



# Traffic Noise Analysis Technical Report

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FM 734 (Parmer Lane)  
From RM 1431 to SH 45  
Williamson County, Texas  
CSJ: 3417-02-030

July 2019

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 (MOU) dated December 9, 2019 and executed by FHWA and TxDOT.

## **1. INTRODUCTION**

This report presents the findings of a traffic noise analysis performed for the proposed improvements to FM 734 from RM 1431 to approximately 0.17 Miles south of SH 45 in Williamson County (CSJ: 3417-02-030– **Figure 1**).

This analysis was accomplished in accordance with Texas Department of Transportation's (TxDOT) (Federal Highway Administration [FHWA] approved) Guidelines for Analysis and Abatement of Roadway Traffic Noise (2011). The analysis evaluated the existing and future traffic noise conditions, as well as potential noise abatement measures, for the proposed project.

### **1.1. Existing Facility**

Within the proposed project limits, FM 734 is a divided four-lane arterial (two lanes in each direction) with shoulders and occasional left and right turn lanes. Travel lanes within this section are typically 12 feet (ft) each with 4-ft to 10-ft inside and 10-ft outside shoulders within an existing right-of-way (ROW) that is 200 ft in width. The roadway spans South Brushy Creek with two separate open drainage bridge structures (one in each direction) near the middle of the project limits; the bridges each measure approximately 1500 ft long by 44 ft wide (southbound) and 50 ft (northbound).

### **1.2. Proposed Project**

The proposed improvements consist of the expansion of FM 734 from a four lane to a six lane roadway (three lanes in each direction) from FM 1431 to SH 45 for a total of approximately 4.4 miles. The project would include widening the existing facility, improving intersections with additional turn lanes, improving water quality for stormwater runoff, providing sidewalks throughout the corridor and a dedicated bike/pedestrian path connecting FM 734 to the Brushy Creek Regional Trail.

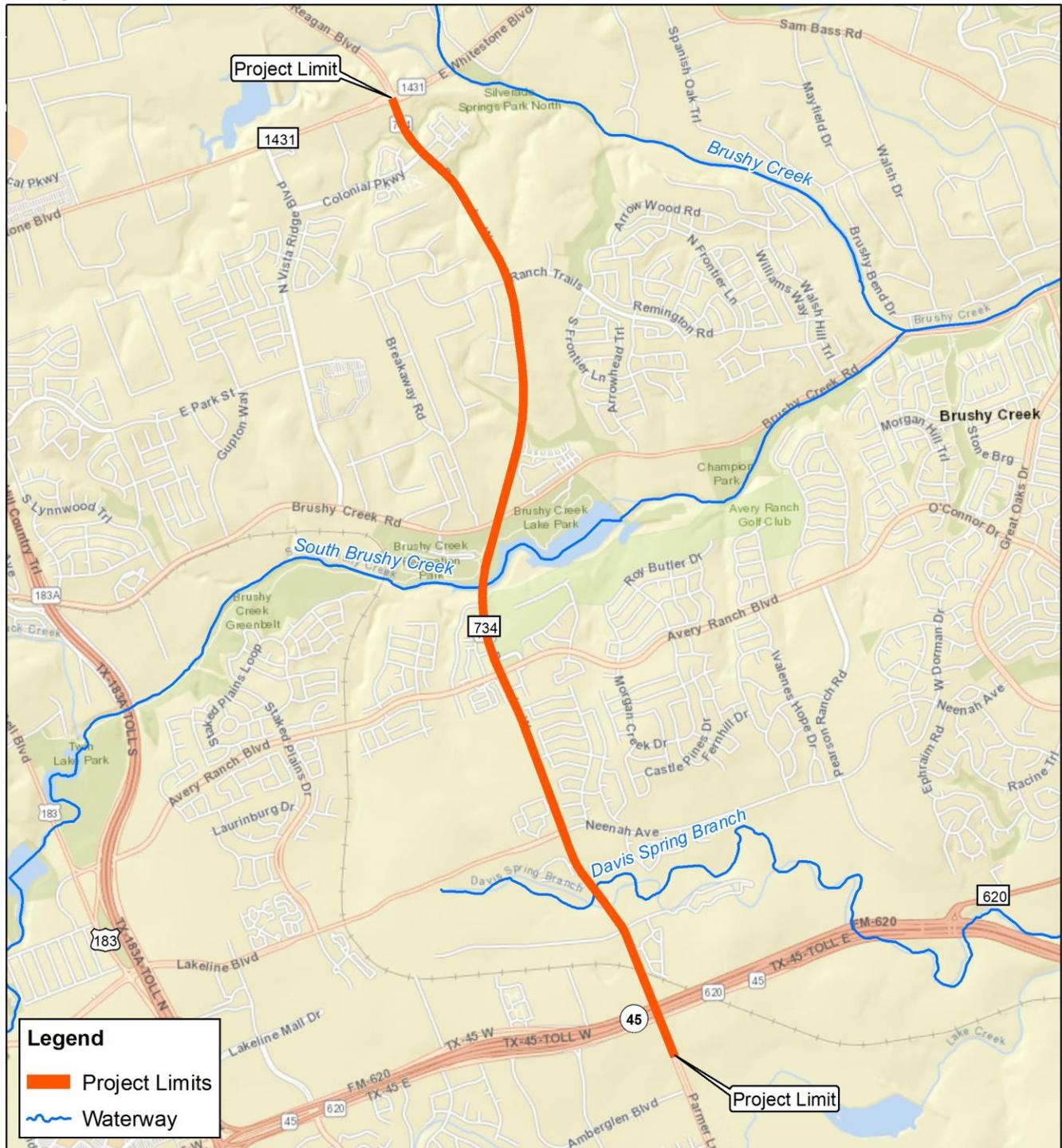
### **1.3. Right-of-Way**

The proposed project would be constructed within existing ROW and easements. No new ROW or permanent easements are anticipated for the project and no residential or commercial displacements are anticipated.

### **1.4. Surrounding Area - Land Use**

Construction of FM 734, or Parmer Lane, began in 1992. A review of USGS topographic maps and aerial photography of the project area showed that the land between RM 1431 and SH 45 was rural and mostly undeveloped prior to the construction of FM 734. Development of the surrounding lands began around the mid-1990's with the construction of the Avery Ranch subdivision located south of the intersection of FM 734 and Brushy Creek. The surrounding area underwent rapid residential, commercial and recreational growth in the years to follow. Development along FM 734 is currently ongoing with few remaining undeveloped parcels.

Figure 1: Project Location



<p>Texas Department of Transportation</p>	<p><b>Figure 1</b> <b>Project Location Map</b></p>	<p>Project Location</p>
<p>FM 734 from FM 1431 to South of SH 45 Williamson County, Texas</p>		
<p>0 1,300 2,600 3,900 5,200 Feet</p>		

Map Created: 11/14/2018

## 1.5. Methodology

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

In addition, 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) [Table 1] 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	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, amphitheatres, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or non-profit 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 non-profit institutional structures, radio studios, recording studios, schools, and television studios

**Table 1 (cont.): FHWA Noise Abatement Criteria (NAC)**

Activity Category	dB(A) Leq	Description of Land Use Activity Areas
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

Source FHWA, December 2011

A noise impact occurs when either the absolute or relative criterion, as defined below, is met.

**Absolute criterion** - The predicted noise level at a receiver 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 receiver 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.

The FHWA traffic noise modelling software (TNM Version 2.5) was used to calculate existing and predicted traffic noise levels. The model primarily considers the number, type and speed of vehicles; roadway 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 existing year for this evaluation is 2018. The design year (the future year used to estimate the probable traffic volume for which a highway is designed) is 2043. The traffic data used in this analysis was developed by the Jacobs Team and reviewed by TxDOT's Transportation Planning and Programming Division (Attachments 1 and 2). Attachment 3 shows the peak hour intersection volumes for existing and the 2043 Build Alternative.

Existing and predicted traffic noise levels were modelled at receiver locations 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.

The majority of the land use activity areas adjacent to the proposed project currently consist of residential (single-family and multi-family – NAC B) and of commercial development (NAC C).

## **2. TRAFFIC NOISE ANALYSIS**

For the proposed project, existing and predicted traffic noise levels were modeled at 277 receivers of which 70 receivers locations are multi-story apartment complexes (two to three receives per story). The noise receivers identified in **Table 2** and **Figures 2a-o** represent land use activity areas adjacent to the proposed project ROW potentially impacted by traffic noise and which would potentially benefit from feasible and reasonable noise abatement.

Table 2: Traffic Noise Levels dB(A) Leq

Receiver	Description	NAC Category	NAC Level	Existing 2018	Predicted 2043	Change (+/-)	Noise Impact
R1 -	Colonial Grand at Silverado Apartments-Pool	B	66	62	64	+2	No
<b>Colonial Grand at Silverado Reserve Apartments</b>							
R2	1 <sup>st</sup> Story	B	66	64	67	+3	Yes
	2 <sup>nd</sup> Story	B	66	67	69	+2	Yes
R3	1 <sup>st</sup> Story	B	66	64	66	+2	Yes
	2 <sup>nd</sup> Story	B	66	67	69	+2	Yes
R4	1 <sup>st</sup> Story	B	66	63	66	+3	Yes
	2 <sup>nd</sup> Story	B	66	67	69	+2	Yes
R5	1 <sup>st</sup> Story	B	66	63	66	+3	Yes
	2 <sup>nd</sup> Story	B	66	67	69	+2	Yes
R6	1 <sup>st</sup> Story	B	66	62	64	+2	No
	2 <sup>nd</sup> Story	B	66	66	68	+2	Yes
R7	1 <sup>st</sup> Story	B	66	65	67	+2	Yes
	2 <sup>nd</sup> Story	B	66	69	71	+2	Yes
R8	1 <sup>st</sup> Story	B	66	69	71	+2	Yes
	2 <sup>nd</sup> Story	B	66	72	74	+2	Yes

Receiver	Description	NAC Category	NAC Level	Existing 2018	Predicted 2043	Change (+/-)	Noise Impact
<b>Colonial Grand at Silverado Reserve Apartments (cont.)</b>							
R9	1 <sup>st</sup> Story	B	66	67	70	+3	Yes
	2 <sup>nd</sup> Story	B	66	71	73	+2	Yes
R10	1 <sup>st</sup> Story	B	66	67	69	+2	Yes
	2 <sup>nd</sup> Story	B	66	71	72	+1	Yes
R11	1 <sup>st</sup> Story	B	66	66	68	+2	Yes
	2 <sup>nd</sup> Story	B	66	70	72	+2	Yes
R12	1 <sup>st</sup> Story	B	66	61	63	+2	No
	2 <sup>nd</sup> Story	B	66	65	67	+2	Yes
R13	1 <sup>st</sup> Story	B	66	61	63	+2	No
	2 <sup>nd</sup> Story	B	66	65	67	+2	Yes
R14	1 <sup>st</sup> Story	B	66	60	62	+2	No
	2 <sup>nd</sup> Story	B	66	64	66	+2	Yes
R15	1 <sup>st</sup> Story	B	66	60	62	+2	No
	2 <sup>nd</sup> Story	B	66	64	66	+2	Yes
<b>Bexley at Silverado Apartments</b>							
R16	1 <sup>st</sup> Story	B	66	64	66	+2	Yes
	2 <sup>nd</sup> Story	B	66	68	70	+2	Yes

Receiver	Description	NAC Category	NAC Level	Existing 2018	Predicted 2043	Change (+/-)	Noise Impact
<b>Bexley at Silverado Apartments (cont.)</b>							
R17	1 <sup>st</sup> Story	B	66	63	65	+2	No
	2 <sup>nd</sup> Story	B	66	67	69	+2	Yes
	3 <sup>rd</sup> Story	B	66	69	71	+2	Yes
R18	1 <sup>st</sup> Story	B	66	63	64	+1	No
	2 <sup>nd</sup> Story	B	66	67	69	+2	Yes
R19	Brushy Creek Montessori School playscape	C	66	60	64	+4	No
R20	LeafSpring School at Cedar Park playscape	C	66	63	63	0	No
R21	Three Points - 816 Clearwell St - Residence	B	66	65	67	+2	Yes
R21a	Three Points - 814 Clearwell St - Residence	B	66	64	66	+2	Yes
R21b	Three Points - 812 Clearwell St - Residence	B	66	63	65	+2	No
R21c	Three Points - 810 Clearwell St - Residence	B	66	62	64	+2	No
R21d	Three Points - 808 Clearwell St - Residence	B	66	62	64	+2	No
R21e	Three Points - 806 Clearwell St - Residence	B	66	64	66	+2	Yes
R21f	Three Points - 804 Clearwell St - Residence	B	66	64	66	+2	Yes
R21g	Three Points - 802 Clearwell St - Residence	B	66	65	67	+2	Yes
R21h	Three Points - 800 Clearwell St - Residence	B	66	64	66	+2	Yes
R21i	Three Points - 3007 Zelma Dr - Residence	B	66	62	64	+2	No

Receiver	Description	NAC Category	NAC Level	Existing 2018	Predicted 2043	Change (+/-)	Noise Impact
R22	Three Points - 900 Clearwell St - Residence	B	66	64	66	+2	Yes
R23	Three Points - 902 Clearwell St - Residence	B	66	62	65	+3	No
R24	Three Points - 904 Clearwell St - Residence	B	66	63	65	+2	No
R25	Three Points - 906 Clearwell St - Residence	B	66	62	64	+2	No
R26	Three Points - 1000 Clearwell St - Residence	B	66	61	64	+3	No
R27	Three Points - 1002 Clearwell St - Residence	B	66	61	63	+2	No
R28	Three Points - 1004 Clearwell St - Residence	B	66	60	63	+3	No
R29	Three Points - 1006 Clearwell St - Residence	B	66	60	63	+3	No
R30	Three Points - 1008 Clearwell St - Residence	B	66	60	62	+2	No
R31	Three Points - 1010 Clearwell St - Residence	B	66	59	62	+3	No
R32	Three Points - 1012 Clearwell St - Residence	B	66	57	59	+2	No
R33	Three Points – 1014 Clearwell St - Residence	B	66	56	59	+3	No
R34	Paradiso Villas Condo – Unit 2	B	66	63	64	+1	No
R35	Paradiso Villas Condo - Unit 3	B	66	64	66	+2	Yes
R36	Paradiso Villas Condo - Unit 4	B	66	66	67	+1	Yes
R37	Paradiso Villas Condo - Unit 5	B	66	69	70	+1	Yes
R38	Paradiso Villas Condo - Unit 14	B	66	66	69	+3	Yes
R39	Paradiso Villas Condo - Unit 15	B	66	66	69	+3	Yes

Receiver	Description	NAC Category	NAC Level	Existing 2018	Predicted 2043	Change (+/-)	Noise Impact
R40	Paradiso Villas Condo - Unit 16	B	66	66	69	+3	Yes
R41	Paradiso Villas Condo - Unit 17	B	66	66	69	+3	Yes
<b>Silverado at Brushy Creek Apartments</b>							
R42	1 <sup>st</sup> Story	B	66	65	68	+3	Yes
	2 <sup>nd</sup> Story	B	66	69	71	+2	Yes
	3 <sup>rd</sup> Story	B	66	71	72	+1	Yes
R43	1 <sup>st</sup> Story	B	66	71	73	+2	Yes
	2 <sup>nd</sup> Story	B	66	73	75	+2	Yes
	3 <sup>rd</sup> Story	B	66	73	75	+2	Yes
R44	1 <sup>st</sup> Story	B	66	70	73	+3	Yes
	2 <sup>nd</sup> Story	B	66	73	75	+2	Yes
	3 <sup>rd</sup> Story	B	66	73	75	+2	Yes
R45	1 <sup>st</sup> Story	B	66	69	71	+2	Yes
	2 <sup>nd</sup> Story	B	66	72	74	+2	Yes
	3 <sup>rd</sup> Story	B	66	72	74	+2	Yes
R46	1 <sup>st</sup> Story	B	66	68	71	+3	Yes
	2 <sup>nd</sup> Story	B	66	71	73	+2	Yes
	3 <sup>rd</sup> Story	B	66	72	74	+2	Yes

Receiver	Description	NAC Category	NAC Level	Existing 2018	Predicted 2043	Change (+/-)	Noise Impact
<b>Silverado at Brushy Creek Apartments (cont.)</b>							
R47	1 <sup>st</sup> Story	B	66	69	72	+3	Yes
	2 <sup>nd</sup> Story	B	66	73	74	+1	Yes
	3 <sup>rd</sup> Story	B	66	73	74	+1	Yes
R48	1 <sup>st</sup> Story	B	66	70	72	+2	Yes
	2 <sup>nd</sup> Story	B	66	72	74	+2	Yes
	3 <sup>rd</sup> Story	B	66	72	74	+2	Yes
R49	1 <sup>st</sup> Story	B	66	69	72	+3	Yes
	2 <sup>nd</sup> Story	B	66	72	74	+2	Yes
	3 <sup>rd</sup> Story	B	66	72	74	+2	Yes
R50	1 <sup>st</sup> Story	B	66	69	71	+2	Yes
	2 <sup>nd</sup> Story	B	66	72	73	+1	Yes
	3 <sup>rd</sup> Story	B	66	72	74	+2	Yes
R51	1 <sup>st</sup> Story	B	66	69	71	+2	Yes
	2 <sup>nd</sup> Story	B	66	71	73	+2	Yes
	3 <sup>rd</sup> Story	B	66	72	74	+2	Yes
R52	Brushy Creek Regional Trail	C	66	64	66	+2	Yes
R53	Brushy Creek Regional Trail	C	66	68	69	+1	Yes
R54	Brushy Creek Regional Trail	C	66	70	73	+3	Yes

Receiver	Description	NAC Category	NAC Level	Existing 2018	Predicted 2043	Change (+/-)	Noise Impact
R55	Brushy Creek Regional Trail	C	66	72	73	+1	Yes
R56	Brushy Creek Regional Trail	C	66	70	72	+2	Yes
R57	Brushy Creek Regional Trail	C	66	70	72	+2	Yes
R58	Brushy Creek Regional Trail	C	66	69	71	+2	Yes
R59	Brushy Creek Regional Trail	C	66	70	72	+2	Yes
R60	Brushy Creek Regional Trail	C	66	67	68	+1	Yes
R61	Brushy Creek Sports Park Bleacher	C	66	61	63	+2	No
R62	Avery Ranch - 11124 Casitas Dr - Residence	B	66	67	69	+2	Yes
R63	Avery Ranch - 11120 Casitas Dr - Residence	B	66	65	66	+1	Yes
R64	Avery Ranch - 11125 Casitas Dr - Residence	B	66	65	68	+3	Yes
R65	Avery Ranch - 11121 Casitas Dr - Residence	B	66	62	64	+2	No
R66	Avery Ranch Overlook Townhomes – Unit 74	B	66	65	68	+3	Yes
R67	Avery Ranch Overlook Townhomes – Unit 73	B	66	60	62	+2	No
R68	Avery Ranch Overlook Townhomes – Unit 66	B	66	68	70	+2	Yes
R69	Avery Ranch Overlook Townhomes – Units 65/67	B	66	62	65	+3	No
R70	Avery Ranch Overlook Townhomes – Units 64/68	B	66	58	61	+3	No
R71	Avery Ranch Overlook Townhomes – Unit 55	B	66	59	61	+2	No
R72	Avery Ranch Overlook Townhomes – Unit 54	B	66	52	55	+3	No
R73	Avery Ranch Overlook Townhomes – Unit 53	B	66	43	45	+2	No

