

TO:	Oklahoma Department of Transportation
FROM:	Freese and Nichols, Inc.
SUBJECT:	US-259: Phase 1B – Preliminary Engineering of Ultimate Configuration
PROJECT:	US-259 from 6.25 Mi. N. of SH-3 junction Ext. N. 6.0 Mi. Oklahoma Department of Transportation Contract Identification No. 2309B Job Piece No. 34333(04) McCurtain County
DATE:	March 31, 2022

1.00 BACKGROUND

The goal of the Phase 1B conceptual design is to maximize the available existing right-of-way (R/W) for the widening of the highway from 2-lanes to 5-lanes. The purpose of this Technical Memorandum is to provide sufficient design detail to the Oklahoma Department of Transportation (ODOT) to aid in the review of the design recommendations for the widening of US-259 in McCurtain County. The functional classification for this portion of US-259 is a Rural Principal Arterial (Table 12-2). However, because this road is not a divided highway, 3R geometric design criteria of Suburban Principal Arterials (Table 13.2E) is expected to be utilized. The existing roadway consists of a 2-lane undivided roadway with variable posted speed ranging from 55 to 65 mph.

This project is separated into 2 phases with Phase 1A supplying temporary intersection designs at Sherry Lane, SH-259A South, SH-259A North, and Stevens Gap Road. Phase 1A is expected to include right-turn and left turn bays to address turning movement issues. Phase 1A is intended to prepare users of the corridor for the ultimate configuration of US-259 upon completion of Phase 1A and Phase 1B. Phase 1B is intended to address the expansion of the roadway footprint and drainage considerations.

1.01 ENVIRONMENTAL

The conceptual design, including both the Limits of Construction (LOC) and the Right-of-Way (R/W) has been reviewed with the Reconnaissance Data Collection Report (May 2021) to identify potential environmental constraints. **Table 1.1** is a summary overview of the constraints that compliment a more detailed description in **Appendix A**.

Table 1.1 Environmental Constraints

Potential Environmental Constraints	Present in Project Area?	Constraint?	Comment (See Appendix A for add'l information)
A. Streams & Wetlands	Y	N	Terms and conditions of Nationwide Permit 14 applies.
B. Protected Species & Habitats			
Federally-listed Threatened/Endangered/Proposed/Candidate Species	Y	N	Listed for McCurtain County, OK.
US Fish & Wildlife Species Designated Critical Habitat	N	N	
Federally-listed Aquatic Dependent Species	Y	N	Listed for the Little Rivers Watershed and the Mountain Fork River and its tributaries
Potential Northern Long-Eared Bat & American Burying Beetle Habitat	Y	N	No occurrences of species in the project area (OK Natural Heritage Inventory).
Critical Resource Waters	N	N	
Section 10 Waters	N	N	
Scenic Rivers	N	N	
C. Cemetery	Y	N	Hochatown Cemetery
D. Federal Properties	Y	N	US Forest Service
E. Tribal Ownership	Y	N	Choctaw Tribal Trust
F. Public Parks & Recreation Areas	N	N	No LWCF funded parks within project area.
G. Festivals	N	N	Access to Beavers Bend State Park is proposed to remain open during festivals.
H. Hazardous Waste/UST & LUST Sites			
Hazardous Waste Sites (including Storage Tanks)	Y	N	Search of federal, state, and local databases performed by ERIS*.
Oil & Gas Wells	N	N	
I. Current & Abandoned Coal Mines	N	N	
J. Airports	N	N	Broken Bow Municipal Airport is approximately 1.5 miles SW of the project area.
K. Railroads & Military Properties	N	N	
Source: Garver Reconnaissance Data Collection Report - JP 34333(04) - US-259 Begin at W. 9th Street in Broken Bow, Extend North Approximately 12.5 Miles (May 2021 - CI-2141E Task Order 2)			
* - Environmental Risk Information Services (ERIS)			

1.02 PRESENT R/W AND UTILITES

Present Right-of-way is a minimum of 65 feet from the centerline of the surveyed alignment throughout the project limits, with variations in offset reaching 90 feet and even up to 130 feet at cut sections through hills.

