Traffic Noise Analysis Report

US 67 at Lake Ridge Parkway

0261-01-041
Dallas District

October 30, 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 U.S.C. 327 and a Memorandum of Understanding dated December 9, 2019, and executed by FHWA and TxDOT.

Table of Contents

The Texas Department of Transportation (TxDOT) – Dallas District proposes the construction of a grade separation (Phase I) at United States Highway (US) 67 project at Lake Ridge Parkway, in Dallas and Ellis Counties, Texas (**Figure 1**).

The proposed improvements would include reconstruction of US 67 mainlanes and frontage roads, from north of Shiloh Road to south of Mt. Lebanon Road. The proposed US 67 mainlanes would consist of four 12-foot lanes (two in each direction), 22-foot inside shoulder, and 10- foot outside shoulders. A 26-foot wide inside grassy median separates the northbound and southbound mainlanes. The 22-foot inside shoulder would be restriped in the future to add one additional travel lane in each direction. The proposed northbound and southbound frontage roads would consist of two 12-foot lanes and 8-foot inside and outside shoulders.

The proposed interchange at Lake Ridge Parkway would consist of a grade-separated interchange with an overpass of US 67. The proposed improvements of Lake Ridge Parkway would consist of six 12-foot lanes (three in each direction), 10-foot raised median, curb and gutter, and Texas U-turns.

The existing ramps within the project area would be converted to an X-ramp pattern design for Lake Ridge Parkway.

A traffic noise analysis was performed because this project is a Type I project. A Type I project is a construction project that includes new location highways, substantial horizontal or vertical alteration, additional through-traffic lanes, auxiliary lanes, or relocation of ramps The project will include a substantial horizontal alteration of the existing condition and relocation of ramps; therefore, it is considered a Type I project and subject to noise analysis requirements.

Introduction

This analysis was accomplished in accordance with TxDOT's (Federal Highway Administration (FHWA)-approved) Traffic Noise Policy (2019).

Sound from highway traffic is generated primarily from a vehicle's tires, engine and exhaust. It is commonly measured in decibels and is expressed as "dB."

Sound occurs over a wide range of frequencies. However, not all frequencies are detectable by the human ear; therefore, an adjustment is made to the high and low frequencies to approximate the way an average person hears traffic sounds. This adjustment is called A-weighting and is expressed as "dB(A)."

Also, because traffic sound levels are never constant due to the changing number, type and speed of vehicles, a single value is used to represent the average or equivalent sound level and is expressed as "Leq."

The traffic noise analysis typically includes the following elements:

- Identification of land use activity areas that might be impacted by traffic noise.
- Determination of existing noise levels.
- Prediction of future noise levels.
- Identification of possible noise impacts.
- Consideration and evaluation of measures to reduce noise impacts.

The FHWA has established the following Noise Abatement Criteria (NAC) for various land use activity areas that are used as one of two means to determine when a traffic noise impact would occur.

Table 1. FHWA Noise Abatement Criteria (NAC)

Activity Category	FHWA (dB(A) Leq)	Description of Land Use Activity Areas
A	57 (exterior)	Lands on which serenity and quiet are of extra-ordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (exterior)	Residential
C	67 (exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52 (interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72 (exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A-D or F.
F	--	Agricultural, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	--	Undeveloped lands that are not permitted.

A noise impact occurs when either the absolute or relative criterion is met:

Absolute criterion - The predicted noise level at a receptor approaches, equals, or exceeds the NAC. "Approach" is defined as one dB(A) below the NAC. For example: a noise impact would occur at a Category B residence if the noise level is predicted to be 66 dB(A) or above.

Relative criterion - The predicted noise level substantially exceeds the existing noise level at a receptor even though the predicted noise level does not approach, equal or exceed the NAC. “Substantially exceeds” is defined as more than 10 dB(A). For example: a noise impact would occur at a Category B residence if the existing level is 54 dB(A) and the predicted level is 65 dB(A).

When a traffic noise impact occurs, noise abatement measures must be considered. A noise abatement measure is any positive action taken to reduce the impact of traffic noise on an activity area.

Analysis

The FHWA traffic noise modeling software (TNM 2.5) was used to calculate existing and predicted traffic noise levels. The model primarily considers the number, type and speed of vehicles; highway alignment and grade; cuts, fills and natural berms; surrounding terrain features; and the locations of activity areas likely to be impacted by the associated traffic noise.

The approved traffic data used in this analysis is included in **Attachment B**.

Validation

A validation study was performed in order to ensure that traffic noise is the main source of noise and to verify that the existing model accurately predicts existing traffic noise based on current conditions. Model validation compares field-collected sound level measurements to traffic noise levels calculated in an existing condition model that used field-collected traffic parameters. Differences between the measured and calculated levels for this project were within the +/- 3 dB(A) tolerance allowed by FHWA. Therefore, the existing noise model is considered validated for this project. Additional information on the validation study is included in **Attachment C.**

Results

Existing and predicted traffic noise levels were modeled at receiver locations (**Table 2** and **Figure 2**) that represent the land use activity areas adjacent to the proposed project that might be impacted by traffic noise and potentially benefit from feasible and reasonable noise abatement.

Table 2. Traffic Noise Levels dB(A) Leq

Representative Receiver	NAC Category	NAC Level	Existing	Predicted 2045	Change (+/-)	Noise Impact (Yes/No)
R1 Residential	B	67	63	63	0	No
R2 Residential	B	67	69	71	+2	**Yes**
R3 Residential	B	67	67	69	+2	**Yes**
R4 Residential	B	67	55	58	+3	No
R5 Residential	B	67	54	58	+4	No
R6 Residential	B	67	59	62	+3	No

Notes: Bold receiver number indicates an absolute or relative criterion potential noise impact.
Abbreviations: NAC, Noise Abatement Criteria; dB(A), A-weighted decibel; Leq, average/equivalent sound level.

As indicated in **Table 2**, the proposed project would result in a traffic noise impact at one or more representative receiver locations.

Noise abatement measures were considered for each location with predicted noise impacts.

Abatement Analysis

Before any abatement measure can be proposed for incorporation into the project, it must be both feasible and reasonable. Feasibility and reasonableness considerations include constructability, the predicted acoustic reductions provided by an abatement measure, a cost allowance, and whether the adjacent receptors desire abatement. Receptors associated with an abatement measure that achieve a noise reduction of five dB(A) or greater are called benefited receptors.

In order to be "feasible," the abatement measure must benefit a minimum of two impacted receptors AND reduce the predicted noise level by at least five dB(A) at greater than 50% of first-row impacted receptors.

In order to be "reasonable," the abatement measure must also reduce the predicted noise level by at least seven dB(A) for at least one benefited receptor (noise reduction design goal) and not exceed the standard barrier cost of 1,500 square feet per benefited receptor. In addition, an abatement measure may not be reasonable if the construction costs are unreasonably high due to site constraints, as determined through an alternate barrier cost assessment.

The following noise abatement measures were considered: traffic management, alteration of horizontal and/or vertical alignments, acquisition of undeveloped property to act as a buffer zone, and the construction of noise barriers.

Traffic management – Control devices could be used to reduce the speed of the traffic; however, the minor benefit of one dB(A) per five mph reduction in speed does not outweigh the associated increase in congestion and air pollution. Other measures such as time or use restrictions for certain vehicles are prohibited on state highways.

Alteration of horizontal and/or vertical alignments – Any alteration of the existing alignment would displace existing businesses and residences, require additional right of way and not be cost effective/reasonable.

Buffer zone – The acquisition of undeveloped property to act as a buffer zone is designed to avoid rather than abate traffic noise impacts and, therefore, is not feasible.

Noise barriers – Noise barriers in the form of noise walls are the most commonly used noise abatement measures and were considered for this project. Noise barriers were evaluated for each of the impacted receptor locations with the following results:

> **R2** and **R3** - These receivers are separate, isolated residences, which are not associated with a neighborhood or subdivision. Because a noise abatement measure must potentially benefit a minimum of two impacted receptors, noise abatement for these locations is not feasible.

None of the above noise abatement measures would be both feasible and reasonable; therefore, no abatement measures are proposed for this project.

Noise Contours for Land Use Planning

To avoid noise impacts that may result from future development of properties adjacent to the project, local officials responsible for land use control programs must ensure, to the maximum extent possible, that no new activities are planned or constructed along or within the following predicted (2043) noise impact contours (Table 3).

Table 3: Traffic Noise Contours

Land Use	Impact Contour	Distance from Right of Way
NAC category B & C	66 dB(A)	150 feet
NAC category E	71 dB(A)	10 feet

Note: Impact contours are one dB(A) lower than the NAC per category to reflect impacts that would occur as a result of approaching the NAC for the respective contours. The undeveloped areas identified above were based on aerial review and field verification conducted in May 2020. Permit research was conducted using the best available online data from the City of Cedar Hill and Midlothian as of October 2020. This research was based on available online permit search and address information from the county appraisal district database.

