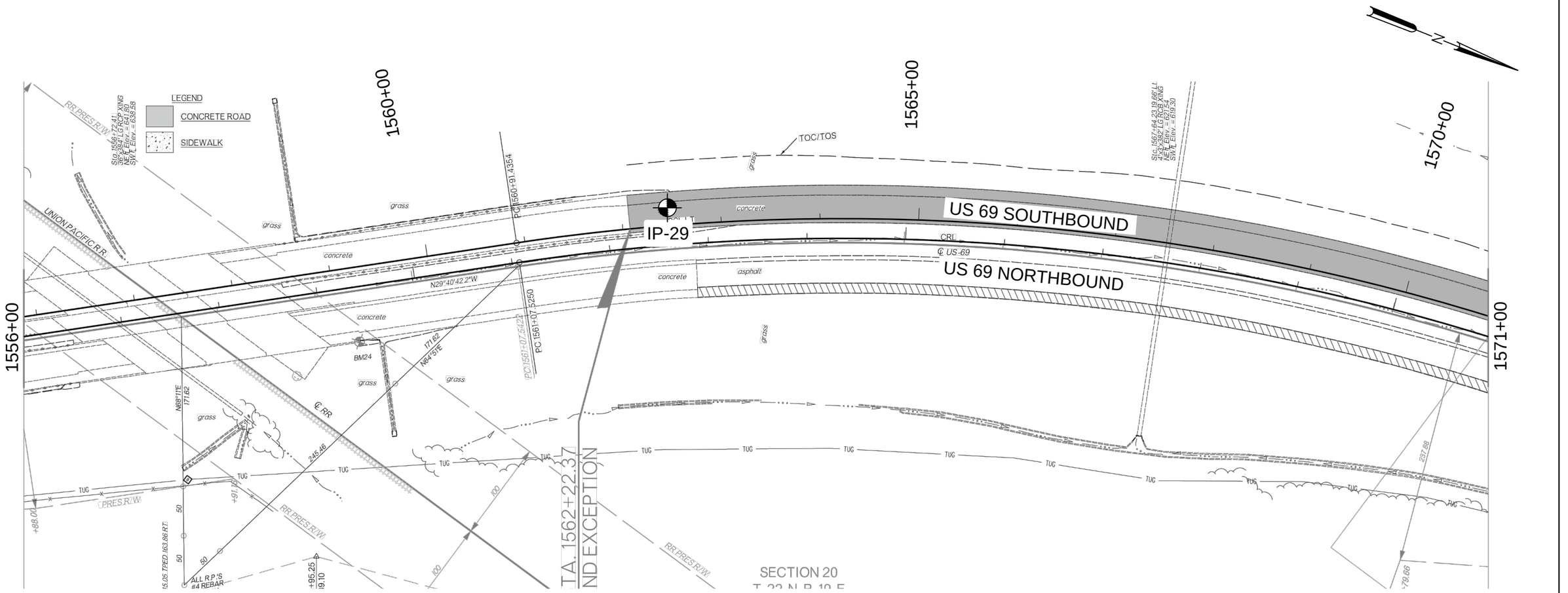
BORING LOCATION DIAGRAM
US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	17/29



Boring	Station	US 69 CL Survey
IP-29	1562+63	42' left

Stations and offsets estimated from plans provided by SRB.

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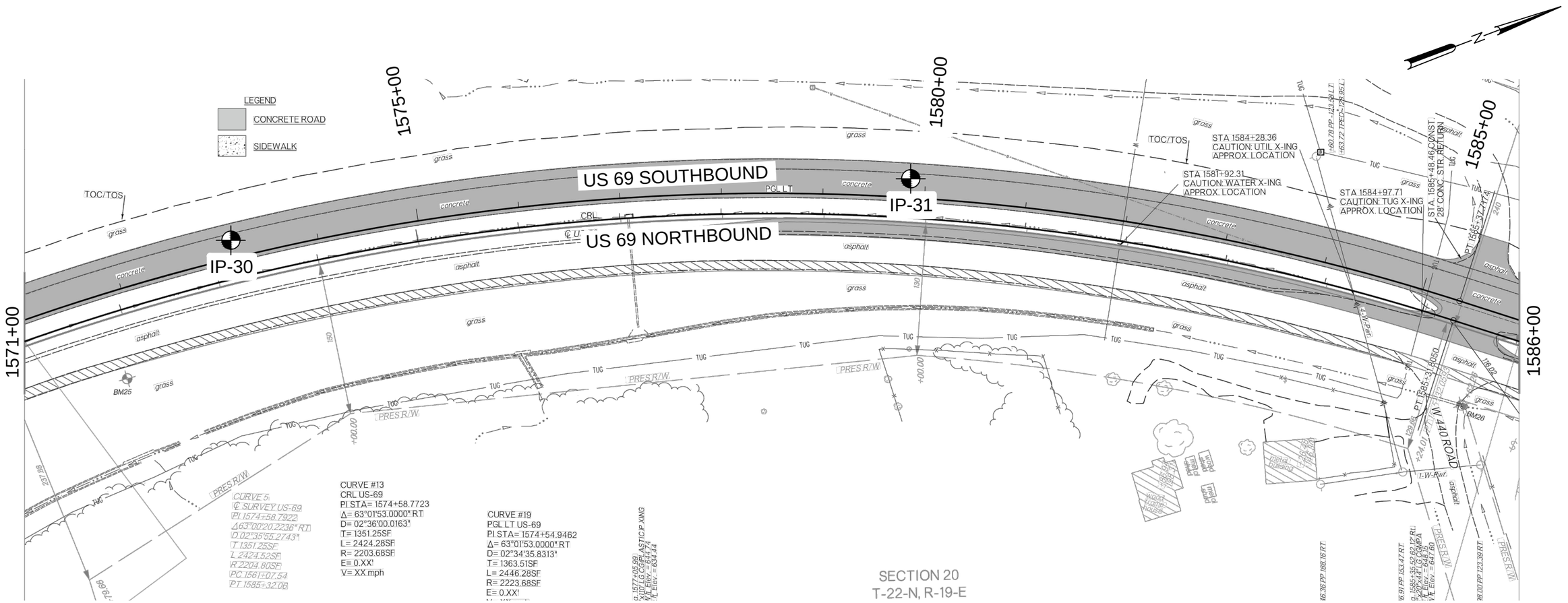
BORING LOCATION DIAGRAM
US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	18/29



Boring	Station	US 69 CL Survey
IP-30	1573+20	43' left
IP-31	1579+82	43' left

Stations and offsets estimated from plans provided by SRB.

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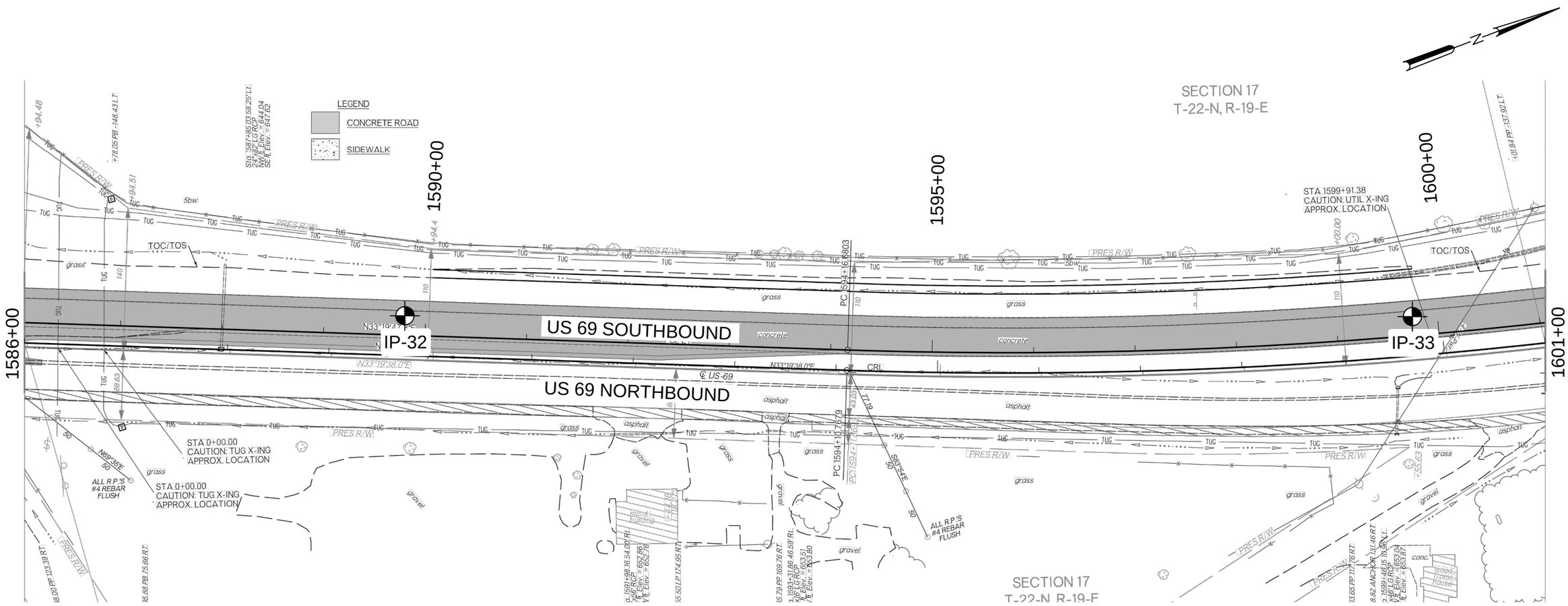
BORING LOCATION DIAGRAM
US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	19/29



Boring	Station	US 69 CL Survey
IP-32	1589+71	43' left
IP-33	1599+71	43' left

Stations and offsets estimated from plans provided by SRB.

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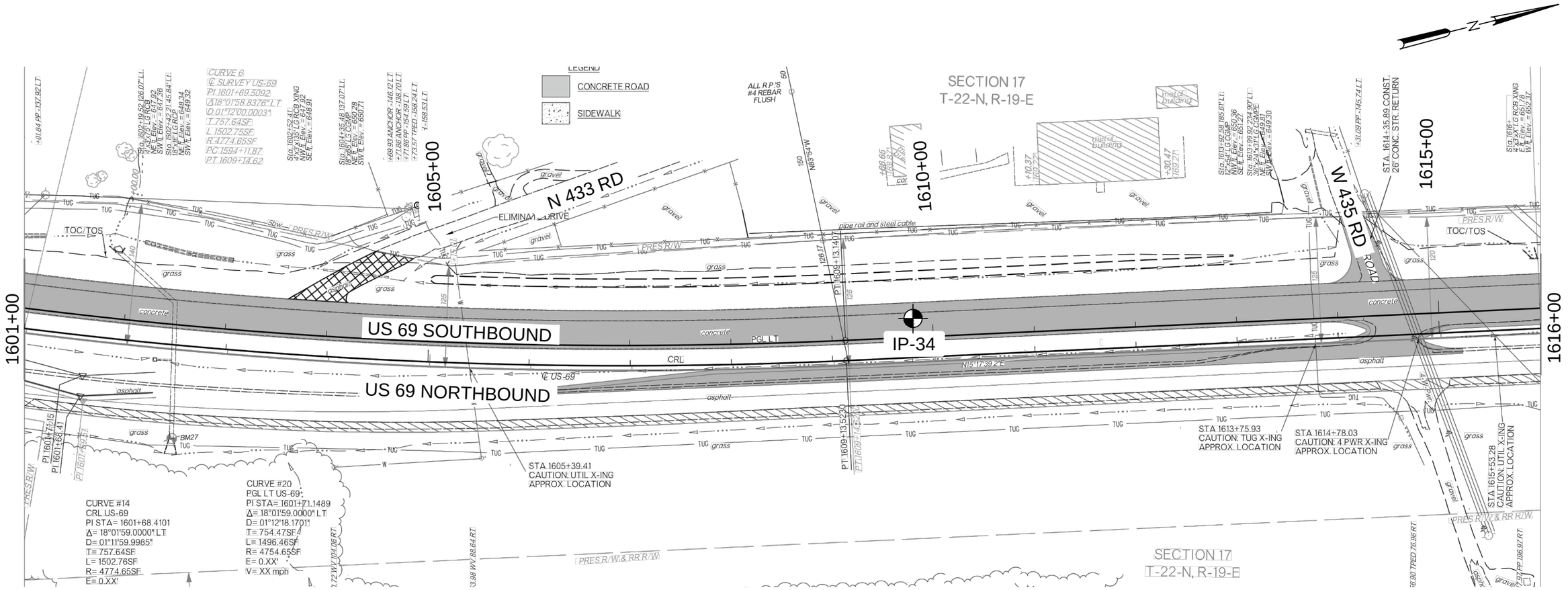
BORING LOCATION DIAGRAM
US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	20/29



Boring	Station	US 69 CL Survey
IP-34	1609+80	44' left

Stations and offsets estimated from plans provided by SRB.

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BORING LOCATION DIAGRAM
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MAYES COUNTY, OKLAHOMA
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Project Mngr:	DLW	RRC Project No.	23035
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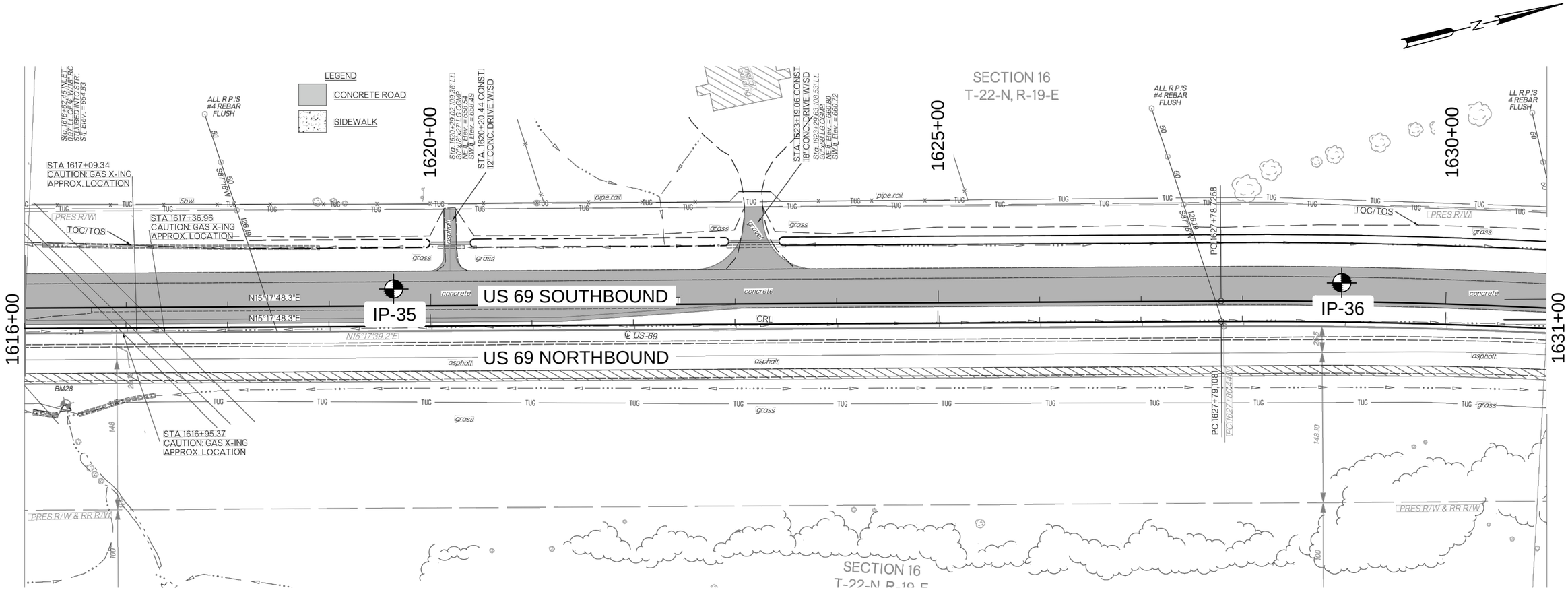
Approved By:	JWB	Page No:	21/29



Boring	Station	US 69 CL Survey
IP-35	1619+62	43' left
IP-36	1628+96	44' left

Stations and offsets estimated from plans provided by SRB.

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MAYES COUNTY, OKLAHOMA
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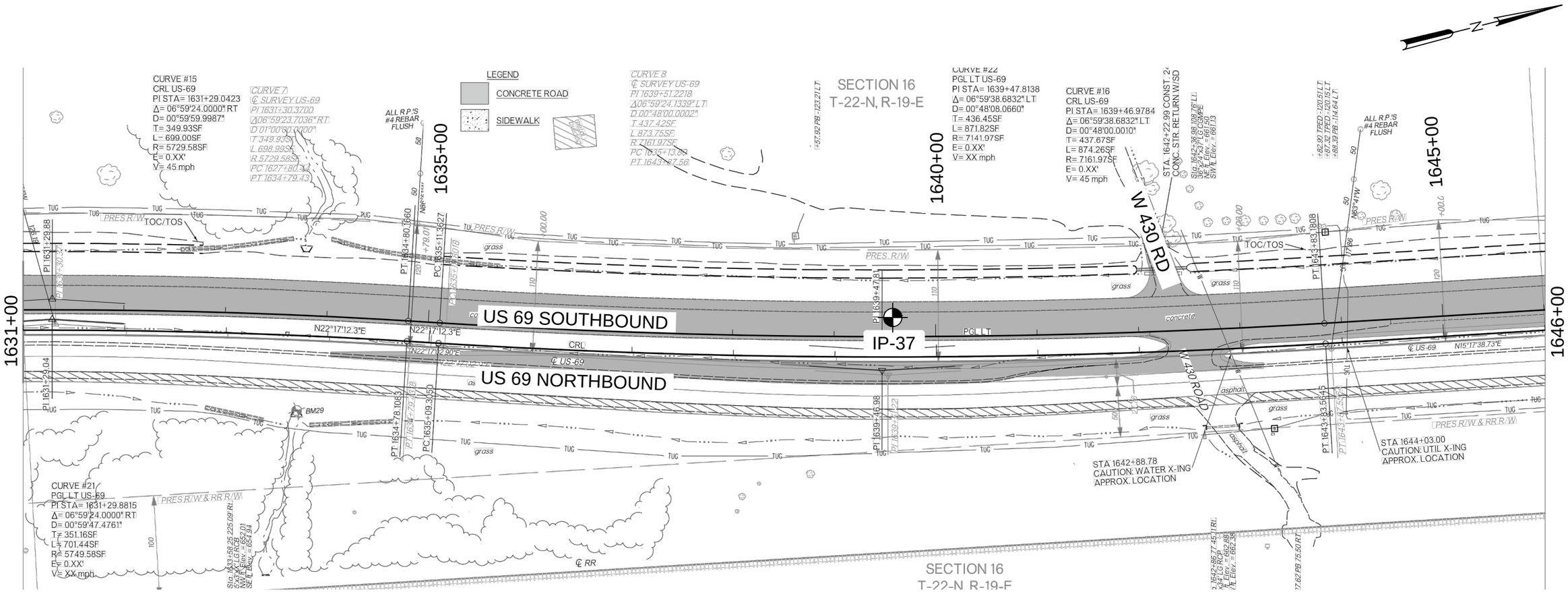
Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	22/29



Boring	Station	US 69 CL Survey
IP-37	1639+55	44' left

Stations and offsets estimated from plans provided by SRB.

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MAYES COUNTY, OKLAHOMA
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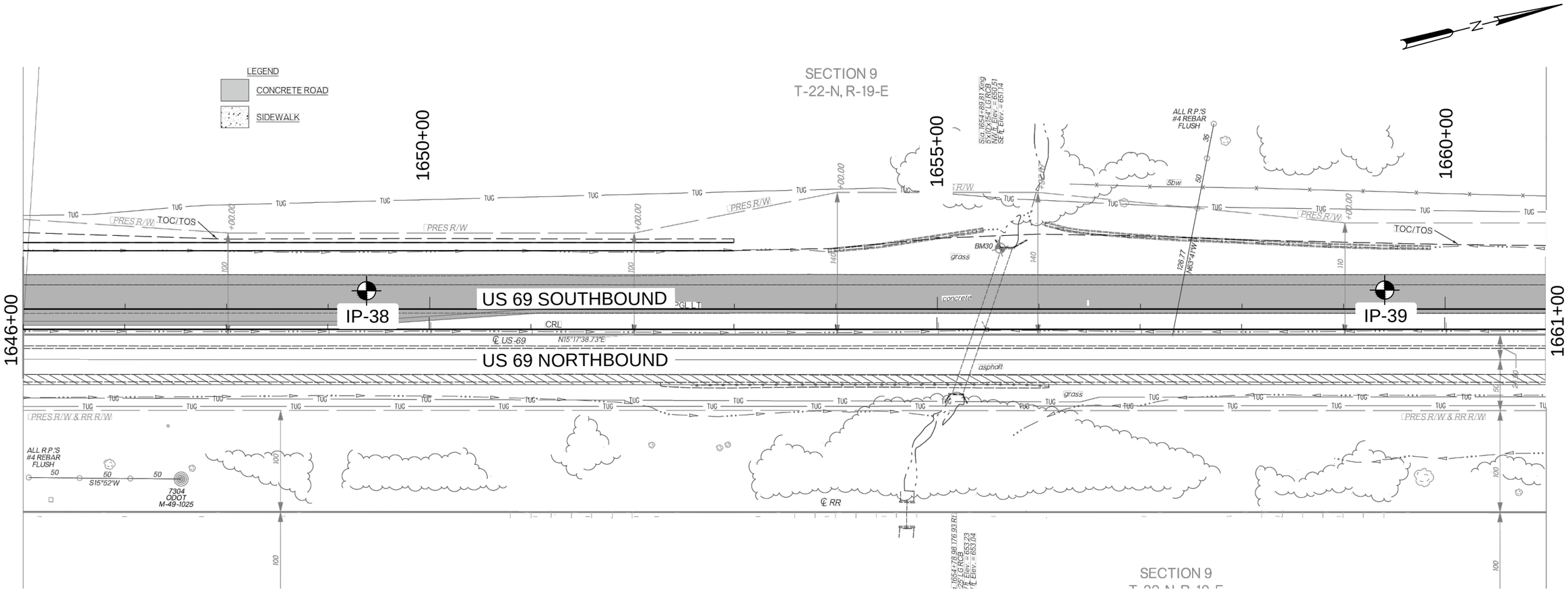
Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	23/29



Boring	Station	US 69 CL Survey
IP-38	1649+36	44' left
IP-39	1659+40	44' left

Stations and offsets estimated from plans provided by SRB.