Utilities within the project limits include water lines, overhead electric transmission lines, telephone lines, and fiber optic lines. According to the survey provided by ODOT, the beginning of this project at the intersection of SH-259A(S) contains two fiber optic lines parallel to the west side and one on the east side. An underground telephone lines runs parallel to the existing roadway on both sides of the road, while an overhead electric runs parallel on the west side. Continuing northbound one fiber optic and one underground telephone line runs parallel to the existing roadway on the west side, with the occasional overhead electric and water line either running parallel to the existing road, or perpendicular to, depending on which side of the road a building is being serviced. In more of the urbanized area beginning just north of SH-259A(N), the fiber optic tends to transition from the west to the east side, while the underground telephone continues on the west side. Through town, a majority of the utilities run parallel on the east side of the existing roadway, including the overhead electric and water line. Out of town, the utilities tend to mirror similar behavior as they do on the south end of the project extents.

1.03 TRAFFIC CONSIDERATIONS

As part of the 30% design, a traffic study of the corridor conducted by Lee Engineering (2018) was utilized to gather insight into possible areas needing attention. The study reported 126 collisions within the limits of the project over a 5-year period from 2011 to 2015. Of the 126 collisions reports, 2 collisions included at least one fatality. One of the fatalities was a single vehicle incident and the other was a head-on collision with unsafe speed attributed. The 126 collisions reported included 50 collisions with injury and 74 collisions that resulted in property damage. Phase 1A of this project is designed to mediate the intersection collision issues within the project limits. Phase 1B will concentrate on segments of US-259 that had higher numbers of collisions. The segments between Old Hochatown Road and Carson Creek Road had a higher number of collisions after the intersections. The study found that nearly 1/3 of collisions involved fixed objects with unsafe vehicle speeds contributing in 40% of incidents. Rear-end and turning collisions, in which unsafe/unlawful actions occurred, were responsible for 45% of collisions.

The existing posted speed along the project corridor are between 55mph to 65mph. It is recommended to reduce the speed in the urban area, between SH-259A(N) and north of Girls Gone Wine to 45mph. This lower speed will increase safety through this area as it continues to develop. This will also help increase the safety of the proposed signalized intersections at SH-259A(N) and Steven’s Gap Road.

Additionally, the area adjacent to the project location has seen a surge in land sales and construction activity over the past 2-3 years and that trend is anticipated to continue for the foreseeable future. To get a gauge on the possible needs of this corridor under various growth scenarios, a lane capacity sensitivity analysis was performed based on known mobility model calibrated capacity values. As shown in **Table 1.2** below, the corridor is anticipated to function at a LOS of D assuming a compounded growth of 2% per year over the life of the facility.

Table 1.2 Lane Capacity Sensitivity Analysis

Segment	Volume (vpd)						Link Capacity ² (Dir. ADT per lane)	V/C & LOS @ Configurations ³					
	Existing (2017) ¹	Growth Rate ¹	Design Year (2022)	Horizon Year (2042)				Lanes/Direction					
				2%	4%	6%		2		3		3	
								2%	4%	6%			
South of SH-259A South	7600	4%	9247	13740	20260	29655	8978	0.77	D	0.75	D	1.10	F
SH-259A South to SH-259A North	7400	4%	9003	13378	19727	28875	8978	0.75	D	0.73	D	1.07	F
SH-259A North to Stevens Gap	7400	4%	9003	13378	19727	28875	8978	0.75	D	0.73	D	1.07	F
North of Stevens Gap	2840	4%	3455	5134	7571	11082	8978	0.29	A/B	0.28	A/B	0.41	C

