



Purpose & Need Memorandum US 380 EIS

Collin County

CSJs 0135-02-065 and 0135-03-053 - Coit Road to FM 1827

September 29, 2020

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 USC. 327 and a Memorandum of Understanding dated December 9, 2019, and executed by FHWA and TxDOT.

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1. Needs

The proposed action is needed because population growth within the central portion of Collin County, primarily the city of McKinney, has caused increases in current and forecasted traffic volumes that exceed the capacity of US 380 between Coit Road and FM 1827, leading to increased congestion, reduced mobility, and higher crash rates compared to other similar roadways in the region.

2. Supporting Facts

2.1. Population and Traffic Growth

2.1.1. Population Growth and Projections

In 2019, Collin County had a population of 1,034,730 people, making it one of the most populous counties in Texas and has experienced a 32.4 percent increase in population between 2010 and 2019 (US Census 2019). According to the Texas State Demographer's 2014 population projections by migration scenario data, over the next 30 years Collin County could anticipate an increase in population of up to 160 to 170 percent. The city of McKinney has experienced even greater growth between 2010 and 2019 with an increase in population of 51.9 percent along with the town of Prosper which has experienced a 158 percent population increase over the same period (US Census, 2019). Officials from Collin County, the City of McKinney, the North Texas Municipal Water District, and the city of Irving continue coordination to construct numerous water supply projects to keep pace with the growth and development.

2.2. Current and Forecasted Traffic Volumes

2.2.1. Increasing Congestion

Travel demand modeling for the US 380 corridor using the North Central Texas Council of Governments (NCTCOG) 2045 Travel Demand Model, indicated congestion along US 380 between Coit Road and FM 1827 during peak travel times is rated in engineering terms as having an "F" level of service (LOS). This means that the number of vehicles on the road exceeds the capacity of the roadway, causing a significant drop in travel speeds and an increase in congestion or delay in traffic, otherwise known as "stop-and-go traffic", as illustrated in Figure 1 (on the next page). US 380 across Collin County has experienced a 30 percent increase in the number of vehicles on the road from 2010 to 2016.¹ Areas including western McKinney have experienced a 45 to 50 percent increase in traffic volumes during this period.² As growth continues increased congestion and reduced mobility will continue over the years to come.

US 380 west of US 75 through McKinney carried an average daily traffic volume (ADT) of 49,000 vehicles in 2017³ and is forecasted to carry an ADT of 86,300 vehicles by 2045⁴. These traffic levels combined with

¹ 2017 TxDOT Traffic Counts

² 2017 TxDOT Traffic Counts

³ Modeling based on 2017 TxDOT Traffic Counts by Kimley-Horn

⁴ NCTCOG 2045 Metropolitan Transportation Plan, *Mobility 2045*

constrained roadway capacity and multiple at-grade connections to local roadways contribute to the modeled LOS F in 2017, especially west of US 75 and a more congested/degraded LOS F across the US 380 corridor between Coit Road and FM 1827 by 2045.

Other roadways within the project area also contribute to the current (2019) traffic volumes and level of congestion experienced along existing US 380 as illustrated in Figure 2 (on the next page) and described as follows from west to east:

- Coit Road, the western logical terminus of the proposed action, is a minor arterial with a posted speed limit of 45 miles per hour. Coit Road provides access to local development and carries an ADT of 10,800 south of US 380 and 8,700 vehicles north of US 380.
- Custer Road (FM 2478), just east of Coit Road, has an ADT of approximately 22,000 vehicles south of US 380 and approximately 12,000 vehicles north of US 380. It is classified as a principal arterial (other) south of US 380 and a minor arterial north of US 380 with a maximum posted speed limit of 55 miles per hour.
- US 75 intersects US 380 near the center of McKinney and serves as the primary north-south connector between McKinney and the Sam Rayburn Tollway through Dallas. It is classified as a principal arterial (other freeways and expressways) with a posted speed limit of 70 miles per hour through McKinney. US 75 carries an average of 134,200 vehicles.
- SH 5 is a principal arterial aligned east of and somewhat parallel to US 75. SH 5 carries an ADT of 14,500 vehicles south of US 380 and 10,000 vehicles north of US 380. The posted speed limit through McKinney varies from 35 to 50 miles per hour.
- FM 1827, the eastern logical terminus of the proposed action, extends to the north of US 380 and is considered a major collector with a posted speed limit of 45 miles per hour and an ADT of nearly 6,000 vehicles.