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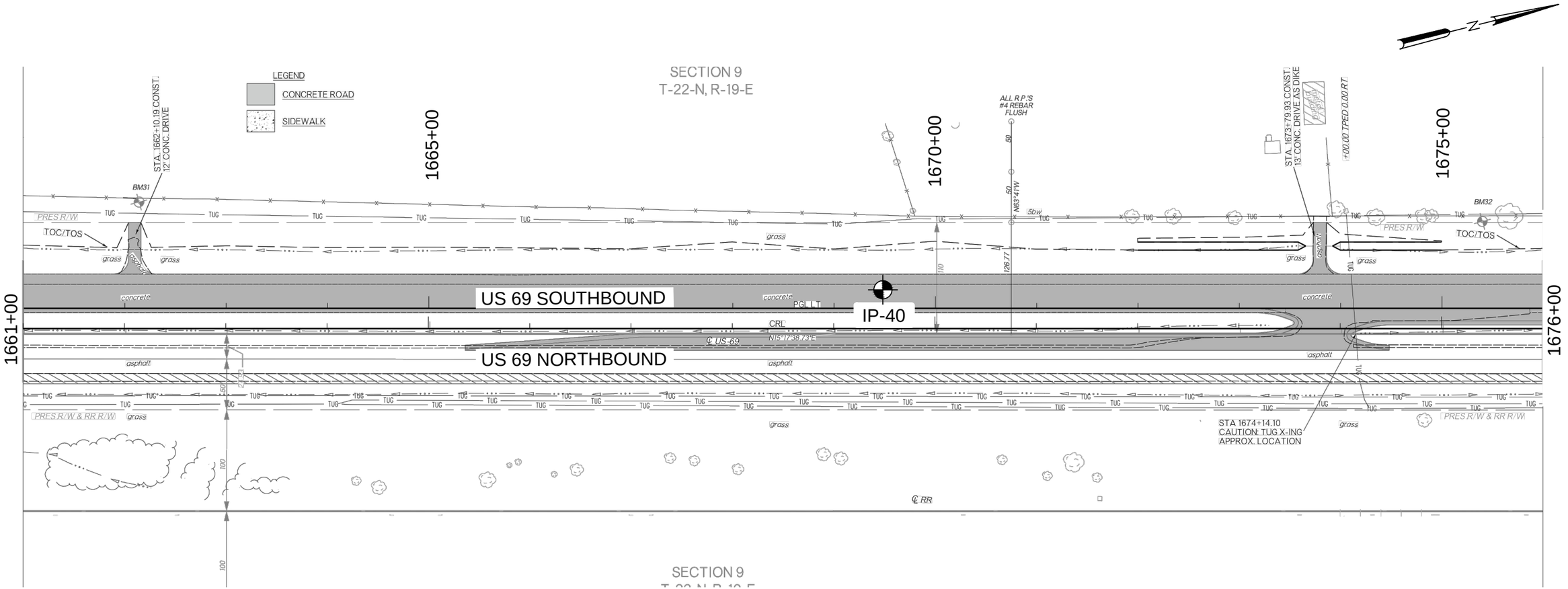
BORING LOCATION DIAGRAM
US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	24/29



Boring	Station	US 69 CL Survey
IP-40	1669+47	44' left

Stations and offsets estimated from plans provided by SRB.

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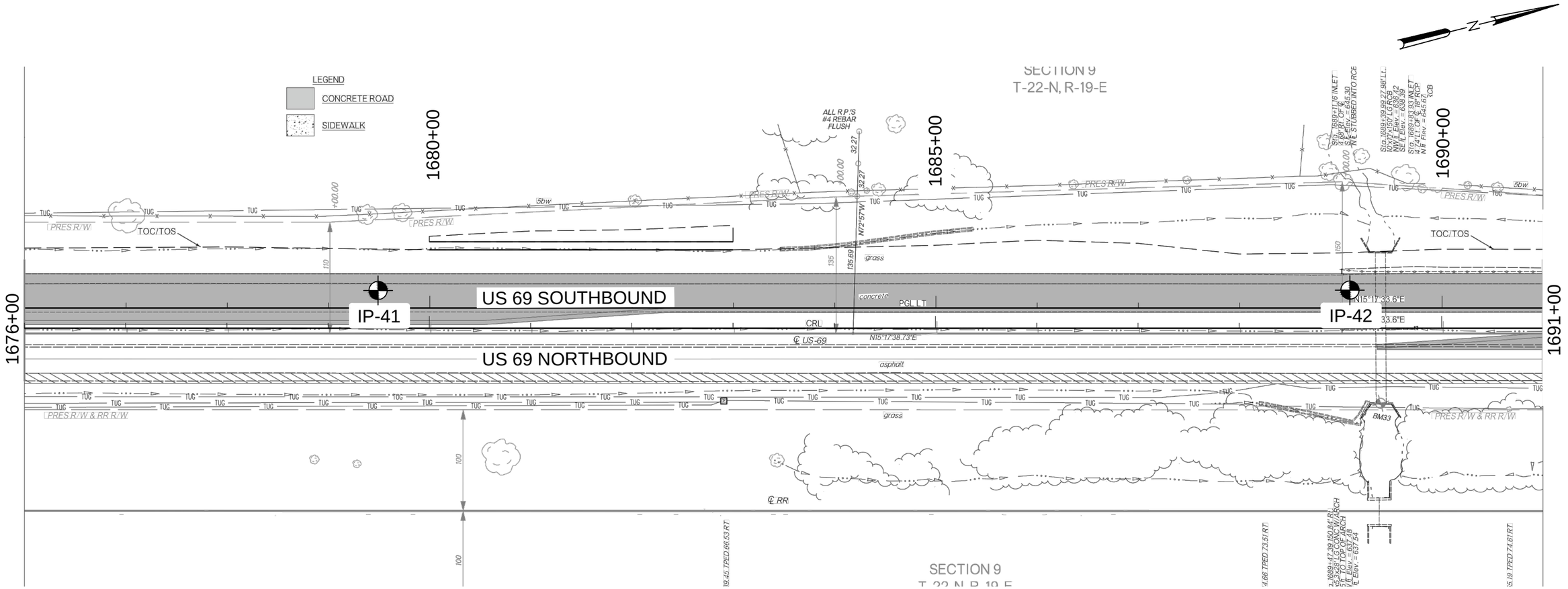
BORING LOCATION DIAGRAM
US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	25/29



Boring	Station	US 69 CL Survey
IP-41	1679+48	43' left
IP-42	1689+08	43' left

Stations and offsets estimated from plans provided by SRB.

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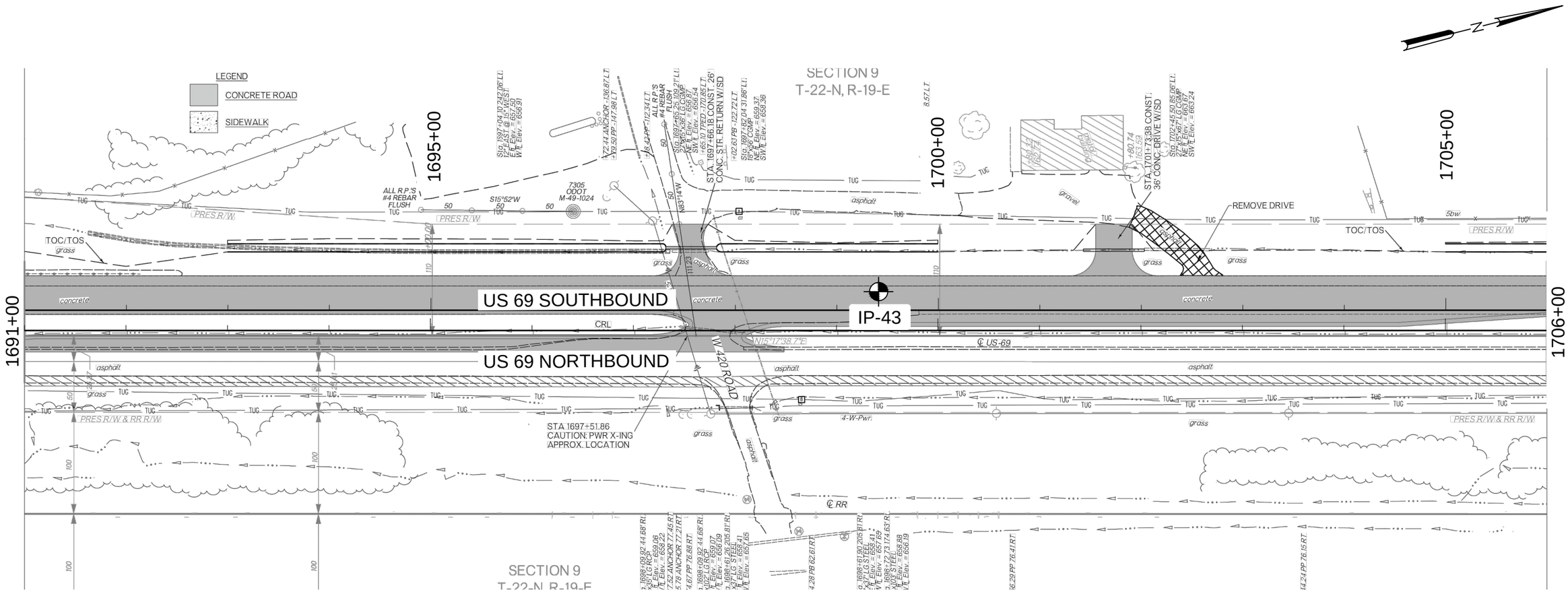
BORING LOCATION DIAGRAM
US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	26/29



Boring	Station	US 69 CL Survey
IP-43	1699+40	44' left

Stations and offsets estimated from plans provided by SRB.

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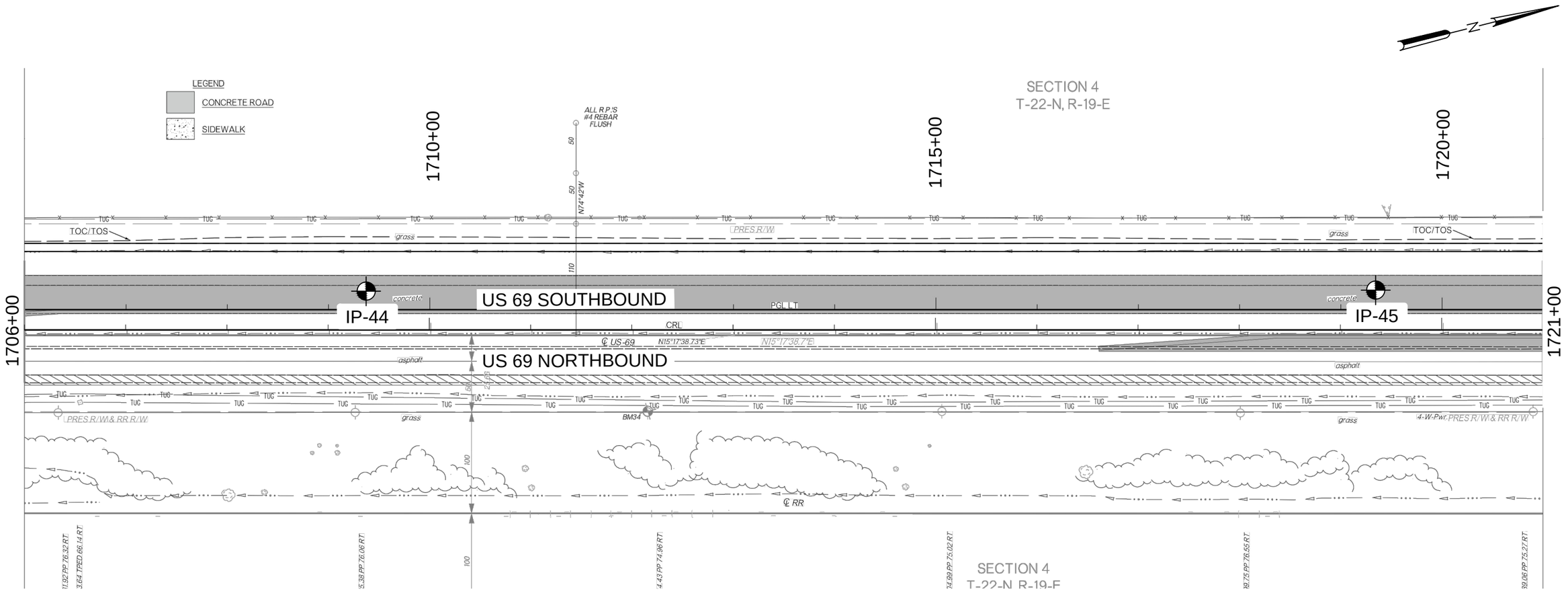
BORING LOCATION DIAGRAM
US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	27/29



Boring	Station	US 69 CL Survey
IP-44	1709+36	44' left
IP-45	1719+34	44' left

Stations and offsets estimated from plans provided by SRB.

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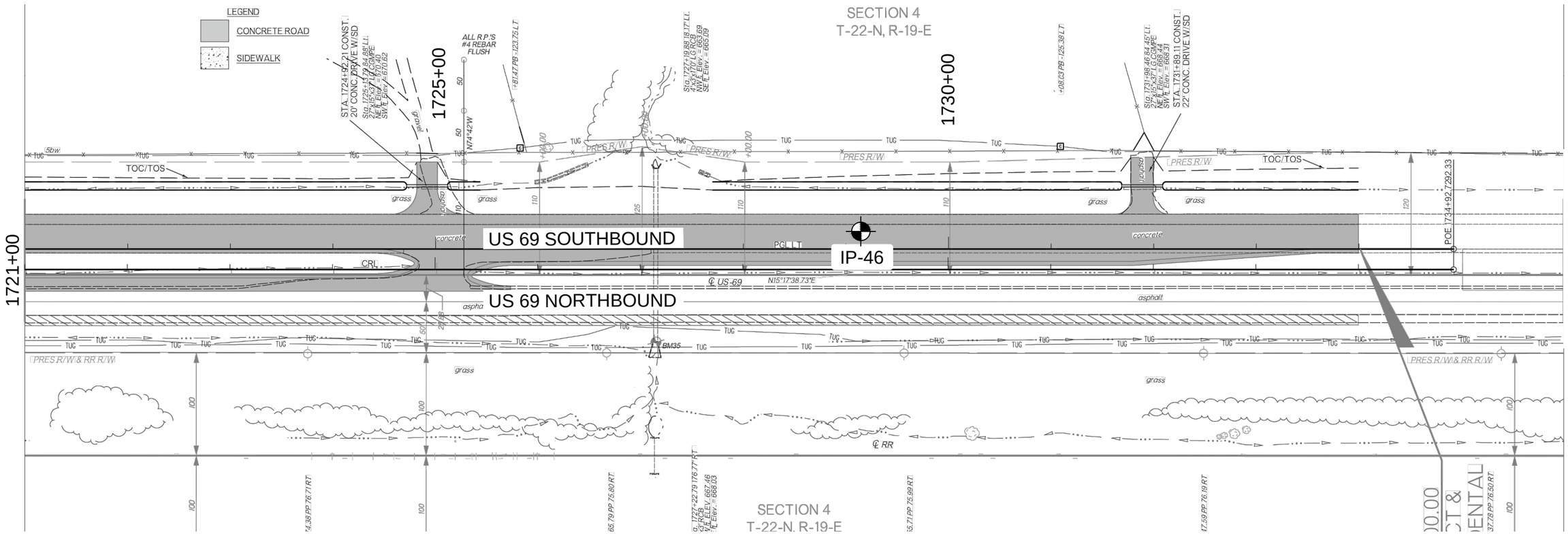
BORING LOCATION DIAGRAM
US 69 IN PLACE SURVEY
MAYES COUNTY, OKLAHOMA
31963(04)

Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	28/29



Boring	Station	US 69 CL Survey
IP-46	1729+14	43' left

Stations and offsets estimated from plans provided by SRB.

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BORING LOCATION DIAGRAM
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31963(04)

Project Mngr:	DLW	RRC Project No.	23035
Designed By:	DLW	Scale:	NOT TO SCALE
Checked By:	JWB	Date:	11/14/2023
Approved By:	JWB	Page No:	29/29

APPENDIX B

Surveyed By: Dawson Wiseman
Date Surveyed: July 12 and 13, 2023

RED ROCK CONSULTING

RRC Project No: 23035
Location: Mayes County, Oklahoma

Pavement and In Place Soils Survey

Boring	Field No.	Soil Group	Station	Description	Depth (in)	LL	PI	Percent Passing						OSI	MC %
								3 in.	3/4 in	#4	#10	#40	#200		
IP-1			1310+95, 27' left	**2" ASPHALT CONCRETE**	0-2										
				8" PORTLAND CEMENT CONCRETE	2-10										
	1A	A-6(5)		**CLAYEY SAND (SC),** brown	10-34	30	17	100	100	95	90	83	49.5	9	18
	1B			**SIMILAR AS 1A,** dark gray	34-46										23
Bulk 2		A-6(3)		**CLAYEY SAND (SC),** brown	10-34	28	13	100	98	90	86	80	47.9	7	
IP-2			1315+42, 27' right	**2" ASPHALT CONCRETE**	0-2										
				8" PORTLAND CEMENT CONCRETE	2-10										
	2A	A-7-6(19)		**LEAN CLAY with SAND (CL),** dark gray	10-46	41	26	100	100	98	95	92	78.2	19	23
IP-3			1324+37, 27 right	**2" ASPHALT CONCRETE**	0-2										
				8" PORTLAND CEMENT CONCRETE	2-10										
	3A			**SIMILAR AS 2A,** brown	10-28										13
	3B	A-7-6(22)		**LEAN CLAY (CL),** grayish brown	28-46	41	24	100	100	100	97	94	91.3	18	21
IP-4			1328+75, 26' left	**2" ASPHALT CONCRETE**	0-2										
				10" PORTLAND CEMENT CONCRETE	2-12										
	4A	A-6(9)		**LEAN CLAY with SAND (CL),** grayish brown	12-48	31	16	100	100	98	95	92	70.3	12	19
IP-5			1333+24, 26' right	**2" ASPHALT CONCRETE**	0-2										
				8" PORTLAND CEMENT CONCRETE	2-10										
	5A	A-6(2)		**CLAYEY SAND with GRAVEL (SC),** brown	10-22	28	12	100	100	94	75	68	45.4	6	13
	5B			**SIMILAR AS 1A,** dark gray	22-46										24
IP-6			1337+66, 10' left	**2" ASPHALT CONCRETE**	0-2										
				10" PORTLAND CEMENT CONCRETE	2-12										
	6A			**SIMILAR AS 5A,** brown	12-24										14
	6B	A-6(23)		**LEAN CLAY (CL),** brown	24-48	40	28	100	100	100	100	99	86.7	19	25
IP-7			1342+16, 58' right	**2" ASPHALT CONCRETE**	0-2										
				8" PORTLAND CEMENT CONCRETE	2-10										
	7A	A-7-6(28)		**LEAN CLAY (CL),** brown to yellowish brown	10-46	45	29	100	100	100	9	95	87.5	21	26
IP-8			1348+70, 39' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	8A			**SIMILAR AS 10B,** yellow brown	10-28										10
	8B	A-6(9)		**LEAN CLAY with SAND (CL),** drak gray to black	28-46	31	15	100	100	97	94	91	71.6	12	15
IP-9			1360+18, 40' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	9A	A-4(0)		**SILTY, CLAYEY SAND (SC-SM),** yellowish brown to gray	10-16	23	5	100	100	87	78	71	36.1	1	11
	9B			**SIMILAR AS 8B,** dark gray	16-46										17

Surveyed By: Dawson Wiseman
Date Surveyed: July 12 and 13, 2023

RED ROCK CONSULTING

RRC Project No: 23035
Location: Mayes County, Oklahoma

Pavement and In Place Soils Survey

Boring	Field No.	Soil Group	Station	Description	Depth (in)	LL	PI	Percent Passing						OSI	MC %
								3 in.	3/4 in	#4	#10	#40	#200		
IP-10			1370+16, 40' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	10A			**SIMILAR AS 10B,** yellowish brown	10-40										14
	10B	A-4(0)		**SANDY SILT (ML),** dark gray	40-46	19	3	100	100	98	98	97	61.9	4	14
IP-11			1380+11, 40' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	11A	A-2-4		**SILTY SAND (SM),** yellowish brown	10-40	NV	NP	100	100	92	90	86	23.2	0	12
	11B			**SIMILAR AS 6B,** olive gray	40-46										22
IP-12			1390+06, 40' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	12A			**SIMILAR AS 11A,** yellowish brown	10-40										11
	12B	A-7-6(23)		**LEAN CLAY with SAND (CL),** dark brown to gray	40-46	48	32	100	100	98	96	94	74.9	22	22
IP-13			1400+07, 40' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	13A	A-2-4		**SILTY SAND (SM),** yellowish brown	10-28	NV	NP	100	100	90	89	86	24.0	0	13
	13B			**SIMILAR AS 12B,** dark gray	28-46										16
IP-14			1410+10, 39' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	14A			**SIMILAR AS 13A,** yellowish brown	10-34										13
	14B	A-7-6(29)		**LEAN CLAY with SAND (CL),** dark brown to gray	34-46	49	35	100	100	100	100	99	84.1	24	23
IP-15			1420+06, 39' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	15A	A-2-4		**SILTY SAND (SM),** yellowish brown	10-34	NV	NP	100	100	98	97	92	25.7	0	14
	15B			**SIMILAR AS 14B,** dark gray	34-46										18
IP-16			1429+98, 40' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	16A			**SIMILAR AS 15A,** yellowish brown	10-40										14
	16B	A-6(17)		**LEAN CLAY with SAND (CL),** dark gray	40-46	36	24	100	100	100	99	97	79.4	17	20
IP-17			1439+96, 40' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	17A			**SIMILAR AS 16A,** yellowish brown	10-34										11
	17B	A-7-6(24)		**LEAN CLAY (CL),** dark gray	34-46	42	28	100	100	100	99	97	86.3	20	32
IP-18			1450+00, 40' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	18A	A-2-4		**SILTY SAND (SM),** yellowish brown	10-36	NV	NP	100	100	94	92	89	26.7	0	13
	18B			**SIMILAR AS 17B,** dark gray	36-46										27
Bulk 1		A-2-4		**SILTY SAND (SM),** yellowish brown	10-36	NV	NP	100	100	90	85	80	27.9	0	