Construction Noise

Noise associated with the construction of the project is difficult to predict. Heavy machinery, the major source of noise in construction, is constantly moving in unpredictable patterns. However, construction normally occurs during daylight hours when occasional loud noises are more tolerable. None of the receptors is expected to be exposed to construction noise for a long duration; therefore, any extended disruption of normal activities is not expected. Provisions will be included in the plans and specifications that require the contractor to make every reasonable effort to minimize construction noise through abatement measures such as work-hour controls and proper maintenance of muffler systems.

Local Official Notification and Date of Public Knowledge Statement

A copy of this traffic noise analysis will be available to local officials. On the date of the environmental decision for this project (Date of Public Knowledge), FHWA and TxDOT are no longer responsible for providing noise abatement for new development adjacent to the project.

List of Attachments

A. Map figures

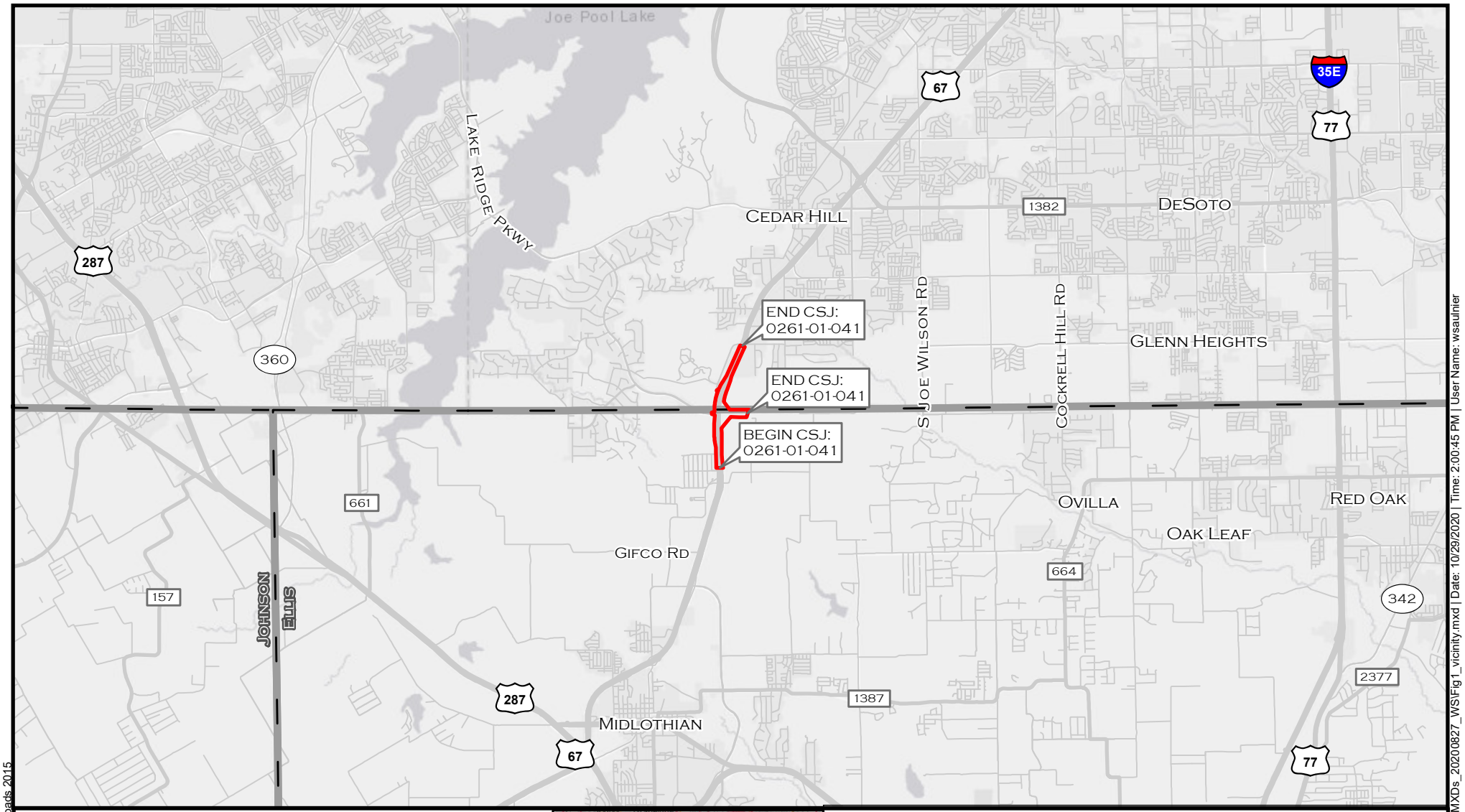
B. Traffic data

C. Existing model validation study

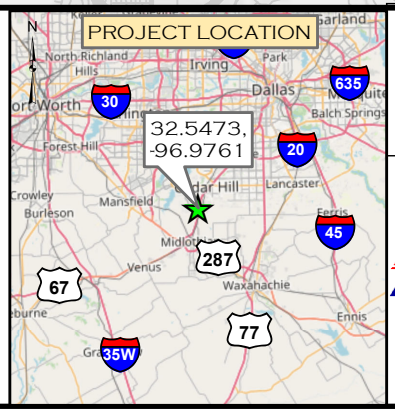
D. Design Schematic

Attachment A: Map figures

Figure 1: Project vicinity map



Project Area



US 67 at Lake Ridge Parkway
CSJ: 0261-01-041
Vicinity Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 1 2 Miles

