



Draft Purpose and Need

Environmental Impact Statement Toll 49, Segment 6

CSJ: 0910-00-129

Smith County, Texas

February 2020 (Version 4)

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated December 9, 2019, and executed by FHWA and TxDOT.

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1 Draft Purpose and Need

1.1 Need

The proposed project is needed because the current roadway network between the Toll 49 Segment 5 terminus at State Highway (SH) 110 and United States (US) 271 northeast of Tyler is inadequate to meet current and future traffic volumes, resulting in reduced mobility, inadequate Level of Service (LOS) of roadways, and unreliable travel times.

1.2 Supporting Facts and Data

Existing Congestion & Mobility Issues

The 2018 Existing Conditions scenario network included in the Tyler Area Metropolitan Planning Organization (MPO) Draft 2045 Master Transportation Plan (MTP) shows congestion occurring along the highways that extend out from the City of Tyler and connect Tyler to surrounding municipalities, including the roadways that continue into the subject project area (SH 110, SH 31 and US 271).

Mobility Issues Based on Continued Growth

Population growth in Smith County is contributing to increasing congestion and longer travel times on local roadways. The population of Smith County grew from 174,714 in 2000 to 222,277 in 2017, an increase of 27 percent (U.S. Census Bureau, 2000, 2017). The central portion of Smith County has experienced growth in recent years, including the expansion of the University of Texas Medical Center and large new retail developments on the south side of Tyler including The Village at Cumberland Park. The Tyler Area MPO Draft 2045 Master Transportation Plan (MTP) indicates that strong population and employment growth is anticipated to continue in much of Tyler. Population growth in the area is shown in **Table 1** below.

Table 1: Population Growth

	Population		Percent Change	Projected Population
	2000	2017		2045
Smith County	174,714 ⁽¹⁾	222,277 ⁽²⁾	+27%	282,208 ⁽³⁾
Tyler East CCD*	15,253 ⁽¹⁾	20,500 ⁽²⁾	+34%	

Source: ⁽¹⁾ U.S. Census Bureau (2000), ⁽²⁾ U.S. Census Bureau (2017) ⁽³⁾ Tyler MPO MTP 2045

*Census County Division

The largest employers in the Tyler area are the CHRISTUS Trinity Mother Frances Health System and the UT Health East Texas Medical Center (Goody Clancy, 2013). Most of the health facilities associated with these employers are in central Tyler; however, additional facilities are present in all directions surrounding the city. The City of Tyler's influence stretches beyond the city and its extraterritorial jurisdiction. Its location effectively serves people who live within a 40 to 50 mile driving distance of Tyler, functioning as a regional center, particularly for retail, medical services, and employment for people living in Smith County and eight other counties in East Texas (Goody Clancy, 2013). The University of Texas (UT) at Tyler, UT Health Science Center and numerous medical facilities are destinations in the area that draw in employees, students, and the general public, contributing to traffic on roadways between SH 110 and US 271.

The region's large and stable base of healthcare, higher education and other key industries are expanding and sited to contribute to future growth in the area (TEDC, 2020). An estimated 10 percent increase in employment is anticipated between 2018 and 2045. The 2045 No Build scenario network presented in the MTP forecasts high levels of congestion extending out along almost all major highways/principal arterials in the Tyler area if there are no transportation improvements made before that time (Tyler Area MPO, 2019).

The project area's location within a larger geographic region that is experiencing growth and attracting people from the greater East Texas area suggests a need for a north-south link east of Tyler. Currently, there is a lack of an efficient, direct route to US 271 and northeast Texas from the terminus of Toll 49 Segment 5 at SH 110. East of the Toll 49 terminus at SH 110 there are limited north-south routes that facilitate traffic flow, none of which are controlled-access roadways. East-north bound traffic on Toll 49 at SH 110 currently travels northwest on SH 110 to SL 323 towards central Tyler and into more traffic-congested areas. Based on the LOS and travel time data presented below, travel times and congestion on existing roadways that facilitate this north-south connection will increase substantially by 2045.