Surveyed By: Dawson Wiseman
Date Surveyed: July 12 and 13, 2023

RED ROCK CONSULTING

RRC Project No: 23035
Location: Mayes County, Oklahoma

Pavement and In Place Soils Survey

Boring	Field No.	Soil Group	Station	Description	Depth (in)	LL	PI	Percent Passing						OSI	MC %
								3 in.	3/4 in	#4	#10	#40	#200		
IP-19			1460+01, 40' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	19A			**SIMILAR AS 18A,** yellowish brown	10-34										12
	19B	A-7-6(16)		**SANDY LEAN CLAY (CL),** yellowish brown	34-46	43	26	100	100	93	88	84	68.4	19	20
IP-20			1470+04, 40' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	20A			**SIMILAR AS 20B,** yellowish brown	10-40										12
	20B	A-4(0)		**SILTY SAND (SM),** yellowish brown with gray	40-46	NV	NP	100	100	91	89	87	39.6	0	16
IP-21			1480+10, 40' left	**8" PORTLAND CEMENT CONCRETE**	0-8										
	21A	A-4(0)		**SILTY, CLAYEY SAND (SC-SM),** yellowish brown	8-20	22	4	100	100	96	92	86	42.5	2	22
	21B			**SIMILAR AS 23B,** dark brown	20-44										19
				***Water at 8 inches**											
IP-22			1490+08, 39' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	22A			**SIMILAR AS 22B,** yellowish brown	10-30										9
	22B	A-4(0)		**SILTY SAND (SM),** olive green	30-46	NV	NP	100	100	95	92	89	35.8	0	11
IP-23			1500+02, 39' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	23A			**SIMILAR AS 26A,** yellowish brown	10-40										11
	23B	A-6(11)		**SANDY LEAN CLAY (CL),** yellowish brown to gray	40-46	38	23	100	100	98	89	82	61.3	14	17
Bulk 3		A-6(10)		**SANDY LEAN CLAY (CL),** yellowish brown to gray	40-46	34	21	100	99	94	91	88	62.1	13	
IP-24			1509+90, 39' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	24A			**SIMILAR AS 22B,** yellowish brown	10-28										11
	24B	A-6(6)		**SANDY LEAN CLAY (CL),** yellowish brown	28-40	30	16	100	100	93	88	85	58.5	10	16
	24C			**SIMILAR AS 17B,** dark gray	40-46										18
IP-25			1519+92, 39' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	25A			**SIMILAR AS 26A,** yellowish brown	10-30										12
	25B	A-6(15)		**LEAN CLAY with SAND (CL),** yellowish brown	30-46	36	20	100	100	97	96	94	82.7	15	21
IP-26			1529+98, 39' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	26A	A-2-4		**SILTY SAND with GRAVEL (SM),** yellowish brown	10-46	NV	NP	100	100	85	76	70	23.1	0	11
IP-27			1539+89, 43' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	27A			**SIMILAR AS 29A,** yellowish brown	10-34										13
	27B	A-6(10)		**LEAN CLAY with SAND (CL),** yellowish brown	34-46	33	16	100	100	98	95	91	75.4	13	23

Surveyed By: Dawson Wiseman
Date Surveyed: July 12 and 13, 2023

RED ROCK CONSULTING

RRC Project No: 23035
Location: Mayes County, Oklahoma

Pavement and In Place Soils Survey

Boring	Field No.	Soil Group	Station	Description	Depth (in)	LL	PI	Percent Passing						OSI	MC %
								3 in.	3/4 in	#4	#10	#40	#200		
IP-28			1549+95, 42' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	28A			**SIMILAR AS 29A,** yellowish brown	10-22										15
	28B	A-6(6)		**SANDY LEAN CLAY (CL),** dark gray	22-46	31	16	100	100	92	85	79	56.8	10	23
IP-29			1562+63, 42' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	29A	A-2-4		**SILTY SAND (SM),** yellowish brown	10-34	NV	NP	100	100	94	89	83	34.5	0	16
	29B			**SIMILAR AS 27B,** yellowish brown to brown	34-46										16
IP-30			1573+20, 43' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	30A			**SIMILAR AS 29A,** yellowish brown	10-34										13
	30B	A-6(4)		**SANDY LEAN CLAY (CL),** yellowish brown to dark gray	34-46	26	12	100	100	96	90	86	56.0	8	20
IP-31			1579+82, 43' left	**12" PORTLAND CEMENT CONCRETE**	0-12										
	31A	A-2-4		**SILTY SAND (SM),** yellowish brown	12-30	NV	NP	100	100	93	86	79	32.8	0	11
	31B			**SIMILAR AS 17B,** yellowish brown to dark gray	30-48										27
IP-32			1589+71, 43' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	32A			**SIMILAR AS 31A,** yellowish brown	10-40										13
	32B	A-6(3)		**SANDY LEAN CLAY (CL),** brown to black	40-46	26	11	100	100	98	91	86	55.8	7	14
IP-33			1599+71, 43' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	33A	A-4(0)		**SILTY SAND (SM),** light brown	10-40	NV	NP	100	100	99	97	95	40.5	0	11
	33B			**SIMILAR AS 32B,** brown to black	40-46										17
IP-34			1609+80, 44' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	34A	A-4(0)		**SILTY, CLAYEY SAND (SC-SM),** yellowish brown	10-46	22	6	100	100	97	95	92	41.5	2	14
IP-35			1619+62, 43' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	35A	A-4(0)		**SILTY SAND (SM),** yellowish brown	10-46	NV	NP	100	100	97	91	88	35.4	0	10
IP-36			1628+96, 44' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	36A			**SIMILAR AS 37A,** yellowish brown	10-40										11
	36B	A-6(14)		**LEAN CLAY with SAND (CL),** dark brown to gray	40-46	33	20	100	100	99	98	97	78.7	15	21
IP-37			1639+55, 44' left	**9" PORTLAND CEMENT CONCRETE**	0-9										
	37A	A-4(0)		**SILTY SAND (SM),** yellowish brown	9-41	NV	NP	100	100	94	91	88	37.0	0	12
	37B			**SIMILAR AS 36B,** dark brown to brown	41-45										18

Surveyed By: Dawson Wiseman
Date Surveyed: July 12 and 13, 2023

RED ROCK CONSULTING

RRC Project No: 23035
Location: Mayes County, Oklahoma

Pavement and In Place Soils Survey

Boring	Field No.	Soil Group	Station	Description	Depth (in)	LL	PI	Percent Passing						OSI	MC %
								3 in.	3/4 in	#4	#10	#40	#200		
IP-38			1649+36, 44' left	**9" PORTLAND CEMENT CONCRETE**	0-9										
	38A			**SIMILAR AS 37A,** yellowish brown	9-39										12
	38B	A-7-6(20)		**LEAN CLAY with SAND (CL),** dark brown	39-45	44	26	100	100	99	98	97	79.9	19	26
IP-39			1659+40, 44' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	39A	A-2-4		**SILTY SAND (SM),** yellowish brown	10-46	NV	NP	100	100	97	95	92	34.6	0	11
IP-40			1669+47, 44' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	40A			**SIMILAR AS 39A,** yellowish brown to light brown	10-34										11
	40B	A-7-6(31)		**FAT CLAY (CH),** dark brown	34-46	53	34	100	100	100	99	99	87.5	24	27
IP-41			1679+48, 43' left	**9" PORTLAND CEMENT CONCRETE**	0-9										
	41A			**SIMILAR AS 42A,** yellowish brown	9-39										11
	41B	A-6(16)		**LEAN CLAY with SAND (CL),** brown with pale red	39-45	38	22	100	100	99	98	97	78.8	16	26
IP-42			1689+08, 43' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	42A	A-4(0)		**SILTY SAND (SM),** yellowish brown	10-46	NV	NP	100	100	97	93	91	36.1	0	27
IP-43			1699+40, 44' left	**9" PORTLAND CEMENT CONCRETE**	0-9										
	43A			**SIMILAR AS 45B,** yellowish brown	9-39										16
	43B	A-6(12)		**SANDY LEAN CLAY (CL),** yellowish brown to brown	39-45	38	24	100	100	94	91	90	62.0	15	28
IP-44			1709+36, 44' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	44A	A-4(0)		**SILTY SAND (SM),** yellowish brown	10-46	NV	NP	100	100	96	93	91	35.2	0	13
IP-45			1719+34, 44' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	45A			**SIMILAR AS 45B,** yellowish brown to brown	10-28										13
	45B	A-4(0)		**SILTY SAND (SM),** yellowish brown	28-46	NV	NP	100	100	95	91	89	49.8	0	23
IP-46			1729+14, 43' left	**10" PORTLAND CEMENT CONCRETE**	0-10										
	46A	A-2-4		**SILTY SAND (SM),** yellowish brown	10-46	NV	NP	100	100	88	76	64	25.3	0	9

APPENDIX C

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

SUMMARY OF LABORATORY RESULTS

CLIENT SRB **PROJECT NAME** US 69 In Place Soils Survey

PROJECT NUMBER 23035 **PROJECT LOCATION** Mayes 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
Bulk 01	10-36		NV	NP	NP	100	100	100	90	85	80	27.9
Bulk 02	10-34		28	15	13	100	98	96	90	86	80	47.9
Bulk 03	40-46		34	13	21	100	99	98	94	91	88	62.1
IP-01	10-34	18.3	30	13	17	100	100	100	95	90	83	49.5
IP-01	34-46	23.4										
IP-02	10-46	22.8	41	15	26	100	100	100	98	95	92	78.2
IP-03	10-28	13.2										
IP-03	28-46	20.7	41	17	24	100	100	100	100	97	94	91.3
IP-04	12-48	18.7	31	15	16	100	100	100	98	95	92	70.3
IP-05	10-22	12.7	28	16	12	100	100	100	84	75	68	45.4
IP-05	22-46	24.2										
IP-06	12-24	13.7										
IP-06	24-48	25.0	40	12	28	100	100	100	100	100	99	86.7
IP-07	10-46	26.2	45	16	29	100	100	100	100	99	95	87.5
IP-08	10-28	10.1										
IP-08	28-46	14.8	31	16	15	100	100	100	97	94	91	71.6
IP-09	10-16	11.4	23	18	5	100	100	100	87	78	71	36.1
IP-09	16-46	16.6										
IP-10	10-40	13.7										
IP-10	40-46	14.4	19	16	3	100	100	100	98	98	97	61.9
IP-11	10-40	11.6	NV	NP	NP	100	100	100	92	90	86	23.2
IP-11	40-46	22.0										
IP-12	10-40	11.4										
IP-12	40-46	22.1	48	16	32	100	100	100	98	96	94	74.9
IP-13	10-28	12.8	NV	NP	NP	100	100	100	90	89	86	24.0
IP-13	28-46	16.4										
IP-14	10-34	12.7										
IP-14	34-46	23.1	49	14	35	100	100	100	100	100	99	84.1
IP-15	10-34	13.9	NV	NP	NP	100	100	100	98	97	92	25.7
IP-15	34-46	17.8										
IP-16	10-40	14.2										
IP-16	40-46	20.4	36	12	24	100	100	100	100	99	97	79.4
IP-17	10-34	11.1										
IP-17	34-46	31.8	42	14	28	100	100	100	100	99	97	86.3
IP-18	10-36	13.3	NV	NP	NP	100	100	100	94	92	89	26.7
IP-18	36-46	27.2										
IP-19	10-34	11.5										
IP-19	34-36	20.3	43	17	26	100	100	100	93	88	84	68.4
IP-20	10-40	12.1										
IP-20	40-46	16.1	NV	NP	NP	100	100	100	91	89	87	39.6
IP-21	8-20	22.4	22	18	4	100	100	100	96	92	86	42.5
IP-21	20-44	19.4										
IP-22	10-30	8.6										

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SUMMARY OF LABORATORY RESULTS

CLIENT SRB **PROJECT NAME** US 69 In Place Soils Survey

PROJECT NUMBER 23035 **PROJECT LOCATION** Mayes 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
IP-22	30-46	11.1	NV	NP	NP	100	100	100	95	92	89	35.8
IP-23	10-40	11.2										
IP-23	40-46	17.2	38	15	23	100	100	100	98	89	82	61.3
IP-24	10-28	11.3										
IP-24	28-40	15.6	30	14	16	100	100	100	93	88	85	58.5
IP-24	40-46	17.6										
IP-25	10-30	12.2										
IP-25	30-46	20.9	36	16	20	100	100	100	97	96	94	82.7
IP-26	10-46	11.4	NV	NP	NP	100	100	100	85	76	70	23.1
IP-27	10-34	12.5										
IP-27	34-46	23.4	33	17	16	100	100	100	98	95	91	75.4
IP-28	10-22	14.9										
IP-28	22-46	23.4	31	15	16	100	100	100	92	85	79	56.8
IP-29	10-34	15.5	NV	NP	NP	100	100	100	94	89	83	34.5
IP-29	34-36	16.4										
IP-30	10-34	12.6										
IP-30	34-36	19.8	26	14	12	100	100	100	96	90	86	56.0
IP-31	12-30	11.0	NV	NP	NP	100	100	100	93	86	79	32.8
IP-31	30-48	27.4										
IP-32	10-40	12.6				100	100	100	98	91	86	55.8
IP-32	40-46	14.4	26	15	11							
IP-33	10-40	11.3	NV	NP	NP	100	100	100	99	97	95	40.5
IP-33	40-46	16.9										
IP-34	10-46	13.9	22	16	6	100	100	100	97	95	92	41.5
IP-35	10-46	10.4	NV	NP	NP	100	100	100	97	91	88	35.4
IP-36	10-40	10.9										
IP-36	40-46	20.9	33	13	20	100	100	100	99	98	97	78.7
IP-37	9-41	11.7	NV	NP	NP	100	100	100	94	91	88	37.0
IP-37	41-45	17.5										
IP-38	9-39	12.4										
IP-38	39-45	25.9	44	18	26	100	100	100	99	98	97	79.9
IP-39	10-46	11.0	NV	NP	NP	100	100	100	97	95	92	34.6
IP-40	10-34	11.0										
IP-40	34-46	27.3	53	19	34	100	100	100	100	99	99	87.5
IP-41	9-39	10.6										
IP-41	39-45	26.1	38	16	22	100	100	100	99	98	97	78.8
IP-42	10-46	27.3	NV	NP	NP	100	100	100	97	93	91	36.1
IP-43	9-39	16.4										
IP-43	39-45	28.0	38	14	24	100	100	100	94	91	90	62.0
IP-44	10-46	13.3	NV	NP	NP	100	100	100	96	93	91	35.2
IP-45	10-28	13.4										
IP-45	28-46	22.7	NV	NP	NP	100	100	100	95	91	89	49.8
IP-46	10-46	8.7	NV	NP	NP	100	100	100	88	76	64	25.3

RED ROCK CONSULTING

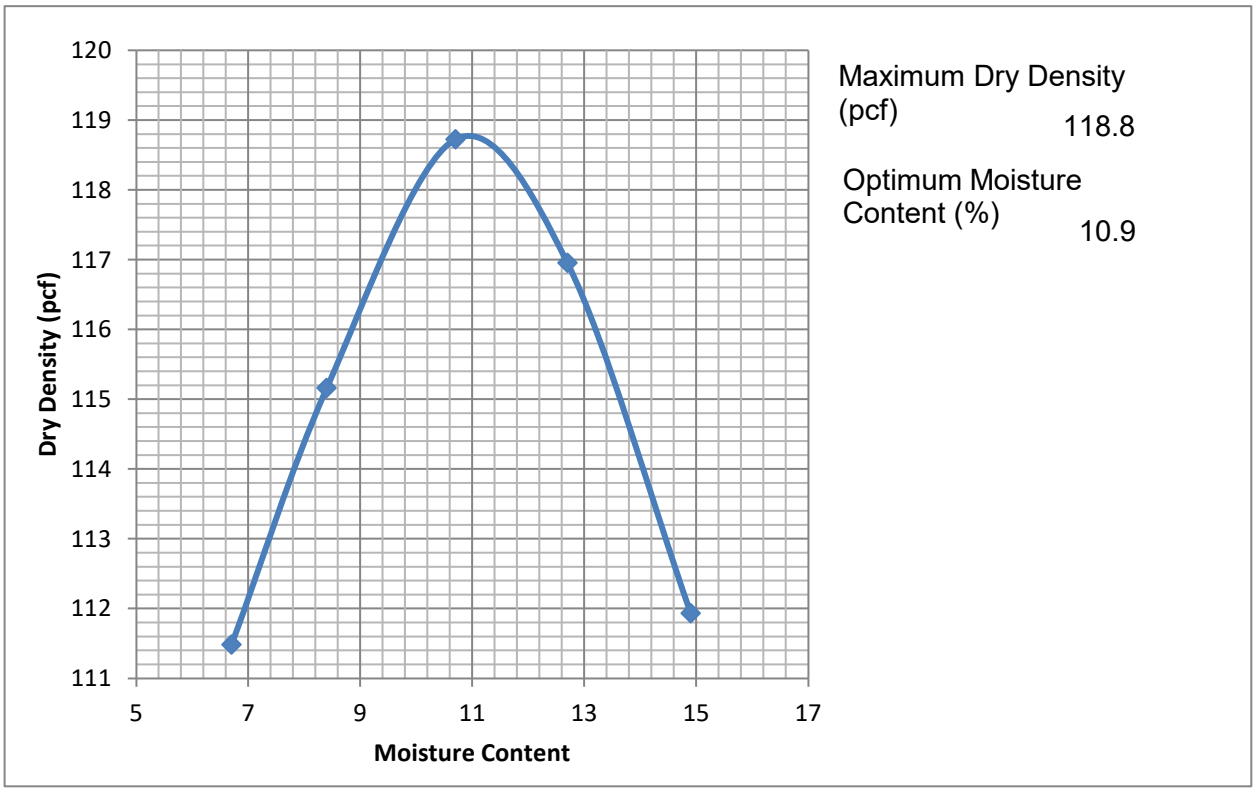
Proctor

Project #: 23035 Project Name: US 69 In Place Survey

Tested By: CP Test Date: 8.28.23 Client: SRB

Weight of Hammer: 5.5 No. of Blows: 25

Bulk 1



Liquid Limit: NV USCS SM

Plasticity Index: NP AASHTO A-2-4

Method: A Soil Classification: SILTY SAND

Resilient Modulus of Subgrade Soils (Recompacted Samples)

1. Project Number US 69 in Place Survey
2. County//State Name Mayes County // Oklahoma
3. Test Date 11/8/2023

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, (%)	10.90
Maximum Dry Density, pcf	118.80
95% MDD (pcf)	112.86

8. Specimen Properties

Compaction Water content, wc, %	10.45
Compaction Dry Density, pcf	113.84
Moisture Content After Mr Test, w(%)	10.10
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	25.39	22.93	2.46	2.02	1.83	0.20	0.0013	0.0016	0.0015	0.00018	10007
Sequence 2	6	4	49.56	44.59	4.97	3.95	3.55	0.40	0.0023	0.0029	0.0026	0.00033	10888
Sequence 3	6	6	75.12	67.80	7.33	5.98	5.40	0.58	0.0035	0.0042	0.0038	0.00048	11254
Sequence 4	6	8	99.24	90.22	9.01	7.90	7.18	0.72	0.0043	0.0054	0.0049	0.00061	11825
Sequence 5	6	10	124.61	112.98	11.64	9.92	8.99	0.93	0.0053	0.0066	0.0060	0.00075	12035
Sequence 6	4	2	25.09	22.77	2.32	2.00	1.81	0.18	0.0014	0.0017	0.0015	0.00019	9410
Sequence 7	4	4	50.57	45.80	4.78	4.03	3.65	0.38	0.0027	0.0034	0.0031	0.00038	9558
Sequence 8	4	6	74.90	67.98	6.92	5.96	5.41	0.55	0.0040	0.0048	0.0044	0.00055	9796
Sequence 9	4	8	99.51	90.05	9.45	7.92	7.17	0.75	0.0051	0.0061	0.0056	0.00070	10222
Sequence 10	4	10	124.52	113.18	11.34	9.91	9.01	0.90	0.0061	0.0072	0.0066	0.00083	10872
Sequence 11	2	2	24.73	22.28	2.45	1.97	1.77	0.20	0.0014	0.0017	0.0016	0.00020	8951
Sequence 12	2	4	50.38	45.32	5.06	4.01	3.61	0.40	0.0028	0.0034	0.0031	0.00038	9410
Sequence 13	2	6	75.01	68.23	6.78	5.97	5.43	0.54	0.0040	0.0050	0.0045	0.00057	9602
Sequence 14	2	8	99.56	90.01	9.55	7.93	7.17	0.76	0.0053	0.0063	0.0058	0.00072	9916
Sequence 15	2	10	124.45	112.65	11.80	9.91	8.97	0.94	0.0062	0.0075	0.0068	0.00085	10519

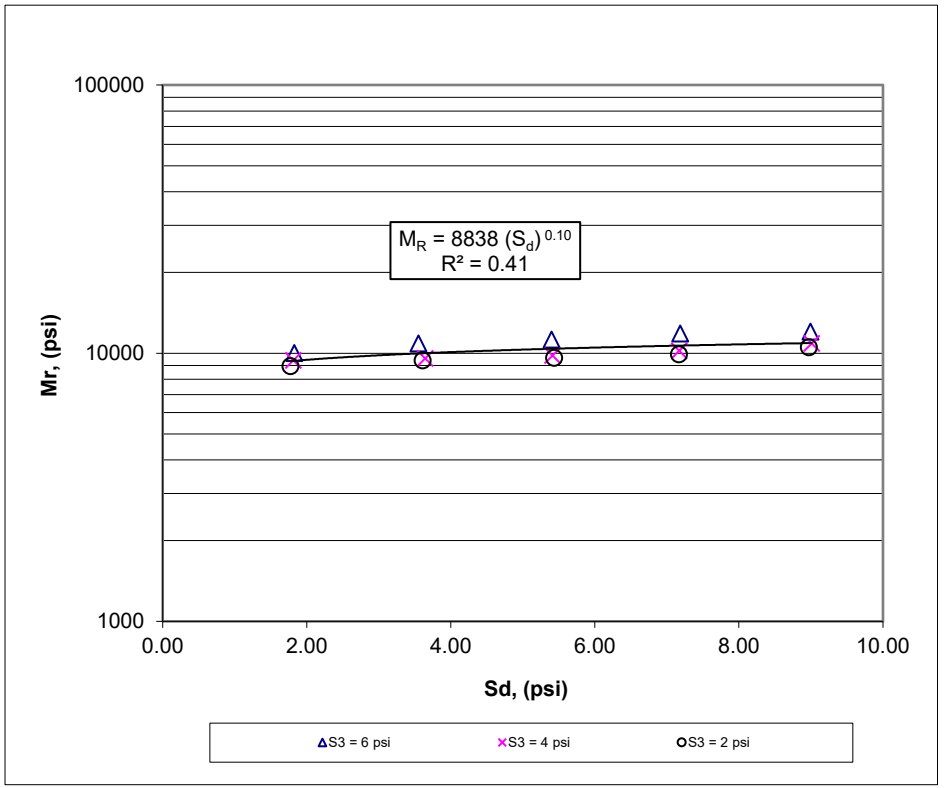
* Reported results are based on the average of the last 5 cycles of each load sequence