1:126,720

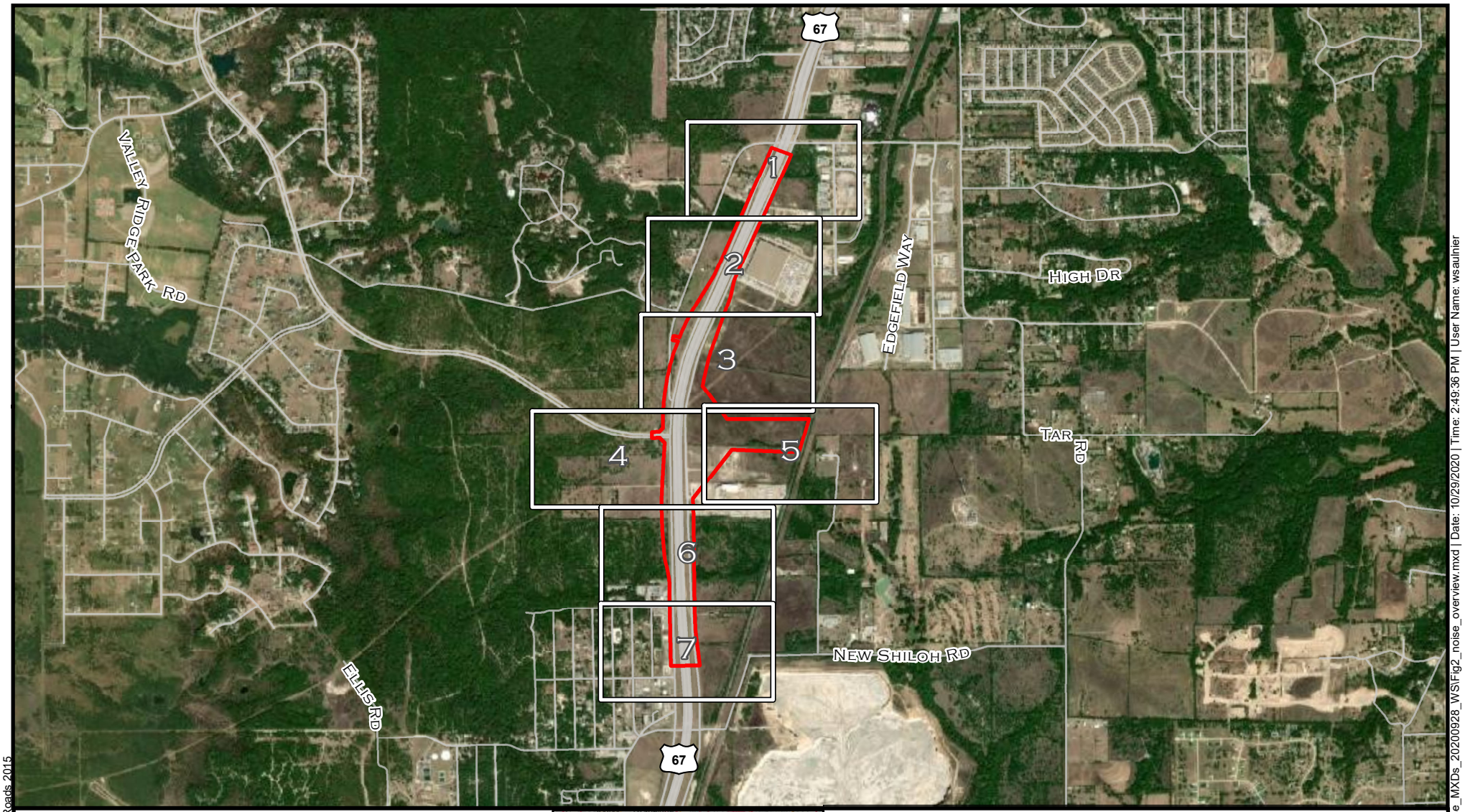
FIGURE 1

DATE: October 2020

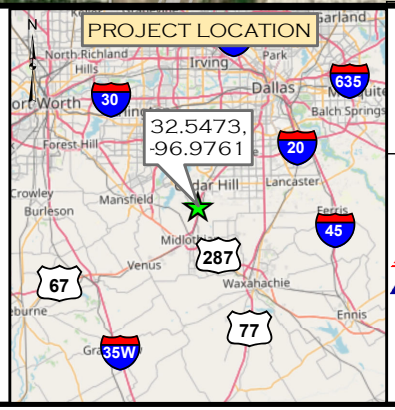
Sources: ESRI Grayscale, Open Street Map: TIGER Roads 2015

Path: C:\GIS_Data\Project_Temp\HOU0162_US67BE_MXDs_20200827_WSI\Fig1_vicinity.mxd | Date: 10/29/2020 | Time: 2:00:45 PM | User Name: wsaulnier

Figure 2: Noise receiver maps



Proposed ROW



US 67 at Lake Ridge Parkway
CSJ: 0261-01-041
Noise Receiver Locations Overview
Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 1,250 2,500 Feet

1:30,000

FIGURE 2

DATE:
October 2020

Sources: ESRI Aerial 2019; Open Street Map; TIGER Roads 2015

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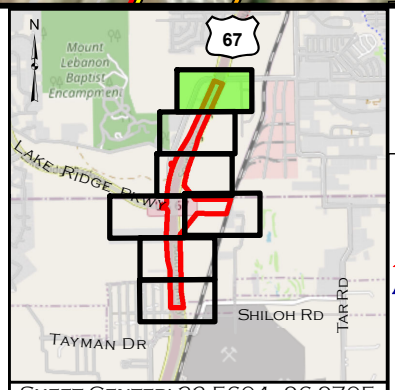
71 dB(A) Contour
66 dB(A) Contour
Proposed ROW
Non-Impacted Receiver
Impacted Receiver



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US 67 at Lake Ridge Parkway
CSJ: 0261-01-041
Noise Receiver Locations Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 150 300 Feet

1:3,600

FIGURE 2
Sheet 1

DATE:
October 2020

Sources: ESRI Aerial 2019; Open Street Map; TIGER Roads 2015;

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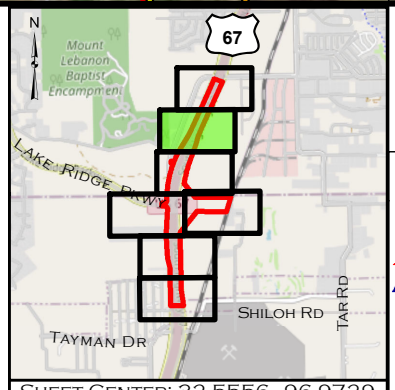
71 dB(A) Contour
66 dB(A) Contour
Proposed ROW
Impacted Receiver



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US 67 at Lake Ridge Parkway
CSJ: 0261-01-041
Noise Receiver Locations Map
Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 150 300 Feet

1:3,600

FIGURE 2
Sheet 2

DATE:
October 2020

Sources: ESRI Aerial 2019; Open Street Map; TIGER Roads 2015;

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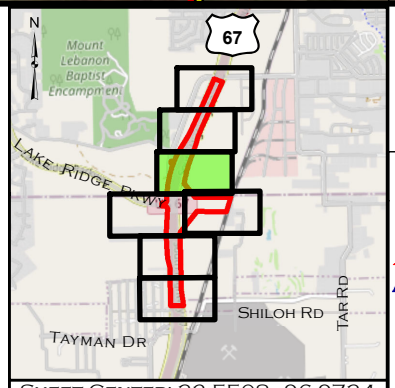
71 dB(A) Contour
66 dB(A) Contour
Proposed ROW
Validation Point



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US 67 at Lake Ridge Parkway
CSJ: 0261-01-041
Noise Receiver Locations Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 150 300 Feet

1:3,600

FIGURE 2
Sheet 3

DATE:
October 2020

Sources: ESRI Aerial 2019; Open Street Map; TIGER Roads 2015;

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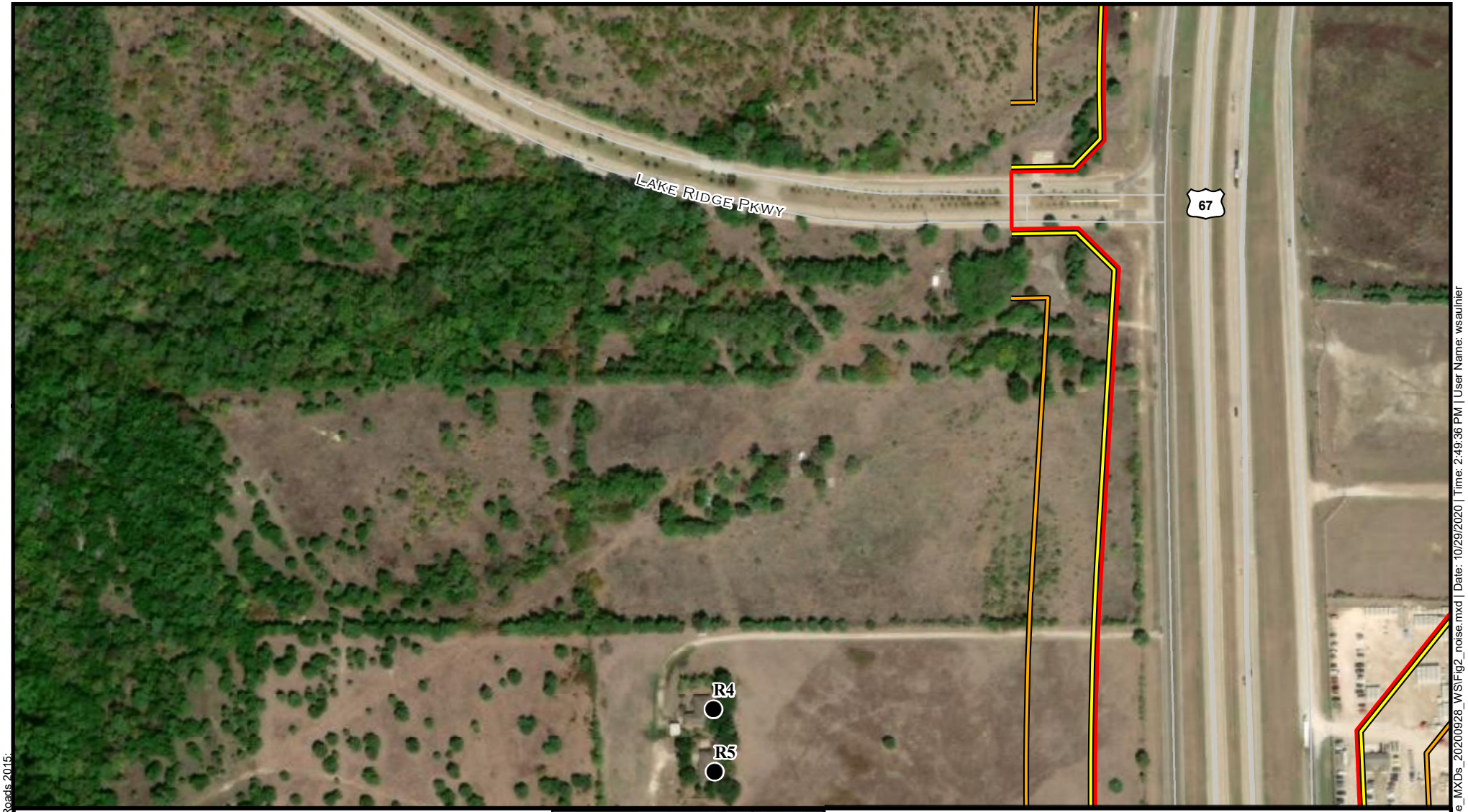
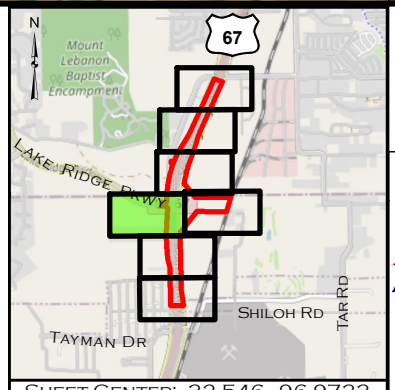