Receiver	Description	NAC Category	NAC Level	Existing 2018	Predicted 2043	Change (+/-)	Noise Impact
R74	Avery Ranch Overlook Townhomes – Unit 52	B	66	57	60	+3	No
R75	Davis Springs - 15000 Terra Verde Dr - Residence	B	66	67	70	+3	Yes
R76	Davis Springs - 15001 Savannah Heights Dr - Residence	B	66	69	72	+3	Yes
R77	Davis Springs - 15005 Savannah Heights Dr - Residence	B	66	68	72	+4	Yes
R78	Davis Springs - 15009 Savannah Heights Dr - Residence	B	66	69	72	+3	Yes
R79	Davis Springs - 15015 Savannah Heights Dr - Residence	B	66	70	73	+3	Yes
R80	Davis Springs - 15019 Savannah Heights Dr - Residence	B	66	69	72	+3	Yes
R81	Davis Springs - 15023 Savannah Heights Dr - Residence	B	66	66	69	+3	Yes
R82	Davis Springs - 15022 Galena Dr - Residence	B	66	66	70	+4	Yes
R83	Davis Springs - 15018 Galena Dr - Residence	B	66	68	72	+4	Yes
R84	Davis Springs- 15016 Galena Dr - Residence	B	66	69	73	+4	Yes
R85	Davis Springs - 15012 Galena Dr - Residence	B	66	70	73	+3	Yes
R86	Davis Springs - 15008 Galena Dr - Residence	B	66	70	73	+3	Yes
R87	Davis Springs - 15004 Galena Dr - Residence	B	66	70	73	+3	Yes
R88	Davis Springs - 15000 Galena Dr - Residence	B	66	69	73	+4	Yes
R89	Davis Springs - 14930 Galena Dr - Residence	B	66	69	73	+4	Yes
R90	Davis Springs - 14926 Galena Dr - Residence	B	66	69	73	+4	Yes
R91	Davis Springs - 14922 Galena Dr - Residence	B	66	69	73	+4	Yes
R92	Davis Springs - 14918 Galena Dr - Residence	B	66	69	72	+3	Yes

Receiver	Description	NAC Category	NAC Level	Existing 2018	Predicted 2043	Change (+/-)	Noise Impact
R93	Davis Springs - 14914 Galena Dr - Residence	B	66	70	73	+3	Yes
R94	Davis Springs - 14908 Galena Dr - Residence	B	66	69	72	+3	Yes
R95	Davis Springs - 14904 Galena Dr - Residence	B	66	69	73	+4	Yes
R96	Davis Springs - 14900 Galena Dr - Residence	B	66	69	72	+3	Yes
R97	Davis Springs - 10057 Lachlan Dr - Residence	B	66	69	72	+3	Yes
R98	Davis Springs - 10053 Lachlan Dr - Residence	B	66	69	71	+2	Yes
R99	Davis Springs - 10121 Majorca Dr - Residence	B	66	68	71	+3	Yes
R100	Davis Springs - 10117 Majorca Dr - Residence	B	66	69	72	+3	Yes
R101	Davis Springs - 10113 Majorca Dr - Residence	B	66	67	70	+3	Yes
R102	Davis Springs - 10109 Majorca Dr - Residence	B	66	68	71	+3	Yes
R103	Davis Springs - 10105 Majorca Dr - Residence	B	66	68	71	+3	Yes
R104	Davis Springs - 10101 Majorca Dr - Residence	B	66	68	71	+3	Yes
R105	Davis Springs - 10025 Majorca Dr - Residence	B	66	68	72	+4	Yes
R106	Davis Springs - 10026 Mirage Cv - Residence	B	66	69	72	+3	Yes
R107	Davis Springs - 10025 Mirage Cv - Residence	B	66	69	71	+2	Yes
R108	Davis Springs - 9920 Mateo Cv - Residence	B	66	68	71	+3	Yes
R109	Davis Springs - 9925 Mateo Cv - Residence	B	66	70	72	+2	Yes
R110	Davis Springs - 9921 Mateo Cv - Residence	B	66	70	72	+2	Yes

Receiver	Description	NAC Category	NAC Level	Existing 2018	Predicted 2043	Change (+/-)	Noise Impact
<b>Griffis Parmer Lane Apartments</b>							
R111	1 <sup>st</sup> Story	B	66	64	67	+3	Yes
	2 <sup>nd</sup> Story	B	66	68	70	+2	Yes
	3 <sup>rd</sup> Story	B	66	69	71	+2	Yes
R112	1 <sup>st</sup> Story	B	66	61	64	+3	No
	2 <sup>nd</sup> Story	B	66	64	67	+3	Yes
	3 <sup>rd</sup> Story	B	66	66	68	+2	Yes
R113	1 <sup>st</sup> Story	B	66	64	67	+3	Yes
	2 <sup>nd</sup> Story	B	66	67	69	+2	Yes
	3 <sup>rd</sup> Story	B	66	69	70	+1	Yes
R114	1 <sup>st</sup> Story	B	66	60	64	+4	No
	2 <sup>nd</sup> Story	B	66	64	66	+2	Yes
	3 <sup>rd</sup> Story	B	66	66	68	+2	Yes
R115	1 <sup>st</sup> Story	B	66	64	67	+3	Yes
	2 <sup>nd</sup> Story	B	66	68	70	+2	Yes
	3 <sup>rd</sup> Story	B	66	69	71	+2	Yes
R116	1 <sup>st</sup> Story	B	66	60	63	+3	No
	2 <sup>nd</sup> Story	B	66	64	66	+2	Yes
	3 <sup>rd</sup> Story	B	66	66	68	+2	Yes

Receiver	Description	NAC Category	NAC Level	Existing 2018	Predicted 2043	Change (+/-)	Noise Impact
<b>Griffis Parmer Lane Apartments (cont.)</b>							
R117	1 <sup>st</sup> Story	B	66	64	67	+3	Yes
	2 <sup>nd</sup> Story	B	66	68	70	+2	Yes
	3 <sup>rd</sup> Story	B	66	69	71	+2	Yes
R118	1 <sup>st</sup> Story	B	66	60	64	+4	No
	2 <sup>nd</sup> Story	B	66	64	66	+2	Yes
	3 <sup>rd</sup> Story	B	66	67	68	+1	Yes
<b>Sycamore Springs Apartments</b>							
R119	1 <sup>st</sup> Story	B	66	64	67	+3	Yes
	2 <sup>nd</sup> Story	B	66	67	69	+2	Yes
	3 <sup>rd</sup> Story	B	66	68	70	+2	Yes
R120	1 <sup>st</sup> Story	B	66	62	65	+3	No
	2 <sup>nd</sup> Story	B	66	65	67	+2	Yes
	3 <sup>rd</sup> Story	B	66	67	69	+2	Yes
R121	1 <sup>st</sup> Story	B	66	64	67	+3	Yes
	2 <sup>nd</sup> Story	B	66	67	70	+3	Yes
	3 <sup>rd</sup> Story	B	66	69	70	+1	Yes
R122	1 <sup>st</sup> Story	B	66	60	64	+4	No
	2 <sup>nd</sup> Story	B	66	64	66	+2	Yes

Receiver	Description	NAC Category	NAC Level	Existing 2018	Predicted 2043	Change (+/-)	Noise Impact
<b>Sycamore Springs Apartments (cont.)</b>							
R122	3 <sup>rd</sup> Story	B	66	66	67	+1	Yes
R123	1 <sup>st</sup> Story	B	66	67	70	+3	Yes
	2 <sup>nd</sup> Story	B	66	70	73	+3	Yes
	3 <sup>rd</sup> Story	B	66	71	73	+2	Yes
R124	1 <sup>st</sup> Story	B	66	66	70	+4	Yes
	2 <sup>nd</sup> Story	B	66	70	72	+2	Yes
	3 <sup>rd</sup> Story	B	66	71	73	+2	Yes
R125	1 <sup>st</sup> Story	B	66	66	69	+3	Yes
	2 <sup>nd</sup> Story	B	66	69	72	+3	Yes
	3 <sup>rd</sup> Story	B	66	71	72	+1	Yes
R126	1 <sup>st</sup> Story	B	66	65	68	+3	Yes
	2 <sup>nd</sup> Story	B	66	69	71	+2	Yes
	3 <sup>rd</sup> Story	B	66	70	72	+2	Yes
R137	1 <sup>st</sup> Story	B	66	62	66	+4	Yes
	2 <sup>nd</sup> Story	B	66	66	69	+3	Yes
	3 <sup>rd</sup> Story	B	66	68	70	+2	Yes
R128	1 <sup>st</sup> Story	B	66	58	61	+3	No
	2 <sup>nd</sup> Story	B	66	62	65	+3	No

Receiver	Description	NAC Category	NAC Level	Existing 2018	Predicted 2043	Change (+/-)	Noise Impact
<b>Sycamore Springs Apartments (cont.)</b>							
R128	3 <sup>rd</sup> Story	B	66	65	66	+1	Yes
R129	1 <sup>st</sup> Story	B	66	59	62	+3	No
	2 <sup>nd</sup> Story	B	66	64	66	+2	Yes
	3 <sup>rd</sup> Story	B	66	65	67	+2	Yes
R130	1 <sup>st</sup> Story	B	66	64	68	+4	Yes
	2 <sup>nd</sup> Story	B	66	68	70	+2	Yes
	3 <sup>rd</sup> Story	B	66	69	71	+2	Yes
R131	1 <sup>st</sup> Story	B	66	71	73	+2	Yes
	2 <sup>nd</sup> Story	B	66	73	75	+2	Yes
	3 <sup>rd</sup> Story	B	66	73	75	+2	Yes
R132	1 <sup>st</sup> Story	B	66	66	69	+3	Yes
	2 <sup>nd</sup> Story	B	66	70	72	+2	Yes
	3 <sup>rd</sup> Story	B	66	71	72	+1	Yes
R133	1 <sup>st</sup> Story	B	66	66	68	+2	Yes
	2 <sup>nd</sup> Story	B	66	69	71	+2	Yes
	3 <sup>rd</sup> Story	B	66	70	72	+2	Yes
R134	1 <sup>st</sup> Story	B	66	62	64	+2	No
	2 <sup>nd</sup> Story	B	66	66	68	+2	Yes

Receiver	Description	NAC Category	NAC Level	Existing 2018	Predicted 2043	Change (+/-)	Noise Impact
<b>Sycamore Springs Apartments (cont.)</b>							
R134	3 <sup>rd</sup> Story	B	66	67	69	+2	Yes
R135	1 <sup>st</sup> Story	B	66	69	72	+3	Yes
	2 <sup>nd</sup> Story	B	66	73	75	+2	Yes
	3 <sup>rd</sup> Story	B	66	73	75	+2	Yes
R136	1 <sup>st</sup> Story	B	66	70	72	+2	Yes
	2 <sup>nd</sup> Story	B	66	73	75	+2	Yes
	3 <sup>rd</sup> Story	B	66	73	75	+2	Yes
<b>95Twenty Apartments</b>							
R137	1 <sup>st</sup> Story	B	66	70	74	+4	Yes
	2 <sup>nd</sup> Story	B	66	74	76	+2	Yes
	3 <sup>rd</sup> Story	B	66	74	76	+2	Yes
R138	1 <sup>st</sup> Story	B	66	68	72	+4	Yes
	2 <sup>nd</sup> Story	B	66	72	74	+2	Yes
	3 <sup>rd</sup> Story	B	66	72	74	+2	Yes
R139	1 <sup>st</sup> Story	B	66	67	71	+4	Yes
	2 <sup>nd</sup> Story	B	66	71	73	+2	Yes
	3 <sup>rd</sup> Story	B	66	72	74	+2	Yes

Receiver	Description	NAC Category	NAC Level	Existing 2018	Predicted 2043	Change (+/-)	Noise Impact
<b>95Twenty Apartments (cont.)</b>							
R140	1 <sup>st</sup> Story	B	66	68	72	+4	Yes
	2 <sup>nd</sup> Story	B	66	72	74	+2	Yes
	3 <sup>rd</sup> Story	B	66	72	74	+2	Yes
R141	1 <sup>st</sup> Story	B	66	67	70	+3	Yes
	2 <sup>nd</sup> Story	B	66	70	73	+3	Yes
	3 <sup>rd</sup> Story	B	66	71	73	+2	Yes
<b>The Ranch Apartments</b>							
R142	1 <sup>st</sup> Story	B	66	66	68	+2	Yes
	2 <sup>nd</sup> Story	B	66	70	71	+1	Yes
	3 <sup>rd</sup> Story	B	66	71	72	+1	Yes
R143	1 <sup>st</sup> Story	B	66	66	68	+2	Yes
	2 <sup>nd</sup> Story	B	66	70	72	+2	Yes
	3 <sup>rd</sup> Story	B	66	71	72	+1	Yes
R144	1 <sup>st</sup> Story	B	66	68	70	+2	Yes
	2 <sup>nd</sup> Story	B	66	72	73	+1	Yes
	3 <sup>rd</sup> Story	B	66	72	74	+2	Yes
R145	1 <sup>st</sup> Story	B	66	69	71	+2	Yes
	2 <sup>nd</sup> Story	B	66	73	74	+1	Yes

Receiver	Description	NAC Category	NAC Level	Existing 2018	Predicted 2043	Change (+/-)	Noise Impact
<b>The Ranch Apartments (cont.)</b>							
R145	3 <sup>rd</sup> Story	B	66	73	75	+2	Yes
R146	1 <sup>st</sup> Story	B	66	68	69	+1	Yes
	2 <sup>nd</sup> Story	B	66	73	74	+1	Yes
	3 <sup>rd</sup> Story	B	66	73	75	+2	Yes
R147	1 <sup>st</sup> Story	B	66	68	69	+1	Yes
	2 <sup>nd</sup> Story	B	66	73	75	+2	Yes
	3 <sup>rd</sup> Story	B	66	73	75	+2	Yes
R148	1 <sup>st</sup> Story	B	66	68	69	+1	Yes
	2 <sup>nd</sup> Story	B	66	73	74	+1	Yes
	3 <sup>rd</sup> Story	B	66	73	75	+2	Yes
R149	1 <sup>st</sup> Story	B	66	68	69	+1	Yes
	2 <sup>nd</sup> Story	B	66	73	75	+2	Yes
	3 <sup>rd</sup> Story	B	66	73	75	+2	Yes
R150	1 <sup>st</sup> Story	B	66	68	69	+1	Yes
	2 <sup>nd</sup> Story	B	66	73	74	+1	Yes
	3 <sup>rd</sup> Story	B	66	73	75	+2	Yes
R151	1 <sup>st</sup> Story	B	66	68	69	+1	Yes
	2 <sup>nd</sup> Story	B	66	73	74	+1	Yes

Receiver	Description	NAC Category	NAC Level	Existing 2018	Predicted 2043	Change (+/-)	Noise Impact
<b>The Ranch Apartments (cont.)</b>							
R151	3 <sup>rd</sup> Story	B	66	73	75	+2	Yes
R152	1 <sup>st</sup> Story	B	66	69	70	+1	Yes
	2 <sup>nd</sup> Story	B	66	73	75	+2	Yes
	3 <sup>rd</sup> Story	B	66	73	75	+2	Yes
R153	1 <sup>st</sup> Story	B	66	69	71	+2	Yes
	2 <sup>nd</sup> Story	B	66	73	75	+2	Yes
	3 <sup>rd</sup> Story	B	66	73	75	+2	Yes

# Figure 2a: FM 734 Noise Receivers and Evaluated Noise Barrier Locations FM 734 (Parmer Lane)

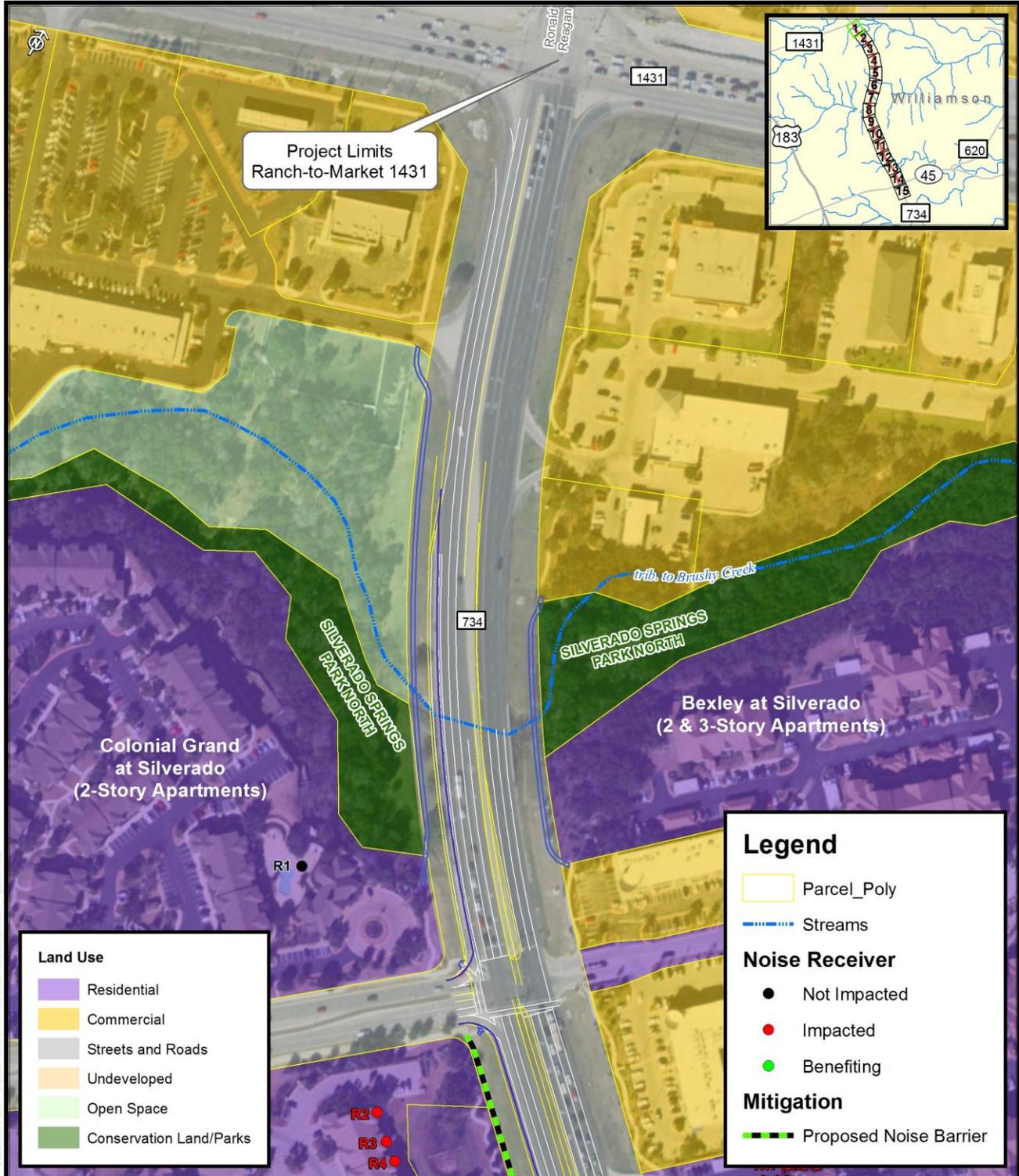
Ranch-to-Market 1431 to South of State Highway 45, Williamson County, Texas  
CSJ 3417-02-030