Notes

- 1 - Data pulled from Lee Engineering Study dated August 2018
- 2 - ACOG planning level link capacities - from Lee Engineering Study.
 - 2 lane Arterial = 17,100 vpd
 - Apply 5% increase for continuous center turn lane
- 3 - Link Capacities
 - V/C <= 0.45 - LOS A/B
 - 0.45 > V/C < 0.65 - LOS C
 - 0.65 > V/C < 0.80 - LOS D
 - 0.80 > V/C < 1.00 - LOS E

As a result of widening of the roadway, it will increase the safety and capacity of the corridor. The existing 2-lane roadway will be expanded to 5-lanes with 12-foot travel lanes and a 14-foot two-way left turn lane (TWLTL).

1.04 ACCESS MANAGEMENT

Existing access management along the corridor was evaluated to identify driveways that could be removed, consolidated, or modified. Some driveways along the project limits greatly exceed the recommended ODOT standard regarding driveways (Table 9.9.). See Appendix B for driveway recommendations.

1.05 DESIGN CRITERIA AND TYPICALS

For the entirety of this project, 3R criteria was selected due to the overlay and widening nature of the existing roadway. Proposed driving lanes are 12 feet wide with a 14-foot wide TWLTL in the center of the roadway. Shoulders are a minimum of 6 feet in width through the rural portions of the project, with the occasional 2-foot offset curb and gutter to help reduce and/or eliminate R/W acquisition. Off the edge of pavement, a 4-foot wide ditch bottom is proposed due to the lack of hydraulic concern along the project. As for the urban section along this project's corridor, the same roadway footprint dimensioning holds true for the typical, except for the 6-foot wide shoulder there will be a 2-foot wide curb and gutter. Clear zone for 3R criteria is 13 feet for cut sections and 19 feet for fill sections for speeds up to 70 mph.

Figure 1 shows an overview of the project and the approximate areas of distinction of what is being considered as rural and urban. The rural segments of the project limits have the most amount of anticipated earthwork. The rural south side experiences some fill portions that require retaining wall, but the rural north side has considerably more deeper fill slopes than the south side. Both the north and south rural segments have their fair share of cut slopes, but the rural north side still has the most that require a hybrid section of the rural template with curb and gutter.



Figure 1. Project Map Overview

An assumed pavement structure consists of a 2" S4 (PG 64-22 OK) lift, two 3" S4 (PG 64-22 OK) lifts, and 8" of Aggregate Base Type A. It is assumed that the overlay of the existing will include a 2" mill and 5" asphalt overlay (2" lift and 3" lift) of the existing driving lanes only. Full-depth reconstruction and widening begins at the edge of the existing driving lanes.

Two locations along this project differ from the approach of widening off of existing grade and will require full-depth reconstruction. These two station ranges are 400+50 to 415+50 and from 510+50 to 525+50.

A. 400+50 to 415+50

This area is through a large existing cut of a hill and to help eliminate R/W and reduce earthwork, curb and gutter was added alongside the proposed shoulder. The existing terrain is flat going north and a minimum slope of 0.3% is required with curb and gutter (November 2014 ODOT Drainage Manual – Sec. 10.9.3.1). However, an alternative solution to eliminate this section for full-depth reconstruction would be an open ditch section with the use of retaining wall. A retaining wall would also reduce a significant amount of earthwork in this area as well.

B. 510+50 to 525+50

The main factor driving this design decision is that businesses such as "Girls Gone Wine" are currently close to the existing roadway footprint. When considering widening the roadway from an existing 2-lane to a proposed 5-lane roadway, it will reduce the capacity of the parking lot for those businesses. It

was determined to do a full-depth reconstruction with curb and gutter to allow for parking within ODOT's R/W. It is possible to match existing grade and perform the overlay with widening and an open ditch, but this takes a majority of the parking lot. In the overlay scenario, a curb and gutter in leu of an open ditch would not be ideal due to water ponding behind the curb. However, an alternative solution would be to put an area inlet behind the curb assuming overlaying the existing roadway is the preferred design option moving forward.