71 dB(A) Contour
66 dB(A) Contour
Proposed ROW
Non-Impacted Receiver



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US 67 at Lake Ridge Parkway
CSJ: 0261-01-041
Noise Receiver Locations Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 150 300 Feet

1:3,600

FIGURE 2
Sheet 4

DATE:
October 2020

Sources: ESRI Aerial 2019; Open Street Map; TIGER Roads 2015;

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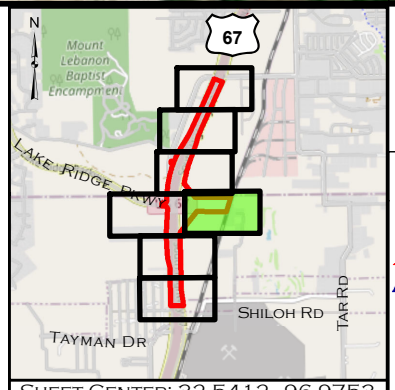
71 dB(A) Contour
66 dB(A) Contour
Proposed ROW



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US 67 at Lake Ridge Parkway
CSJ: 0261-01-041
Noise Receiver Locations Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 150 300 Feet

1:3,600

FIGURE 2
Sheet 5

DATE:
October 2020

Sources: ESRI Aerial 2019; Open Street Map; TIGER Roads 2015;

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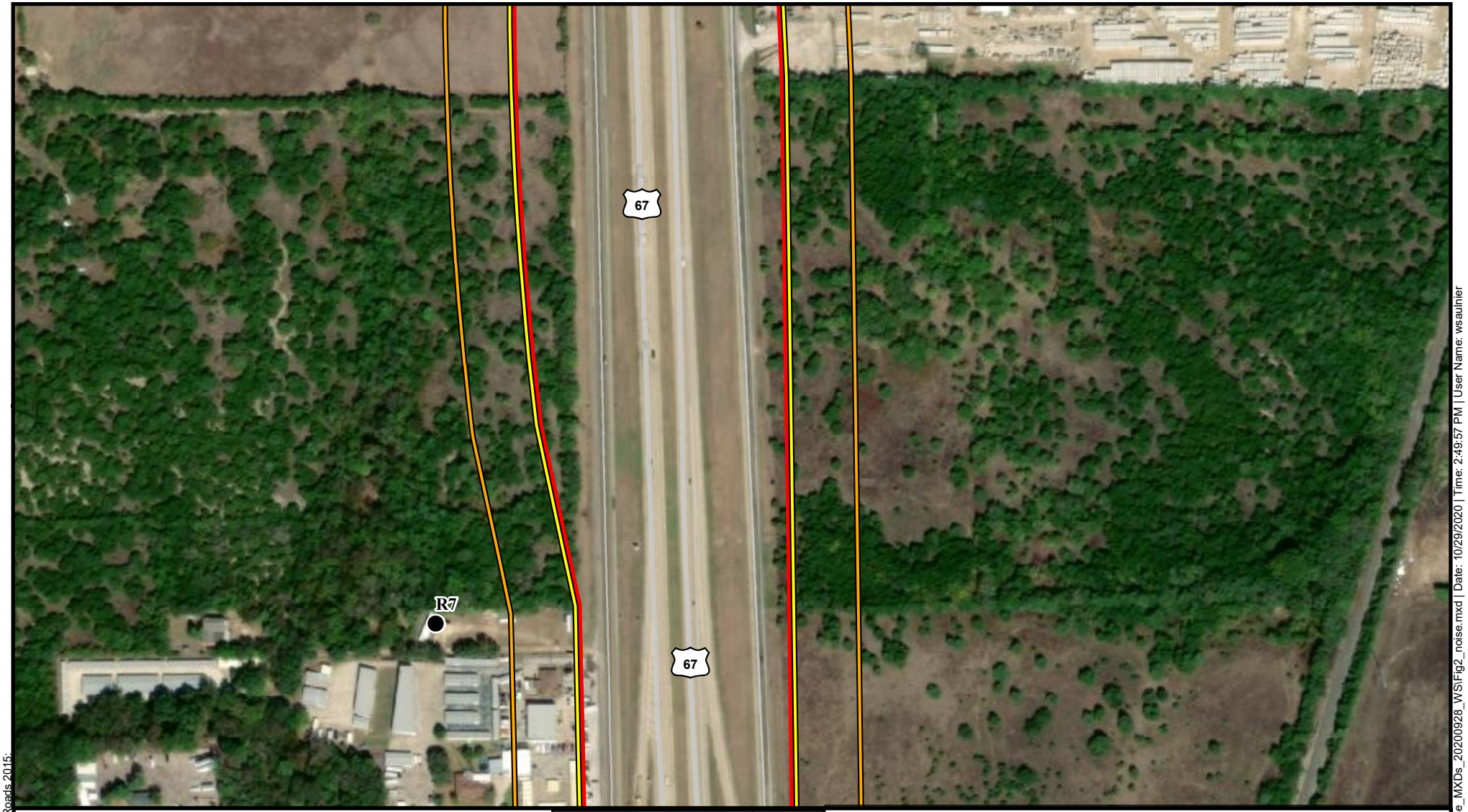
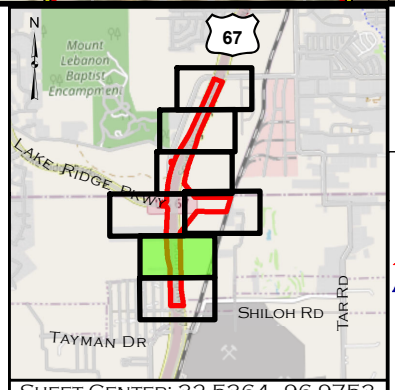


71 dB(A) Contour
66 dB(A) Contour
Proposed ROW
Non-Impacted Receiver



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US 67 at Lake Ridge Parkway
CSJ: 0261-01-041
Noise Receiver Locations Map
Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 150 300 Feet

1:3,600

FIGURE 2
Sheet 6

DATE:
October 2020

Sources: ESRI Aerial 2019; Open Street Map; TIGER Roads 2015;

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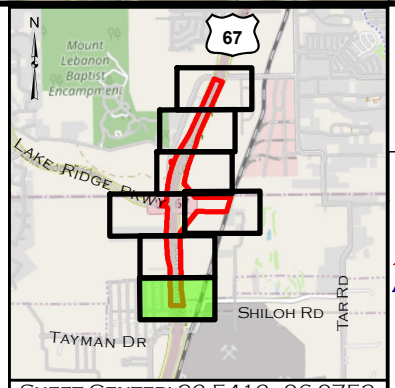
71 dB(A) Contour
66 dB(A) Contour
Proposed ROW



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US 67 at Lake Ridge Parkway
CSJ: 0261-01-041
Noise Receiver Locations Map

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 150 300 Feet

1:3,600

FIGURE 2
Sheet 7

DATE:
October 2020

Sources: ESRI Aerial 2019; Open Street Map; TIGER Roads 2015;

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Attachment B: Traffic data

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN (OPTION C)

Dallas District **September 10, 2020**

Description of Location	Average Daily Traffic 2028	Average Daily Traffic 2048	Base Year Dir Dist %	Base Year K Factor	Base Year Percent Trucks ADT	Base Year Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2028 to 2048) Flexible Pavement	S N	Rigid Pavement	SLAB
US 67 - Mainlanes At LP 9 (Proposed) Ellis County	90,868	114,409	58 - 42	7.9	7.0	4.2	12,800	40	24,310,000	3	33,963,000	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Base Year % of ADT	Base Year % of DHV
Light Duty	93.0	95.8
Medium Duty	2.0	1.2
Heavy Duty	5.0	3.0

Description of Location	Average Daily Traffic 2028	Average Daily Traffic 2058	Base Year Dir Dist %	Base Year K Factor	Base Year Percent Trucks ADT	Base Year Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 30 Year Period (2028 to 2058) Flexible Pavement	S N	Rigid Pavement	SLAB
US 67 - Mainlanes At LP 9 (Proposed) Ellis County	90,868	125,842	58 - 42	7.9	7.0	4.2	12,900	40	38,498,000	3	53,784,000	8"

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN (OPTION C)