## Noise Receivers and Evaluated Noise Barrier Locations



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**Land Use**

- Residential
- Commercial
- Streets and Roads
- Undeveloped
- Open Space
- Conservation Land/Parks

**Legend**

- Parcel\_Poly
- Streams

**Noise Receiver**

- Not Impacted
- Impacted
- Benefiting

**Mitigation**

- Proposed Noise Barrier

Figure 2b: FM 734 Noise Receivers and Evaluated Noise Barrier Locations

**FM 734 (Parmer Lane)**

Ranch-to-Market 1431 to South of State Highway 45, Williamson County, Texas

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Noise Receivers and Evaluated Noise Barrier Locations

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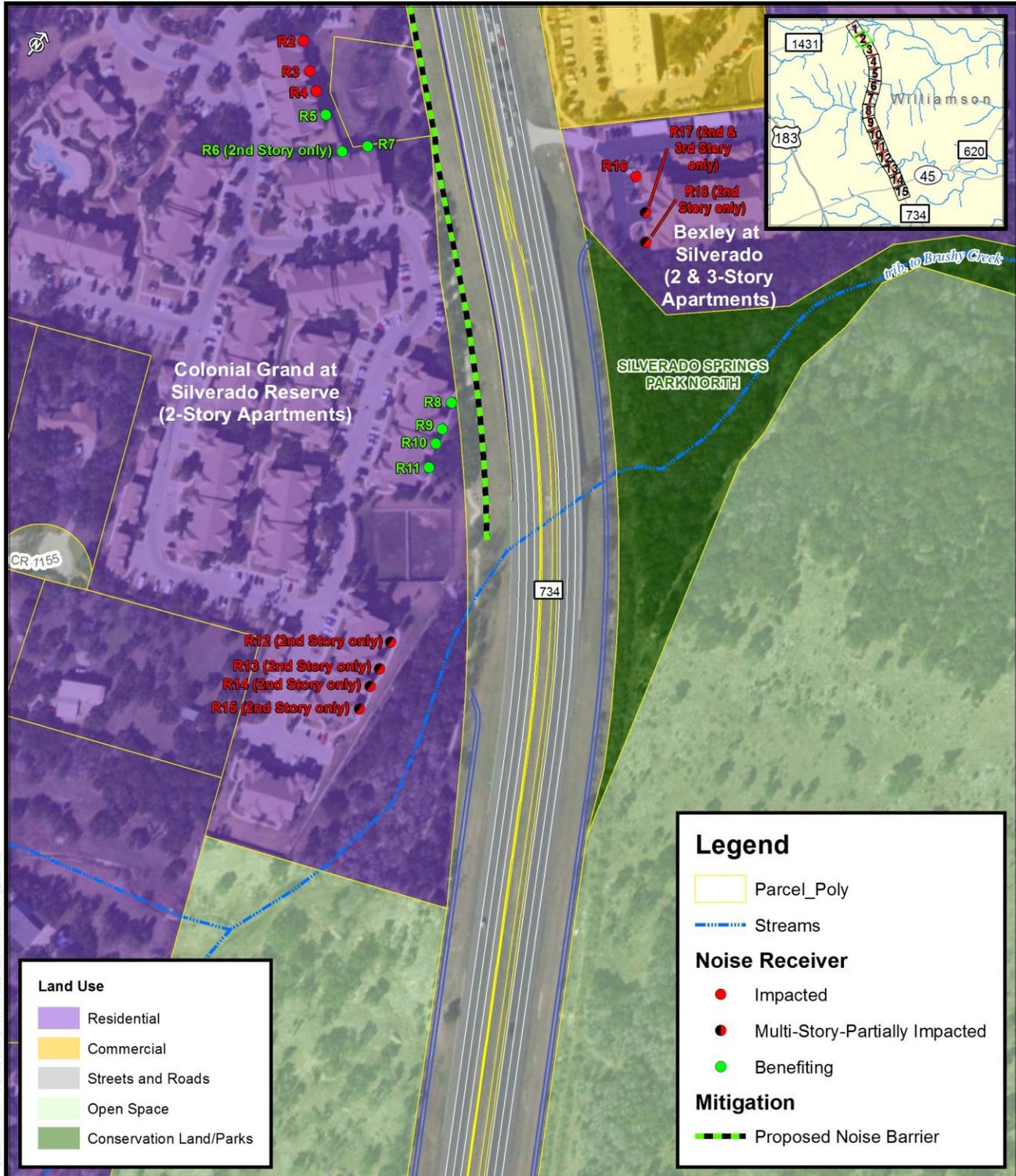


Figure 2c: FM 734 Noise Receivers and Evaluated Noise Barrier Locations

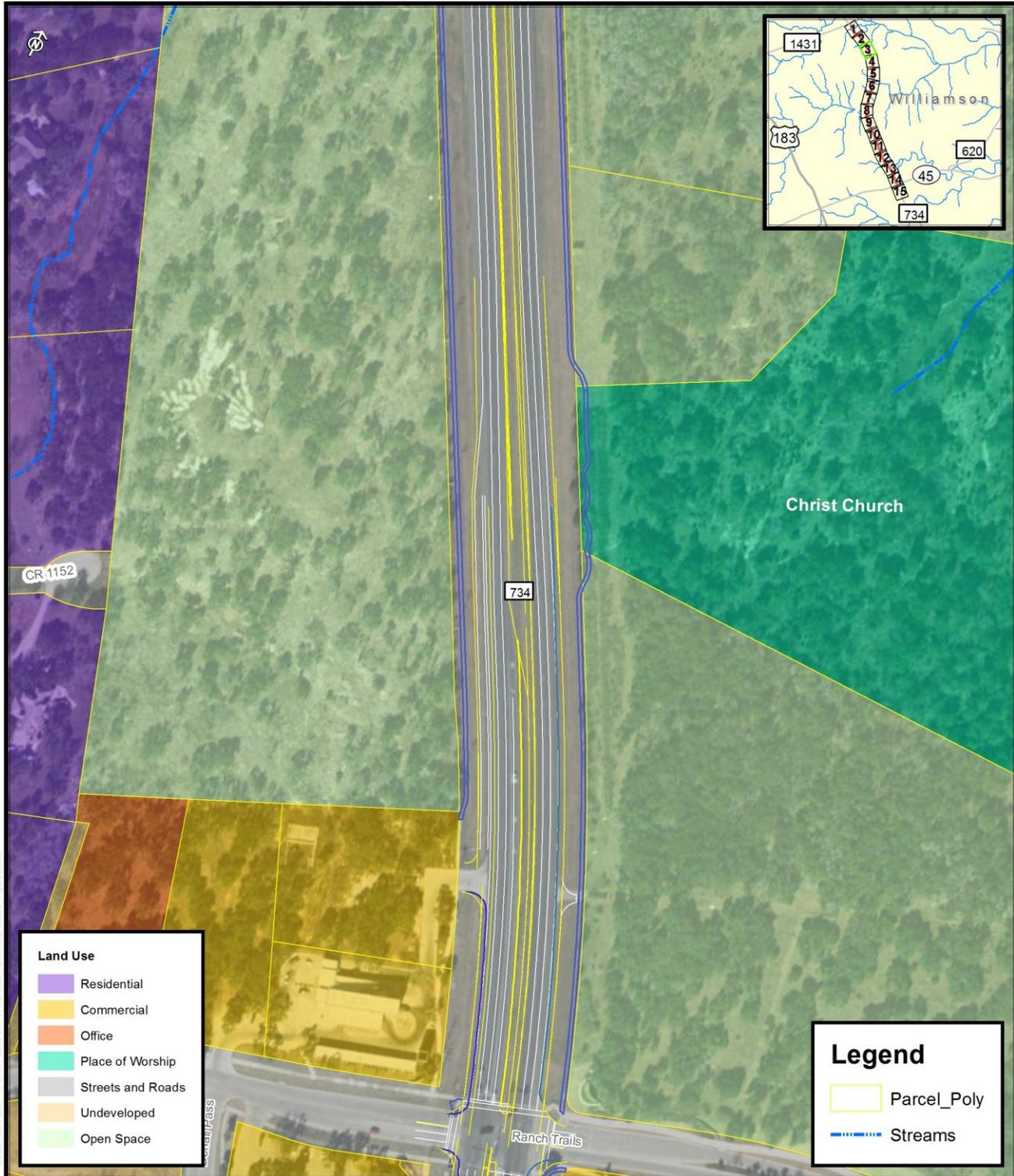
**FM 734 (Parmer Lane)**

Ranch-to-Market 1431 to South of State Highway 45, Williamson County, Texas

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Noise Receivers and Evaluated Noise Barrier Locations

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Land Use	
	Residential
	Commercial
	Office
	Place of Worship
	Streets and Roads
	Undeveloped
	Open Space

Legend	
	Parcel_Poly
	Streams

Figure 2d: FM 734 Noise Receivers and Evaluated Noise Barrier Locations

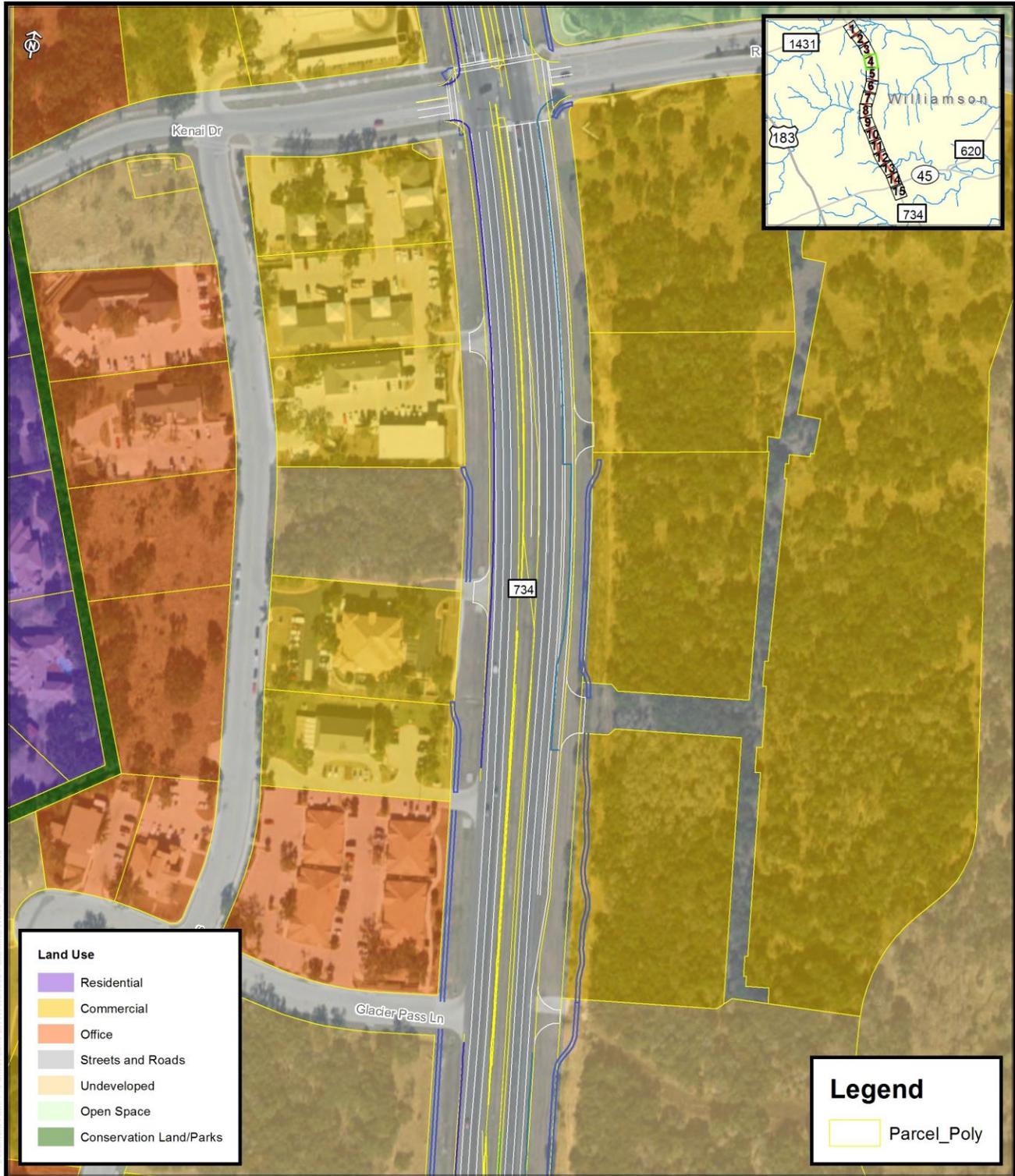
**FM 734 (Parmer Lane)**

Ranch-to-Market 1431 to South of State Highway 45, Williamson County, Texas

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Noise Receivers and Evaluated Noise Barrier Locations

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**Land Use**

- Residential
- Commercial
- Office
- Streets and Roads
- Undeveloped
- Open Space
- Conservation Land/Parks

**Legend**

- Parcel\_Poly

Figure 2e: FM 734 Noise Receivers and Evaluated Noise Barrier Locations

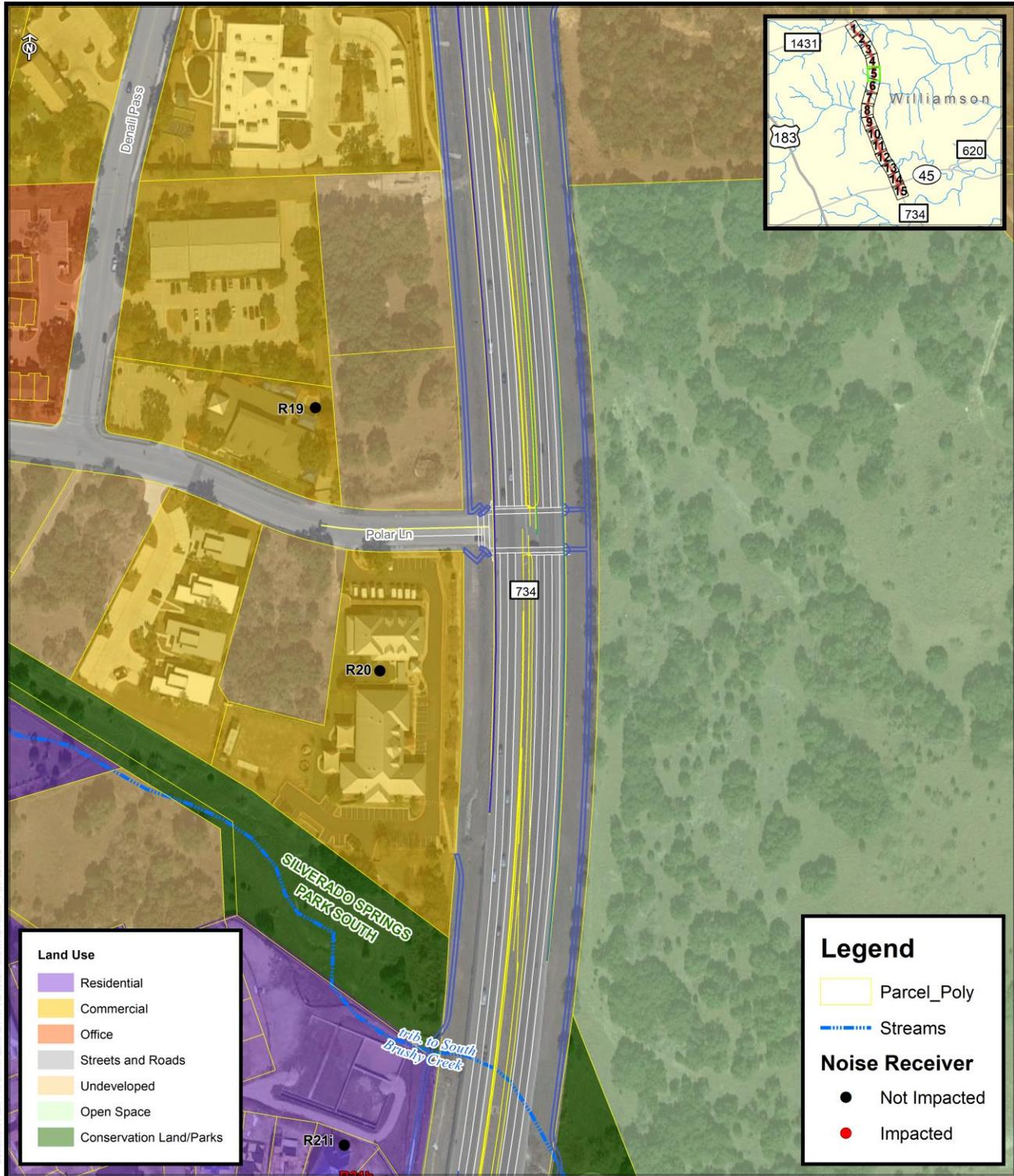
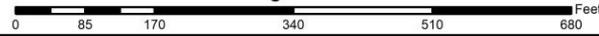
**FM 734 (Parmer Lane)**

Ranch-to-Market 1431 to South of State Highway 45, Williamson County, Texas

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Noise Receivers and Evaluated Noise Barrier Locations

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Land Use	
<span style="display:inline-block; width:15px; height:15px; background-color:purple; border:1px solid black;"></span>	Residential
<span style="display:inline-block; width:15px; height:15px; background-color:yellow; border:1px solid black;"></span>	Commercial
<span style="display:inline-block; width:15px; height:15px; background-color:orange; border:1px solid black;"></span>	Office
<span style="display:inline-block; width:15px; height:15px; background-color:gray; border:1px solid black;"></span>	Streets and Roads
<span style="display:inline-block; width:15px; height:15px; background-color:lightyellow; border:1px solid black;"></span>	Undeveloped
<span style="display:inline-block; width:15px; height:15px; background-color:lightgreen; border:1px solid black;"></span>	Open Space
<span style="display:inline-block; width:15px; height:15px; background-color:green; border:1px solid black;"></span>	Conservation Land/Parks