1.06 R/W ELIMINATION MEASURES

A. Retaining Walls

A retaining wall has been proposed to help eliminate R/W acquisition along the project limits. The proposed retaining wall is currently designed at approximately 9 feet tall, and has total segment runs of 12,275 linear feet along the corridor. Both fill and cut sections periodically required retaining wall. All proposed retaining wall is outside of the required 3R clear zone for speeds up to 70mph. Although the retaining wall is outside of the required clear zone, a 10:1 taper for 100 feet was provided at the beginning of each approach to add a buffer to the clear zone and to increase safety. The current estimate for the proposed retaining wall accounts for about \$7.63M (unit cost estimated at \$800/SY), the largest single cost for any pay item.

B. Rural Curb and Gutter

Curb and gutter were used frequently in the proposed design of this project. It was added on to the rural template which already had 6-foot shoulders, but the additional 2-foot curb and gutter offset allows for the elimination of ditch and can tie in more quickly to existing ground. Curb and gutter also allows for a 3:1 slope (Table 8.3B & Table 8.3) in leu of a 4:1 backslope.

C. Drainage Structures

There are approximately 26 cross-drain structures within the project limits. Of those 16 are RCBs while 10 are RCPs. The intent is to remove existing headwalls/end treatments and extend them using parallel wingwalls. For larger RCB structures, it is proposed to either use guardrail to protect errant vehicles from driving over the headwall, while a curb and gutter to reduce R/W needs and to allow for appropriate flowline grading. With smaller structures, less room is needed for flowline grading, while the parallel wingwalls could be constructed to the proposed retaining wall, when necessary.

D. Driveways/Access Management

There are over 100 existing residential and commercial driveways within the project limits. The ACCESS MANAGEMENT section further elaborates on the proposed intent to consolidate a few of the driveways and entrance/exits to assist with traffic flow and safety. Regarding R/W, the preliminary design layout shows that there could be a few driveways that may need temporary construction easements (TCE) beyond present R/W due to grading, consolidation efforts, etc.

1.07 PUBLIC EDUCATION

Given the nature of the corridor and the adjacent growth that the area is experiencing, information decimation and education of the general public will be key aspects in the success of this project in making the process go smoothly but also in achieving the desired safety improvements along the corridor. With this corridor serving as both a local roadway for residents and a regional connector, it is traveled by both familiar and unfamiliar driver. In order to reach the intended audience, a Public Education plan will need to be developed. Below are our recommended means of reaching the end user of this facility:

- Park Fliers – attached to the informational documents that are received upon making a reservation at the Park.
- Discussion/coordination with the local Podcast.
- Dynamic Message Signs (DMS) with corridor-based information before, during and after construction.

These elements can be discussed and negotiated as part of Phase 2.

1.08 CONSTRUCTION COST

According to the Initiation Report (2021) supplied by ODOT, the project budget for the roadway portion is \$30M. The estimated construction cost for the project with a proposed 5-lane roadway and drainage corridor is approximately \$34.3M with a 15% contingency included.

NOTE: Sources are all based on the ODOT 1992 Roadway Design Manual unless otherwise specified.

APPENDIX A

ENVIRONMENTAL

ENVIRONMENTAL CONSTRAINTS SUMMARY

The conceptual design, including both the Limits of Construction (LOC) and the Right-of-Way (R/W) (herein referred to as the project area) has been reviewed with the Reconnaissance Data Collection Report (May 2021) to identify potential environmental constraints:

- A. **Streams & Wetlands:** Seven stream crossings and one potential wetland were identified within the project area. Based on information provided by the Natural Resources Conservation Service, there are no wetland restoration program sites within the project area. It is anticipated that impacts to potential waters of the U.S. could meet the terms and conditions of Nationwide Permit 14.
- B. **Protected Species & Habitat:** Federally-listed threatened, endangered, proposed, and candidate species listed by the US Fish and Wildlife Service for the project area in McCurtain County included the following: the northern long-eared bat, piping plover, red knot, red-cockaded woodpecker, American alligator, leopard darter, Ouachita rock pocketbook, rabbitsfoot, scaleshell mussel, winged mapleleaf, American burying beetle and harperella. No designated critical habitat for these species is located within the project area. The majority of the project area occurs within the Little Rivers watershed. This area is located within a federally-listed aquatic dependent species watershed for the rabbitsfoot, Ouachita rock pocketbook, scaleshell, and winged mapleleaf. The north section of the project area is located within the Mountain Fork Rivers and its tributaries, which is a federally-listed aquatic dependent species watershed for the Leopard Darter. Potential habitat for the northern long-eared bat and the American burying beetle was observed within the project area. Communication with the Oklahoma Natural Heritage Inventory revealed no occurrences of relevant species within the project area or within 5 miles of the project area. There are no critical resource waters, Section 10 waters, or scenic rivers in the project area. Yashau Creek, which crosses the project area near Hochatown, is listed in Oklahoma's 2018 303(d) list of impaired waters for benthic macroinvertebrate bioassessments. Based on information obtained from the Oklahoma Department of Wildlife Conservation, there are no wildlife or waterfowl refuges located within the project area.
- C. **Cemetery:** The Hochatown Cemetery borders the R/W boundary along the east side of US-259 within the city limits of Hochatown.
- D. **Federal Properties:** There are three federal properties associated with the US Forest Service within or immediately adjacent to the project area .
- E. **Tribal Ownership:** There are two parcels within or immediately adjacent to the project area that are tribally owned by the Choctaw Tribal Trust.
- F. **Public Parks & Recreation Areas:** Based on information provided by the Oklahoma Tourism and Recreation Department, there are no parks within the project area that are funded by the Land and Water Conservation Fund (LWCF). Six access roads were identified within the project area that intersect with US-259 and provide access points to Beavers Bend State Park that are outside the park boundaries. These access roads are proposed to remain open during the construction phase of the project, and as such, the project is not expected to result in a "use" of a Section 4(f) property.
- G. **Festivals:** Five festivals were identified that occur in Beavers Bend State Park. These festivals include the Beavers Bend Folk Festival and Craft Show (occurs in November), Kiamichi Owa-Chito Festival of the Forest (occurs last weekend in April), Masters at Work Woodturning Competition & Exhibition (occurs in September), Master Woodworking Artist of the Year Competition and Exhibit (occurs March through May), and Total Archery Challenge (occurs in April). Access to Beavers Bend State Park is proposed to remain open during each festival.

- H. Hazardous Waste/UST & LUST Sites: A search of federal, state, and local databases of hazardous waste sites was performed by Environmental Risk Information Services (ERIS). According to the ERIS report, there are 12 hazardous waste sites (including storage tanks) within or adjacent to the project area. These hazardous waste sites are confirmed locations based on data from ERIS and field reconnaissance. According to the Oklahoma Corporation Commission Petroleum Tank Division database, no oil or gas wells are within or adjacent to the project area.
- I. Current & Abandoned Coal Mines: Based on information provided by the Oklahoma Conservation Commission Abandoned Mine Land Division, the project area is not within the Commercial Coal Belt of the Northeast Oklahoma Shelf, and no current or abandoned coal mines are within the project area.
- J. Airports: There are no airports located within the project area. The closest airport is the Broken Bow Municipal Airport, which is approximately 1.5 miles southwest of the project area.
- K. Railroads & Military Properties: There are no railroads or military properties located within or adjacent to the project area.

Based on the review of potential environmental constraints within the project area, significant adverse environmental impacts are not expected to result from the proposed project.