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	11/8/2023

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**	1.83	10007	**9350**
Sequence 2	6	**3.60**	3.55	10888	**9991**
Sequence 3	6	**5.40**	5.40	11254	**10386**
Sequence 4	6	**7.20**	7.18	11825	**10676**
Sequence 5	6	**9.00**	8.99	12035	**10906**
Sequence 6	4	**1.80**	1.81	9410	**9350**
Sequence 7	4	**3.60**	3.65	9558	**9991**
Sequence 8	4	**5.40**	5.41	9796	**10386**
Sequence 9	4	**7.20**	7.17	10222	**10676**
Sequence 10	4	**9.00**	9.01	10872	**10906**
Sequence 11	2	**1.80**	1.77	8951	**9350**
Sequence 12	2	**3.60**	3.61	9410	**9991**
Sequence 13	2	**5.40**	5.43	9602	**10386**
Sequence 14	2	**7.20**	7.17	9916	**10676**
Sequence 15	2	**9.00**	8.97	10519	**10906**
*Predicted Mr values at the desired applied cyclic stresses using Model					



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

S3 (psi)	K1	K2	R^2
6	9345	0.12	0.99
4	8774	0.08	0.79
2	8419	0.09	0.91
All	8838	0.10	0.41

Resilient Modulus of Subgrade Soils (Recompacted Samples)

1. Project Number US 69 in Place Survey
2. County//State Name Mayes County // Oklahoma
3. Test Date 11/8/2023

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

9. Soil Properties

Optimum Moisture Content, (%)	10.90
Maximum Dry Density, pcf	118.80
95% MDD (pcf)	112.86

8. Specimen Properties

Compaction Water content, wc, %	12.54
Compaction Dry Density, pcf	113.14
Moisture Content After Mr Test, w(%)	12.4
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	25.10	22.35	2.74	2.00	1.78	0.22	0.0028	0.0025	0.0027	0.00033	5317
Sequence 2	6	4	50.33	45.84	4.48	4.01	3.65	0.36	0.0053	0.0048	0.0051	0.00063	5780
Sequence 3	6	6	75.45	68.32	7.12	6.01	5.44	0.57	0.0076	0.0070	0.0073	0.00091	5960
Sequence 4	6	8	99.96	90.83	9.13	7.96	7.23	0.73	0.0097	0.0088	0.0093	0.00116	6250
Sequence 5	6	10	124.83	113.20	11.63	9.94	9.01	0.93	0.0114	0.0103	0.0108	0.00136	6649
Sequence 6	4	2	25.16	22.38	2.78	2.00	1.78	0.22	0.0030	0.0028	0.0029	0.00036	4908
Sequence 7	4	4	50.09	45.38	4.71	3.99	3.61	0.38	0.0059	0.0054	0.0057	0.00071	5101
Sequence 8	4	6	75.21	68.17	7.04	5.99	5.43	0.56	0.0082	0.0074	0.0078	0.00097	5569
Sequence 9	4	8	99.66	90.29	9.37	7.93	7.19	0.75	0.0104	0.0097	0.0100	0.00125	5743
Sequence 10	4	10	124.22	112.96	11.25	9.89	8.99	0.90	0.0126	0.0114	0.0120	0.00150	5996
Sequence 11	2	2	25.08	22.77	2.31	2.00	1.81	0.18	0.0037	0.0034	0.0035	0.00044	4104
Sequence 12	2	4	49.89	44.87	5.02	3.97	3.57	0.40	0.0069	0.0061	0.0065	0.00081	4408
Sequence 13	2	6	74.95	67.76	7.20	5.97	5.39	0.57	0.0087	0.0081	0.0084	0.00105	5122
Sequence 14	2	8	99.77	90.50	9.27	7.94	7.21	0.74	0.0116	0.0103	0.0110	0.00137	5253
Sequence 15	2	10	124.60	113.00	11.60	9.92	9.00	0.92	0.0132	0.0121	0.0126	0.00158	5696

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

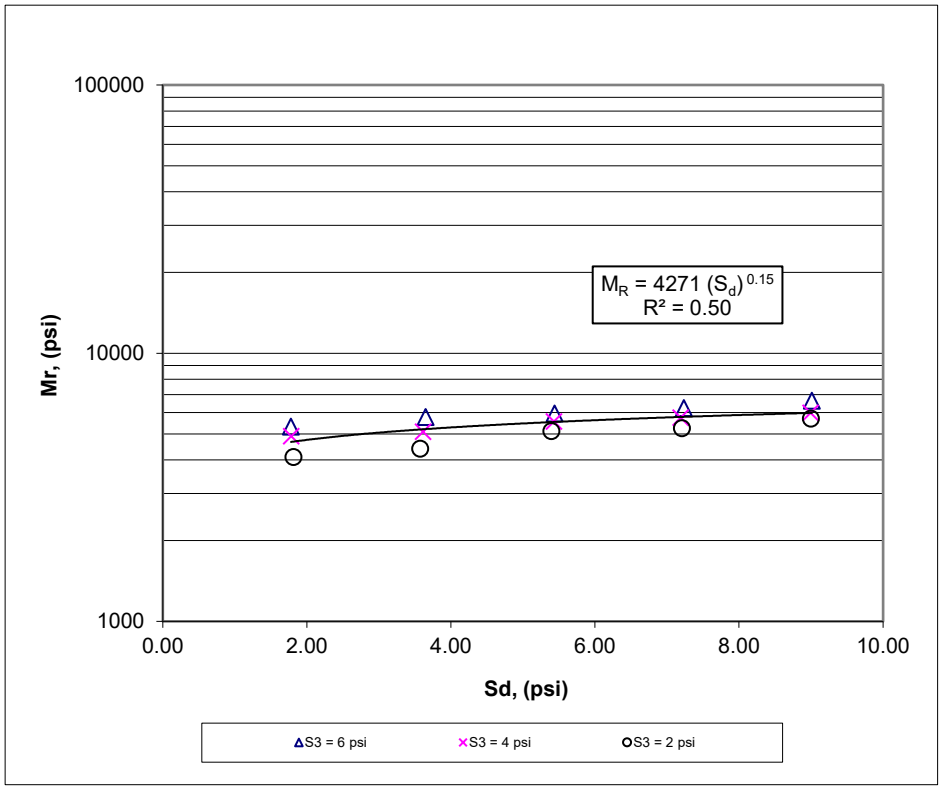
Resilient Modulus of Subgrade Soils (Recompacted Samples)

(Plot)

1. Sample Number	Bulk 1 (Compacted @ OMC+2%)
2. Material Type	Type 2
3. Soil Series	n/a
4. Horizon	n/a
5. Test Date	11/8/2023

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**	1.78	5317	**4675**
Sequence 2	6	**3.60**	3.65	5780	**5200**
Sequence 3	6	**5.40**	5.44	5960	**5535**
Sequence 4	6	**7.20**	7.23	6250	**5785**
Sequence 5	6	**9.00**	9.01	6649	**5987**
Sequence 6	4	**1.80**	1.78	4908	**4675**
Sequence 7	4	**3.60**	3.61	5101	**5200**
Sequence 8	4	**5.40**	5.43	5569	**5535**
Sequence 9	4	**7.20**	7.19	5743	**5785**
Sequence 10	4	**9.00**	8.99	5996	**5987**
Sequence 11	2	**1.80**	1.81	4104	**4675**
Sequence 12	2	**3.60**	3.57	4408	**5200**
Sequence 13	2	**5.40**	5.39	5122	**5535**
Sequence 14	2	**7.20**	7.21	5253	**5785**
Sequence 15	2	**9.00**	9.00	5696	**5987**

*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	4897	0.13	0.96
4	4482	0.13	0.94
2	3549	0.21	0.95
All	4271	0.15	0.50

RED ROCK CONSULTING

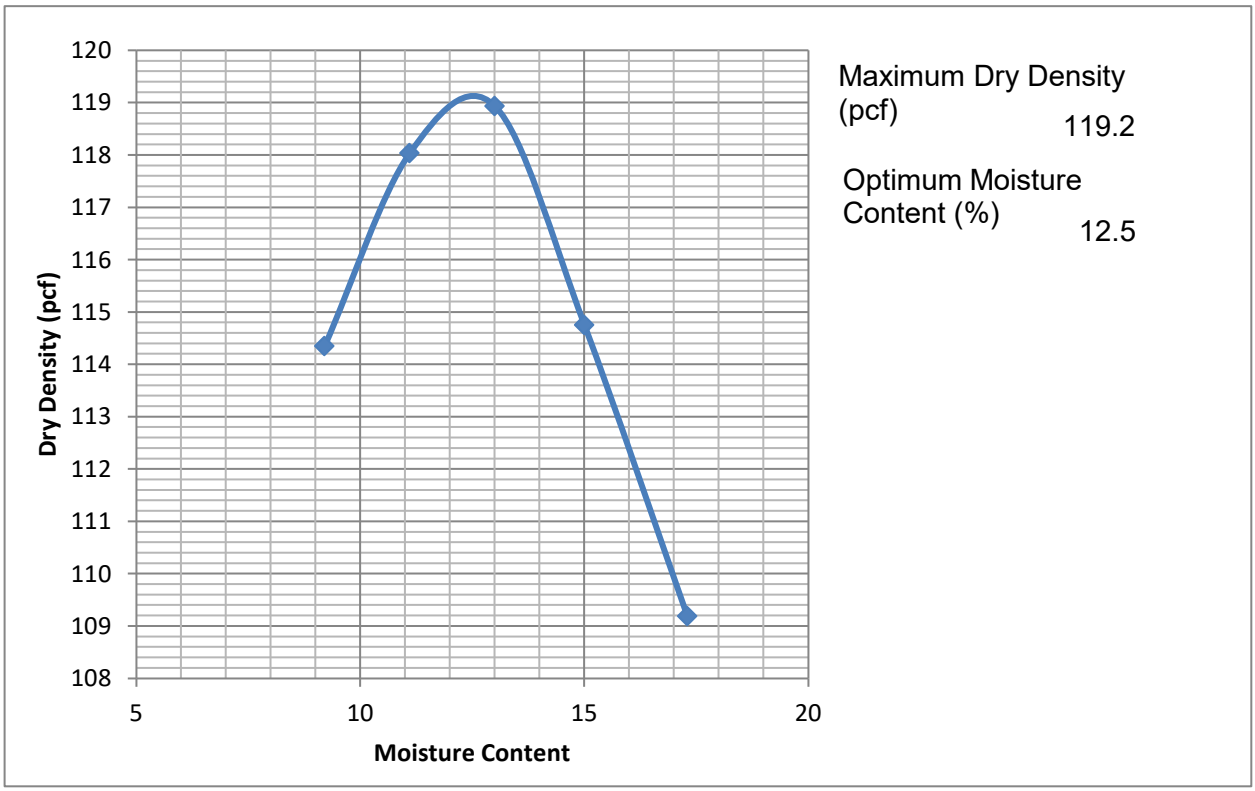
Proctor

Project #: 23035 Project Name: US 69 In Place Survey

Tested By: CP Test Date: 8.28.23 Client: SRB

Weight of Hammer: 5.5 No. of Blows: 25

Bulk 2



Liquid Limit: 28 USCS SC

Plasticity Index: 13 AASHTO A-6(3)

Method: A Soil Classification: CLAYEY SAND

Resilient Modulus of Subgrade Soils (Recompacted Samples)

1. Project Number US 69 in Place Survey
2. County//State Name Mayes County // Oklahoma
3. Test Date 11/8/2023

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, (%)	12.50
Maximum Dry Density, pcf	119.20
95% MDD (pcf)	113.24

8. Specimen Properties

Compaction Water content, wc, %	12.11
Compaction Dry Density, pcf	113.87
Moisture Content After Mr Test, w(%)	12.03
Permanent Deformation (in)	0.075

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	24.29	21.98	2.30	1.93	1.75	0.18	0.0012	0.0011	0.0011	0.00014	12384
Sequence 2	6	4	49.70	45.20	4.50	3.96	3.60	0.36	0.0026	0.0024	0.0025	0.00031	11678
Sequence 3	6	6	75.18	68.32	6.85	5.99	5.44	0.55	0.0041	0.0036	0.0039	0.00048	11293
Sequence 4	6	8	100.10	90.55	9.55	7.97	7.21	0.76	0.0056	0.0050	0.0053	0.00066	10956
Sequence 5	6	10	124.37	113.00	11.36	9.90	9.00	0.90	0.0073	0.0068	0.0070	0.00088	10244
Sequence 6	4	2	24.88	22.65	2.23	1.98	1.80	0.18	0.0013	0.0012	0.0012	0.00015	11745
Sequence 7	4	4	49.94	45.33	4.62	3.98	3.61	0.37	0.0028	0.0025	0.0027	0.00034	10765
Sequence 8	4	6	74.75	67.46	7.29	5.95	5.37	0.58	0.0043	0.0039	0.0041	0.00051	10526
Sequence 9	4	8	100.05	90.65	9.40	7.97	7.22	0.75	0.0061	0.0055	0.0058	0.00072	10026
Sequence 10	4	10	124.40	112.96	11.44	9.90	8.99	0.91	0.0077	0.0068	0.0072	0.00090	9945
Sequence 11	2	2	25.31	22.73	2.59	2.02	1.81	0.21	0.0014	0.0013	0.0013	0.00017	10737
Sequence 12	2	4	49.93	45.27	4.66	3.98	3.60	0.37	0.0032	0.0030	0.0031	0.00039	9300
Sequence 13	2	6	75.68	68.42	7.27	6.03	5.45	0.58	0.0050	0.0046	0.0048	0.00060	9061
Sequence 14	2	8	99.69	90.61	9.08	7.94	7.21	0.72	0.0067	0.0062	0.0065	0.00081	8915
Sequence 15	2	10	125.04	113.35	11.69	9.96	9.03	0.93	0.0087	0.0078	0.0082	0.00103	8774

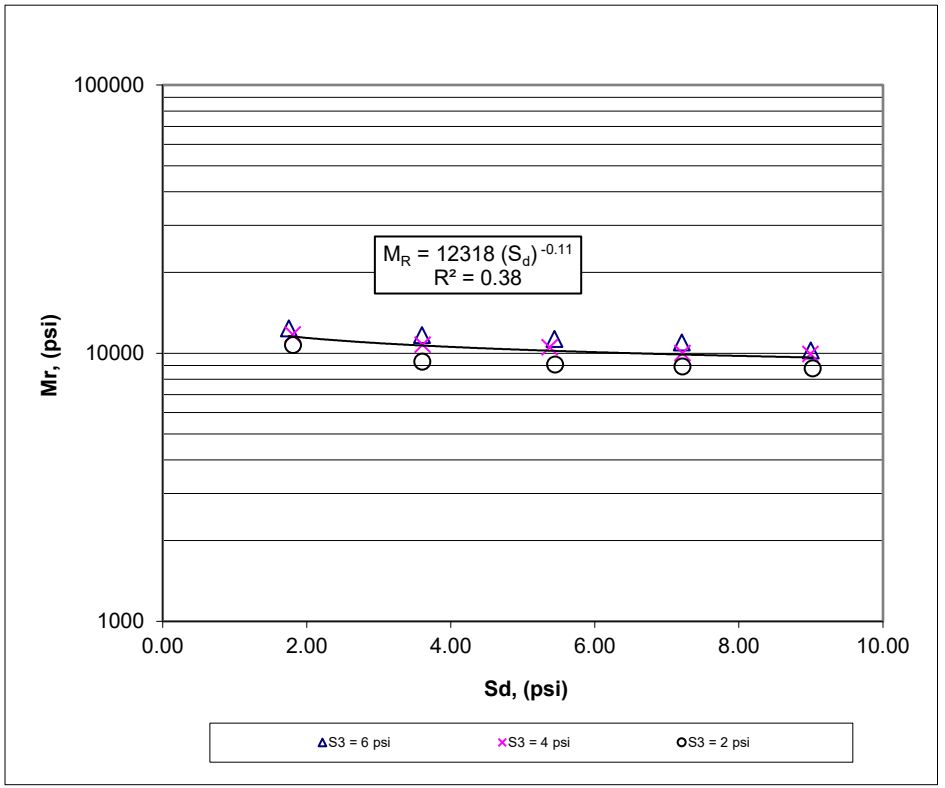
* Reported results are based on the average of the last 5 cycles of each load sequence

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	11/8/2023

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**	1.75	12384	**11537**
Sequence 2	6	**3.60**	3.60	11678	**10679**
Sequence 3	6	**5.40**	5.44	11293	**10207**
Sequence 4	6	**7.20**	7.21	10956	**9885**
Sequence 5	6	**9.00**	9.00	10244	**9642**
Sequence 6	4	**1.80**	1.80	11745	**11537**
Sequence 7	4	**3.60**	3.61	10765	**10679**
Sequence 8	4	**5.40**	5.37	10526	**10207**
Sequence 9	4	**7.20**	7.22	10026	**9885**
Sequence 10	4	**9.00**	8.99	9945	**9642**
Sequence 11	2	**1.80**	1.81	10737	**11537**
Sequence 12	2	**3.60**	3.60	9300	**10679**
Sequence 13	2	**5.40**	5.45	9061	**10207**
Sequence 14	2	**7.20**	7.21	8915	**9885**
Sequence 15	2	**9.00**	9.03	8774	**9642**
*Predicted Mr values at the desired applied cyclic stresses using Model					



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

S3 (psi)	K1	K2	R^2
6	13280	-0.11	0.93
4	12440	-0.10	0.98
2	11277	-0.12	0.91
All	12318	-0.11	0.38

Resilient Modulus of Subgrade Soils (Recompacted Samples)

1. Project Number US 69 in Place Survey
2. County//State Name Mayes County // Oklahoma
3. Test Date 11/8/2023

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

9. Soil Properties

Optimum Moisture Content, (%)	12.50
Maximum Dry Density, pcf	119.20
95% MDD (pcf)	113.24

8. Specimen Properties

Compaction Water content, wc, %	15.44
Compaction Dry Density, pcf	114.12
Moisture Content After Mr Test, w(%)	15.06
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	24.44	22.14	2.30	1.95	1.76	0.18	0.0023	0.0026	0.0024	0.00031	5757
Sequence 2	6	4	49.87	45.17	4.70	3.97	3.60	0.37	0.0052	0.0058	0.0055	0.00068	5264
Sequence 3	6	6	74.58	67.55	7.03	5.94	5.38	0.56	0.0085	0.0092	0.0088	0.00110	4871
Sequence 4	6	8	100.30	90.83	9.47	7.99	7.23	0.75	0.0127	0.0136	0.0132	0.00165	4395
Sequence 5	6	10	124.52	112.73	11.79	9.91	8.98	0.94	0.0165	0.0185	0.0175	0.00218	4112
Sequence 6	4	2	25.02	22.80	2.22	1.99	1.82	0.18	0.0029	0.0031	0.0030	0.00038	4828
Sequence 7	4	4	49.99	45.11	4.89	3.98	3.59	0.39	0.0061	0.0068	0.0065	0.00081	4440
Sequence 8	4	6	74.82	67.48	7.34	5.96	5.37	0.58	0.0096	0.0106	0.0101	0.00127	4245
Sequence 9	4	8	99.35	89.86	9.49	7.91	7.15	0.76	0.0141	0.0157	0.0149	0.00186	3842
Sequence 10	4	10	125.07	113.49	11.58	9.96	9.04	0.92	0.0193	0.0205	0.0199	0.00249	3630
Sequence 11	2	2	25.45	23.06	2.39	2.03	1.84	0.19	0.0034	0.0037	0.0036	0.00045	4123
Sequence 12	2	4	50.35	45.54	4.81	4.01	3.63	0.38	0.0071	0.0077	0.0074	0.00092	3925
Sequence 13	2	6	74.44	67.67	6.77	5.93	5.39	0.54	0.0110	0.0119	0.0115	0.00143	3763
Sequence 14	2	8	99.81	90.68	9.14	7.95	7.22	0.73	0.0165	0.0179	0.0172	0.00215	3363
Sequence 15	2	10	123.97	112.42	11.55	9.87	8.95	0.92	0.0209	0.0224	0.0216	0.00271	3308

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

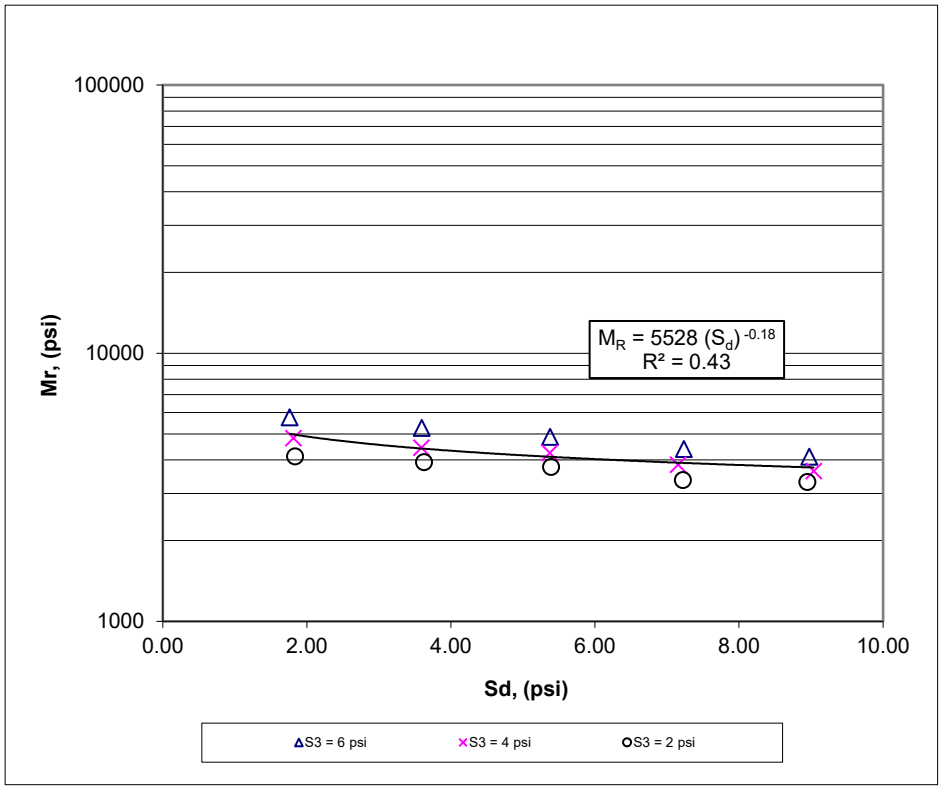
Resilient Modulus of Subgrade Soils (Recompacted Samples)