Existing and Predicted LOS

A preliminary LOS analysis was performed by comparing model-based travel speeds to model-based free flow speeds to examine existing and future operating conditions along the roadway network between SH 110 at Toll 49 and US 271. LOS is the qualitative measure used to evaluate the effectiveness of a roadway system to provide adequate capacity and is a term used to describe the operating conditions of a roadway based on factors including speed, travel time, maneuverability, delay and safety. LOS ranges from "A" to "F", with "A" being the best operating conditions and "F" representing the worst congested conditions. **Table 2** provides a brief summary description of each LOS condition.

Table 2: Levels of Service (LOS)

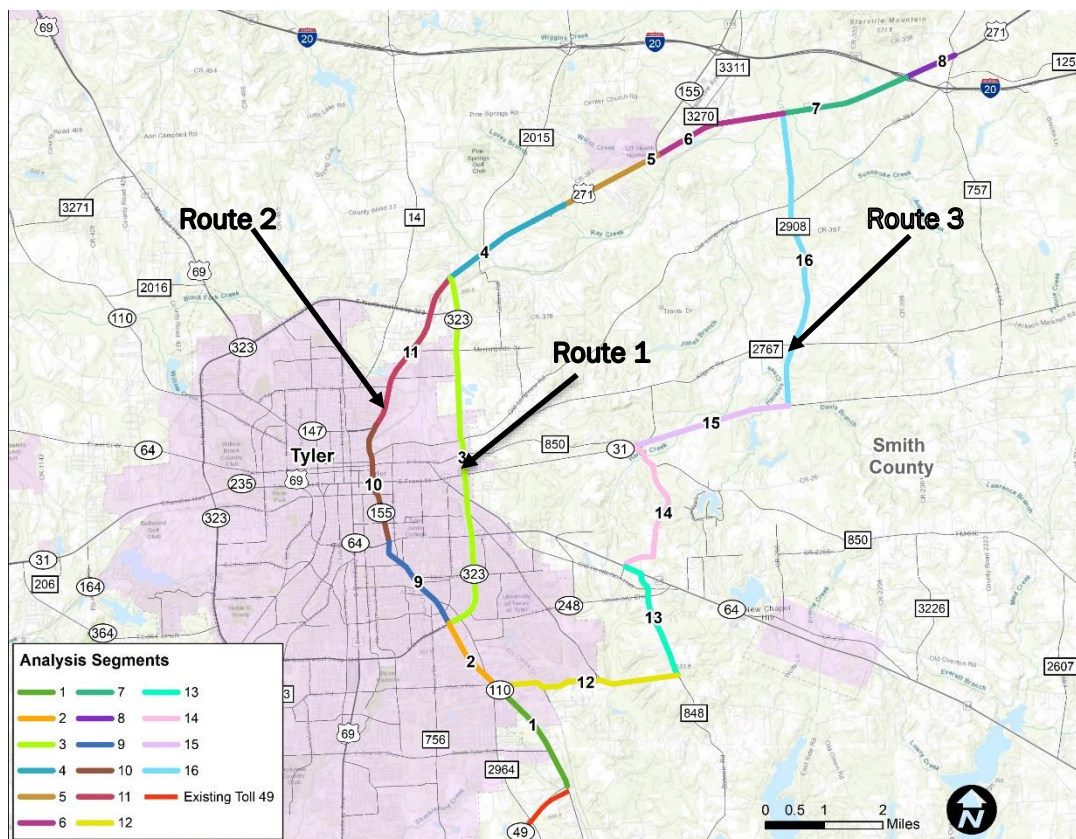
LOS	Description
A	Free flow conditions Freedom to select desired speed is extremely important Freedom to maneuver within the traffic stream is extremely high. General level of comfort/convenience for motorists is excellent.
B	Stable flow conditions. Presence of other vehicles in the traffic stream becomes noticeable. Slight decline in the freedom to maneuver within the traffic stream.
C	Stable flow conditions. Ability to maneuver and operating speed in the traffic stream is significantly affected by other vehicles. General level of comfort/convenience declines noticeably at this level.
D	High density, but stable flow – approaching unstable traffic flow. Speeds and freedom to maneuver are severely restricted. General level of comfort/convenience is poor. Small increases in traffic flow will generally cause operational problems at this level.