APPENDIX B

ACCESS MANAGEMENT

ACCESS MANAGEMENT

STATION	LEFT / RIGHT	FNI COMMENT/RECOMMENDATION	ODOT COMMENT/RECOMMENDATION
322+50	L	Facilitating Shady Oaks property access with dedicated driveway.	
327+50	R	Facilitating Beavers Bend Wildlife Museum property access with dedicated driveway. Replacing all of driveway within R/W and/or constructing access off SH-259A South?	
335+00	R	Removing existing gravel driveway. Property currently has access off SH-259A South.	
340+00	L	Removing existing gravel driveway. Property currently has access at STA. 345+00.	
389+00	R	Removing existing dirt driveway. Property currently has access at STA. 391+25.	
394+00	L	Removing existing driveway. Property currently has access at STA. 395+25.	
395+25	L	Realigning Post Oak Road. Will require temporary construction easement.	
403+75	L	Removing existing driveway. Property currently has access at STA. 405+00. Replacing all of driveway within R/W?	
414+00	L	Removing Post Oak Road access.	
417+75	R	Reconstruct/connecting to proposed Casino access drive.	
430+00	L	Realign Pinyon Road. Will require temporary construction easement.	
447+25	L	Removing existing driveway. Property currently has access at STA. 458+00 (Pinyon Road).	
449+50	L	Removing existing driveway. Property currently has access at STA. 458+00 (Pinyon Road).	
456+00	R	Removing existing driveway. Property currently has access at STA. 458+00 (Old Hochatown Road).	
456+75	L	Removing existing driveway. Property currently has access at STA. 458+00 (Pinyon Road).	
458+00	R	Realign Old Hochatown Road. Will require temporary construction easement.	
458+75	L	Removing existing driveway. Property currently has access at STA. 460+25.	
460+50	R	Removing existing driveway. Property currently has access at STA. 462+50.	
461+50	L	Removing existing driveway. Property currently has access at STA. 460+25.	
463+00	L	Removing existing driveway. Property currently has access at STA. 465+75.	
466+75	R	Removing existing driveway. Property currently has access at STA. 466+25.	

468+50	L	Removing existing driveway. Property currently has access at STA. 470+25.	
468+50	R	Removing existing driveway. Property currently has access at STA. 470+25.	
470+25	R	Reconstruct access to cemetery. Will require temporary construction easement.	
491+25	R	Removing existing driveway. Property currently has access at STA. 487+75.	
504+50	L	Removing existing driveway. Property currently has access at STA. 506+00.	
506+75	L	Removing existing driveway. Property currently has access at STA. 508+00.	
506+75	R	Removing existing driveway. Property currently has access at STA. 508+00.	
507+93	R	Construct shared access driveway to Abendigo's/Bruton's Outdoors North. Driveway is steeper than original and exceeds ODOT's 15% slope requirement.	
508+50	R	Removing existing driveway. Property currently has access at STA. 508+00.	
509+50	R	Removing existing driveway. Property currently has access at STA. 508+00.	
514+25	L	Removing existing driveway. Property currently has access at STA. 515+50.	
516+50 to 520+00	R	Remove and reconstruct all of Girls Gone Wine driveway within Pres. R/W? Maintain access drive on north side (STA. 520+00)?	
519+00	L	Removing existing driveway. Property currently has access at STA. 518+00.	
525+00 to 526+50	R	Realign Orca Road. Replace The Eat Out driveway?	
549+00	L	Removing existing driveway.	
555+00	L	Removing existing driveway.	
556+75	R	Removing existing driveway. Realigning access drive at STA. 560+00. Will require temporary construction easement.	
561+00	L	Realigning Sugarberry Trail. Will require temporary construction easement.	
634+50	R	Removing existing driveway.	
638+75	R	Realigning access driveway. Will require temporary construction easement.	
643+50	L	Facilitating Log Cabin Rentals property access with dedicated driveway.	
643+75	R	Reconstructing Gulf Course Road. May require temporary construction easement.	
647+00	L	Reconstructing access drive. May require temporary construction easement.	