(Plot)

1. Sample Number	Bulk 2 (Compacted @ Wetter than OMC)
2. Material Type	Type 2
3. Soil Series	n/a
4. Horizon	n/a
5. Test Date	11/8/2023

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**	1.76	5757	**4983**
Sequence 2	6	**3.60**	3.60	5264	**4408**
Sequence 3	6	**5.40**	5.38	4871	**4104**
Sequence 4	6	**7.20**	7.23	4395	**3901**
Sequence 5	6	**9.00**	8.98	4112	**3750**
Sequence 6	4	**1.80**	1.82	4828	**4983**
Sequence 7	4	**3.60**	3.59	4440	**4408**
Sequence 8	4	**5.40**	5.37	4245	**4104**
Sequence 9	4	**7.20**	7.15	3842	**3901**
Sequence 10	4	**9.00**	9.04	3630	**3750**
Sequence 11	2	**1.80**	1.84	4123	**4983**
Sequence 12	2	**3.60**	3.63	3925	**4408**
Sequence 13	2	**5.40**	5.39	3763	**4104**
Sequence 14	2	**7.20**	7.22	3363	**3901**
Sequence 15	2	**9.00**	8.95	3308	**3750**

*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	6639	-0.20	0.95
4	5467	-0.17	0.94
2	4612	-0.15	0.89
All	5528	-0.18	0.43

RED ROCK CONSULTING

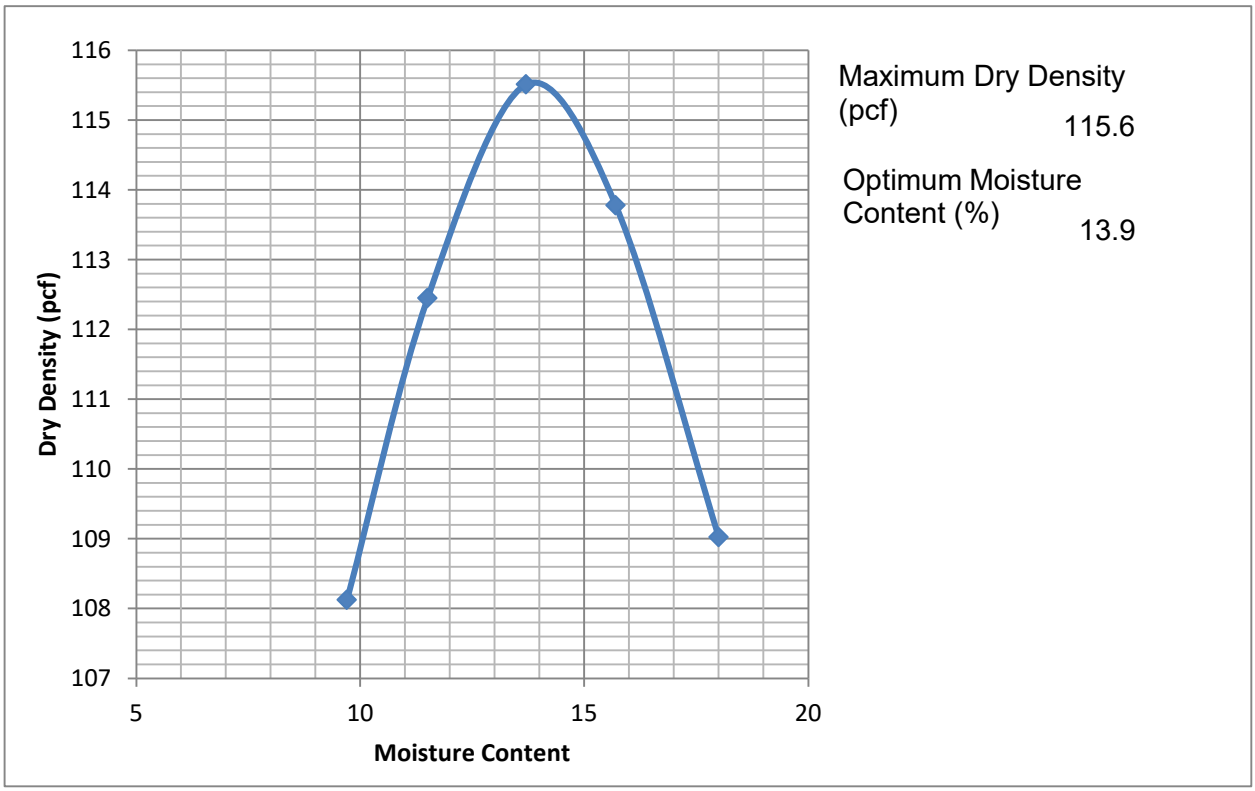
Proctor

Project #: 23035 Project Name: US 69 In Place Survey

Tested By: CP Test Date: 8.28.23 Client: SRB

Weight of Hammer: 5.5 No. of Blows: 25

Bulk 3



Liquid Limit: 34 USCS CL

Plasticity Index: 21 AASHTO A-6(10)

Method: A Soil Classification: SANDY LEAN CLAY

Resilient Modulus of Subgrade Soils (Recompacted Samples)

1. Project Number US 69 in Place Survey
2. County//State Name Mayes County // Oklahoma
3. Test Date 11/14/2023

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, (%)	13.90
Maximum Dry Density, pcf	115.60
95% MDD (pcf)	109.82

8. Specimen Properties

Compaction Water content, wc, %	13.94
Compaction Dry Density, pcf	110.17
Moisture Content After Mr Test, w(%)	13.67
Permanent Deformation (in)	0.08

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	25.16	22.41	2.75	2.00	1.78	0.22	0.0011	0.0013	0.0012	0.00015	12093
Sequence 2	6	4	49.64	44.85	4.79	3.95	3.57	0.38	0.0023	0.0028	0.0025	0.00032	11267
Sequence 3	6	6	74.54	67.45	7.08	5.93	5.37	0.56	0.0036	0.0046	0.0041	0.00051	10466
Sequence 4	6	8	99.94	90.35	9.59	7.96	7.19	0.76	0.0051	0.0063	0.0057	0.00071	10089
Sequence 5	6	10	124.45	113.21	11.25	9.91	9.01	0.90	0.0068	0.0082	0.0075	0.00094	9603
Sequence 6	4	2	24.72	22.17	2.55	1.97	1.77	0.20	0.0011	0.0014	0.0012	0.00015	11543
Sequence 7	4	4	49.81	44.90	4.90	3.97	3.58	0.39	0.0025	0.0029	0.0027	0.00034	10626
Sequence 8	4	6	74.42	67.36	7.07	5.93	5.36	0.56	0.0039	0.0048	0.0043	0.00054	9872
Sequence 9	4	8	99.66	90.29	9.37	7.93	7.19	0.75	0.0053	0.0066	0.0060	0.00074	9663
Sequence 10	4	10	124.45	113.02	11.43	9.91	9.00	0.91	0.0073	0.0087	0.0080	0.00100	8997
Sequence 11	2	2	25.57	22.99	2.58	2.04	1.83	0.21	0.0012	0.0015	0.0014	0.00017	10835
Sequence 12	2	4	49.73	44.97	4.76	3.96	3.58	0.38	0.0025	0.0031	0.0028	0.00035	10089
Sequence 13	2	6	74.89	68.04	6.85	5.96	5.42	0.55	0.0043	0.0051	0.0047	0.00059	9201
Sequence 14	2	8	99.78	90.62	9.16	7.94	7.22	0.73	0.0058	0.0070	0.0064	0.00080	8989
Sequence 15	2	10	124.26	112.71	11.55	9.89	8.97	0.92	0.0074	0.0089	0.0082	0.00102	8776

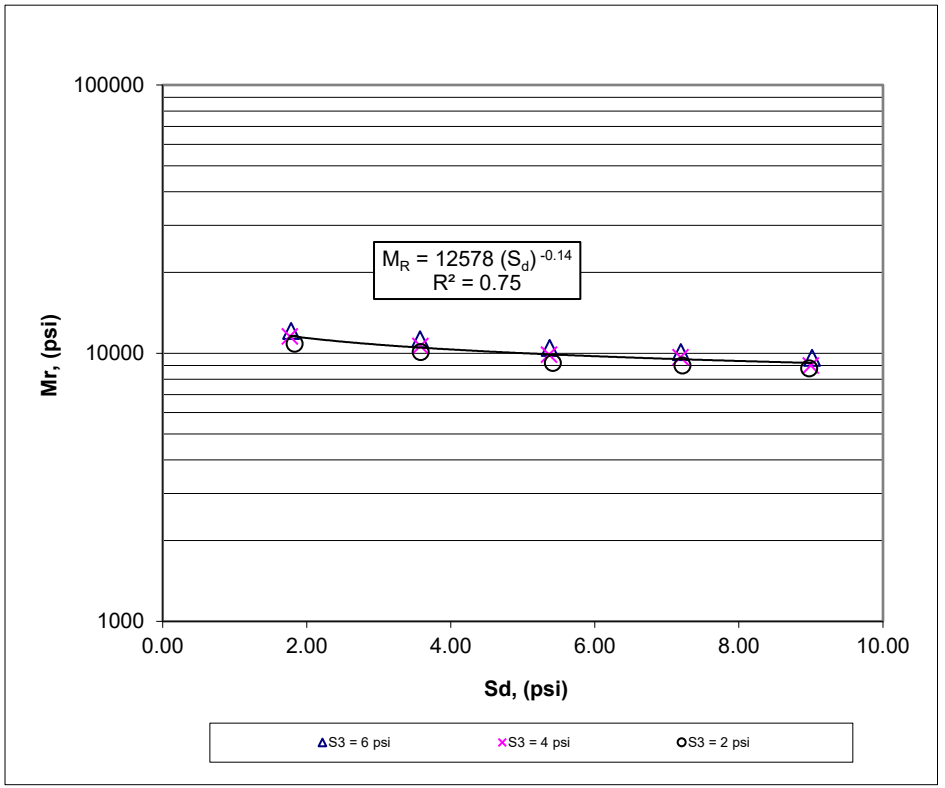
* Reported results are based on the average of the last 5 cycles of each load sequence

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	11/14/2023

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**	1.78	12093	**11567**
Sequence 2	6	**3.60**	3.57	11267	**10479**
Sequence 3	6	**5.40**	5.37	10466	**9891**
Sequence 4	6	**7.20**	7.19	10089	**9494**
Sequence 5	6	**9.00**	9.01	9603	**9197**
Sequence 6	4	**1.80**	1.77	11543	**11567**
Sequence 7	4	**3.60**	3.58	10626	**10479**
Sequence 8	4	**5.40**	5.36	9872	**9891**
Sequence 9	4	**7.20**	7.19	9663	**9494**
Sequence 10	4	**9.00**	9.00	8997	**9197**
Sequence 11	2	**1.80**	1.83	10835	**11567**
Sequence 12	2	**3.60**	3.58	10089	**10479**
Sequence 13	2	**5.40**	5.42	9201	**9891**
Sequence 14	2	**7.20**	7.22	8989	**9494**
Sequence 15	2	**9.00**	8.97	8776	**9197**
*Predicted Mr values at the desired applied cyclic stresses using Model					



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

S3 (psi)	K1	K2	R^2
6	13263	-0.14	0.98
4	12650	-0.15	0.97
2	11835	-0.14	0.98
All	12578	-0.14	0.75

Resilient Modulus of Subgrade Soils (Recompacted Samples)

1. Project Number US 69 in Place Survey
2. County//State Name Mayes County // Oklahoma
3. Test Date 11/14/2023

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

9. Soil Properties

Optimum Moisture Content, (%)	13.90
Maximum Dry Density, pcf	115.60
95% MDD (pcf)	109.82

8. Specimen Properties

Compaction Water content, wc, %	17.67
Compaction Dry Density, pcf	110.74
Moisture Content After Mr Test, w(%)	17.46
Permanent Deformation (in)	0.380

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	25.87	23.18	2.69	2.06	1.85	0.21	0.0029	0.0031	0.0030	0.00037	4982
Sequence 2	6	4	49.68	44.91	4.77	3.96	3.58	0.38	0.0060	0.0067	0.0063	0.00079	4508
Sequence 3	6	6	74.97	67.99	6.99	5.97	5.41	0.56	0.0104	0.0110	0.0107	0.00134	4051
Sequence 4	6	8	98.93	89.94	8.99	7.88	7.16	0.72	0.0145	0.0160	0.0152	0.00190	3760
Sequence 5	6	10	125.30	113.47	11.83	9.98	9.03	0.94	0.0206	0.0225	0.0216	0.00269	3353
Sequence 6	4	2	25.50	22.77	2.74	2.03	1.81	0.22	0.0033	0.0036	0.0035	0.00043	4199
Sequence 7	4	4	49.99	45.27	4.72	3.98	3.60	0.38	0.0069	0.0074	0.0072	0.00089	4028
Sequence 8	4	6	74.61	67.59	7.02	5.94	5.38	0.56	0.0112	0.0124	0.0118	0.00148	3647
Sequence 9	4	8	99.12	89.92	9.20	7.89	7.16	0.73	0.0179	0.0190	0.0184	0.00230	3109
Sequence 10	4	10	123.96	112.48	11.48	9.87	8.96	0.91	0.0225	0.0244	0.0235	0.00293	3054
Sequence 11	2	2	25.60	22.80	2.81	2.04	1.82	0.22	0.0036	0.0038	0.0037	0.00047	3892
Sequence 12	2	4	50.79	45.74	5.06	4.04	3.64	0.40	0.0080	0.0086	0.0083	0.00104	3509
Sequence 13	2	6	74.71	67.48	7.23	5.95	5.37	0.58	0.0119	0.0133	0.0126	0.00158	3410
Sequence 14	2	8	99.28	90.05	9.23	7.90	7.17	0.74	0.0183	0.0199	0.0191	0.00239	3004
Sequence 15	2	10	124.91	113.12	11.79	9.94	9.01	0.94	0.0257	0.0273	0.0265	0.00331	2721

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

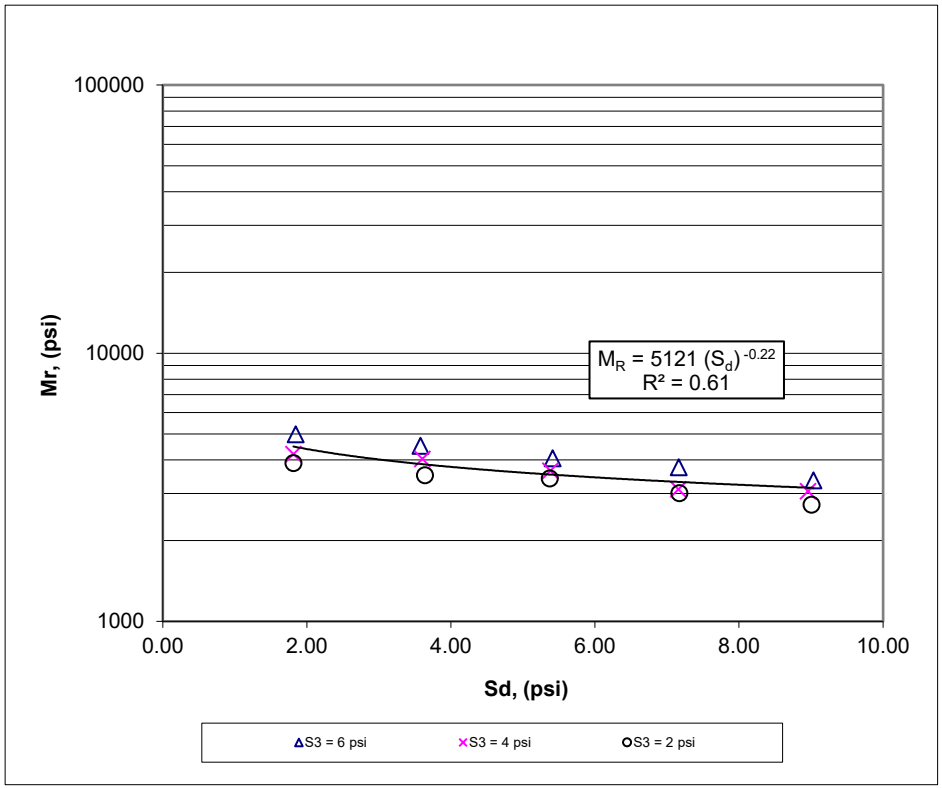
Resilient Modulus of Subgrade Soils (Recompacted Samples)

(Plot)

1. Sample Number	Bulk 3 (Compacted @ Wetter than OMC)
2. Material Type	Type 2
3. Soil Series	n/a
4. Horizon	n/a
5. Test Date	11/14/2023

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	4982	**4496**
Sequence 2	6	**3.60**	3.58	4508	**3856**
Sequence 3	6	**5.40**	5.41	4051	**3525**
Sequence 4	6	**7.20**	7.16	3760	**3307**
Sequence 5	6	**9.00**	9.03	3353	**3147**
Sequence 6	4	**1.80**	1.81	4199	**4496**
Sequence 7	4	**3.60**	3.60	4028	**3856**
Sequence 8	4	**5.40**	5.38	3647	**3525**
Sequence 9	4	**7.20**	7.16	3109	**3307**
Sequence 10	4	**9.00**	8.96	3054	**3147**
Sequence 11	2	**1.80**	1.82	3892	**4496**
Sequence 12	2	**3.60**	3.64	3509	**3856**
Sequence 13	2	**5.40**	5.37	3410	**3525**
Sequence 14	2	**7.20**	7.17	3004	**3307**
Sequence 15	2	**9.00**	9.01	2721	**3147**

*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	5935	-0.24	0.95
4	4990	-0.22	0.87
2	4540	-0.21	0.90
All	5121	-0.22	0.61

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

Roadway Design Division
200 N.E. 21st Street
Oklahoma City, OK 73105-3204
www.odot.org

Submit Form | Reset Form

To: Roadway Design, Pavement Design Engineer

From: Greg Allen - SRB

Subject: Request for Pavement Design

Submitted on: 4-25-2024

Project No.:
Job Piece No.: 31963(04)
County: Mayes
Highway. No.: US-69
Division: 8
Description: US-69 from SH-20 in Pryor, Extending North 8 m

Project Dates:
PIH 30%:
R/W Submission: May 2024
Let Date: FFY 2026
Date Needed: August 2024

Plan Set:

☐ Attached:
☒ Projectwise: 60% Plans, Geotech Reports and Pavement Design Report
☐ Other:

Attach Plan Set | Clear Plan Set

For *In-House Projects*: Please consider the following Geotechnical Investigations:

☐ **Pedological and Geological Survey**
- New highway alignment
- New construction parallel to existing highway alignments
- New construction requiring a raising of the grade on and above existing highway alignments.

☐ **Shoulder Soil Survey**
- A shoulder survey is required for the widening of existing pavement at grade. Survey shall apply to the adding of shoulders, lanes, and medians to existing grade.

☐ **In-Place Soil Survey**
- At locations where a new highway alignment will tie into existing highway alignment.
  I.e.: at beginning and end of offset alignment tie ins to existing highways.
- This survey is required for new construction when the design calls for separation of the grading and paving contracts.
- It may be used to evaluate the subgrade of existing pavement sections which are to be reconstructed with no change in grade and alignment.
- Bridge and Approach projects (Depends on project specifics, so case by case basis)
- For surfacing of previous grading project. (this is to evaluate soils on the embankment that is currently "In-Place")

☐ **Pavement and Subgrade Soil Survey**
- This survey is required when the properties of an existing pavement structure and underlying subgrade soils are needed for evaluation of the pavement load capacity and for an overlay design.
  - May require F.W.D. evaluation

☐ **Borrow Pit Investigation**
- A borrow pit investigation is required where selective subgrade topping is requested.

☐ **Embankment and Foundation Soil Settlement and Stabilized** (Embankments greater than 10')
- Estimates of embankment and underlying foundation soil settlement and stability are required.

Roadway Design Division
200 N.E. 21st Street
Oklahoma City, OK 73105-3204
www.odot.org

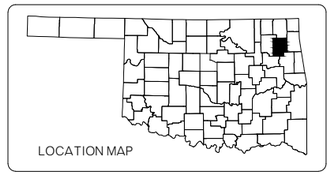
☐ **Cut and Natural Slope Stability**

- Cut Slopes greater than 30' below the natural ground line in soil shall be analyzed for both end of construction and long term slope stability conditions.