Dallas District **September 9, 2020**

Description of Location	Average Daily Traffic 2028	Average Daily Traffic 2048	Base Year Dir Dist %	Base Year K Factor	Base Year Percent Trucks ADT	Base Year Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2028 to 2048) Flexible Pavement	S N	Rigid Pavement	SLAB
<u>US 67 - Frontage Roads</u> At LP 9 (Proposed) Ellis County	13,521	28,811	58 - 42	7.9	6.7	5.0	11,400	40	3,744,000	3	4,828,000	8"

Data for Use in Air & Noise Analysis

Vehicle Class	Base Year % of ADT	Base Year % of DHV
Light Duty	93.3	95.0
Medium Duty	2.0	1.5
Heavy Duty	4.7	3.5

Description of Location	Average Daily Traffic 2028	Average Daily Traffic 2058	Base Year Dir Dist %	Base Year K Factor	Base Year Percent Trucks ADT	Base Year Percent Trucks DHV	ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 30 Year Period (2028 to 2058) Flexible Pavement	S N	Rigid Pavement	SLAB
<u>US 67 - Frontage Roads</u> At LP 9 (Proposed) Ellis County	13,521	41,286	58 - 42	7.9	6.7	5.0	11,700	40	7,271,000	3	9,376,000	8"

Memorandum

Date: September 21, 2020

To: Hossein Hosseiny, PE – BGE
From: Rhett Dollins, PE, PTOE – Maldonado-Burkett
CC: Mike Zieminski, PE – BGE; Melanie Young, PE, Maldonado-Burkett; Jason Pang, Maldonado-Burkett

Re: Proposed Methodology for US 67 Traffic Projections & Analysis

Per the request made by BGE on May 8, 2020, Maldonado-Burkett (M-B) proposes the following methodology for the traffic projection on US 67 segments for the Proposed Loop 9 Segment A schematic design phase.

The proposed methodology for traffic volume projection of US 67 mainline, frontage road, and ramps is as follows:

1. M-B received the TransCAD Traffic Demand Models (TDMs) provided by NCTCOG for the years 2028, 2037, and 2045.
2. From these models, M-B will extract traffic volumes for the requested segments on US 67.
3. Using the 2028, 2037, and 2045 TMD model volumes for each segment, M-B will calculate the growth rates for each segment between 2028 and 2045 and also for 2037 to 2045. MB will then calculate the average of these two growth rates and use it for future year projection.
4. M-B will apply the average growth rate of each segment to the 2045 TransCAD values and shrink the volumes by 3 years, then grow them by 10 years, to arrive at the 2025 and 2055 volumes.
5. MB will document the calculated traffic volumes in spreadsheet.

The US 67 volume for frontage roads and ramps will be integrated with the approved turning movement counts at the Loop 9 & US 67 interchange for each design year. Frontage road volumes and ramp volumes will then be calculated based on the forecasted turning movement counts and mainlane volumes calculated using the above steps.

The data source used for the base US 67 volumes was the NCTCOG Travel Demand Model (TDM). The reason for this is because during the analysis of Loop 9, the NCTCOG TDM was the only source of data available, since Loop 9 does not currently exist. The data for design years 2028, 2037, and 2045 were provided by NCTCOG for use in analysis.

The TDM provides projected AADT and turning movement counts for each segment of the future Loop 9 corridor, allowing analysts to calculate a growth rate for each segment based on future projected growth. This was deemed more accurate than applying a global growth rate. Since more precise data was available, it was used.

When requested to perform a similar analysis at the US 67 & Loop 9 interchange, the same methodology was used. If the results of the analysis for US 67 and Loop 9 were derived from two separate data sources and methodologies, the results would be of questionable validity. Therefore, the NCTCOG data was used for both Loop 9 and US 67.

The 2028, 2037 and 2045 traffic volumes from the NCTCOG TDM, as well as the projected 2025 and 2055 traffic volumes based on the proposed methodology are presented in Appendix A.

Example calculations for each segment of US 67 identified in the Appendix A exhibit are shown below.

Segment	NCTCOG TDM ADT			Growth Rate			Projected ADT				
	2028	2037	2045	2028-2045	2037-2045	Average	2025	2025 Adjusted ADT	2045 Adjusted ADT	2055	2055 Adjusted ADT
1	40,773	46,292	49,124	1.10%	0.74%	0.92%	39,664	**39,664**	**49,124**	53,854	**53,854**
2	42,554	48,386	51,137	1.09%	0.69%	0.89%	41,438	**41,439**	**51,137**	55,876	**55,890**
3	45,916	53,187	55,403	1.11%	0.51%	0.81%	44,817	**44,817**	**55,404**	60,065	**60,145**
4	44,952	52,520	55,771	1.28%	0.75%	1.02%	43,611	**43,611**	**55,771**	61,698	**61,698**
5	41,872	46,760	49,387	0.98%	0.69%	0.83%	40,846	**40,851**	**49,386**	53,646	**53,646**
6	40,682	45,586	48,091	0.99%	0.67%	0.83%	39,686	**39,691**	**48,090**	52,235	**52,232**
7	1,781	2,094	2,013	0.72%	-0.49%	0.12%	1,775	**1,775**	**2,013**	2,036	**2,036**
8	3,362	4,803	4,267	1.41%	-1.47%	-0.03%	3,365	**3,378**	**4,267**	4,255	**4,255**
9	5,578	7,025	7,577	1.82%	0.95%	1.38%	5,353	**5,353**	**7,577**	8,693	**8,693**
10	4,389	6,706	7,264	3.01%	1.00%	2.01%	4,136	**4,136**	**7,264**	8,860	**8,860**
11	3,080	5,761	6,385	4.38%	1.29%	2.84%	2,833	**2,760**	**6,385**	8,447	**8,052**
12	1,190	1,174	1,296	0.50%	1.24%	0.87%	1,160	**1,160**	**1,296**	1,414	**1,414**
13	5,790	8,285	11,874	4.32%	4.60%	4.46%	5,080	**5,147**	**11,874**	18,367	**18,367**
14	3,350	5,304	5,775	3.26%	1.07%	2.16%	3,142	**3,142**	**4,853**	7,152	**7,152**
15	3,080	5,773	7,028	4.97%	2.49%	3.73%	2,760	**2,760**	**7,024**	10,137	**10,180**
16	4,760	7,248	11,649	5.41%	6.11%	5.76%	4,025	**4,367**	**11,614**	20,390	**17,165**

Note: ADT were adjusted to correct discrepancies between the NCTCOG model geometry and proposed schematic geometry.

Appendix A. Traffic Volume Projection for US 67

N

NOT TO SCALE

Lake Ridge Pkwy

US 67 SB FNTG

US 67 NB FNTG

67

67

1425 (N/A) [N/A]

503 (8,374) [12,801]

832 (3,441) [5,133]

1,165 (3,240) [4,364]

3,560 (4,716) [6,232]

4,367 (11,614) [17,165] 16

1,160 (1,296) [1,414]

12

39,691 (48,090) [52,232]

6

2,699 (N/A) [N/A]

2,392 (N/A) [N/A]

40,851 (49,386) [53,646]

5

N/A (3,078) [4,461]

N/A (3,946) [5,719]

2,760 (7,024) [10,180] 15

N/A (7,869) [12,215]

N/A (4,155) [5,408]

2,760 (6,385) [8,052]

11

4,136 (7,264) [8,860]

10

43,611 (55,771) [61,698]

4

1

39,664 (49,124) [53,854]

2

41,439 (51,137) [55,890]

3

44,817 (55,404) [60,145]

9

5,353 (7,577) [8,693]

7

1,775 (2,013) [2,036]

2,260 (4,515) [6,489]

2,163 (3,642) [4,876]

3,142 (4,853) [7,152] 14

8

3,378 (4,267) [4,255]

13

5,147 (11,874) [18,367]

1,769 (N/A) [N/A]

759 (3,578) [5,572]

2,619 (8,296) [12,795]

3,322 (N/A) [N/A]

220 (N/A) [N/A]

N/A (2,809) [4,154]

N/A (4,411) [6,294]

N/A (9,215) [13,469]

N/A (442) [858]

SHILOH RD

LOOP 9
* TWO-WAY FNTG - 2025
* EB FNTG - 2045 & 2055

LOOP 9
WB FNTG - 2045 & 2055

MT. LEBANON RD

LEGEND

2025 ADJUSTED ADT

(#) 2045 ADJUSTED ADT

[#] 2055 ADJUSTED ADT

(#) SEGMENT NO.

TRAFFIC VOLUME (ADT)
PROJECTION FOR
US 67 STUDY SEGMENT

LOOP 9 - SEGMENT A

Attachment C: Existing model validation study

Existing Model Validation Study

A validation study was performed in order verify that the existing model accurately predicts existing traffic noise based on current conditions and to ensure that traffic noise is the main source of noise. Model validation compares field-collected sound level measurements to traffic noise levels calculated in an existing condition model that used field-collected traffic parameters.