Legend	
<span style="display:inline-block; width:20px; height:10px; border:1px solid yellow;"></span>	Parcel_Poly
<span style="display:inline-block; width:20px; border-bottom:2px dashed blue;"></span>	Streams
Noise Receiver	
<span style="display:inline-block; width:10px; height:10px; background-color:black; border-radius:50%;"></span>	Not Impacted
<span style="display:inline-block; width:10px; height:10px; background-color:red; border-radius:50%;"></span>	Impacted

Figure 2f: FM 734 Noise Receivers and Evaluated Noise Barrier Locations

**FM 734 (Parmer Lane)**

Ranch-to-Market 1431 to South of State Highway 45, Williamson County, Texas

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Noise Receivers and Evaluated Noise Barrier Locations

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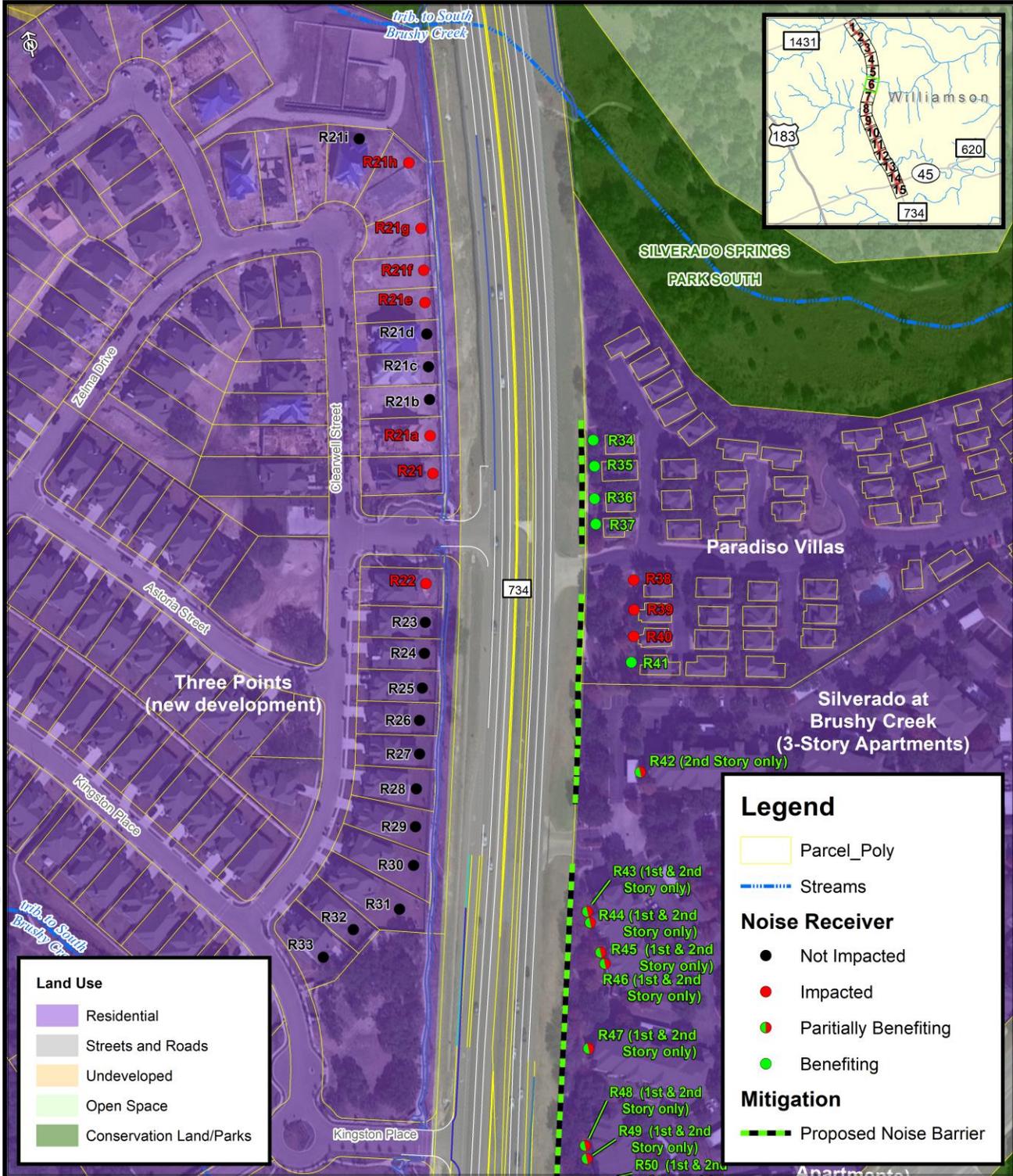




Figure 2h: FM 734 Noise Receivers and Evaluated Noise Barrier Locations

**FM 734 (Parmer Lane)**

Ranch-to-Market 1431 to South of State Highway 45, Williamson County, Texas

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Noise Receivers and Evaluated Noise Barrier Locations

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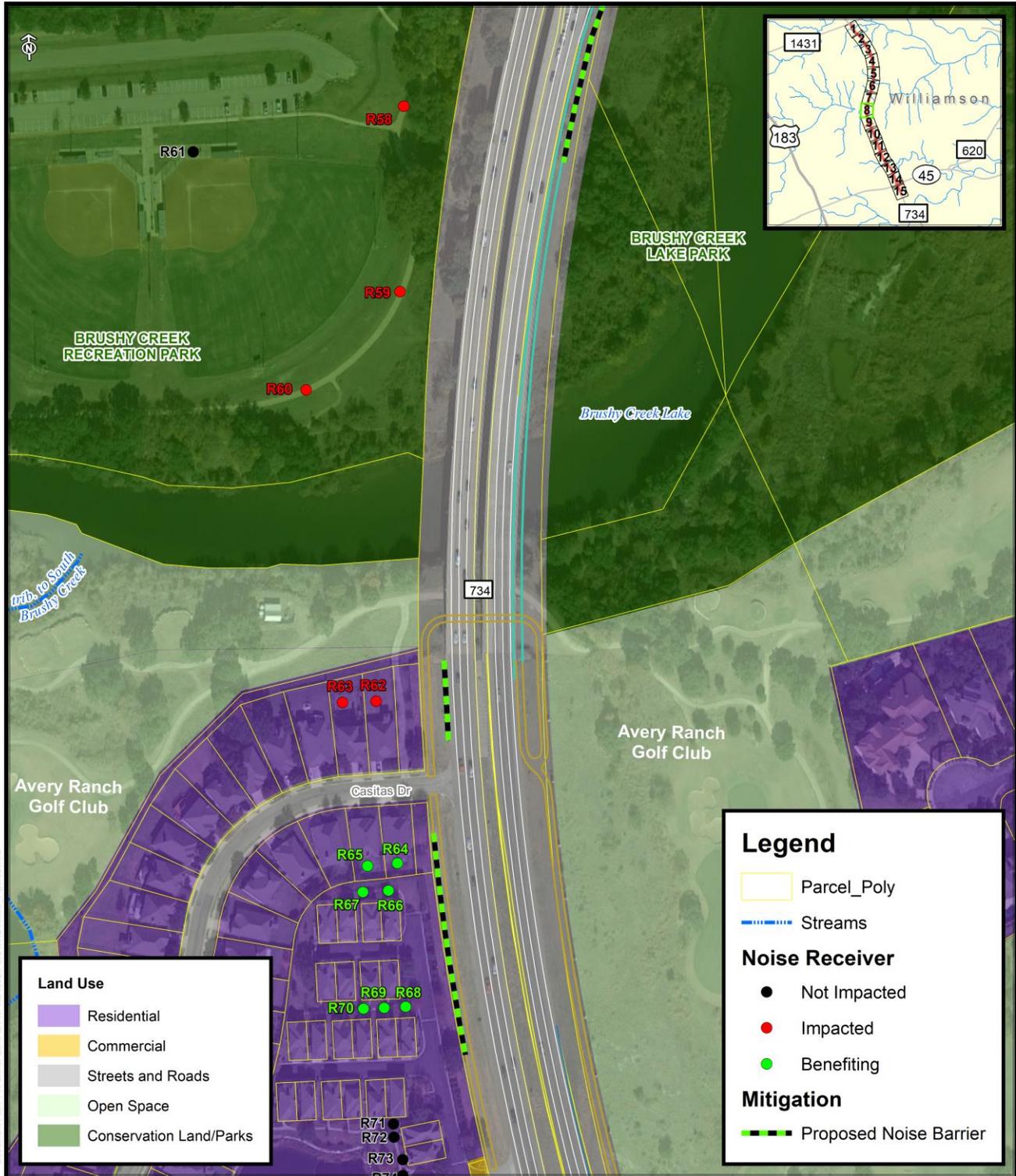


Figure 2i: FM 734 Noise Receivers and Evaluated Noise Barrier Locations

**FM 734 (Parmer Lane)**

Ranch-to-Market 1431 to South of State Highway 45, Williamson County, Texas

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Noise Receivers and Evaluated Noise Barrier Locations

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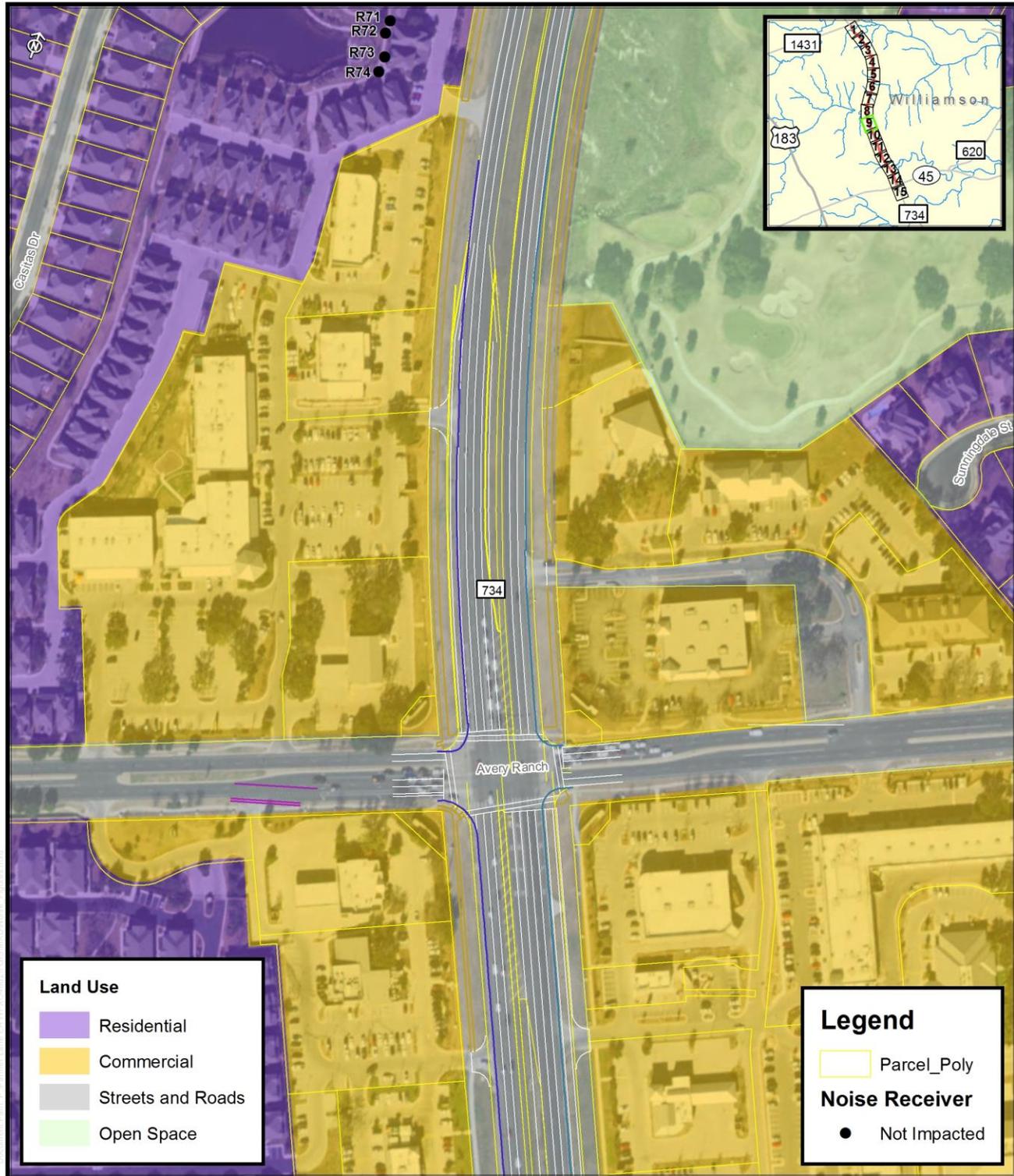
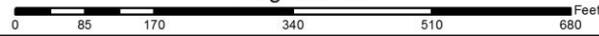


Figure 2j: FM 734 Noise Receivers and Evaluated Noise Barrier Locations

**FM 734 (Parmer Lane)**

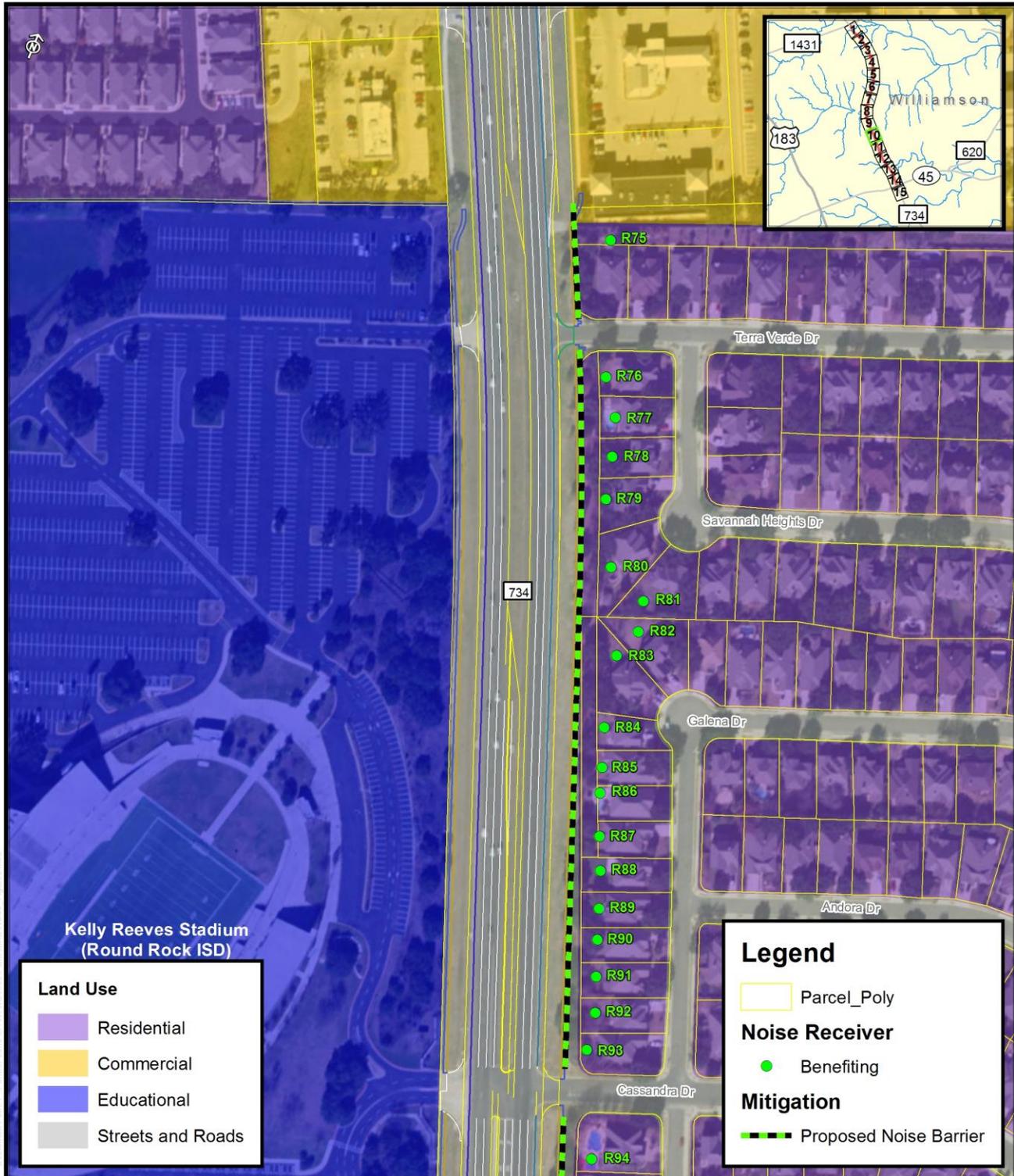
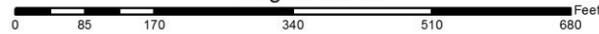
Ranch-to-Market 1431 to South of State Highway 45, Williamson County, Texas

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Noise Receivers and Evaluated Noise Barrier Locations



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**Land Use**

- Residential
- Commercial
- Educational
- Streets and Roads

**Legend**

- Parcel\_Poly
- Noise Receiver**
- Benefiting
- Mitigation**
- Proposed Noise Barrier

Figure 2k: FM 734 Noise Receivers and Evaluated Noise Barrier Locations

**FM 734 (Parmer Lane)**

Ranch-to-Market 1431 to South of State Highway 45, Williamson County, Texas

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Noise Receivers and Evaluated Noise Barrier Locations