☐ **Geological Investigation**

- Rock cuts of 10' or greater
- Shallow rock mapped within proposed cut section
- Rock mechanics analysis
- Geologic hazards
- Rock fills
    - A geologic Field Investigation may consist of the following elements:
        - Borings
        - Slope stability analysis
        - Rippability ratings
        - Evaluation of geologic hazards
        - Shear strength of rock fills
        - Evaluation of excavated rock for use as a source of aggregate
        - Geologic statements

FOR SURVEY CONTROL DATA,
SEE SURVEY DATA SHEETS



DISTRICT VIII

APPROX. CENTER OF PROJECT
LATITUDE: 36°21'48.01" N
LONGITUDE: 95°17'37.22" W

STATE OF OKLAHOMA
DEPARTMENT OF TRANSPORTATION

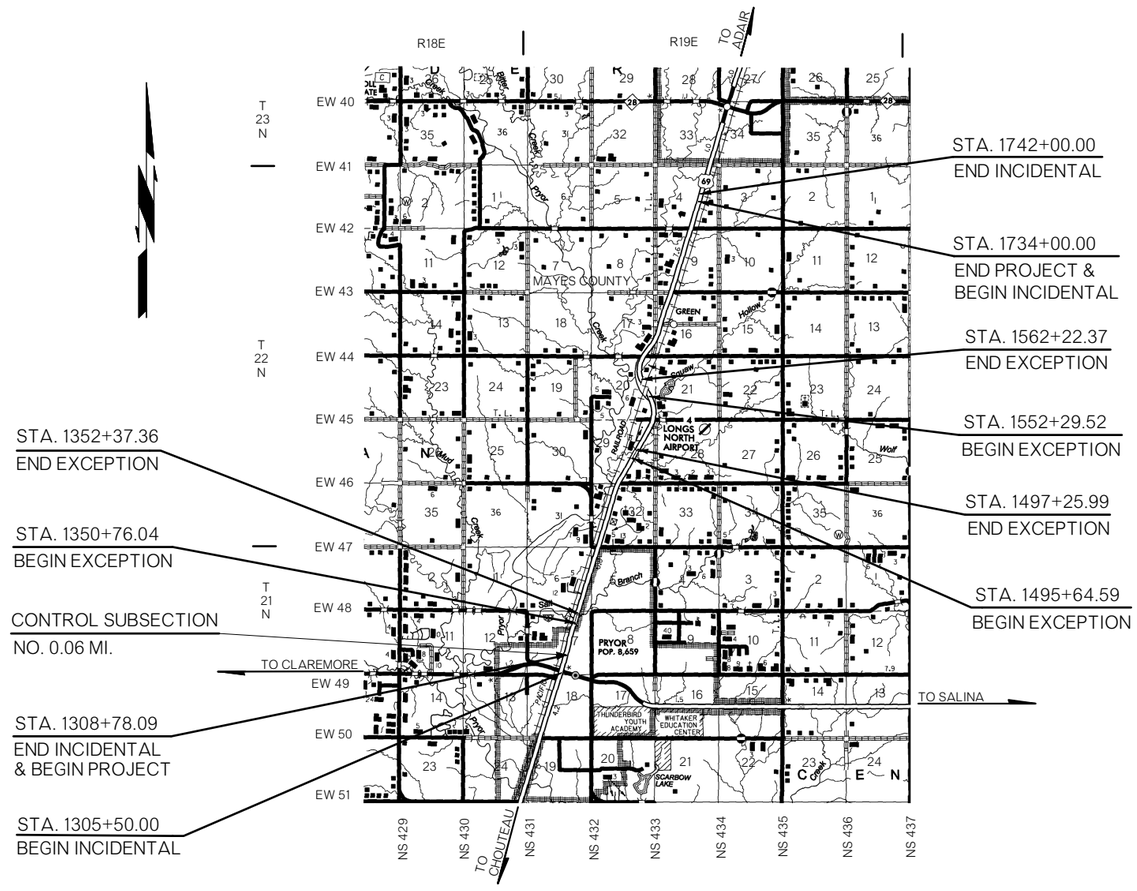
PLAN OF PROPOSED

U.S. HIGHWAY

FEDERAL AID PROJECT NO. J3-1963(004)
PAVEMENT REHABILITATION PLANS
U.S. HIGHWAY 69

MAYES COUNTY

CONTROL SECTION NO. 69-49-04
STATE JOB NO. 31963(04)



DESIGN DATA

	URBAN	RURAL
AADT 2028	= 22,075	= 12,639
AADT 2058	= 28,749	= 17,282
DHV (1-WAY)	= 59%	= 54%
K (DHV/AADT)	= 11%	= 10%
D	= 59%	= 54%
T (% AADT)	= 31%	= 31%
T³(% AADT)	= 28%	= 28%
V	= 45 MPH	= 65 MPH
30 YR RIGID ESALS	= 166.86M	= 88.77M

SCALES 1"
PLAN 1" = 20' & 50'
PROFILE HOR. 1" = 20' & 50'
VER. 1" = 10'
LAYOUT MAP 1" = 5,280'

CONVENTIONAL SYMBOLS

- PROPOSED ROAD
- RAILROADS
- RANGE & TOWNSHIP
- SECTION LINES
- QUARTER SECTION LINES
- EXISTING FENCE
- PROPOSED FENCE
- GROUND LINE
- EXISTING ROADS
- BASE LINE
- GRADE LINES
- TELEPHONE & TELEGRAPH
- POWER LINES
- BUILDINGS
- OIL WELL
- DRAINAGE STRUCTURES - IN PLACE
- DRAINAGE STRUCTURES - NEW
- PRES. R/W
- RIGHT-OF-WAY LINES - EXISTING
- R/W
- RIGHT-OF-WAY LINES - NEW
- CONTROLLED ACCESS
- R/W
- RIGHT-OF-WAY FENCE

2019 OKLAHOMA STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION GOVERN, APPROVED BY THE U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION, DECEMBER 18, 2019.

THIS PROJECT IS PARTIALLY LOCATED WITHIN THE CORPORATE AND URBAN LIMITS OF THE CITY OR PRYOR.

NOTE: PROJECT LENGTH BASED ON CRL STATIONING

ROADWAY LENGTH	41,206.60 FT.	7.804 MI.
BRIDGE LENGTH	00.00 FT.	0.00 MI.
PROJECT LENGTH		7.804 MI.

EQUATIONS : NONE

EXCEPTIONS :
STA. 1350+76.04 TO STA. 1352+37.36 LENGTH= 161.32 FT.
STA. 1495+64.59 TO STA. 1497+25.99 LENGTH= 161.14 FT.
STA. 1552+29.52 TO STA. 1562+22.37 LENGTH= 992.85 FT.

OKLAHOMA DEPARTMENT OF TRANSPORTATION

THIS DOCUMENT IS PRELIMINARY IN NATURE AND IS NOT A FINAL, SIGNED AND SEALED DOCUMENT.
95%

OKLAHOMA DEPARTMENT OF TRANSPORTATION

FED. ROAD DIST. NO.	STATE	JOB PIECE NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
6	OKLA.	31963(04)		0001	432

DESCRIPTION	REVISIONS	DATE

INDEX OF SHEETS

2019 STANDARD ODOT DRAWINGS
ROADWAY

BMPR-0	PCI-1-1
TESCA-0	CI-2-2
IPD-0	SSIF-5-1
RSF-0	CIG-4-1
SSS-2-1	MFC-5-1
ASCD-6-1	MJB-4-2
CSCD-6-2	PRM-1-3
LECS-5-2	PMD-1-1
LTU-5-1	SPI-5-2
PCPR-4-2	CCI-1-0
WCR-4-2	CCI-2-0
TWD-2-2	PBB-1-3
PSMD-2-2	SBI-5-2
SMD-4-2	MI-4-2
CET4S-4-2	DC-4-1
SSCD-4-1	PDT-2-3

2009 STANDARD ODOT DRAWINGS
TRAFFIC

SIGNING

PM1-1-03	MSD4-1-00	PBD1-1-00	
PM2-1-01	MSD5-1-00	GMF1-2-01	
PM3-1-02	SBS1-1-00	HLBP1-1-01	
PM5-1-00	SBS2-1-00	HLGN1-1-01	
PM6-1-00	SBS3-1-00	HLPD1-1-00	
PM8-1-01	SBS4-1-00	PPD1-2-00	
RSD1-1-00	SBS5-1-00	HLD1-2-01	
RSD2-1-00	GMS1-1-00	HLD2-2-01	
WSD1-1-00	SSP1-1-02	HLMA2-1-01	
WSD2-1-00	SSA1-1-00	SPD1-1-00	
WSD3-1-00	SSA2-1-00	SCD1-1-00	
SZSD1-1-00	FGS1-1-00	TEWD1-2-00	
MSD1-1-00	FGS2-1-01		
MSD3-1-01	SPA1-1-00		

LIGHTING

CONTROL

TCS1-1-01	TCS14-1-00
TCS2-1-00	TCS15-1-00
TCS3-1-01	TCS16-1-00
TCS4-1-01	TCS18-1-01
TCS5-1-00	TCS19-1-01
TCS6-1-02	TCS20-1-00
TCS7-1-02	TCS21-1-02
TCS8-1-00	
TCS9-1-01	
TCS10-1-00	
TCS11-1-01	
TCS12-1-00	
TCS13-1-00	

BRIDGE

RCB-C1-3&4&5-2-20-01E	RCB-E1-H3-30-2-01E
RCB-C1-6(2-14)-01E	RCB-E1-H3-30-3-01E
RCB-E1-H3-0-1-01E	RCB-CW1-D4-0-01E
RCB-E1-H3-0-2-01E	RCB-CW1-D4-30-01E
RCB-E1-H3-30-1-01E	

SMITH ROBERTS BALDISCHWILER, LLC
ENGINEERING
SURVEYING
PLANNING
OKLAHOMA CITY
100 N.E. 5th Street
Oklahoma City,
Oklahoma 73104
T: 405.840.7094
F: 405.840.9116
www.srbok.com
NORMAN
2500 McGee Drive,
Suite 100
Norman, OK 73072
T: 405.418.2288
F: 405.418.2289
srb@srbok.com
CERTIFICATE OF AUTHORIZATION NO. 3949 EXPIRES JUNE 30, 2025

SUBMITTED FOR APPROVAL BY:

GREGORY DON ALLEN
REGISTERED PROFESSIONAL ENGINEER NO. 16191

REGISTERED PROFESSIONAL ENGINEER GREGORY DON ALLEN 16191 OKLAHOMA
PRELIMINARY NOT FOR CONSTRUCTION

OKLAHOMA DEPARTMENT OF TRANSPORTATION	DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION
DATE APPROVED	DATE APPROVED
BY CHIEF ENGINEER	BY DIVISION ADMINISTRATOR

SWO 5357(1) PROJECT NO. J3-1963(004)
COUNTY MAYES HIGHWAY US-69 SHEET NO. 0001

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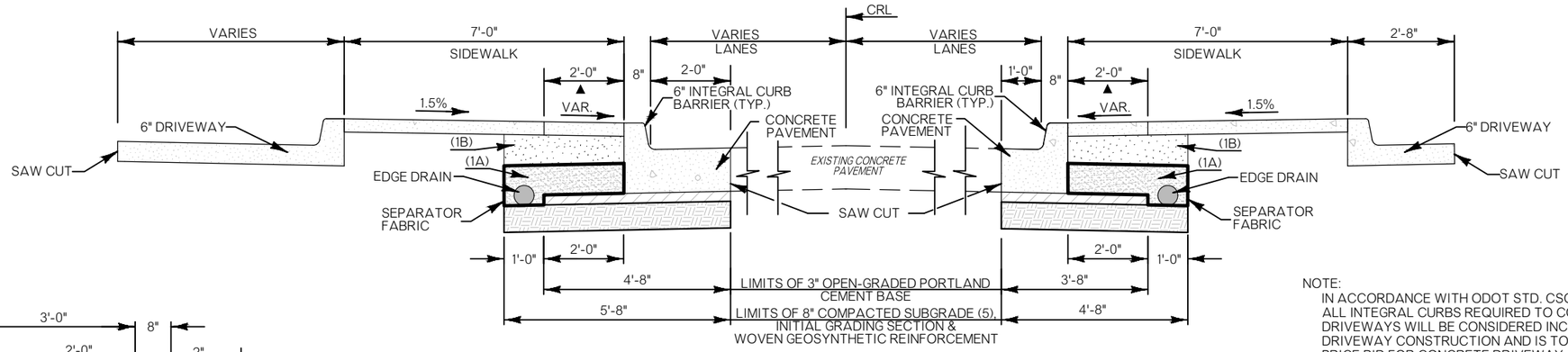


▲ STAMPED AND STAINED CONCRETE.

▲ STAMPED AND STAINED CONCRETE.

TYPICAL SECTION 1

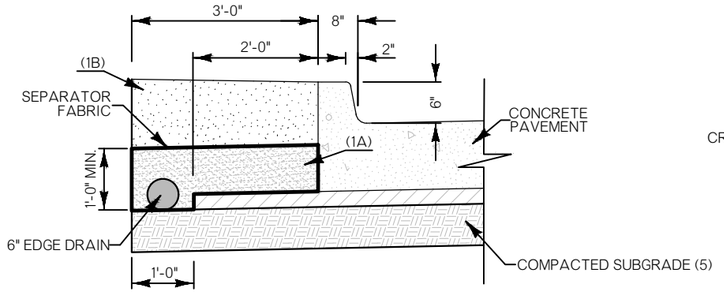
CRL US-69 STA. 1306+09.21 TO STA. 1308+78.09 (LT. SIDE)

CRL US-69 STA. 1308+25.18 TO STA. 1308+78.09 (RT. SIDE)

PAVEMENT REQUIREMENT	
16" PAVT. STRUCTURE	LANES
SURFACE COURSE	13" DOWEL JOINTED PC CONCRETE
BASE COURSE	3" OPEN-GRADED PORTLAND CEMENT BASE

NOTE:
IN ACCORDANCE WITH ODOT STD. CSCD-6 (LATEST REV), ALL INTEGRAL CURBS REQUIRED TO CONSTRUCT DRIVEWAYS WILL BE CONSIDERED INCIDENTAL TO DRIVEWAY CONSTRUCTION AND IS TO BE INCLUDED IN THE PRICE BID FOR CONCRETE DRIVEWAY.

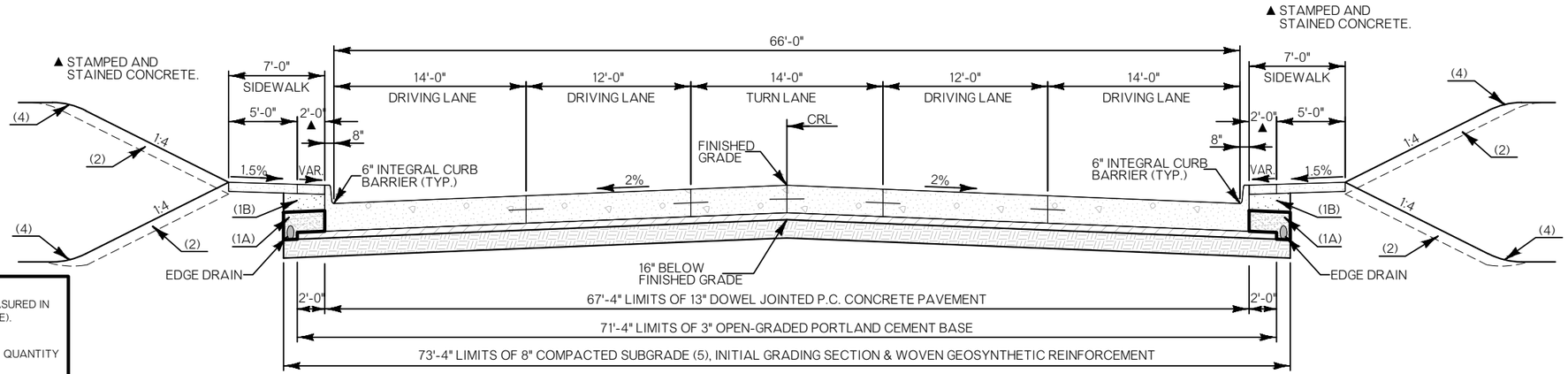
ALL CURBS OR SLOPED CONCRETE REQUIRED TO TIE SIDEWALKS TO ADJACENT FEATURES WILL BE CONSIDERED INCIDENTAL TO SIDEWALK CONSTRUCTION AND IS TO BE INCLUDED IN THE PRICE BID FOR 4" SIDEWALK.



EDGE DRAIN & INTEGRAL CURB DETAIL

6" BARRIER

N.T.S.



TYPICAL SECTION 2

CRL US-69 STA. 1308+78.09 TO STA. 1330+58.57

PAVEMENT REQUIREMENT	
16" PAVT. STRUCTURE	LANES
SURFACE COURSE	13" DOWEL JOINTED PC CONCRETE
BASE COURSE	3" OPEN-GRADED PORTLAND CEMENT BASE

(1A) BACKFILL NOTE:
TO BE BACKFILLED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN T.B.S.C. TYPE E. QUANTITY IS COMPUTED AT 0.32 TON PER LF (0.16 TON PER SIDE).

(1B) BACKFILL NOTE:
TO BE BACKFILLED AND COMPACTED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN UNCLASSIFIED BORROW.

(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.

(4) FOR ROUNDING DETAIL SEE SHEET 0004

(5) COMPACTED SUBGRADE NOTE:
TO BE COMPACTED TO AT LEAST 95% OF MAXIMUM DENSITY AND WITHIN 2% OF OPTIMUM MOISTURE CONTENT PER SECTION 202.04A.(5)(b)(2). MOISTURE CONTENT SHALL BE VERIFIED IMMEDIATELY PRIOR TO THE PLACEMENT OF THE PAVEMENT SECTION. COST TO BE INCLUDED IN OTHER ITEMS OF WORK.

OKLAHOMA DEPARTMENT OF TRANSPORTATION

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CHECKED		TYPICALS
APPROVED		
SQUAD	SRB	

COUNTY MAYES HIGHWAY US-69 STATE JOB NO. 31963(04) SHEET NO. 0002

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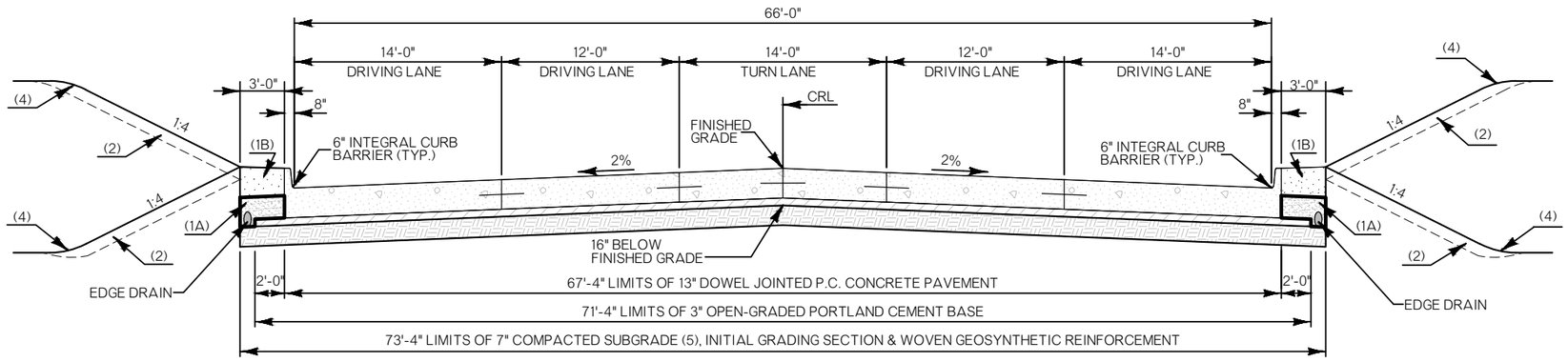
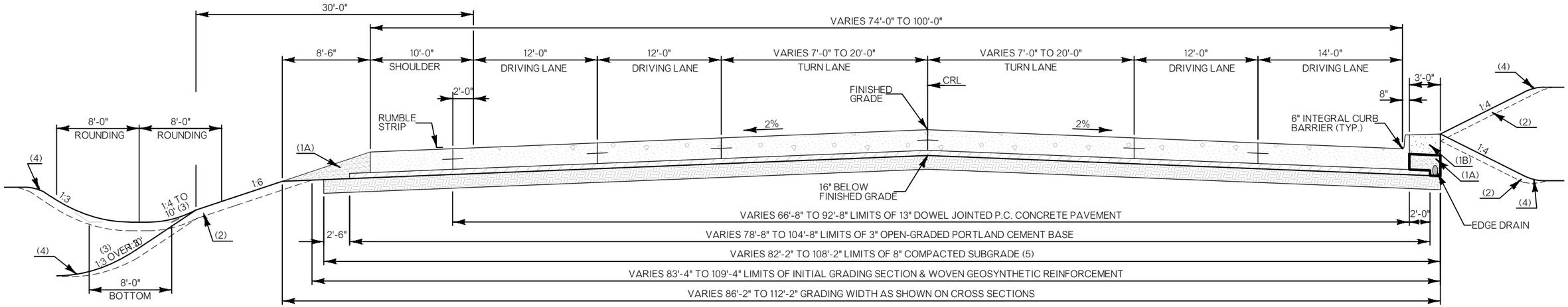


TYPICAL SECTION 3

CRL US-69 STA. 1330+58.57 TO STA. 1337+80.34

PAVEMENT REQUIREMENT	
16" PAVT. STRUCTURE	LANES
SURFACE COURSE	13" DOWEL JOINTED PC CONCRETE
BASE COURSE	3" OPEN-GRADED PORTLAND CEMENT BASE



TYPICAL SECTION 4

CRL US-69 STA. 1337+80.34 TO STA. 1344+13.06

PAVEMENT REQUIREMENT		
16" PAVT. STRUCTURE	LANES	10'-0" OUTSIDE SHOULDER
SURFACE COURSE	13" DOWEL JOINTED PC CONCRETE	13" PC CONCRETE
BASE COURSE	3" OPEN-GRADED PORTLAND CEMENT BASE	3" OPEN-GRADED PORTLAND CEMENT BASE

(1A) BACKFILL NOTE:
TO BE BACKFILLED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN T.B.S.C. TYPE E. QUANTITY IS COMPUTED AT 0.32 TON PER LF. (0.16 TON PER SIDE) IN TYPICAL 3 AND 0.50 TON PER LF (0.34 TON LEFT SIDE & 0.16 TON RIGHT SIDE) IN TYPICAL 4.

(1B) BACKFILL NOTE:
TO BE BACKFILLED AND COMPACTED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN UNCLASSIFIED BORROW.

(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 ARE MEASURED VERTICALLY FROM EDGE OF FINISHED GRADE SHOULDER.

(4) FOR ROUNDING DETAIL SEE SHEET 0004

(5) COMPACTED SUBGRADE NOTE:
TO BE COMPACTED TO AT LEAST 95% OF MAXIMUM DENSITY AND WITHIN 2% OF OPTIMUM MOISTURE CONTENT PER SECTION 202.04A.(5)(b)(2). MOISTURE CONTENT SHALL BE VERIFIED IMMEDIATELY PRIOR TO THE PLACEMENT OF THE PAVEMENT SECTION. COST TO BE INCLUDED IN OTHER ITEMS OF WORK.