One validation site was selected along the project ROW (**Figure C1**) after consultation with TxDOT district staff and ENV noise subject matter experts. Field measurements were collected on May 22, 2020 between 6:30 and 6:45 pm. The weather was sunny and dry, with calm to light winds. During the measurements, traffic was free-flowing and traveling at a relatively constant speed.

A *SoundPro DL Type 2* sound level meter was used to measure sound levels in dB(A) Leq. The sound level meter was positioned on a tripod with the microphone facing the roadway and set at a height of five feet. The measurement duration was 15 minutes. The meter was calibrated before measurements were taken and at the end of the day.

Concurrently with the sound level measurement, a video camera was used to record traffic conditions for all existing travel lanes adjacent to the noise meter. A laser speed detector was used to estimate average traffic speeds in both directions. Weather conditions, including temperature and wind speed/direction, were also recorded during the measurement period. Field data sheets are included in **Appendix A**.

Traffic during the validation measurements were atypical. Measurements were taken during the stay at home orders due to the Covid-19 pandemic. Many workers were not travelling to work and traffic levels were expected to be lower than normal.

Upon return from the field, traffic video recordings were reviewed to obtain traffic counts by vehicle classification (car, medium truck, and heavy truck). Because the noise modeling software uses a vehicle per hour input, vehicle counts for the 15-minute measurement interval were multiplied by four to convert the values to the hourly condition. Traffic counts and model inputs are included in **Appendix B**.

The FHWA traffic noise modeling software (TNM 2.5) was used to calculate existing traffic noise levels at each validation location, based on the field-observed conditions. The validation model run(s) used the existing roadway parameters, observed hourly traffic counts, and observed speeds.

The traffic noise model validation results are shown in **Table 1**.

Table 1. Traffic Noise Model Validation

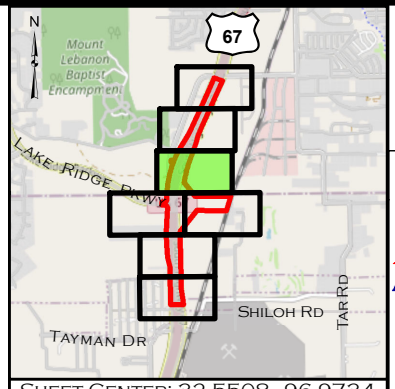
Validation Site	Field-Measured Level dB(A) Leq	Modeled Level dB(A) Leq	Difference (+/-)	Validated?
Site 1 – Southbound US67 Frontage Road approximately 750 feet north of Lake Ridge Parkway	58.9	61.7	+2.8	Yes

Differences between the measured and model-calculated sound levels were within the +/- 3 dB(A) tolerance allowed by FHWA. Therefore, the existing noise model is considered validated for this project.

FIGURE C1

Proposed ROW

Validation Point



Sheet Center: 32.5508, -96.9734

US 67 at Lake Ridge Parkway
CSJ: 0261-01-041
Noise Validation LocationsMap

Dallas & Ellis Counties, Texas

Texas Department of Transportation

N

0 150 300 Feet

1:3,600

FIGURE C
Sheet 1

DATE:
October 2020

Sources: ESRI Aerial 2019; Open Street Map; TIGER Roads 2015;

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APPENDIX A
FIELD DATA SHEETS

Field Data Sheets

EQUIPMENT: METER: Sound Pro DL CALIBRATOR: Quest QC 10/ QC 20

CALIBRATION: START: 114.0 dB END: 114.0 dB

RESPONSE: FAST: X SLOW: A-WEIGHTING X BATTERY CHECK X

WEATHER: 78° F Cloudy Wind < 5 mph

TRAFFIC DATA

ROAD	US67 SB FR	US67 SB ML
AUTOS	2	112
MED TRUCKS	0	1
HVY TRUCKS	0	2
DURATION	15 Minutes	15 minutes
SPEED	50	70

DATE: 5/22/2020
SITE #: V1
START: 18:30
END: 18:45
LEQ: 58.9

ROAD	US67 NB FR	US67 NB ML
AUTOS	4	312
MED TRUCKS	0	156/2
HVY TRUCKS	0	12
DURATION	15 Minutes	15 minutes
SPEED	50	70

Site Sketch

BACKGROUND NOISE: Traffic

MAJOR SOURCES: Traffic

UNUSUAL EVENTS: None

OTHER NOTES:

APPENDIX B
TRAFFIC COUNTS USED IN TNM

Field Data Sheets

ROAD	US67 SB FR	US67 SB ML	US67 NB FR	US67 NB ML
AUTOS	2	112	4	312
MED TRUCKS	0	1	0	156/2
HVY TRUCKS	0	2	0	12
DURATION	15 Minutes	15 minutes	15 Minutes	15 minutes
SPEED	50	70	50	70

Attachment D: Design schematic

TEXAS DEPARTMENT OF TRANSPORTATION

COUNTY: DALLAS/ELLIS
DATE: AUGUST 2020

DESIGN SCHEMATIC - US 67
DALLAS/ELLIS COUNTY

ROLL 3 OF 3

TEXAS DEPARTMENT OF TRANSPORTATION

DALLAS DISTRICT
MOHAMED K. BUR, P.E., DISTRICT ENGINEER

DESIGN SCHEMATIC

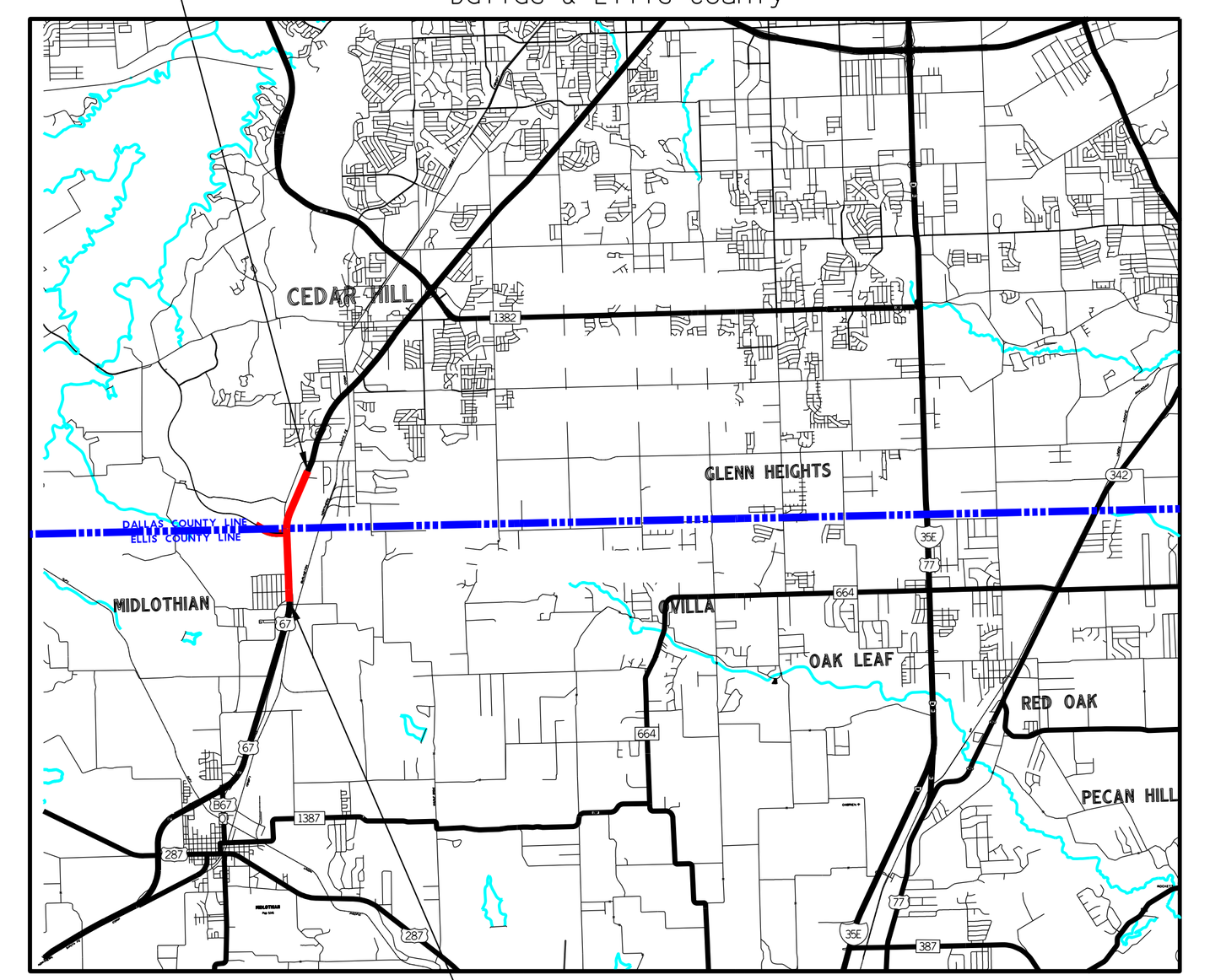
US 67
AT LAKE RIDGE PARKWAY
DALLAS & ELLIS COUNTIES