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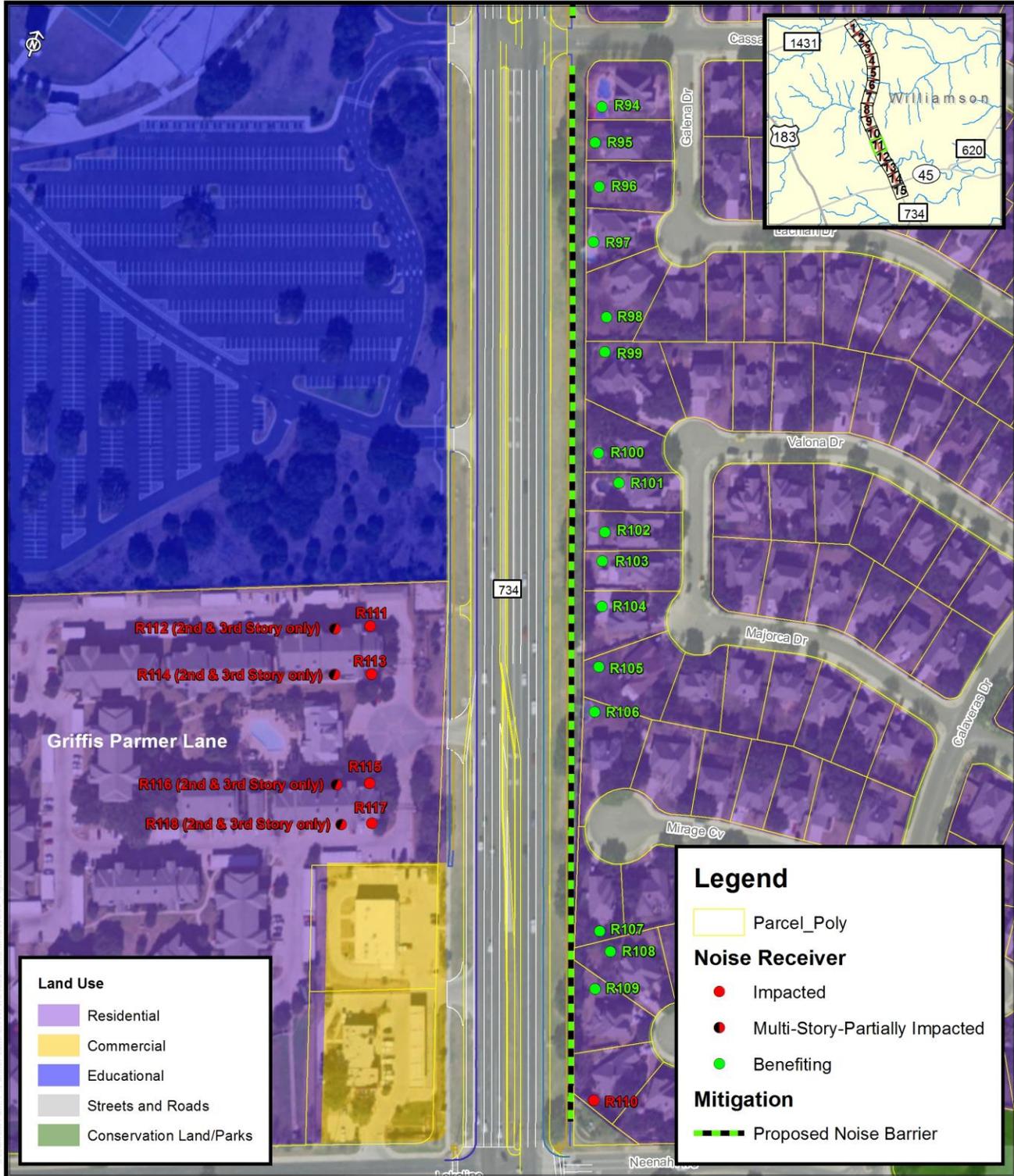
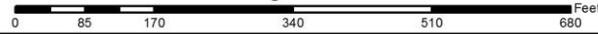


Figure 2i: FM 734 Noise Receivers and Evaluated Noise Barrier Locations

**FM 734 (Parmer Lane)**

Ranch-to-Market 1431 to South of State Highway 45, Williamson County, Texas

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Noise Receivers and Evaluated Noise Barrier Locations

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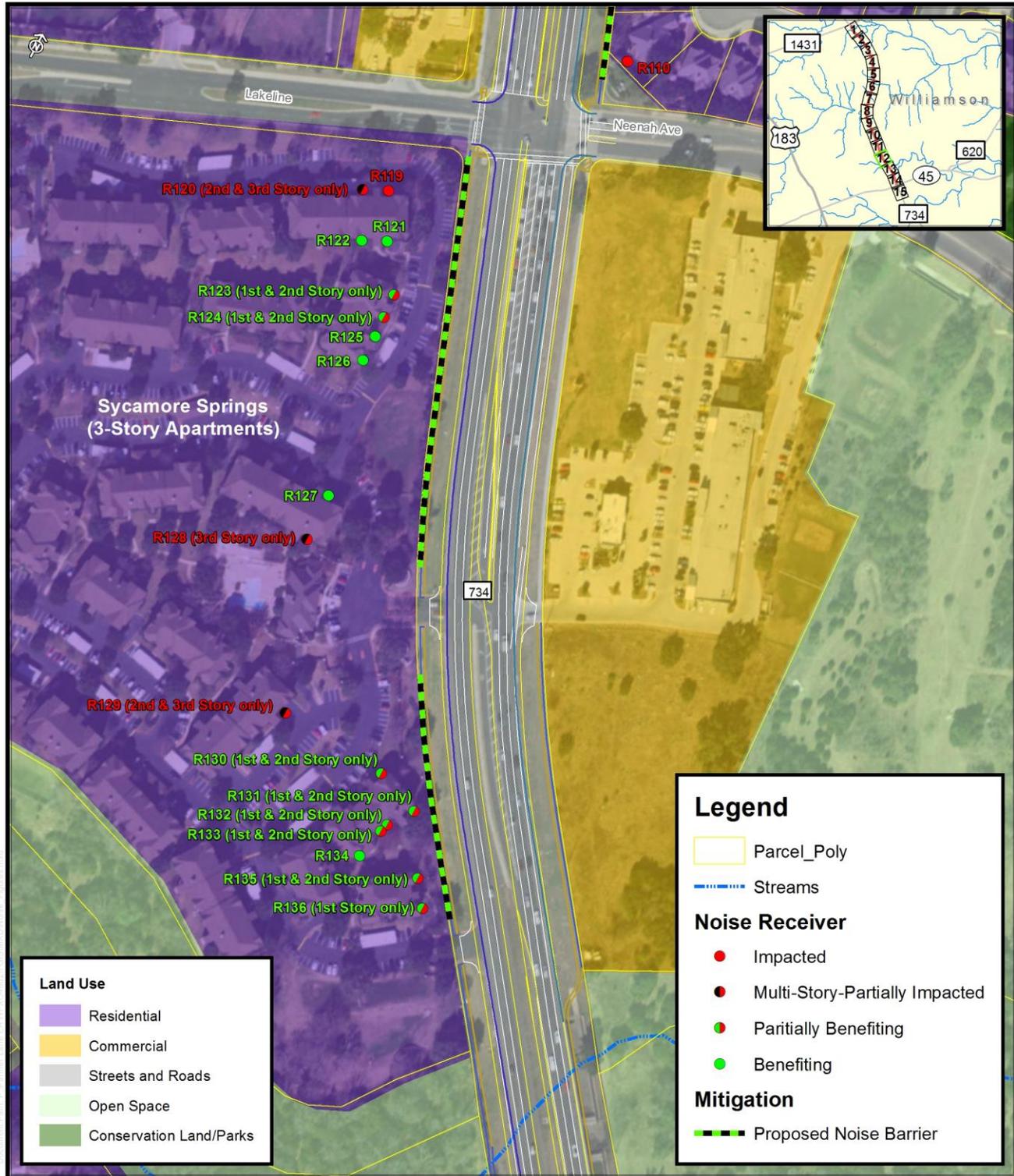
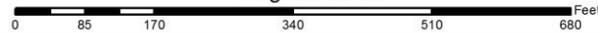


Figure 2m: FM 734 Noise Receivers and Evaluated Noise Barrier Locations

**FM 734 (Parmer Lane)**

Ranch-to-Market 1431 to South of State Highway 45, Williamson County, Texas

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Noise Receivers and Evaluated Noise Barrier Locations



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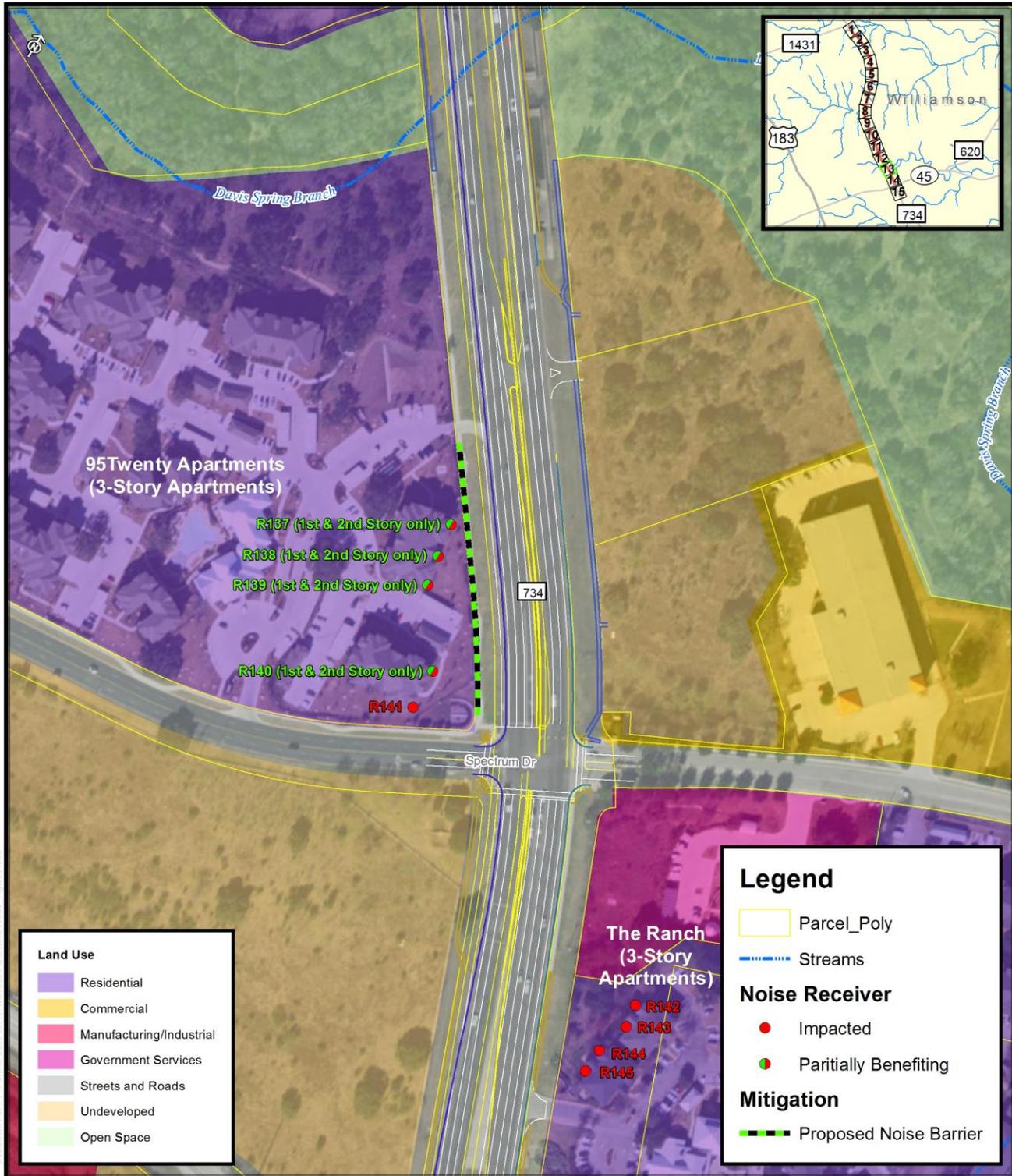
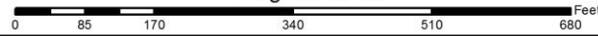


Figure 2n: FM 734 Noise Receivers and Evaluated Noise Barrier Locations

**FM 734 (Parmer Lane)**

Ranch-to-Market 1431 to South of State Highway 45, Williamson County, Texas

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Noise Receivers and Evaluated Noise Barrier Locations



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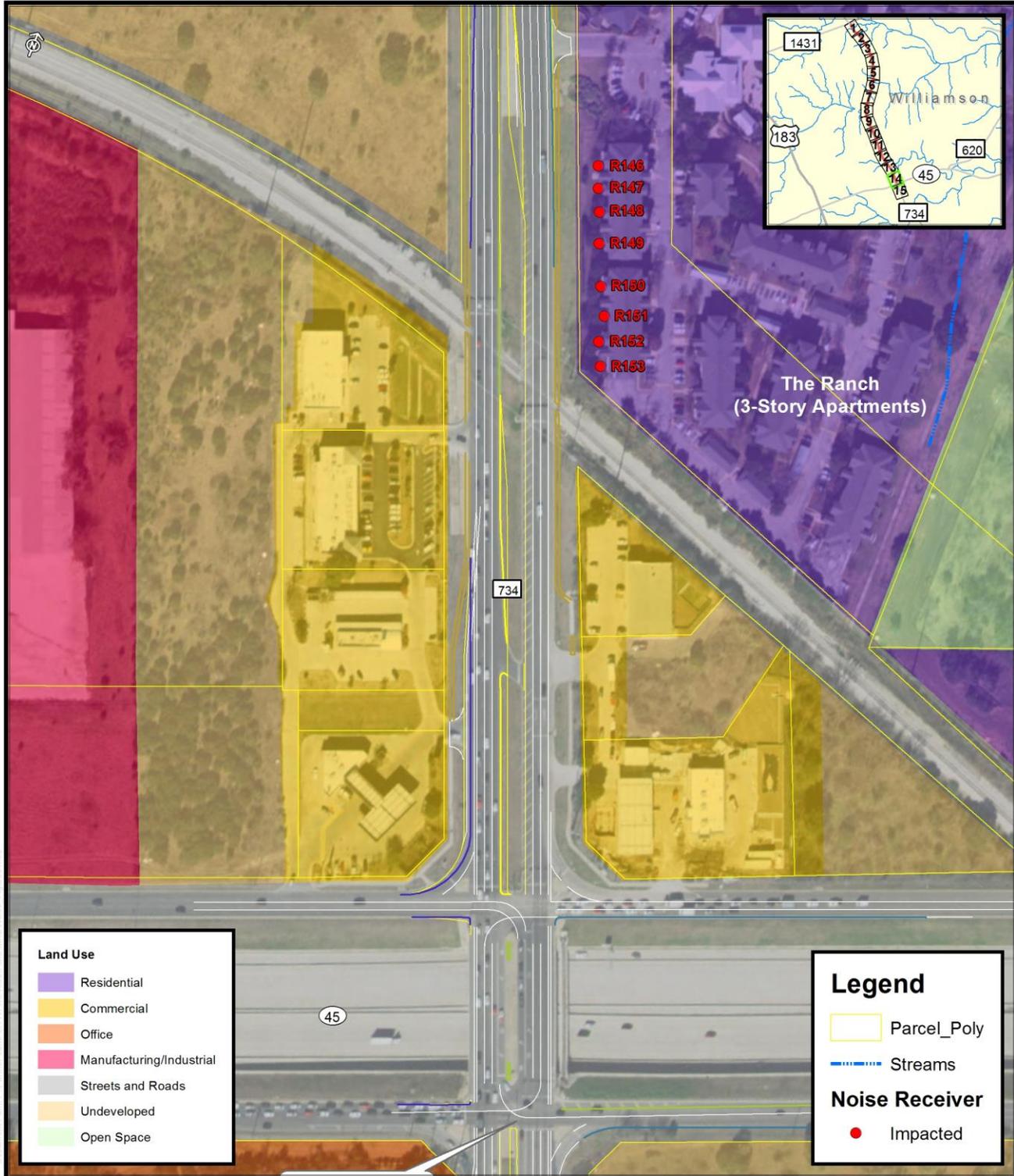
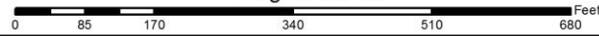


Figure 2o: FM 734 Noise Receivers and Evaluated Noise Barrier Locations

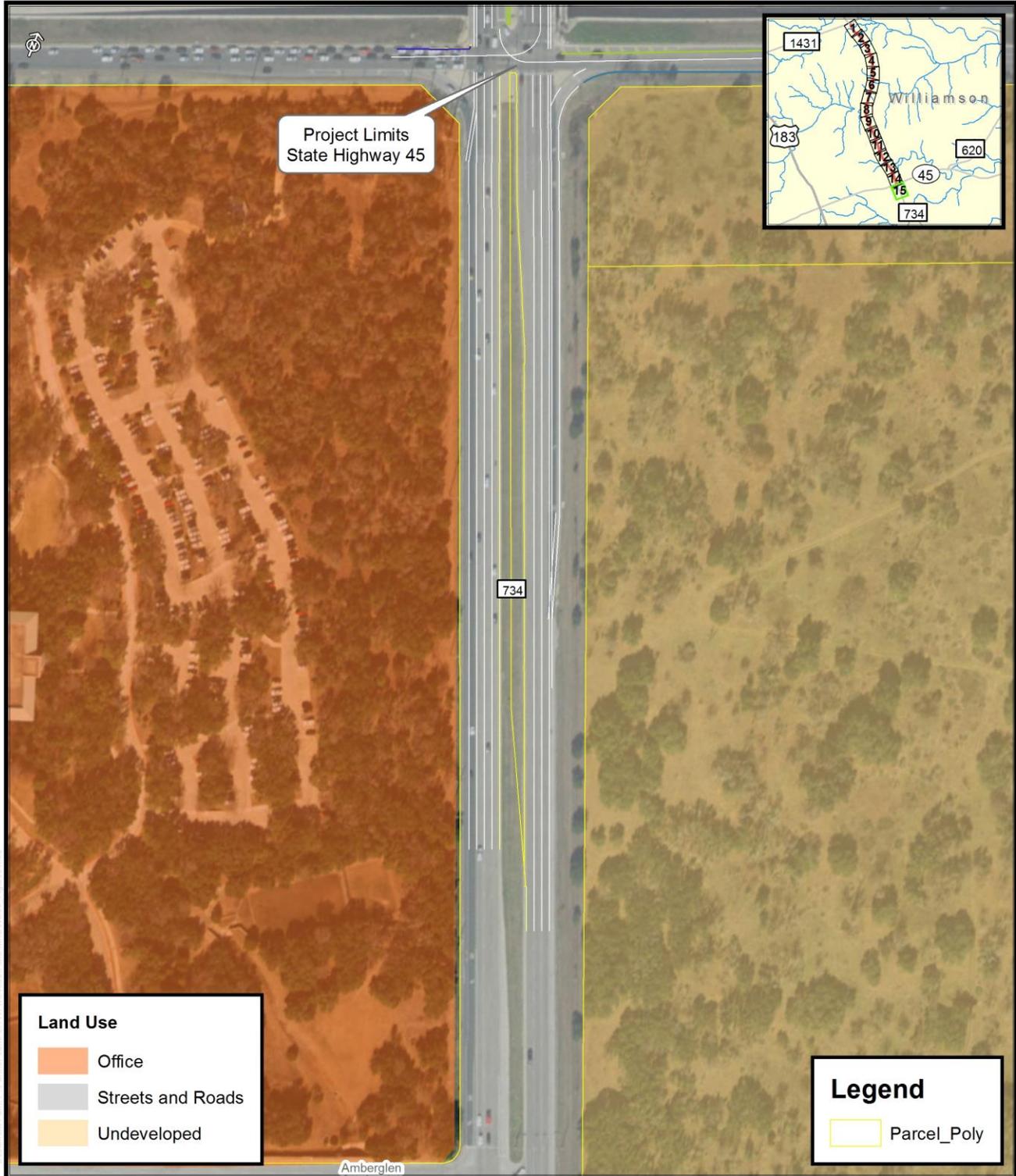
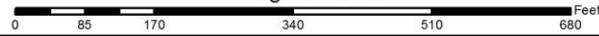
**FM 734 (Parmer Lane)**

Ranch-to-Market 1431 to South of State Highway 45, Williamson County, Texas

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Noise Receivers and Evaluated Noise Barrier Locations

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As indicated in **Table 2**, the proposed project would result in no change to an increase of 4 dB(A) in traffic noise levels for all receivers from the 2018 existing noise levels to 2043 Build predicted noise levels. Analysis results also estimated traffic noise impacts for 247 out of 277 modelled receiver locations.