OKLAHOMA DEPARTMENT OF TRANSPORTATION

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COUNTY MAYES HIGHWAY US-69 STATE JOB NO. 31963(04) SHEET NO. 0003

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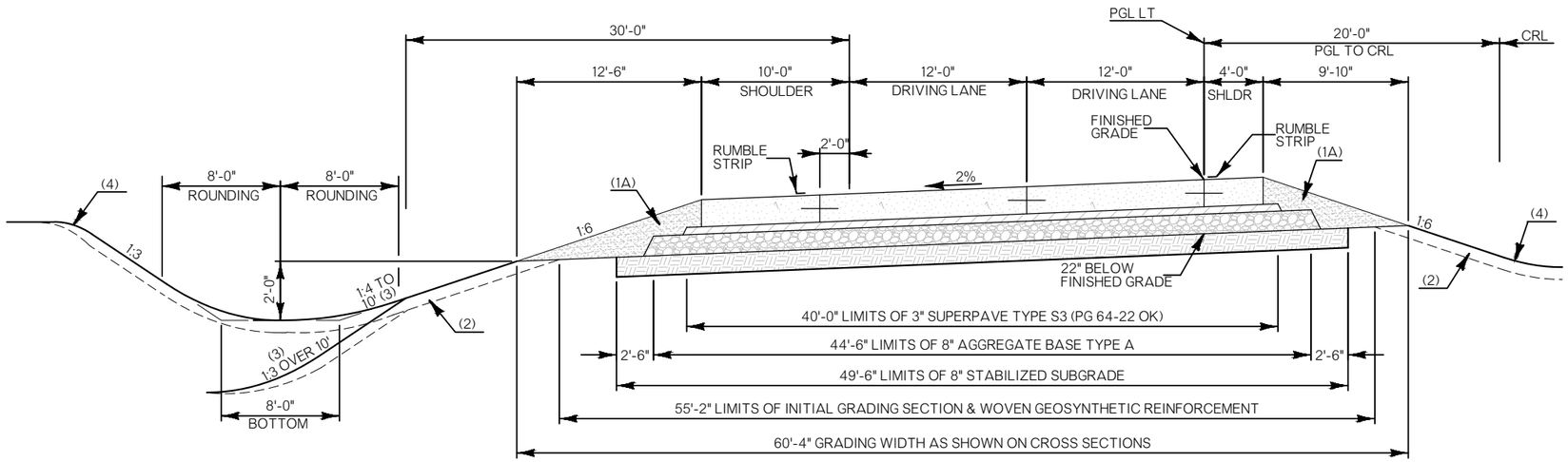
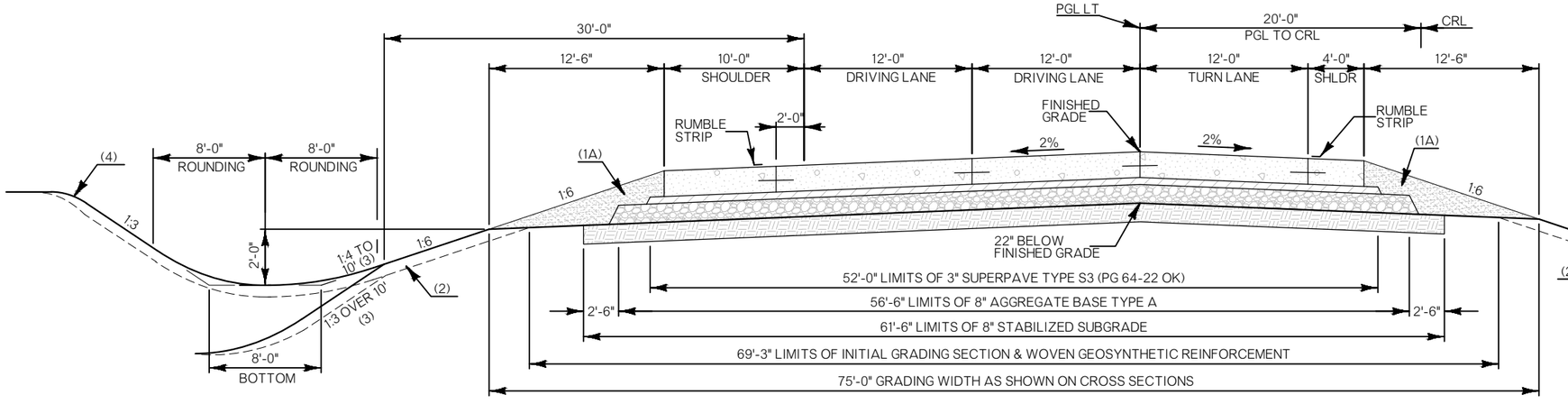


CRL US-69 SOUTHBOUND
STA. 1344+13.06 TO STA. 1350+76.04
STA. 1352+37.36 TO STA. 1372+70.10
STA. 1378+63.15 TO STA. 1413+07.68
STA. 1419+00.68 TO STA. 1431+49.96
STA. 1437+42.96 TO STA. 1452+19.21
STA. 1458+12.21 TO STA. 1469+27.54
STA. 1475+20.54 TO STA. 1495+64.59
STA. 1497+25.99 TO STA. 1508+99.42
STA. 1514+92.42 TO STA. 1529+21.35
STA. 1542+56.92 TO STA. 1547+23.72
STA. 1562+22.37 TO STA. 1585+75.80
STA. 1591+68.80 TO STA. 1614+79.93
STA. 1620+72.93 TO STA. 1642+79.30
STA. 1648+72.65 TO STA. 1674+06.51
STA. 1679+99.51 TO STA. 1698+06.48
STA. 1703+99.44 TO STA. 1725+31.62
STA. 1731+24.62 TO STA. 1734+00.00

TYPICAL SECTION 5

PAVEMENT REQUIREMENT		
14" PAVT. STRUCTURE	DRIVING LANES & INSIDE SHOUDER	8'-0" OUTSIDE SHOULDER
SURFACE COURSE	11" DOWEL JOINTED PC CONCRETE	11" PC CONCRETE
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)



CRL US-69 SOUTHBOUND
STA. 1372+70.10 TO STA. 1376+83.13
STA. 1413+07.68 TO STA. 1417+20.68
STA. 1431+49.96 TO STA. 1435+62.96
STA. 1452+19.21 TO STA. 1456+32.21
STA. 1469+27.54 TO STA. 1473+40.54
STA. 1508+99.42 TO STA. 1513+12.42
STA. 1529+21.35 TO STA. 1540+75.84
STA. 1547+23.72 TO STA. 1551+36.72
STA. 1585+75.80 TO STA. 1589+88.80
STA. 1614+79.93 TO STA. 1618+92.93
STA. 1642+79.30 TO STA. 1646+92.46
STA. 1674+06.51 TO STA. 1678+19.51
STA. 1698+06.48 TO STA. 1702+19.48
STA. 1725+31.62 TO STA. 1729+44.62

TYPICAL SECTION 6

PAVEMENT REQUIREMENT		
14" PAVT. STRUCTURE	DRIVING LANES & INSIDE SHOUDER	8'-0" OUTSIDE SHOULDER
SURFACE COURSE	11" DOWEL JOINTED PC CONCRETE	11" PC CONCRETE
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

(1A) BACKFILL NOTE:
TO BE BACKFILLED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN T.B.S.C. TYPE E. QUANTITY IS COMPUTED AT 1.05 TON PER LF. (0.61 TON LEFT SIDE & 0.44 TON RIGHT SIDE) IN TYPICAL 5 AND 1.22 TON PER LF (0.61 TON PER SIDE) IN TYPICAL 6.

(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.

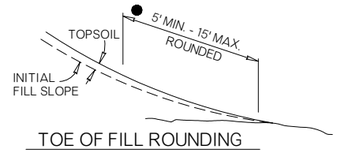
THE GRADING LINE AS SHOWN ON THE TYPICAL AND CROSS SECTIONS IS TO THE TOP OF THE TOPSOIL. EARTHWORK QUANTITIES WERE NOT ADJUSTED FOR SALVAGE AND THE TOPSOIL QUANTITY IS INCLUDED IN THE MASS LINE BALANCE.

(3) DISTANCE ARE MEASURED VERTICALLY FROM EDGE OF FINISHED GRADE SHOULDER.

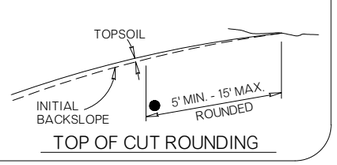
(4) FOR ROUNDING DETAIL SEE THIS SHEET.

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

OKLAHOMA DEPARTMENT OF TRANSPORTATION

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COUNTY MAYES HIGHWAY US-69 STATE JOB NO. 31963(04) SHEET NO. 0004

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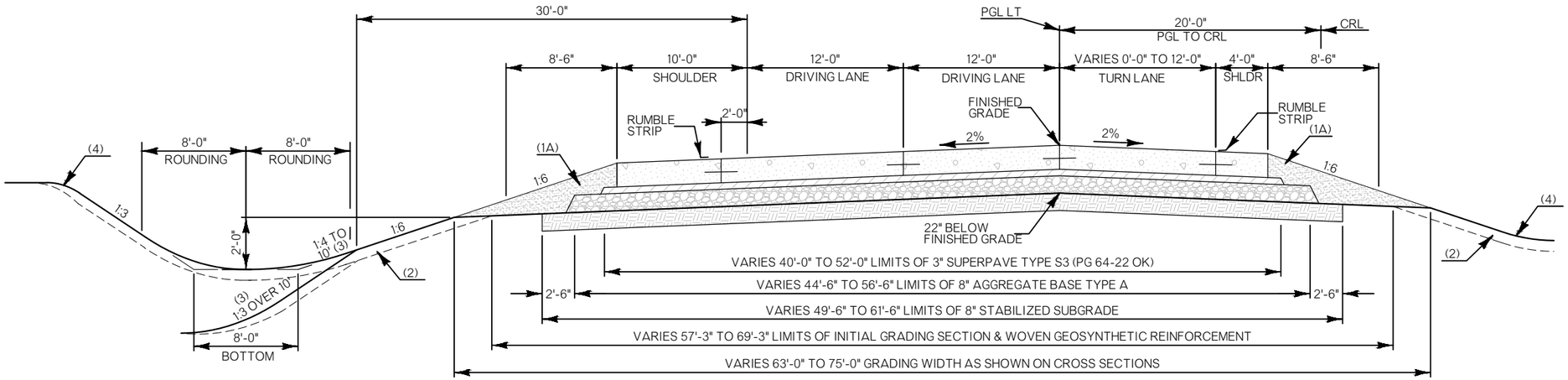
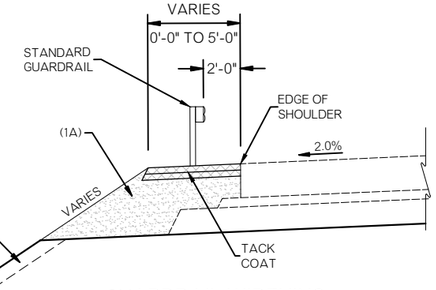


TYPICAL SECTION 7

CRL US-69 SOUTHBOUND
STA. 1376+83.13 TO STA. 1378+63.15
STA. 1417+20.68TO STA. 1419+00.68
STA. 1435+62.96TO STA. 1437+42.96
STA. 1456+32.21 TO STA. 1458+12.21
STA. 1473+40.54 TO STA. 1475+20.54
STA. 1513+12.42 TO STA. 1514+92.42
STA. 1540+75.84 TO STA. 1542+56.92
STA. 1551+36.72 TO STA. 1552+29.52
STA. 1589+88.80 TO STA. 1591+68.80
STA. 1618+92.93 TO STA. 1620+72.93
STA. 1646+92.46 TO STA. 1648+72.65
STA. 1678+19.51 TO STA. 1679+99.51
STA. 1702+19.48 TO STA. 1703+99.44
STA. 1729+44.62 TO STA. 1731+24.62

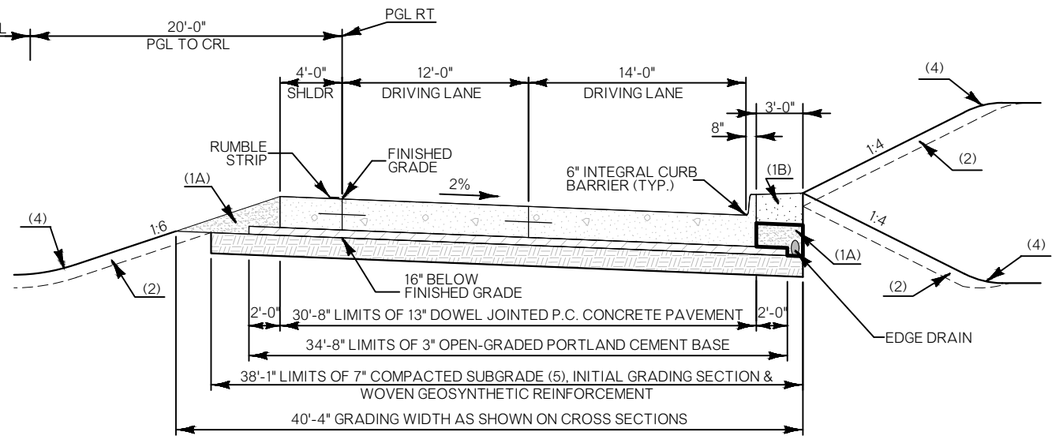
PAVEMENT REQUIREMENT		
14" PAVT. STRUCTURE	DRIVING LANES & INSIDE SHOUDER	8'-0" OUTSIDE SHOULDER
SURFACE COURSE	11" DOWEL JOINTED PC CONCRETE	11" PC CONCRETE
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	3" SUPERPAVE TYPE S3 (PG 64-22 OK)



GUARDRAIL WIDENING

CRL US-69 SOUTHBOUND
STA. 1352+37.36 TO STA. 1355+67.38 (LT. SIDE)
STA. 1352+37.36 TO STA. 1356+29.88 (RT. SIDE)
STA. 1497+25.98 TO STA. 1500+56.00 (LT. SIDE)
STA. 1497+25.98 TO STA. 1501+18.51 (RT. SIDE)

PAVEMENT REQUIREMENT	
4" PAVT. STRUCTURE	GUARDRAIL WIDENING
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 64-22 OK)
BASE COURSE	2" SUPERPAVE TYPE S4 (PG 64-22 OK)



TYPICAL SECTION 8

CRL US-69 NORTHBOUND
STA. 1344+13.06 TO STA. 1344+43.60

PAVEMENT REQUIREMENT	
16" PAVT. STRUCTURE	DRIVING LANES & SHOULDER
SURFACE COURSE	13" DOWEL JOINTED PC CONCRETE
BASE COURSE	3" OPEN-GRADED PORTLAND CEMENT BASE

(1A) BACKFILL NOTE:
TO BE BACKFILLED AS PART OF THE FINISHING OPERATIONS. QUANTITY IS MEASURED IN T.B.S.C. TYPE E. QUANTITY IS COMPUTED AT 1.22 TON PER LF (0.61 TON PER SIDE) IN TYPICAL 7 AND 0.42 TON PER LF (0.26 TON LEFT SIDE & 0.16 TON RIGHT SIDE) IN TYPICAL 8 AND AN ADDITIONAL 0.09 TON PER LF IN GUADRAIL WIDENING.

(1B) BACKFILL NOTE:
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(2) TOPSOIL NOTE:
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(3) DISTANCE ARE MEASURED VERTICALLY FROM EDGE OF FINISHED GRADE SHOULDER.

(4) FOR ROUNDING DETAIL SEE SHEET 0004.

(5) COMPACTED SUBGRADE NOTE:
TO BE COMPACTED TO AT LEAST 95% OF MAXIMUM DENSITY AND WITHIN 2% OF OPTIMUM MOISTURE CONTENT PER SECTION 202.04A.(5)(b)(2). MOISTURE CONTENT SHALL BE VERIFIED IMMEDIATELY PRIOR TO THE PLACEMENT OF THE PAVEMENT SECTION. COST TO BE INCLUDED IN OTHER ITEMS OF WORK.

OKLAHOMA DEPARTMENT OF TRANSPORTATION
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COUNTY MAYES HIGHWAY US-69 STATE JOB NO. 31963(04) SHEET NO. 0005

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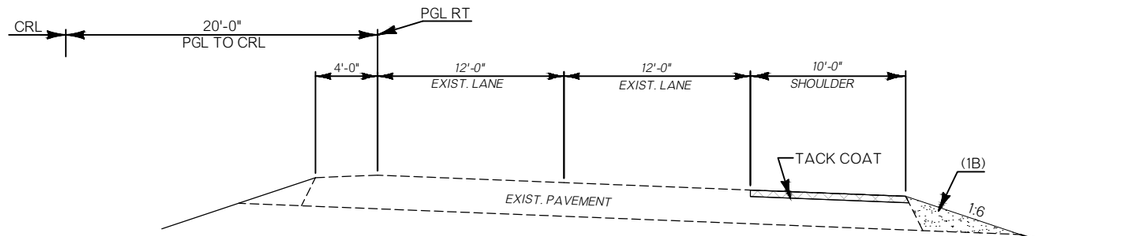
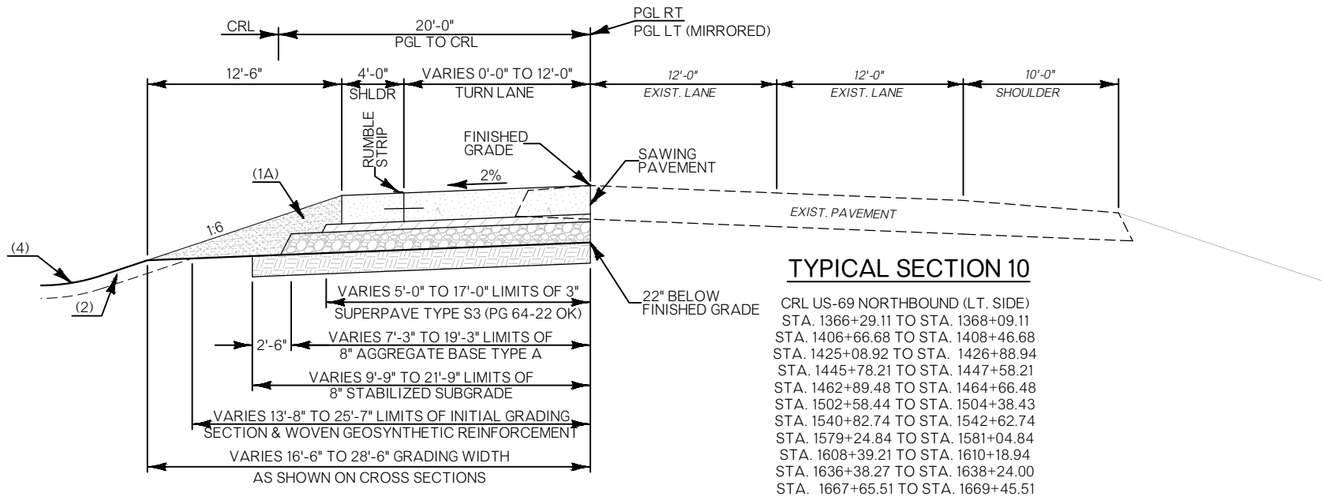


TYPICAL SECTION 9

CRL US-69 NORTHBOUND (RT. SIDE)
STA. 1344+43.60 TO STA. 1350+73.06
STA. 1352+36.46 TO STA. 1495+63.48
STA. 1497+25.45 TO STA. 1518+71.90
STA. 1544+39.49 TO STA. 1552+98.92
STA. 1562+85.80 TO STA. 1736+92.72

PAVEMENT REQUIREMENT	
2" PAVT. STRUCTURE	SHOULDER
MILL	2"
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 64-22 OK)



TYPICAL SECTION 10

CRL US-69 NORTHBOUND (LT. SIDE)
STA. 1366+29.11 TO STA. 1368+09.11
STA. 1406+66.68 TO STA. 1408+46.68
STA. 1425+08.92 TO STA. 1426+88.94
STA. 1445+78.21 TO STA. 1447+58.21
STA. 1462+89.48 TO STA. 1464+66.48
STA. 1502+58.44 TO STA. 1504+38.43
STA. 1540+82.74 TO STA. 1542+62.74
STA. 1579+24.84 TO STA. 1581+04.84
STA. 1608+39.21 TO STA. 1610+18.94
STA. 1636+38.27 TO STA. 1638+24.00
STA. 1667+65.51 TO STA. 1669+45.51
STA. 1691+65.48 TO STA. 1693+45.48
STA. 1716+61.42 TO STA. 1718+36.62

CRL US-69 SOUTHBOUND (RT. SIDE) (MIRRORED)
STA. 1552+29.52 TO STA. 1553+16.72

PAVEMENT REQUIREMENT	
14" PAVT. STRUCTURE	TURN LANE & SHOULDER
SURFACE COURSE	11" DOWEL JOINTED PC CONCRETE
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

(1A) BACKFILL NOTE:
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(1B) BACKFILL NOTE:
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(2) TOPSOIL NOTE:
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(4) FOR ROUNDING DETAIL SEE SHEET 0004.