LOS	Description
E	Unstable flow. Speeds reduced to a low, but relatively uniform value. Volumes at or near capacity level. Freedom to maneuver within the traffic stream is extremely difficult. Small increases in traffic flow or minor perturbations within the traffic stream will cause breakdowns.
F	Forced or breakdown flow conditions. Volumes exceed roadway capacity. Formation of unstable queues. Operations within the queue are characterized by stop-and-go conditions. Stoppages for long periods of time because of traffic congestion.

Source: Transportation Research Board, Highway Capacity Manual, Special Report #209, 1994.

There is not a direct route to US 271 and northeast Texas from the terminus of Toll 49 at Segment 5 (SH 110); motorists using existing Toll 49 exit the existing unsignalized free-flow facility and travel through the city when continuing northeast. Therefore, the draft traffic analysis focused on the three most direct, existing routes within the area that currently support this north-south connection. The three existing routes are depicted on **Figure 1** and generally described as follows. Route 1 utilizes SL 323 in Tyler and is comprised of SH 110, SL 323 and US 271; Route 2 carries traffic through the central portion of Tyler and is comprised of SH 110, Beckham Ave, Gantry Parkway and US 271. Route 3 utilizes a local roadway network east of the city and follows SH 110, Shiloh Road, FM 848, FM 210/FM 850, SH 31, FM 2908 and US 271.

Figure 1: Routes and Analysis Segments



Although many of the segments that comprise each of the three travel routes operate at LOS A and B, current (2019) LOS ranges from “A” to “E” on all three routes. LOS deteriorates on specific segments along each route and is not concentrated at one specific location, which suggests a broader, more regional congestion problem.

The LOS analysis shows that in 2045, several segments along each of the routes would operate at a poorer level of service compared to existing conditions, with an increasing number of segments operating at LOS E or F. Regardless of the route, motorists will encounter LOS E along a portion of each route under both the existing and future conditions. A breakdown of LOS by segment and route is presented in the table included in **Appendix A**.

Existing and Predicted Travel Time

Travel times were determined along the individual 16 segments that comprise each of the three routes to obtain an average total travel time for each route. **Table 3** presents the average travel time by route during the AM and PM periods and in both directions; the data included for 2019 represents existing conditions. The total lengths of the routes range from 19.1 to 21.2 miles and existing travel times are reported as 26.6 to 30.1 minutes to travel these routes. The shortest route, Route 1, which follows SL 323, has 20 signalized intersections (Google, 2019). While traffic signals help manage the flow of vehicular traffic, signals and corresponding stop conditions also contribute to travel delays.

Consistent with LOS data, the traffic analysis shows that travel times for trips between SH 110 at Toll 49 and US 271 at FM 757 will increase substantially by 2045. The largest change is evident during the morning peak. Travel times during PM travel will also increase, but to a lesser extent, as shown in **Table 3** below.

Table 3: Comparison of Travel Times*

Existing Route	Direction	Average Travel Time (minutes)				Average Travel Time (minutes)			
		AM				PM			
		Existing 2019	No Build 2045	Change in Travel Time	Percent Change	Existing 2019	No Build 2045	Change in Travel Time	Percent Change
Route 1	NB/EB	26.7	42.4	15.7	59%	26.7	34.5	7.8	29%
	SB/WB	26.6	40.2	13.6	51%	26.6	32.4	5.8	22%
Route 2	NB/EB	29.5	43.9	14.4	49%	29.2	38.8	9.6	33%
	SB/WB	29.2	37.6	8.4	29%	29.3	33.3	4.0	14%
Route 3	NB/EB	30.0	45.3	15.3	51%	30.0	33.2	3.2	11%
	SB/WB	30.1	39.6	9.5	32%	29.9	34.8	4.9	16%

* The preliminary 2045 Tyler MPO model was used for the analysis; results are included in the draft Preliminary Travel Time and LOS Analysis and subject to change.