## **2.1. Evaluation of Noise Abatement Measures**

Before any abatement measure can be proposed for incorporation into the project, it must be both feasible and reasonable. In order to be "feasible", the abatement measure must be able to reduce the noise level at greater than 50% of impacted, first row receivers by at least five dB(A). To be "reasonable", an abatement measure must not exceed the cost-effectiveness criterion of \$25,000 for each receiver that would benefit by a reduction of at least five dB(A) and the abatement measure must be able to reduce the noise level at least one impacted, first row receiver by at least seven dB(A).

**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** - This is the most commonly used noise abatement measure. Noise barriers were evaluated for each of the impacted receiver locations.

For the proposed project, noise barriers were analyzed as potential mitigation for impacted receivers. The barriers were evaluated to determine if the potential noise abatement measure satisfied the criteria of "feasible" and "reasonable" noise abatement. In accordance with TxDOT's Guidelines for Analysis and Abatement of Roadway Traffic Noise (2011), a construction cost estimate of \$18 per square-foot was used for each proposed noise barrier analyzed for the project.

To assess the cost effectiveness of impacted Category C (parks/preserves) land activity areas (R52-R61 in **Table 2** and **Figures 2g-h**), a land area calculation was used to determine the equivalent number of residences as outline in the TxDOT's Guidelines for Analysis and Abatement of Roadway Traffic Noise (2011). This was accomplished by dividing the impacted adjacent areas in Category C by a representative single-family residential lot size development within the study area.

### Traffic Noise Barriers Determined Not “Feasible” or “Reasonable”

Results of the traffic noise barrier analysis performed for the following impacted receivers indicated that the proposed noise barriers would be neither “feasible” nor “reasonable”, therefore, noise barriers for the following impacted receivers are not proposed for incorporation into the project.

R16-R18 (Bexley at Silverado Apartments): These receivers represent seven 2&3-story apartments of which five units are impacted in the Bexley at Silverado complex (see **Figure 2b**) located adjacent to the proposed northbound FM 734 project. The apartment complex is currently shielded by existing concrete traffic barrier at these receivers on top of a retaining wall. In addition, the apartment complex has an existing driveway that accesses northbound FM 734 on the north portion of the property. The receivers are approximately 150 horizontal feet from the proposed northbound FM 734 travel lanes.

Traffic noise barrier analysed for the impacted receivers indicated that a noise barrier 250 feet long and 20 feet high located on the outside edge of the northbound FM 734 ROW would achieve neither the minimum “feasible” reduction of 5 dB(A) nor the design goal of 7dB(A).

#### R21-R31 and R21a-i (Three Points Neighbourhood)

These receivers represent 7 impacted receivers in a new residential development of Three Points (see **Figure 2f** and **Attachment 4**) adjacent to the southbound FM 734. Some of the receivers are currently shielded by existing cut and retaining wall into the terrain and are elevated approximately 8-10 feet above the FM 734 roadway. The receivers are located approximately 90 to 110 horizontal feet from the southbound FM 734 roadway.

A non-continuous traffic noise barrier with an approximately 55-foot wide gap to provide access for Scott Robinson Drive analysed for the impacted receivers indicated that a noise barrier 1,445 feet long and 20 feet high located on the ROW line of the southbound FM 734 would not be sufficient to achieve the minimum, feasible reduction of 5 dB(A) for a majority of impacted receptors or the noise reduction design goal of 7 dB(A).

#### R55-R60 (Brushy Creek Regional Trail West of FM 734)

The Brushy Creek Recreational Park contains a total of 17 equivalent residential receivers in west of the proposed southbound FM 734 project. The 17 equivalent residences represent the Brushy Creek Regional Trail (see **Figures 2g-h**) that passes under the FM 734 bridge structure and parallels FM 734 southbound. The receivers are approximately 50 to 240 horizontal feet from the proposed southbound FM 734 travel lanes.

Based on preliminary calculations, a noise barrier located along the southbound FM 734 project and adjacent to the bridge would be approximately 1,175 feet long and 9 feet high would reduce noise levels by at least 5 dB(A) for 11 first row receivers, as well as achieve the 7 dB(A) noise reduction design goal for five impacted first row receivers. Six of the equivalent residential receivers represented at the ends of the barrier, did not achieve the

minimum “feasible” reduction of 5 dB(A), and consequently would not benefit from the proposed barrier. The estimated total cost for the proposed noise barrier would be \$190,350 (\$17,305 per benefited receiver). However, this existing bridge structure cannot support the additional weight and is not going to be expanded as part of the proposed project, therefore the traffic noise barrier needs its own structure adjacent to the bridge. Based on the estimated costs to support the traffic noise barrier adjacent to the bridge (approximately \$1,500,000), this barrier is not cost reasonable. A copy of the Alternate Barrier Cost Assessment Worksheet has been uploaded to the project file.

R111-R118 (Griffis Parmer Lane Apartments): These receivers represent 24 3-story apartments of which 20 units are impacted in the Griffis Parmer Lane complex (see **Figure 2k**) located adjacent to the proposed southbound FM 734 project. The apartment complex has an existing driveway that accesses southbound FM 734 on the east side of the property. The receivers are approximately 150 horizontal feet from the proposed southbound FM 734 travel lanes.

A non-continuous noise barrier analysed for the impacted receivers indicated that a noise barrier 295 feet long and 20 feet high located on the outside edge of the southbound FM 734 ROW would achieve neither the minimum “feasible” reduction of 5 dB(A) nor the design goal of 7dB(A).

R142-R153 (The Ranch Apartments):

These receivers represent 36, 3-story apartments in the Ranch Apartment complex (see **Figures 2m-n**) located adjacent to the proposed northbound FM 734 project. The receivers are approximately 80 to 150 horizontal feet from the proposed northbound FM 734 travel lanes.

A non-continuous proposed noise barrier 570 feet long and 20 feet high, with a 140-foot wide gap to provide access for the entrance into The Ranch Apartment complex located on the outside edge of the northbound FM 734 ROW would not achieve “feasible” reduction of 5 dB(A) at greater than 50 percent (16 of 36) of the first row receivers.

### **Traffic Noise Barriers Determined “Feasible” and “Reasonable”**

Results of the traffic noise barrier analysis performed for the following impacted receivers indicated that a proposed noise barrier would be both “feasible” and “reasonable.” Therefore, noise barriers for the following impacted receivers are proposed for incorporation into the project.

Traffic Noise Barrier 1 - R2-R15 (Colonial Grand at Silverado Reserve Apartments)

These receivers represent 28 first and second level apartments of which 23 units are impacted in the Colonial Grand at Silverado Reserve complex located adjacent to the proposed southbound FM 734 project (see **Figures 2a-b**). The southern portion of the apartment complex (R12-R15) is currently shielded by an existing concrete traffic barrier

approximately 500 feet long on top of a retaining wall. The receivers are approximately 92 to 235 horizontal feet from the proposed southbound FM 734 travel lanes.

A noise barrier located along the southbound FM 734 project ROW was analysed for the impacted receivers and would both be “feasible” and “reasonable.” The proposed traffic noise barrier 900 feet long and 20 feet high would reduce noise levels by at least 5 dB(A) for 13 first row receivers and one non-impacted first row receiver, as well as achieve the 7 dB(A) noise reduction design goal for seven impacted first row receivers. Ten receivers, R2-R4 and R-12-R15 (2<sup>nd</sup> story), did not achieve the minimum “feasible” reduction of 5 dB(A), and consequently would not benefit from the proposed barrier. The estimated total cost for the proposed noise barrier would be \$324,000 (\$24,923 per benefited receiver). Therefore, Barrier 1 would be considered acoustically “feasible” and “reasonable.”

#### Traffic Noise Barrier 3N/3S - R34-R41 (Paradiso Villas Condos)

These receivers represent seven impacted receivers in the residential development of Paradiso Villas condos (see **Figures 2f**) adjacent to the northbound FM 734. Some of the receivers, R34 and R35 are currently shielded by an existing concrete traffic barrier approximately 900 feet long on top of a retaining wall. The receivers are located approximately 65 to 130 horizontal feet from the northbound FM 734 roadway.

Results of the analysis for a proposed traffic noise barrier for the impacted receivers indicated that a noise barrier located near the project ROW would both be “feasible” and “reasonable.” A non-continuous proposed noise barrier 435 feet long and 14 to 16 feet in height, with a 75-foot wide gap to provide access for the driveway into Paradiso Villas, would reduce noise levels by at least 5 dB(A) for four first row receivers (R35 – R37 and R41) and one non-impacted first row receiver (R34), as well as achieve the 7 dB(A) noise reduction design goal for three impacted first row receivers. Three receivers, R38-R40, did not achieve the minimum “feasible” reduction of 5 dB(A), and consequently would not benefit from the proposed barrier. The estimated total cost for the proposed noise barrier would be \$122,580 (\$24,516 per benefited receiver). Therefore, Barrier 3N/3S would be considered acoustically “feasible” and “reasonable.”

#### Traffic Noise Barrier 4N/4S – R42-R51 (Silverado at Brushy Creek Apartments)

These receivers represent 30, 3-story apartments in the Silverado at Brushy Creek complex (see **Figures 2f-g**) located adjacent to the proposed northbound FM 734 project. The receivers are approximately 80 to 150 horizontal feet from the proposed northbound FM 734 travel lanes.

A noise barrier located along the northbound FM 734 project ROW was analysed for the impacted receivers and would both be “feasible” and “reasonable.” A non-continuous proposed noise barrier 825 feet long and 12 to 16 feet high, with a 93-foot wide gap to provide access for the entrance into Silverado at Brushy Creek complex would reduce noise levels by at least 5 dB(A) for 18 first row receivers, as well as achieve the 7 dB(A) noise reduction design goal for nine impacted first row receivers. Twelve receivers, R42 1<sup>st</sup>-and 2<sup>nd</sup>

story and all the 3<sup>rd</sup>-story receivers, did not achieve the minimum “feasible” reduction of 5 dB(A), and consequently would not benefit from the proposed barrier. The estimated total cost for the proposed noise barrier would be \$184,500 (\$10,250 per benefited receiver). Therefore, Barrier 4N/S would be considered acoustically “feasible” and “reasonable.”

#### Traffic Noise Barrier 5 – R52-R54 (Brushy Creek Regional Trail East of FM 734)

The Brushy Creek Recreational Park contains a total of 11 equivalent residential receivers (see **Figures 2g-h**) east of the proposed northbound FM 734 project. The 11 equivalent residences represent the Brushy Creek Regional Trail that passes under the FM 734 bridge structure and continues east of northbound FM 734. The receivers are approximately 30 to 290 horizontal feet from the proposed southbound FM 734 travel lanes.

A noise barrier located along the southbound FM 734 project on the bridge structure was analysed for the impacted receivers and would both be “feasible” and “reasonable.” A proposed traffic noise barrier 845 feet long and 10 feet high would reduce noise levels by at least 5 dB(A) for eight first row receivers, as well as achieve the 7 dB(A) noise reduction design goal for two impacted first row receivers. Three of the equivalent residential receivers represented at the ends of the barrier, did not achieve the minimum “feasible” reduction of 5 dB(A), and consequently would not benefit from the proposed barrier. The estimated total cost for the proposed noise barrier would be \$152,100 (\$19,013 per benefited receiver). Therefore, Barrier 5 would be considered acoustically “feasible” and “reasonable.”

#### Traffic Noise Barrier 7N/7S - R62-R74 (Avery Ranch - Overlook/Casitas Neighbourhoods)

These receivers represent five impacted receivers in the residential development of Avery Ranch neighbourhoods of Overlook and Casitas (see **Figure 2h**) adjacent to the southbound FM 734. The receivers are located approximately 108 to 190 horizontal feet from the southbound FM 734 roadway.

Results of the analysis for a proposed traffic noise barrier for the impacted receivers indicated that a noise barrier located along the project ROW would both be “feasible” and “reasonable.” Two noise barrier 485 feet long and varying and 10 feet high with a gap of 110 feet wide to provide access for Casitas Drive would reduce noise levels by at least 5 dB(A) for three first row receivers (R64, R66, and R68) and four non-impacted receiver (R65, R67, R69, and R70), as well as achieve the 7 dB(A) noise reduction design goal for one impacted first row receivers. Two receivers, R62 and R63, did not achieve the minimum “feasible” reduction of 5 dB(A), and consequently would not benefit from the proposed barrier. The estimated total cost for the proposed noise barrier would be \$87,300 (\$9,700 per benefited receiver). Therefore, Barrier 7N/M/S would be considered acoustically “feasible” and “reasonable.”

#### Traffic Noise Barrier 8N/8M/8S - R75-R110 (Davis Springs Neighbourhood)

These receivers represent 36 impacted receivers in the residential development of Davis Springs (see **Figures 2j-k**) adjacent to the northbound FM 734. The receivers are located approximately 90 to 140 horizontal feet from the northbound FM 734 roadway.

Results of the analysis for a proposed traffic noise barrier for the impacted receivers indicated that a noise barrier located along the project ROW would both be “feasible” and “reasonable.” A non-continuous noise barrier 2,965 feet long and 10 feet high, with two gaps of 50 and 75 feet wide to provide access for Terra Verde Drive and Cassandra Drive, respectfully, would reduce noise levels by at least 5 dB(A) for 35 first row receivers (R79-R113), as well as achieve the 7 dB(A) noise reduction design goal for 28 impacted first row receivers. One receiver, R114, did not achieve the minimum “feasible” reduction of 5 dB(A), and consequently would not benefit from the proposed barrier. The estimated total cost for the proposed noise barrier would be \$533,700 (\$15,249 per benefited receiver). Therefore, Barrier 8N/8M/8S would be considered acoustically “feasible” and “reasonable.”

#### Traffic Noise Barrier 9N/9S – R119-R136 (Sycamore Springs Apartments)

These receivers represent 54, 3-story apartments of which 48 units are impacted in the in the Sycamore Springs complex (see **Figure 2l**) located adjacent to the proposed southbound FM 734 project. The receivers are approximately 60 to 140 horizontal feet from the proposed southbound FM 734 travel lanes.

A noise barrier located along the southbound FM 734 project ROW was analysed for the impacted receivers and would both be “feasible” and “reasonable.” A non-continuous proposed noise barrier 1,040 feet long and 16 feet high, with a 170-foot wide gap to provide access for the entrance into Sycamore Springs complex would reduce noise levels by at least 5 dB(A) for 31 first row receivers as well as two non-impacted first row receiver (R126 and R137, both 1-story), as well as achieve the 7 dB(A) noise reduction design goal for 24 impacted first row receivers. Seventeen impacted first row receivers did not achieve the minimum “feasible” reduction of 5 dB(A), and consequently would not benefit from the proposed barrier. The estimated total cost for the proposed noise barrier would be \$299,520 (\$9,076 per benefited receiver). Therefore, Barrier 9N/9S would be considered acoustically “feasible” and “reasonable.”

#### Traffic Noise Barrier 10 – R137-R141 (95Twenty Apartments)

These receivers represent 15, 3-story apartments, are impacted in the 95Twenty Apartments complex (see **Figure 2m**) located adjacent to the proposed southbound FM 734 project. The receivers are approximately 60 to 140 horizontal feet from the proposed southbound FM 734 travel lanes.

A noise barrier located along the southbound FM 734 project ROW was analysed for the impacted receivers and would both be “feasible” and “reasonable.” The proposed noise barrier 430 feet long and 16 feet high would reduce noise levels by at least 5 dB(A) for eight

first row receivers, as well as achieve the 7 dB(A) noise reduction design goal for six impacted first row receivers. Seven impacted first-row receivers, R144 and all the 3<sup>rd</sup>-story receivers, did not achieve the minimum “feasible” reduction of 5 dB(A), and consequently would not benefit from the proposed barrier. The estimated total cost for the proposed noise barrier would be \$123,840 (\$15,480 per benefited receiver). Therefore, Barrier 10 would be considered acoustically “feasible” and “reasonable.”

### 3. CONCLUSION

**Table 3** identifies the traffic noise barriers proposed for incorporation into the project. Locations of the proposed noise barriers are shown in **Figure 2a-o**.

**Table 3: Traffic Noise Barriers Proposed for Project Incorporation**

Barrier	Receivers	Total Benefited Receivers	Proposed Barrier Size		Total Cost*	Cost per Benefited Receiver*
			Height	Length		
1	R2-R15	13	20	900	\$324,000	\$24,923
3N/3S	R34-R41	5	14-16	435	\$122,580	\$24,516
4N/4S	R42-R51	18	12-16	825	\$184,500	\$10,250
5	R52-R54	8	10	845	\$152,100	\$19,013
7N/7S	R62-R74	9	10	485	\$87,300	\$9,700
8N/8M/8S	R75-R110	35	10	2,965	\$533,700	\$15,249
9N/9S	R119-R136	33	16	1,040	\$299,520	\$9,076
10	R137-R141	8	16	430	\$123,840	\$15,480

Any subsequent design changes to the proposed project may require a re-evaluation of this analysis. A final decision regarding the construction of any proposed traffic noise barriers would not be made until completion of project design, evaluation of utilities, and polling of adjacent property owners.

To avoid noise impacts that may result from the future development of properties adjacent to the project ROW, local officials responsible for land use control must ensure, to the extent possible, that no new land use activities are planned or constructed along or within the predicted (2043) noise impact contours identified in **Table 4**.

**Table 4: Traffic Noise Impact Contours for Category G (Undeveloped Land)**

Location*	NAC Category	Impact Contour [dB(A)]	Distance from Right of Way (feet)
East of FM 734 1,400 feet North of Ranch Trails	B&C	66	150
	E	71	50
West of FM 734 1,400 feet North of Ranch Trails	B&C	66	175
	E	71	50
East of FM 734 1,125 feet South of Neenah Ave	B&C	66	125
	E	71	25
West of FM 734 300 feet South of Spectrum Drive	B&C	66	175
	E	71	65

\*Identified undeveloped areas determined through online research of City of Cedar Park building permit information, Williamson County Appraisal District data, and field verification conducted in November 2018.

Noise associated with the construction of the proposed project is difficult to predict. Although construction normally occurs during daylight hours when occasional loud noises are more tolerable, heavy machinery, the major source of construction noise, is constantly moving in unpredictable patterns. For the proposed project, provisions would 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 (i.e., reduced overnight construction near residential areas) and proper maintenance of muffler systems.

A copy of this traffic noise analysis will be made available to local public officials. On the date of approval of this document (Date of Public Knowledge), FHWA and TxDOT would no longer be responsible for providing noise abatement measures for new development adjacent to the project ROW.