Figure 1: Level of Service - Defined

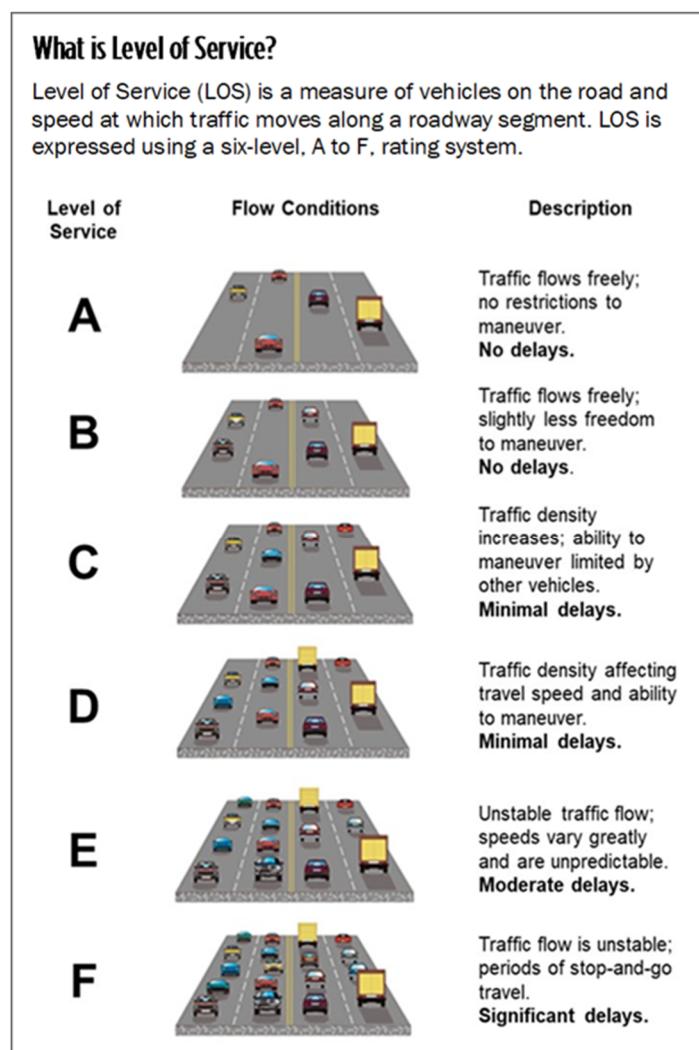
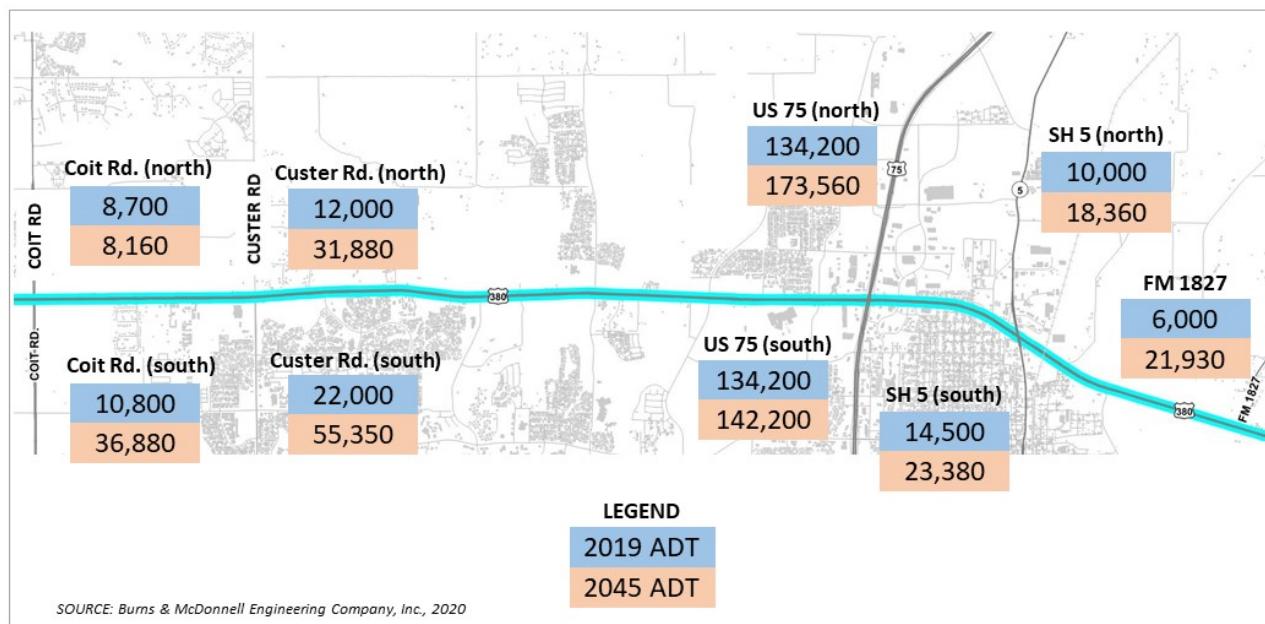