OKLAHOMA DEPARTMENT OF TRANSPORTATION

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COUNTY MAYES HIGHWAY US-69 STATE JOB NO. 31963(04) SHEET NO. 0006

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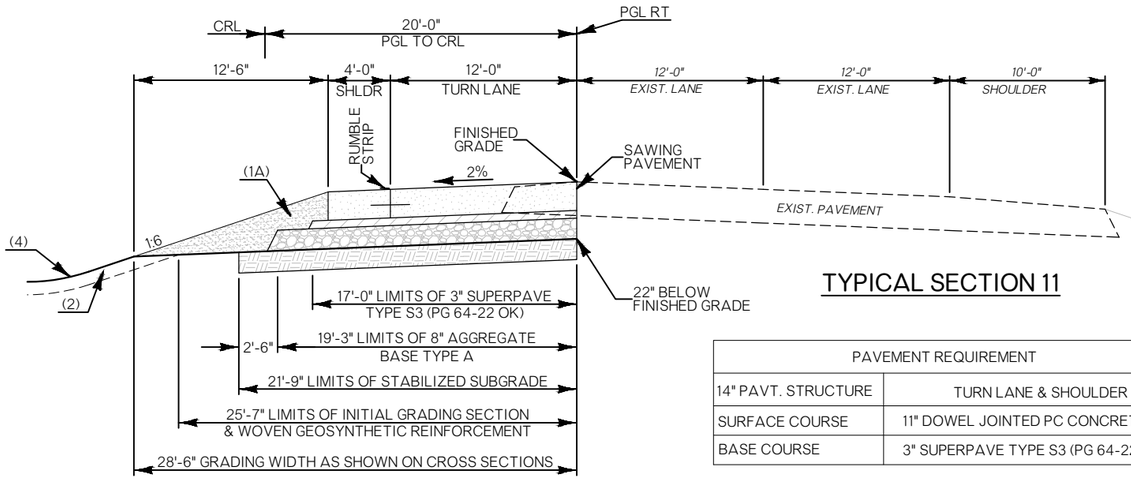
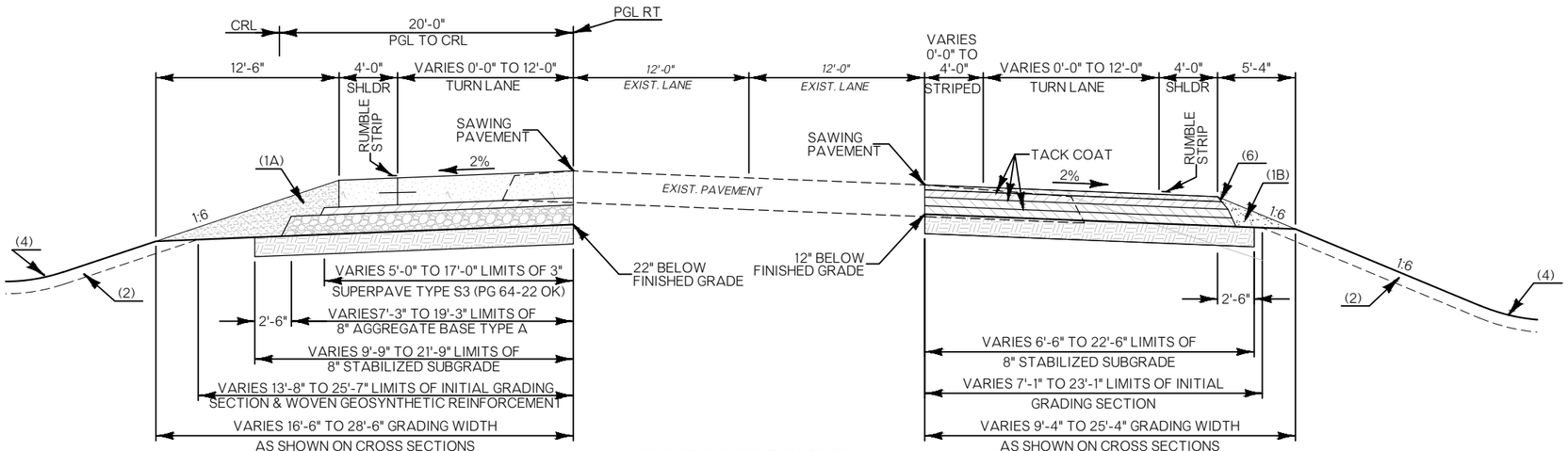


TYPICAL SECTION 11

PAVEMENT REQUIREMENT	
14" PAVT. STRUCTURE	TURN LANE & SHOULDER
SURFACE COURSE	11" DOWEL JOINTED PC CONCRETE
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)

CRL US-69 NORTHBOUND (LT. SIDE)
STA. 1368+09.11 TO STA. 1372+22.11
STA. 1408+46.68 TO STA. 1412+59.68
STA. 1426+88.94 TO STA. 1431+01.96
STA. 1447+58.21 TO STA. 1451+71.21
STA. 1464+66.48 TO STA. 1468+79.48
STA. 1504+38.43 TO STA. 1508+51.42
STA. 1542+62.74 TO STA. 1546+75.74
STA. 1581+04.84 TO STA. 1585+17.84
STA. 1610+18.94 TO STA. 1614+31.94
STA. 1638+24.00 TO STA. 1642+31.27
STA. 1669+45.51 TO STA. 1673+58.51
STA. 1693+45.48 TO STA. 1697+58.48
STA. 1718+36.62 TO STA. 1724+83.62



TYPICAL SECTION 12

CRL US-69 NORTHBOUND
STA. 1518+71.90 TO STA. 1521+11.90 (RT. SIDE)
STA. 1522+70.28 TO STA. 1524+50.28 (LT. SIDE)

PAVEMENT REQUIREMENT			
14" PAVT. STRUCTURE	LEFT TURN LANE & SHOULDER	12" PAVT. STRUCTURE	RIGHT TURN LANE & SHOULDER
SURFACE COURSE	11" DOWEL JOINTED PC CONCRETE	SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 70-28 OK)
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	BASE COURSE	3" SUPERPAVE TYPE S3 (PG 70-28 OK)
			3.5" SUPERPAVE TYPE S3 (PG 64-22 OK)
			3.5" SUPERPAVE TYPE S3 (PG 64-22 OK)

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(4) FOR ROUNDING DETAIL SEE SHEET 0004

(6) SAFETY EDGE TO BE USED INSTEAD OF TRADITIONAL 1:1 SLOPE AND COST TO BE INCLUDED IN OTHER ITEMS OF WORK, AS NO ADDITIONAL QUANTITY HAS BEEN INCLUDED.

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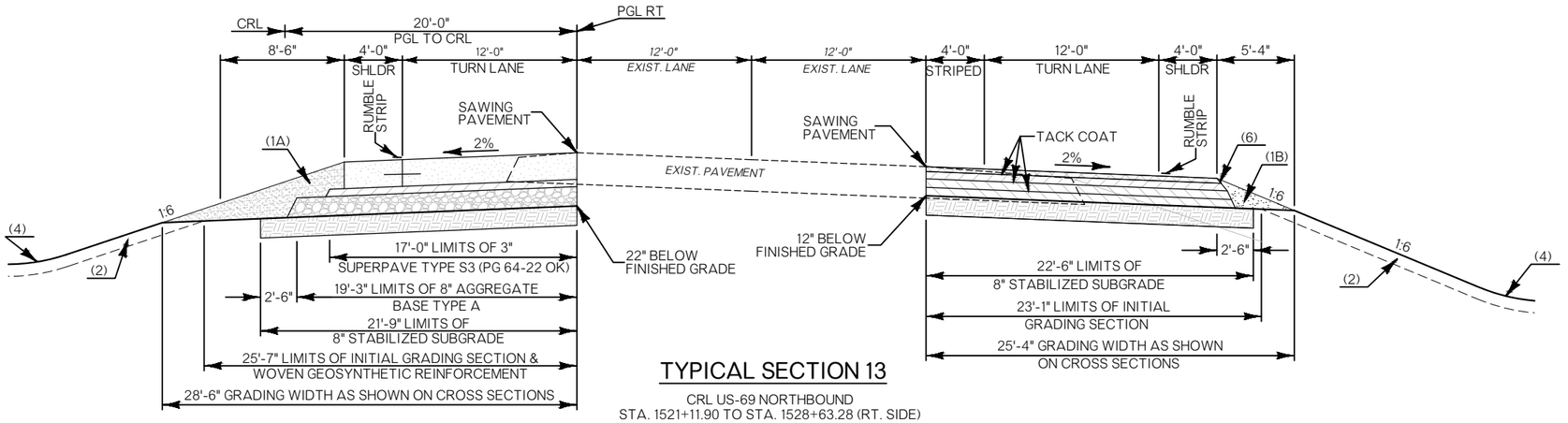
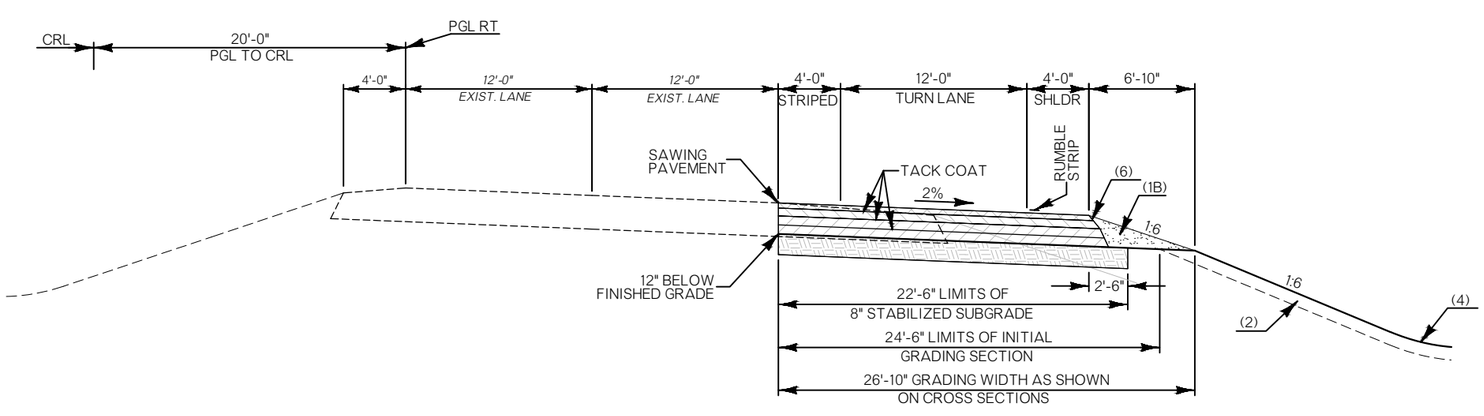


TYPICAL SECTION 13

CRL US-69 NORTHBOUND
STA. 1521+11.90 TO STA. 1528+63.28 (RT. SIDE)
STA. 1524+50.28 TO STA. 1528+63.28 (LT. SIDE)

PAVEMENT REQUIREMENT			
14" PAVT. STRUCTURE	LEFT TURN LANE & SHOULDER	12" PAVT. STRUCTURE	RIGHT TURN LANE & SHOULDER
SURFACE COURSE	11" DOWEL JOINTED PC CONCRETE	SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 70-28 OK)
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 64-22 OK)	BASE COURSE	3" SUPERPAVE TYPE S3 (PG 70-28 OK)
			3.5" SUPERPAVE TYPE S3 (PG 64-22 OK)
			3.5" SUPERPAVE TYPE S3 (PG 64-22 OK)



TYPICAL SECTION 14

CRL US-69 NORTHBOUND (RT. SIDE)
STA. 1528+63.28 TO STA. 1541+46.04

PAVEMENT REQUIREMENT	
12" PAVT. STRUCTURE	RIGHT TURN LANE & SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 70-28 OK)
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 70-28 OK)
	3.5" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3.5" SUPERPAVE TYPE S3 (PG 64-22 OK)

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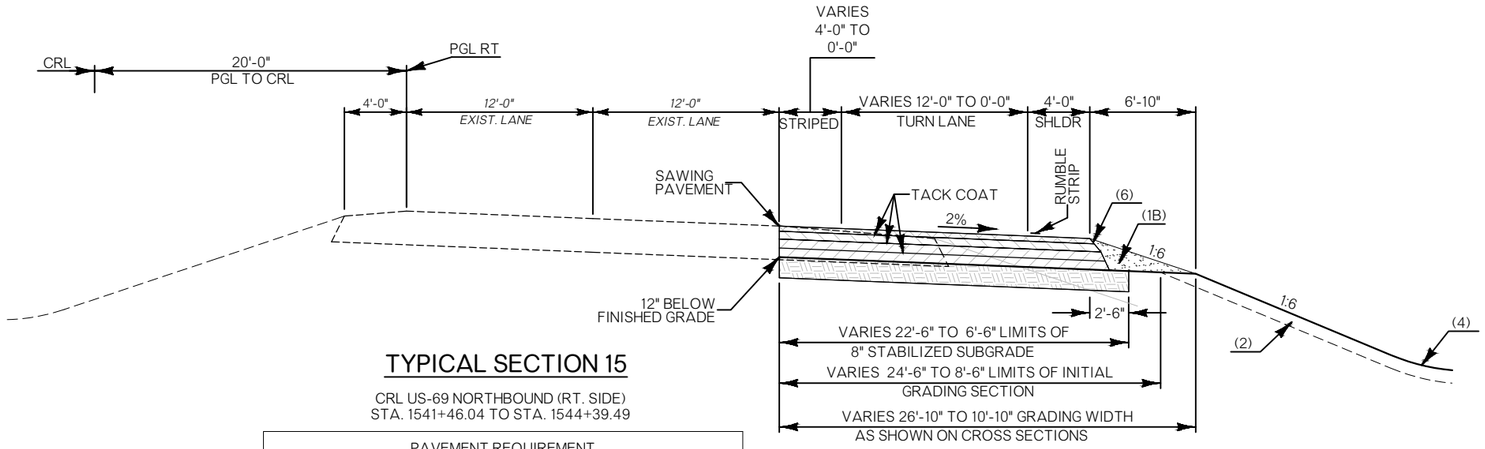
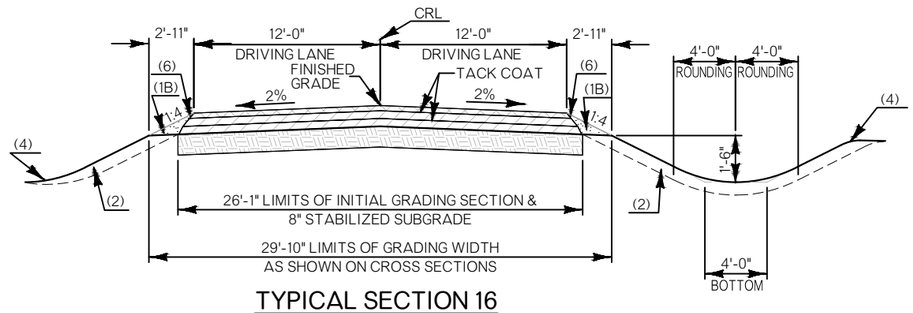


TYPICAL SECTION 15

CRL US-69 NORTHBOUND (RT. SIDE)
STA. 1541+46.04 TO STA. 1544+39.49

PAVEMENT REQUIREMENT	
12" PAVT. STRUCTURE	RIGHT TURN LANE & SHOULDER
SURFACE COURSE	2" SUPERPAVE TYPE S4 (PG 70-28 OK)
BASE COURSE	3" SUPERPAVE TYPE S3 (PG 70-28 OK)
	3.5" SUPERPAVE TYPE S3 (PG 64-22 OK)
	3.5" SUPERPAVE TYPE S3 (PG 64-22 OK)



TYPICAL SECTION 16

CRL W 450
STA. 10+90.24 TO STA. 13+82.12

PAVEMENT REQUIREMENT	
8" PAVT. STRUCTURE	DRIVING LANES
SURFACE COURSE	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)

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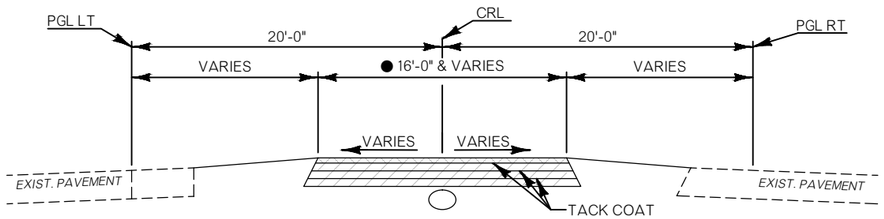


FOR DETAILS NOT SHOWN SEE PLAN & PROFILE SHEETS

DETOUR CROSSOVER TYPICAL

CRL US-69

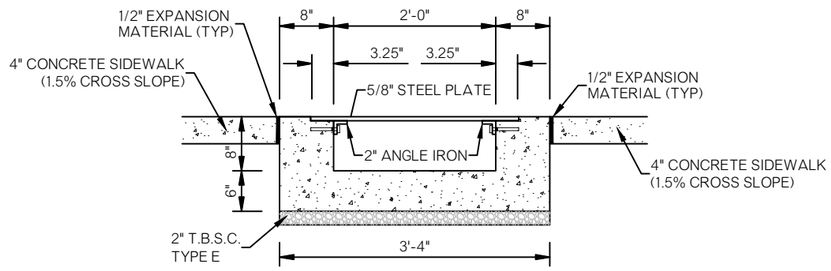
CROSSOVER 1:	STA. 1344+12.58	TO	STA. 1344+37.34	● VARIES 10'-5" TO 16'-0"
	STA. 1344+37.34	TO	STA. 1345+17.04	● 16'-0"
	STA. 1345+17.04	TO	STA. 1346+59.14	● VARIES 16'-0" TO 0'-0"
CROSSOVER 2:	STA. 1485+75.92	TO	STA. 1487+63.18	● VARIES 0'-0" TO 16'-0"
	STA. 1487+63.18	TO	STA. 1488+81.94	● 16'-0"
	STA. 1488+81.94	TO	STA. 1490+95.90	● VARIES 16'-0" TO 0'-0"
CROSSOVER 3:	STA. 1498+86.69	TO	STA. 1500+75.89	● VARIES 0'-0" TO 16'-0"
	STA. 1500+75.89	TO	STA. 1501+92.44	● 16'-0"
	STA. 1501+92.44	TO	STA. 1503+84.07	● VARIES 16'-0" TO 0'-0"
CROSSOVER 4:	STA. 1549+17.78	TO	STA. 1551+39.29	● VARIES 0'-0" TO 21'-9"
	STA. 1551+39.29	TO	STA. 1552+99.07	● VARIES 21'-9" TO 32'-0"
	STA. 1552+99.07 RT	TO	STA. 1554+76.33 RT	● VARIES 14'-6" TO 0'-0"
	STA. 1552+99.07 LT	TO	STA. 1554+88.31 LT	● VARIES 13-9" TO 0'-0"
CROSSOVER 5:	STA. 1650+51.39 RT	TO	STA. 1652+40.50 RT	● VARIES 0'-0" TO 16'-2"
	STA. 1650+51.65 LT	TO	STA. 1652+40.50 LT	● VARIES 0'-0" TO 16'-0"
	STA. 1652+40.50	TO	STA. 1653+00.00	● VARIES 32'-4" TO 16'-2"
	STA. 1653+00.00	TO	STA. 1653+58.96	● VARIES 16'-2" TO 32'-4"
	STA. 1653+58.96 RT	TO	STA. 1655+39.64 RT	● VARIES 16'-2" TO 0'-0"
	STA. 1653+58.96 LT	TO	STA. 1655+49.36 LT	● VARIES 16'-0" TO 0'-0"
CROSSOVER 6:	STA. 1735+96.88	TO	STA. 1737+73.01	● VARIES 2'-3" TO 16'-0"
	STA. 1737+73.01	TO	STA. 1739+42.20	● 16'-0"
	STA. 1739+42.20	TO	STA. 1741+95.59	● VARIES 16'-0" TO 2'-0"

PAVEMENT REQUIREMENT	
11" PAVT. STRUCTURE	TEMPORARY MEDIAN CROSSOVER
SURFACE COURSE	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)

FASTEN PLATE TO BOTH SIDES OF FLUME WALLS WITH WELDED 2" ANGLE IRON AND 1/2"X4" ANCHOR BOLTS 6" IN FROM EACH END AND A MAXIMUM SPACING OF 1'-0" ALONG THE LENGTH OF THE COVERPLATE.

NOTE:
STEEL PLATE TO EXTEND 2'-0" BEYOND BOTH EDGES OF SIDEWALK WIDTH WHERE POSSIBLE.

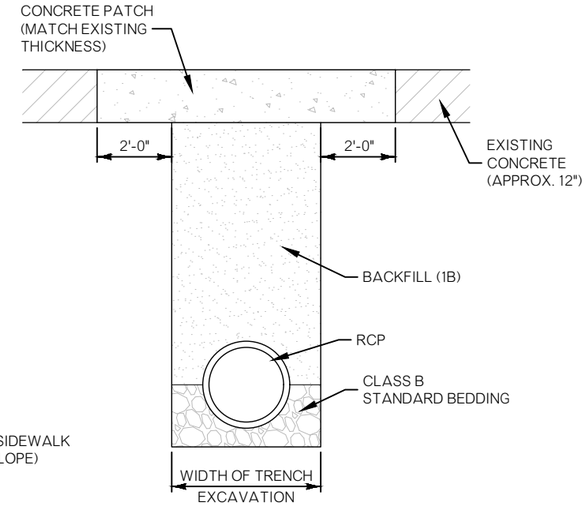
ALL ASSOCIATED COSTS TO CONSTRUCT CONCRETE FLUME SHALL BE INCLUDED IN UNIT PRICE BID PER CY FOR CLASS A CONCRETE.



FLUME DETAIL

NTS

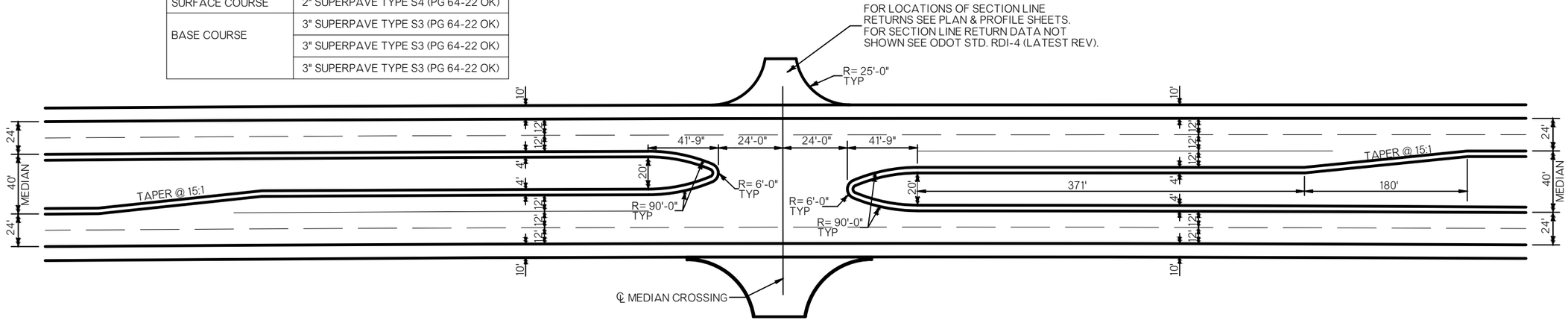
CRL US-69
STA. 1306+78.20 LT
STA. 1313+54.12 RT



CONCRETE PATCH DETAIL

NTS

CRL US-69
STA. 1305+97.96 TO STA. 1307+70.39
STA. 1313+17.19
STA. 1330+71.57



TYPICAL MEDIAN OPENING DETAIL

NTS

CRL US-69
STA. 1372+46.11
STA. 1412+83.68
STA. 1431+25.96
STA. 1451+95.21
STA. 1469+03.46
STA. 1508+75.42
STA. 1528+92.38
STA. 1546+99.78
STA. 1585+46.80
STA. 1614+55.94
STA. 1642+55.30
STA. 1673+82.51
STA. 1697+82.48
STA. 1725+07.62

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