#### **4. REFERENCES CITED**

Texas Department of Transportation (TxDOT). 2011. Guidelines for Analysis and Abatement of Roadway Traffic Noise. March. Environmental Affairs Division.  
<http://ftp.dot.state.tx.us/pub/txdot-info/env/toolkit/730-02-gui.pdf>.

TxDOT. 2018. Traffic Data Memorandum, May 11.

## LIST OF ATTACHMENTS

1. TxDOT Traffic Request Memorandum
2. Traffic Project Line Diagrams
3. Traffic Volumes for Noise Analysis Line Diagrams
4. Three Points Development

# Attachment 1 - TxDOT Traffic Request Memorandum



# MEMO

May 11, 2018

**To:** Terry G. McCoy, P.E., District Engineer  
Lorena E. Echeverria De Misi, P.E., Director of TPD

**Through:** William E. Knowles, P.E.  
Traffic Analysis Section Director, TPP

**From:** Gabriel Contreras  
Planner III, TPP

**Subject:** Traffic Data  
CSJ: 3417-02-030  
FM 734:  
From RM 1431 (East Whitestone Boulevard)  
To SH 45

Williamson County

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Attached is a corridor information packet for the described limits of the route. The FM 734 Corridor Growth Rate Methodology has been approved.

Please refer to your original request dated January 24, 2018.

If you have any questions or need additional information, please contact Gabriel Contreras at (512) 486-5180.

Attachments

**CC:** Carmen Ramos, Planner, Austin District

OUR VALUES: People • Accountability • Trust • Honesty

OUR MISSION: Through collaboration and leadership, we deliver a safe, reliable, and integrated transportation system that enables the movement of people and goods.

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# TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

May 8, 2018

Austin District

Description of Location	Base Year						ATHWLD		Percent Tandem Axles in ATHWLD		Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2023 to 2043)			
	Average Daily Traffic		Dir Dist %	K Factor	Percent Trucks									
	2023	2043			ADT	DHV								
	2023	2053	Dir Dist %	K Factor	ADT	DHV	Flexible Pavement	Rigid Pavement	S	N	SLAB			
FM 734 "DRAFT" From RM 1431 (East Whitestone Boulevard) To SH 45 Williamson County	49,900	69,100	57 - 43	10.8	4.6	3.5	0	0	0	3	0	8"		
<b>Data for Use in Air &amp; Noise Analysis</b>														
<b>Vehicle Class</b>	Base Year													
	% of ADT	% of DHV												
Light Duty	95.4	96.5												
Medium Duty	2.7	2.0												
Heavy Duty	1.9	1.5												
Description of Location	Base Year						ATHWLD		Percent Tandem Axles in ATHWLD		Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 30 Year Period (2023 to 2053)			
	Average Daily Traffic		Dir Dist %	K Factor	Percent Trucks									
	2023	2053			ADT	DHV								
	2023	2053	Dir Dist %	K Factor	ADT	DHV	Flexible Pavement	Rigid Pavement	S	N	SLAB			
FM 734 "DRAFT" From RM 1431 (East Whitestone Boulevard) To SH 45 Williamson County	49,900	77,700	57 - 43	10.8	4.6	3.5	0	0	0	3	0	8"		

777 Main Street  
Fort Worth, Texas 76102  
United States  
T +1.817.735.6000  
F +1.817.735.6148  
www.jacobs.com

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**Date** January 15, 2018  
**To** Terry McCoy, P.E. (TxDOT- Austin District)  
**From** Edward J. Pultorak Jr., P.E., PTOE  
**Subject** FM 734 Corridor Growth Rate Methodology

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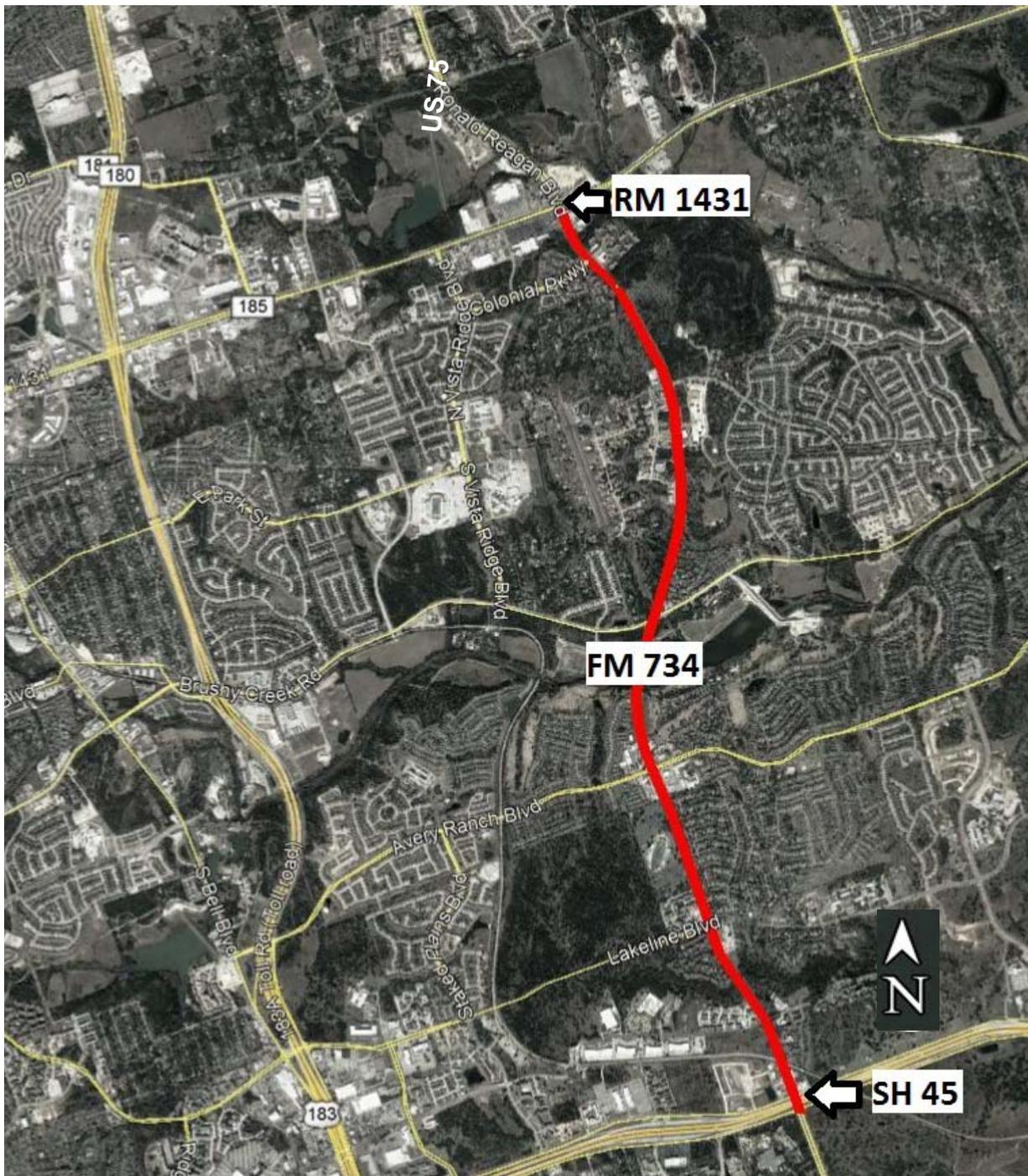
Texas Department of Transportation (TxDOT) Austin District has asked Jacobs to develop the traffic projections along the FM 734 corridor. The limit of the study corridor is approximately 4.5 miles. The study corridor is located in Williamson County between RM 1431 and SH 45. The location of the study corridor is shown in **Figure 1**. The developed traffic projections will be used to determine the capacity and traffic operations along the study corridor. Daily traffic projections will be developed for years 2023 (Opening Year), 2043 (Design Year) and 2053 (Pavement Design Year).

This memorandum describes the proposed methodology for developing the traffic projections for the above noted years within the study limits.

### **SOURCES**

Jacobs will use the following data sources to develop traffic projections:

- Historic Average Annual Daily Traffic (AADT) in the study corridor, as obtained from the Statewide Traffic Analysis and Report System (STARS) II program website;
- Traffic Counts collected by Jacobs and Gram Traffic Counting, Inc. during November 2017.
- Corridor analysis information packet from TPP (January 3, 2018 Memo)
- 20-Year Regression Worksheet



**Figure 1 – Study Corridor**

## METHODOLOGY

The following steps below will be used in developing the traffic projections for the years 2023, 2043, and 2053.

### Step 1: Historical Growth Calculation:

The traffic volume 20-Yr regression worksheet has been developed for the study corridor, and growth rates have been summarized below in **Table 1**. Based on the historic counts, the average annual growth rate from the years 1999 to 2016 is 0.8%. The detailed 20-Yr regression worksheet is shown in **Appendix A**.

**TABLE 1**  
TxDOT Statewide Traffic Analysis and Report System (STARS) (Daily Volumes)

Location ID	Location	Growth Rate (1999-2016)
246H36D	South of RM 1431	2.4%
246H36C	North of SH 45	1.3%
246H36B	South of SH 45	-0.4%
227H19C	North of McNeil Dr	-0.2%
Average		0.8%

Step 2: Recent Growth Calculation:

The 2016 counts were compared to data for 2012 at various locations along the corridor to see the recent growth. Traffic count location maps are included in the **Appendix B**. Recent growth has been much higher (4.2%). **Table 2** shows the average growth rate between 2012 and 2016.

**TABLE 2**  
Growth Rate 2012-2016 (recent counts)

FM 734 Corridor Locations	Daily Traffic		Growth Rate
	2012	2016	2012-2016
South of RM 1431	28000	33729	4.1%
North of SH 45	38000	42683	2.5%
South of SH 45	37000	46079	4.9%
North of McNeil Dr	42000	53104	5.3%
Average			4.2%

Step 3: FM 734 Model Growth Calculation:

TxDOT's future traffic map was used as a reference for estimating growth factors in the study area, and can be found in **Appendix C**. The traffic volumes extracted from the model at various locations along the FM 734 corridor are shown in **Table 3**. Based on the data, the average annual growth rate from the years 2015 to 2035 is 5.0%.

**TABLE 3**  
 TxDOT TDM Traffic Volumes  
 (2035 Future Traffic Map)

FM 734 Corridor Location	Daily Traffic		Growth Rate
	2015	2035	2015-2035
South of RM 1431	32954	65910	5.0%
South of Brushy Creek Rd	36976	73950	5.0%
South of SH 45	39951	79900	5.0%
Average			5.0%

Step 4: Recommended Growth Rates:

The historical growth (from step 1) and future growth (from steps 2 and 3) were compared to determine the trends. The growth factors were adjusted based on the trends, volume to capacity ratios (V/C) and engineering judgment. Considering the historic growth rate (0.8%), the recent growth rate (4.2%), the travel demand model growth rate (5.0%), and TxDOT's TPP 20 year regression growth rate (1.9%), **Table 4** shows the recommended growth rates for the study area roadways.

**TABLE 4**  
Recommended Corridor Growth Rates

Roadway	Corridor Growth Rates	
	≤20 years	>20 years
FM 734	1.94%	1.23%

Step 5: Design Hour Volume and Truck Percentages:

From the TPP corridor analysis information packet, provided in **Appendix D**, the k and D factors and the percent trucks have been extracted as shown below.

- k-factor = 10.8%
- Directional Distribution = 57% / 43%
- Truck Percentages = 4.6% (ADT)

If new traffic data (e.g. k, D, and T factors) is made available to Jacobs during the development of the detailed corridor traffic projections, the new data will be incorporated into the development of the traffic projections.



## Memorandum

FM 734 Corridor Growth Rate Methodology  
Edward J. Pultorak Jr., P.E., PTOE

### APPENDIX A

#### 20-YEAR REGRESSION WORKSHEET



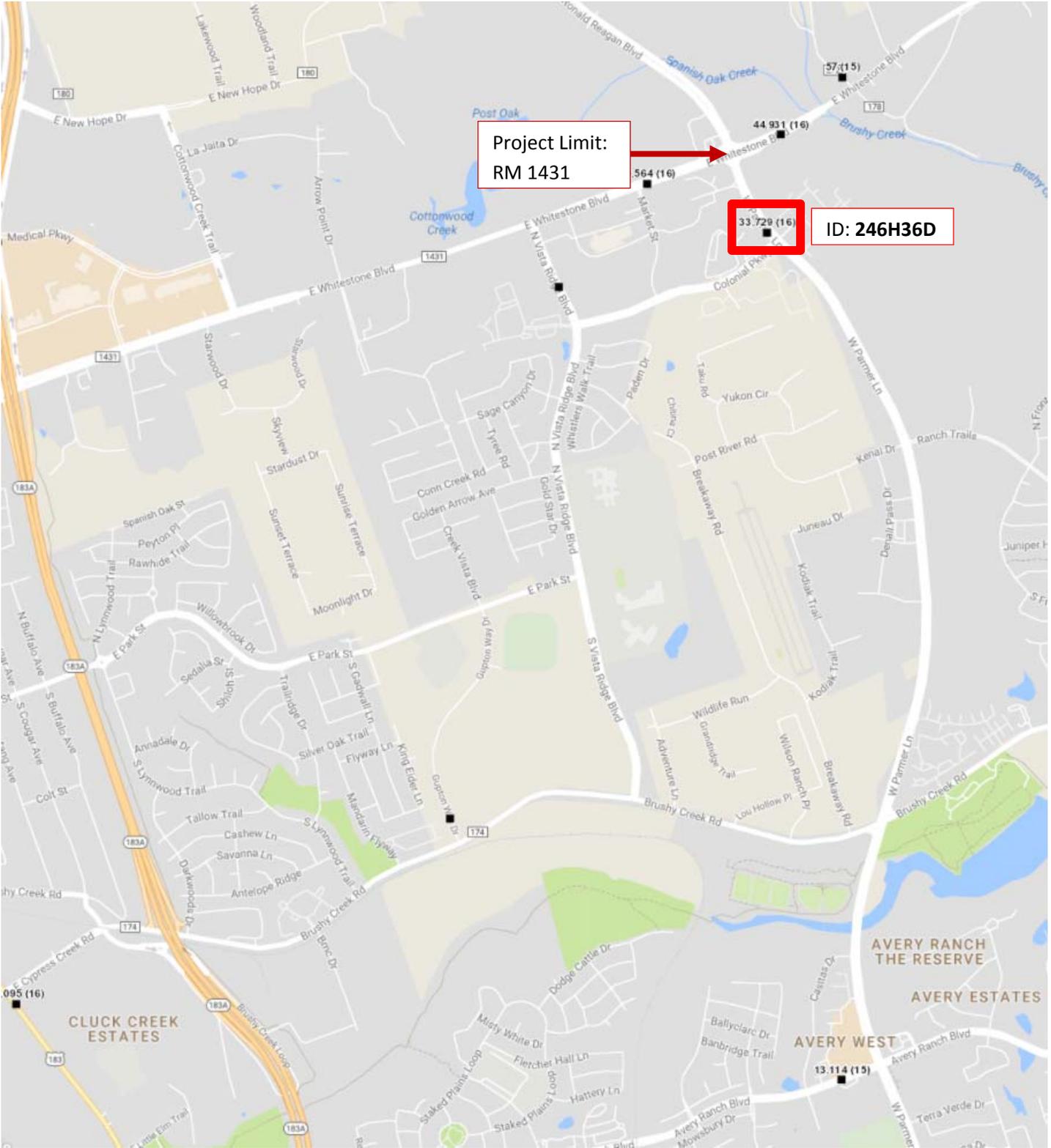


## Memorandum

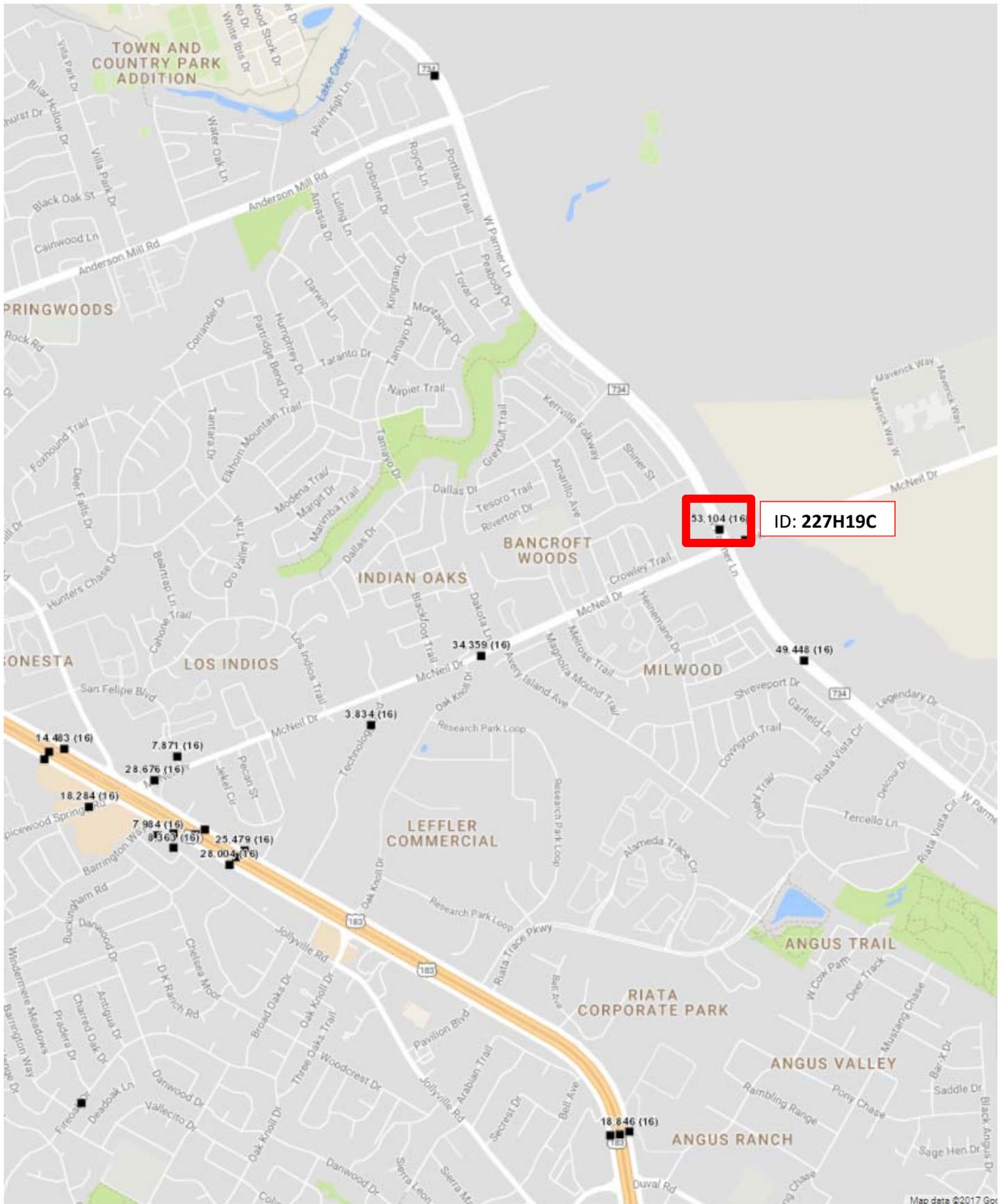
FM 734 Corridor Growth Rate Methodology  
Edward J. Pultorak Jr., P.E., PTOE