Figure 2: Map of Major Arterials with Existing (2019) and Forecasted (2045)⁵ Traffic Volumes North and South of US 380

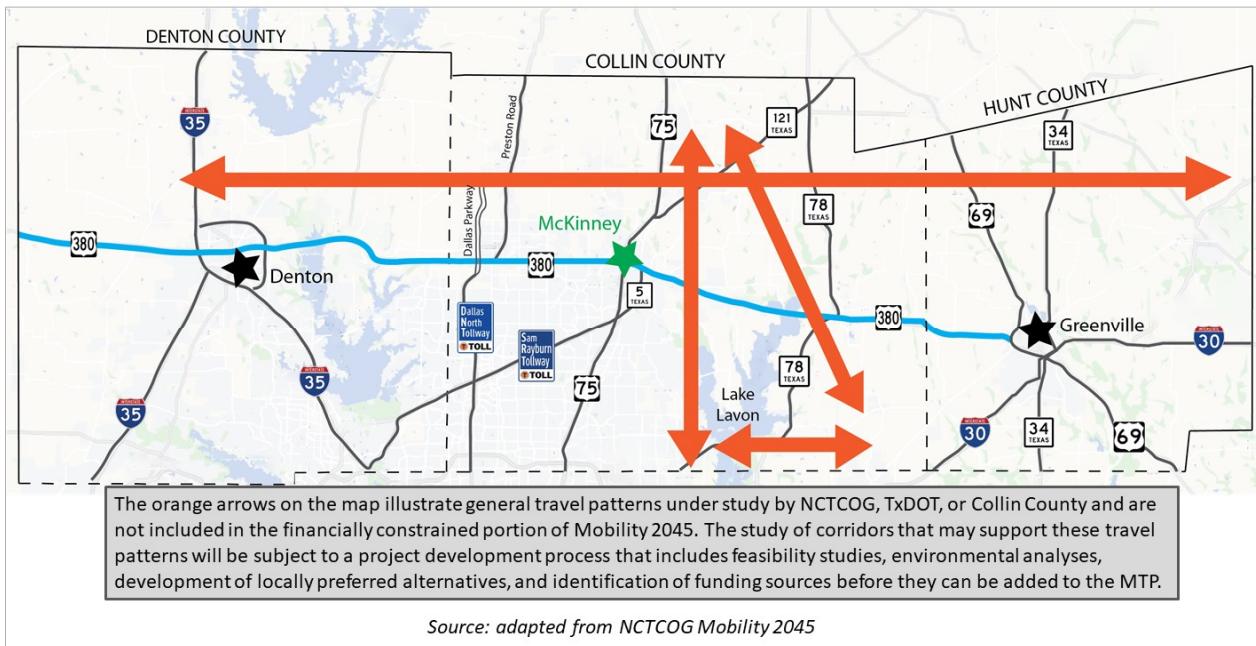


2.2.2. Reduced Mobility

Major travel corridors across Collin County are limited. The only major east-west corridor is US 380, connecting Denton and IH 35E (Denton County) on the west with Greenville and IH 30 (Hunt County) on the east. North-south mobility corridors are limited to SH 289 on the west (connecting Prosper and Frisco), US 75/SH 5 through the middle of McKinney, and SH 78 east of Lake Lavon through Farmersville. In the NCTCOG Metropolitan Transportation Plan (MTP), *Mobility 2045*, future regional mobility corridors have been discussed to support growing travel demand across the region. In Collin County, both east-west (US 380) and north-south major travel patterns, not specific roadway corridors, have been identified as priority areas for further study (see Figure 3). NCTCOG is advancing the Collin County Outer Loop, a proposed freeway around the northern and eastern portions of the county. Collin County is acquiring right-of-way for the segment of the Outer Loop from the Denton/Collin County line to US 75 and plans to initiate construction of this segment in 2021.

⁵ NCTCOG 2045 Metropolitan Transportation Plan, *Mobility 2045*

Figure 3: NCTCOG Corridors for Future Evaluation



A Select Link Analysis conducted during the US 380 Feasibility Study showed that in 2045, 54 percent of the peak period westbound traffic along US 380 through Collin County would opt to take a freeway bypass (if available) rather than continue driving west along existing US 380. Of the remaining 46 percent of westbound traffic, 26 percent would opt to use a freeway connection from US 380 to Spur 399 (if available) to connect to destinations to the south (Dallas metropolitan area), while the remaining 20 percent would take existing US 380 or other available routes to connect to destinations south of McKinney. Likewise, 54 percent of the US 380 eastbound traffic would take a freeway bypass (if available), and of the remaining 46 percent, 22 percent would use existing US 380 for local destinations and 24 percent would travel to US 75 to access destinations south of McKinney.