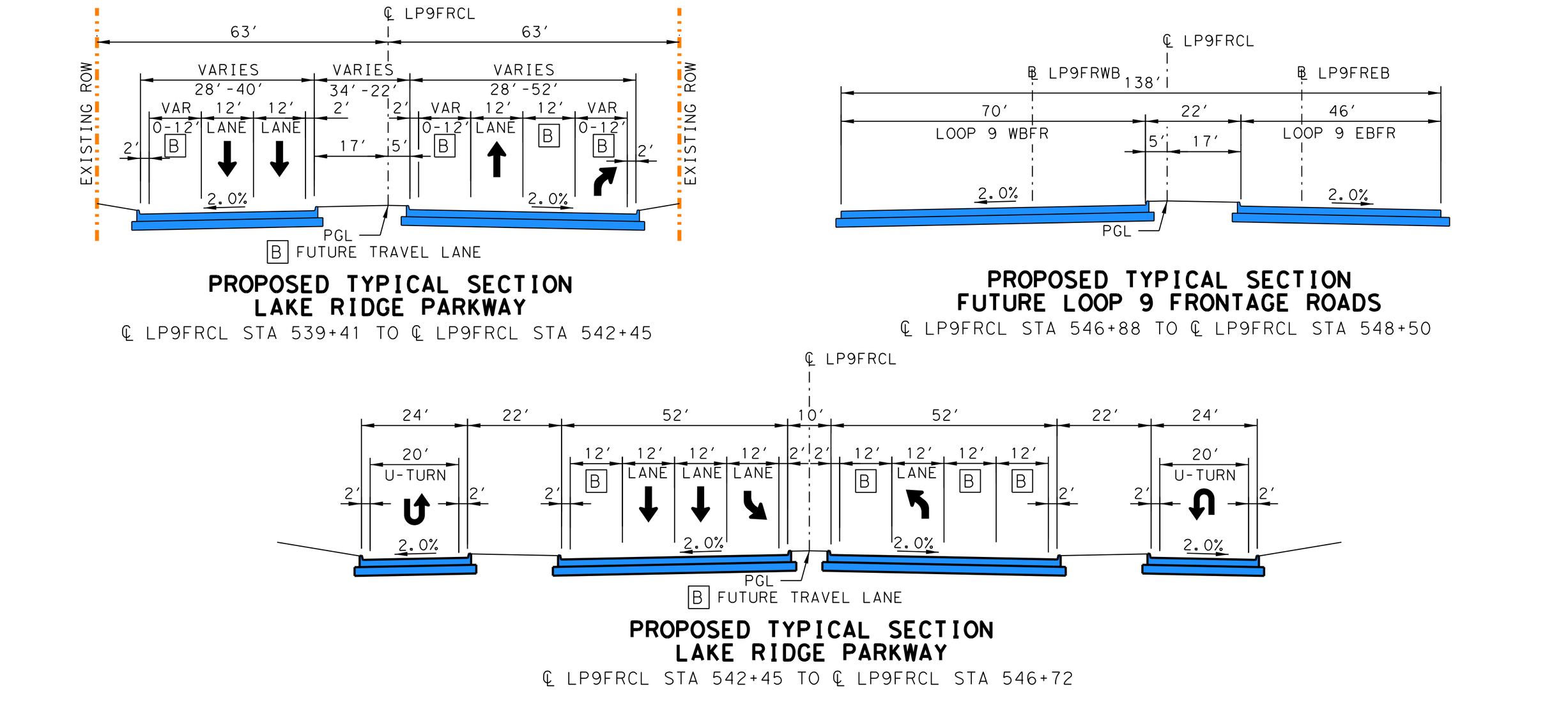
CSJ # 0261-01-041
Project Length = 1.82 Miles

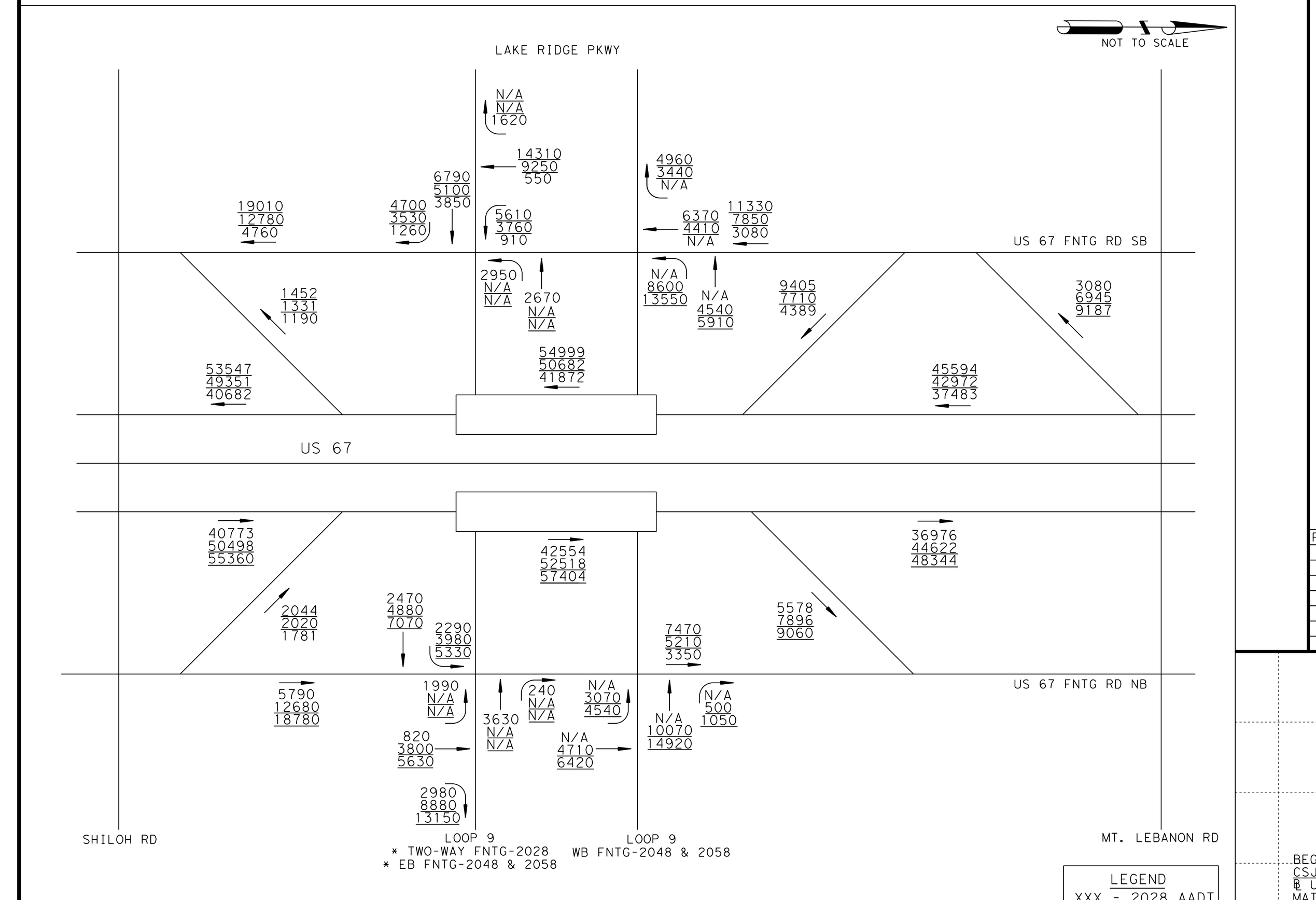
DESIGN SPEEDS

DESIGN SPEEDS AND FUNCTIONAL CLASSIFICATIONS:

MAINLANES (RURAL FREEWAY)	-	70 MPH
RAMPS AND TRANSITIONS (RURAL FREEWAY)	-	50 MPH
FRONTAGE ROADS (URBAN COLLECTOR)	-	50 MPH
CROSS STREETS	-	40 MPH
U-TURNS (URBAN COLLECTOR)	-	25 MPH







GENERAL NOTES:

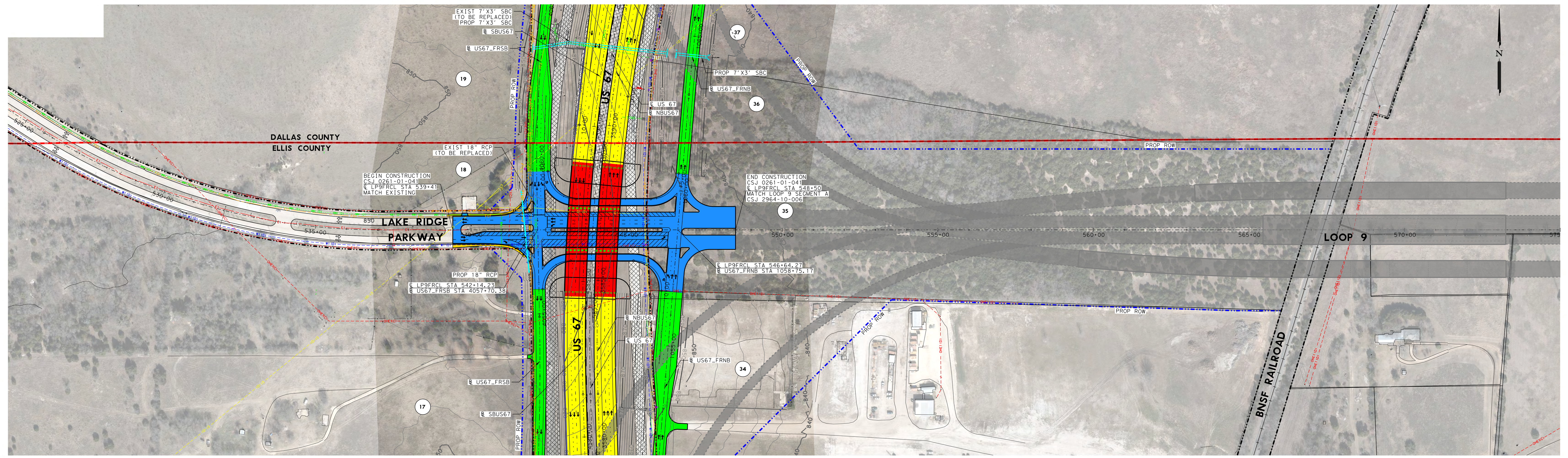
1. EXISTING FEATURES WERE NOT FIELD SURVEYED. SCHEMATICS ARE BASED ON AERIAL SURVEYS DATED DECEMBER 2013 AND RECORD PLANS.
2. FINAL LOCATION OF MEDIAN OPENINGS WILL BE DETERMINED IN THE PS&E DEVELOPMENT PHASE IN COORDINATION WITH THE LOCAL GOVERNMENTS.
3. SUPERELEVATION AXIS OF ROTATION IS ABOUT THE PGL.
4. DIMENSIONS ARE TO THE EDGE OF PAVEMENT OR NOMINAL FACE OF CURB, RAIL, BARRIER, OR WALL (UNLESS NOTED OTHERWISE). REFER TO TYPICAL SECTIONS FOR BARRIER TYPES AND LIMITS.
5. APPROXIMATE 100 YEAR FLOODPLAIN LIMITS ARE BASED UPON FEMA FLOOD INSURANCE RATE MAPS 48113C0615K.
6. OWNERSHIP INFORMATION SHOWN ON SCHEMATIC OBTAINED FROM DALLAS, ELLIS COUNTIES APPRAISAL DISTRICTS. (LATEST DATA AVAILABLE AS OF JANUARY 2020)
7. EXISTING CULVERT LOCATIONS, SIZE, AND ELEVATIONS OBTAINED FROM RECORD DOCUMENTS AND ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY.
8. ADA RAMPS AND SIDEWALKS ARE DIAGRAMMATIC ONLY AND WILL BE DESIGNED DURING PS&E. SIDEWALKS ARE SHOWN ON TYPICAL SECTIONS.
9. EXISTING DRIVEWAYS WILL REMAIN UNLESS IT IS DETERMINED IN COORDINATION WITH THE LOCAL GOVERNMENT THAT THE DRIVEWAY IS A SAFETY ISSUE AND/OR IS LOCATED WITHIN ACCESS DENIAL LIMITS.
10. BUILDINGS ARE SHOWN AS POTENTIAL DISPLACEMENT IF THE PROPOSED ROW PHYSICALLY INTERSECTS THE EXISTING BUILDING STRUCTURE.
11. CURBS ARE TYPE II (8") UNLESS NOTED OTHERWISE.
12. CONVENTIONAL ROADWAY SIGNAGE (SMALL SIGNS) ARE NOT SHOWN AND WILL BE DEVELOPED DURING THE PS&E PHASE OF THE PROJECT.
13. WHERE CONTROL OF ACCESS IS NOT SHOWN AT THE RAMP LOCATIONS, CONTROL OF ACCESS WILL BE REVIEWED AND DENIED AT THE DISCRETION OF THE AREA OFFICE THROUGH THE DRIVEWAY PERMIT PROCESS.
14. EXISTING PAVEMENT/BRIDGES LOCATED WITHIN LIMITS OF PROPOSED RECONSTRUCTION WILL BE REMOVED (UNLESS NOTED OTHERWISE).
15. ALL CROSS STREETS CORNER RADII ARE 50 FT MINIMUM UNLESS NOTED OTHERWISE.
16. ALL DRIVEWAYS CORNER RADII ARE 25 FT MINIMUM UNLESS NOTED OTHERWISE.
17. ALL MAINLANE MEDIAN CONCRETE TRAFFIC BARRIERS SHALL BE SINGLE SLOPE CONCRETE BARRIER (SSCB) UNLESS NOTED OTHERWISE.

ROLL INDEX

ROLL 1:	US 67 MAINLANES BEGIN PROJECT TO STA 594+00
ROLL 2:	US 67 MAINLANES STA 594+00 TO END PROJECT
ROLL 3:	LOOP 9 FRONTAGE ROAD BEGIN PROJECT TO STA 548+50

PLAN LEGEND

- PROPOSED ℄/ℬ
- PROPOSED ROW
- EXISTING ROW
- CONTROL OF ACCESS
- PROPERTY LINES
- CITY LIMITS
- 100 YR FLOODPLAIN LIMITS
- EXISTING PLANIMETRIC FEATURES
- COUNTY LINE
- PROPOSED EDGE OF PAVEMENT
- PROPOSED TRAFFIC BARRIER
- PROPOSED RETAINING WALL
- PROPOSED BRIDGE ABUTMENT/BENT
- PROPOSED CULVERT
- EXISTING MAJOR CONTOURS (5 FT)
- EXISTING MINOR CONTOURS (1 FT)
- PROPOSED MAJOR CONTOURS (10 FT)
- PROPOSED MINOR CONTOURS (2 FT)
- PROPOSED DIRECTION OF TRAVEL
- EXISTING DIRECTION OF TRAVEL
- PROPOSED BRIDGE
- PROPOSED MAIN LANES
- PROPOSED FRONTAGE ROAD
- PROPOSED RAMP
- PROPOSED CROSS STREET
- PROPOSED SIDEWALK
- FUTURE LOOP 9
- PAVEMENT TO BE REMOVED
- POTENTIAL DISPLACEMENT
- XXXXX-## CURVE ID
- ## PARCEL ID



PROFILE LEGEND:
- PROPOSED PROFILE
- EXISTING GROUND
- BRIDGE COLUMNS
- BRIDGE STRUCTURE

APPROVED SCHEMATIC
NOT FOR CONSTRUCTION

SCHEMATIC PREPARED BY:
BGE, INC.
REGISTRATION NUMBER F-1046
FOR INTERIM REVIEW ONLY. NOT FOR PERMITTING, BIDDING OR CONSTRUCTION.
Prepared by or under the Direct Supervision of:

NAME	P.E. NUMBER
HOSSEIN M. HOSSEINY, P.E.	118668
MICHAEL G. ZIEMINSKI, P.E.	103845

9/21/2020
DATE

HORIZONTAL SCALE 0 50 100 200 300
VERTICAL SCALE 0 5 10 20 30

ROLL 3 OF 3

BGE, Inc.
2595 Dallas Parkway, Suite 101, Frisco, TX 75034
Tel: 972-464-4800 • www.bgeinc.com
TBPE Registration No. F-1046

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TEXAS DEPARTMENT OF TRANSPORTATION
DALLAS DISTRICT
MOHAMED K. BUR, P.E., DISTRICT ENGINEER
DESIGN SCHEMATIC
US 67
AT LAKE RIDGE PARKWAY
DALLAS & ELLIS COUNTIES
CSJ # 0261-01-041
Project Length = 1.82 Miles
DESIGN SPEEDS
APPROVED SCHEMATIC NOT FOR CONSTRUCTION
ROLL 3 OF 3
BGE, Inc.
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Tel: 972-464-4800 • www.bgeinc.com
TBPE Registration No. F-1046
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