Under existing conditions (2019), the average travel time for each route is generally the same in both directions and during both time periods, ranging from approximately 26.6 minutes to travel 19.1 miles and 30.1 minutes to travel 21.2 miles. In 2045, conditions are projected to deteriorate in both directions along all three routes, with considerably greater deterioration evident in the AM period. In 2045, the 19.1-mile trip in the NB/EB direction along Route 1 is projected to take 42.4 minutes in the AM peak period compared to the existing travel time of 26.7 minutes, which is an

increase of 59%. Overall, travel time in 2045 is projected to increase between 29% and 59% during AM travel and 11% to 33% during the PM period compared to existing conditions.

1.3 Purpose

The purpose of the proposed project is to improve mobility and provide reliable travel times for local and regional traffic traveling between the Toll 49 Segment 5 terminus at SH 110 and US 271 northeast of Tyler.

References cited

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APPENDIX A

Draft Preliminary Toll 49 Level of Service (LOS)

Roadway Segment ID	Roadway Segments	From	To	Distance (miles)		Base Year (2019)				No Build 2045			
						AM		PM		AM		PM	
				NB/EB	SB/WB	NB/EB	SB/WB	NB/EB	SB/WB	NB/EB	SB/WB	NB/EB	SB/WB
	Level of Service (LOS)*												
Route 1	Route 1												
1	SH 110	Toll 49	Shiloh Rd	2.1	2.1	A	A	A	A	E	A	A	A
2	SH 110	Shiloh Rd	Loop 323	1.3	1.3	B	A	A	A	E	A	A	A
3	Loop 323	SH 110	US 271	6.2	6.2	A	A	A	A	B	C	A	A
4	US 271	Loop 323	FM 383	2.3	2.3	E	E	A	C	F	F	F	E
5	US 271	FM 383	SH 155	1.8	1.8	D	C	A	B	F	F	D	C
6	US 271	SH 155	FM 2908	2.3	2.3	A	A	A	A	A	A	A	A
7	US 271	FM 2908	I-20	2.2	2.2	A	A	A	A	A	B	A	A
8	US 271	I-20	FM 757	0.9	0.9	A	A	A	A	A	A	A	A
-													
Route 2	Route 2												
1	SH 110	Toll 49	Shiloh Rd	2.1	2.1	A	A	A	A	E	A	A	A
2	SH 110	Shiloh Rd	Loop 323	1.3	1.3	B	A	A	A	E	A	A	A
9	SH 110	Loop 323	E 5th St	1.8	1.8	E	C	D	D	D	A	B	B
10	Beckham Ave	E 5th St	SH 147	2.0	2.0	B	A	B	A	C	A	B	A
11	Gentry Pkwy	SH 147	Loop 323	2.9	2.9	A	A	A	A	B	A	B	A
4	US 271	Loop 323	FM 383	2.3	2.3	E	E	A	C	F	F	F	E
5	US 271	FM 383	SH 155	1.8	1.8	D	C	A	B	F	F	D	C
6	US 271	SH 155	FM 2908	2.3	2.3	A	A	A	A	A	A	A	A
7	US 271	FM 2908	I-20	2.2	2.2	A	A	A	A	A	B	A	A
8	US 271	I-20	FM 757	0.9	0.9	A	A	A	A	A	A	A	A
-													
Route 3	Route 3												
1	SH 110	Toll 49	Shiloh Rd	2.1	2.1	A	A	A	A	E	A	A	A
12	Shiloh Rd	SH 110	FM 848	3.2	3.2	A	C	A	A	B	D	B	A
13	FM 848	Shiloh Rd	SH 64	2.2	2.2	B	A	A	A	E	A	A	A
14	FM 210/FM 850	SH 64	SH 31	2.7	2.7	A	A	A	A	A	A	A	A
15	SH 31	FM 850	FM 2908	2.7	2.7	E	E	E	E	F	F	F	F
16	FM 2908	SH 31	US 271	5.1	5.1	A	A	A	A	A	B	A	A
7	US 271	FM 2908	I-20	2.2	2.2	A	A	A	A	A	B	A	A
8	US 271	I-20	FM 757	0.9	0.9	A	A	A	A	A	A	A	A
-	*LOS was determined by comparing model-based travel speeds to model-based free flow speeds.												

*LOS was determined by comparing model-based travel speeds to model-based free flow speeds.

LOS data extracted from draft Preliminary LOS Analysis