2.3. Higher Crash Rates than the Statewide Average

Between 2010 and 2016, US 380 within the city limits of McKinney experienced a 404 percent increase in crashes (according to TxDOT's Crash Records Information System [CRIS] database)⁶, while traffic counts increased by approximately 30 percent. These crashes can be attributed to overcapacity, closely spaced driveways, and lack of separation of high-speed and low-speed traffic within the corridor.

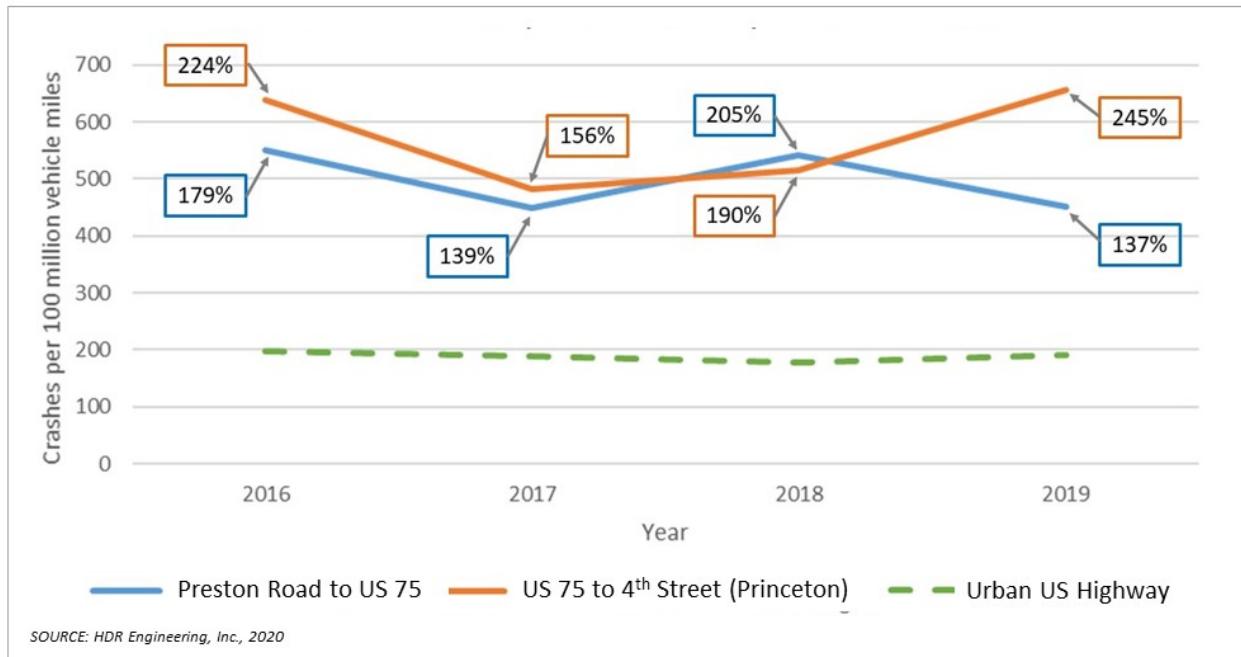
The TxDOT CRIS crash data for the US 380 corridor also indicated concentrations of crashes at Preston Road (west of Coit Road), US 75, and Airport Drive/FM 1827. Comparing crashes to traffic volumes, crash rates increased at a more rapid rate than the increase in annual traffic volumes.

A separate analysis was conducted to evaluate crash rates for two segments of US 380 - between Preston Road and US 75 and between US 75 and 4th Street in Princeton. CRIS data from 2016-2019 and annual average daily traffic (AADT) data from TxDOT's OpenGIS portal were used for the evaluation.

⁶ TxDOT CRIS Database, accessed November 29, 2017

Figure 4 illustrates the crash rates within each segment of US 380 as well as the Texas statewide average crash rates for an urban US Highway, similar to US 380 (reported in crashes per 100 million vehicle miles traveled).

Figure 4: Crash Rate Comparison



Both segments analyzed along US 380 through the project area experienced considerably higher crash rates than the statewide average crash rate for an urban US Highway. As shown in Figure 4, these sections of US 380 experienced a range of 137 percent to 245 percent higher crash rates compared to the urban US Highway statewide average between the years 2016 and 2019.

3. Purpose

The purpose of the proposed action is to manage congestion and improve east-west mobility and safety through the project area.