### **APPENDIX B**

#### **TRAFFIC COUNT LOCATION MAPS**









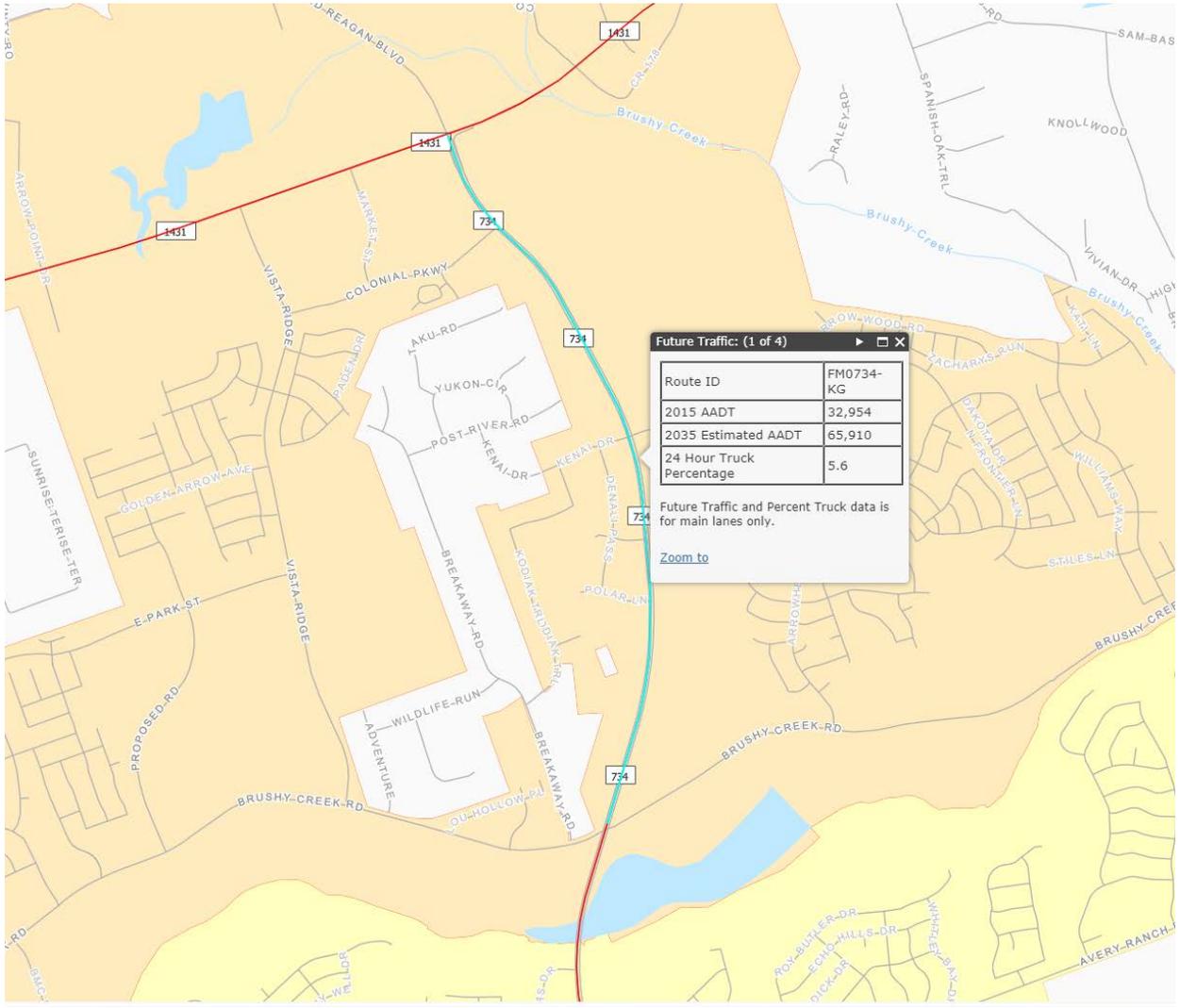
## Memorandum

FM 734 Corridor Growth Rate Methodology  
Edward J. Pultorak Jr., P.E., PTOE

### APPENDIX C

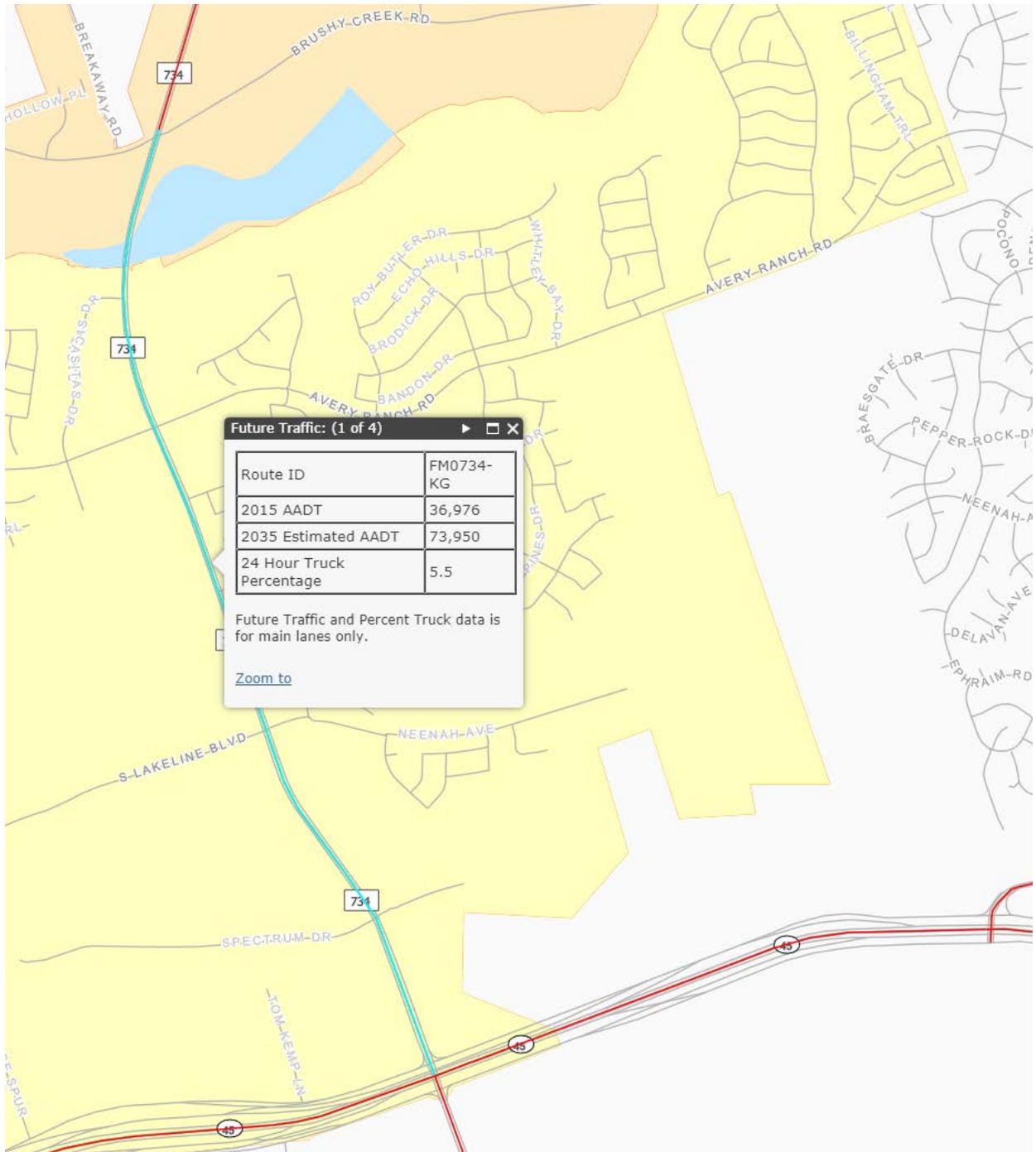
#### TXDOT FUTURE TRAFFIC DATA MAPS

# TXDOT Statewide Planning Map Future Traffic

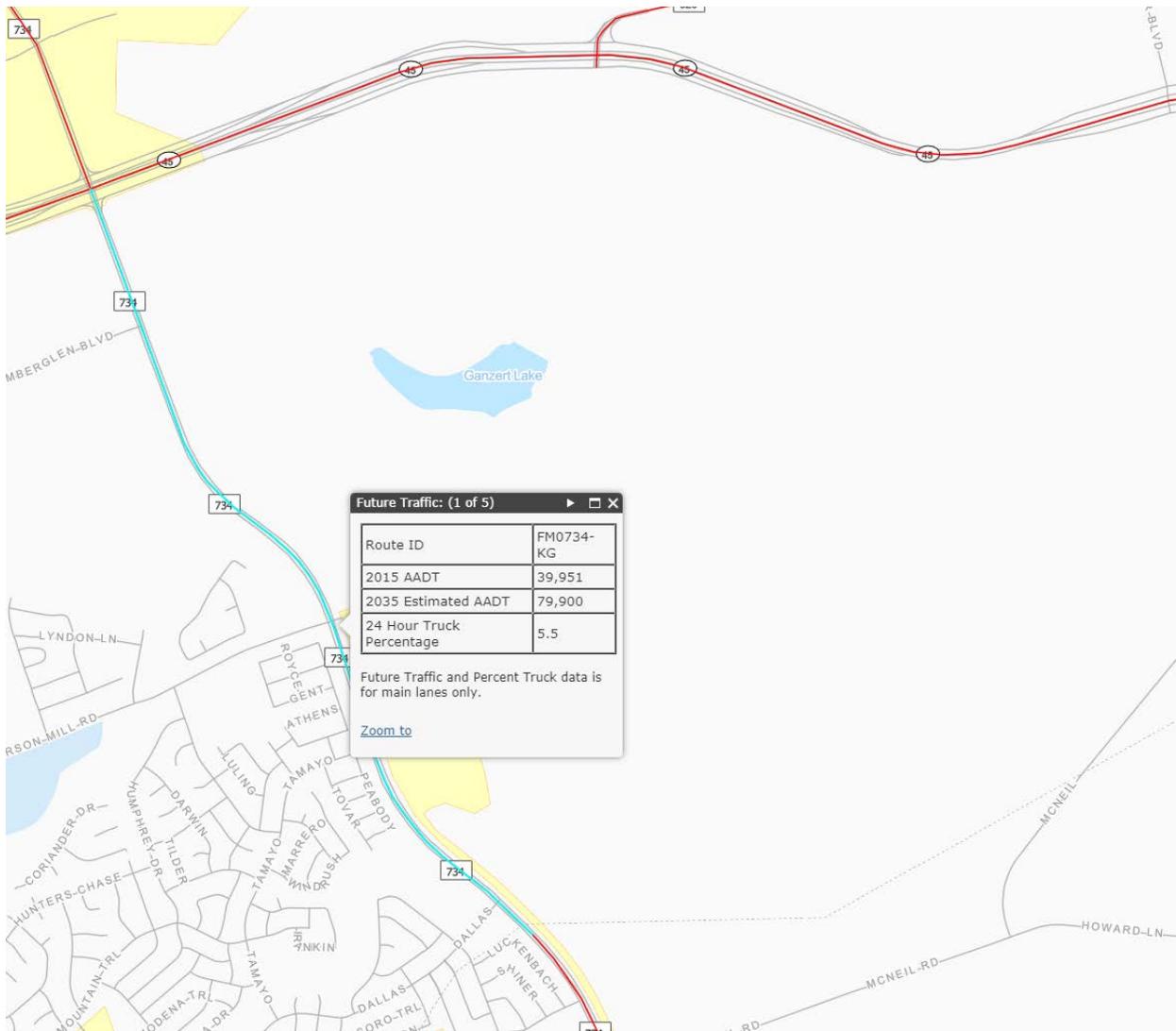


RM 1431 to Brushy Creek Rd

Future Count  
Locations



Brushy Creek Rd to SH 45



SH 45 to Dallas Dr



## Memorandum

FM 734 Corridor Growth Rate Methodology  
Edward J. Pultorak Jr., P.E., PTOE

### **APPENDIX D**

#### **TPP CORRIDOR ANALYSIS PACKET**

APD



T.X.D.O.T.  
RECEIVED

JAN 08 2018

DISTRICT 14 - MAIL ROOM  
AUSTIN, TX

# MEMO

January 3, 2018

**To:** Terry G. McCoy, P.E., District Engineer  
Attention: Lorena E. Echeverria De Misi, P.E., Director of TPD

**Through:** William E. Knowles, P.E.  
Traffic Analysis Section Director, TPP

**From:** Greg Lancaster  
Planner, TPP

**Subject:** Traffic Data  
CSJ: 3417-02-030  
FM 734:  
From RM 1431 (East Whitestone Boulevard)  
To SH 45  
  
Williamson County

Attached are tabulations showing traffic analysis for highway design for the 2023 to 2043 twenty year period and 2023 to 2053 thirty year period for the described limits of the route. Included is a tabulation showing data for use in air and noise analysis.

Please refer to your original memorandum dated November 28, 2017.

If you have any questions or need additional information, please contact Greg Lancaster at (512) 486-5091.

Attachments

**CC:** Carmen Ramos  
Planner, Austin District ✓  
Design Division

OUR VALUES: People • Accountability • Trust • Honesty

OUR MISSION: Through collaboration and leadership, we deliver a safe, reliable, and integrated transportation system that enables the movement of people and goods.

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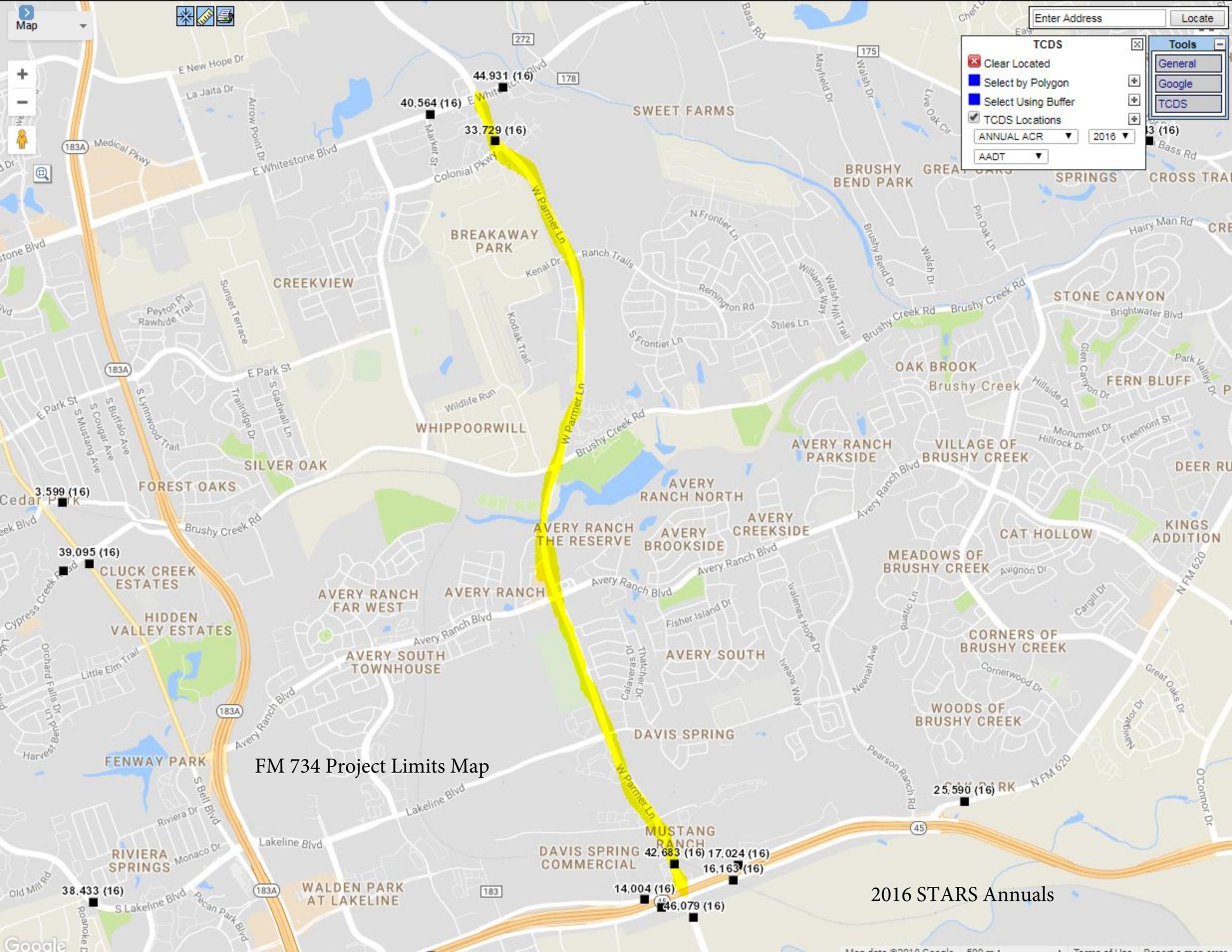
# TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

January 2, 2018

Austin District

Description of Location	Base Year				Dir Dist %	K Factor	Percent Trucks		ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2023 to 2043)		
	Average Daily Traffic		ADT	DHV			S	N			Rigid Pavement	SLAB	
	2023	2043											
FM 734 From RM 1431 (East Whitestone Boulevard) To SH 45 Williamson County	49,800	69,100	57 - 43	10.8	4.6	3.5	30	12,000	3	6,838,000	8,444,000	8"	
<b>Data for Use in Air &amp; Noise Analysis</b>													
<b>Vehicle Class</b>	<b>Base Year</b>												
	<b>% of ADT</b>	<b>% of DHV</b>											
Light Duty	95.4	96.5											
Medium Duty	2.7	2.0											
Heavy Duty	1.9	1.5											
Description of Location	Base Year				Dir Dist %	K Factor	Percent Trucks		ATHWLD	Percent Tandem Axles in ATHWLD	Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 30 Year Period (2023 to 2053)		
	Average Daily Traffic		ADT	DHV			S	N			Rigid Pavement	SLAB	
	2023	2053											
FM 734 From RM 1431 (East Whitestone Boulevard) To SH 45 Williamson County	49,800	77,600	57 - 43	10.8	4.6	3.5	30	12,000	3	10,991,000	13,571,000	8"	

NOT INTENDED FOR CONSTRUCTION  
 RIDDING OR PERMIT PURPOSES  
 William E. Brown, P.E.  
 Civil Number 84704



FM 734 Project Limits Map

2016 STARS Annuals

Enter Address

**TCDS**

- Clear Located
- Select by Polygon
- Select Using Buffer
- TCDS Locations

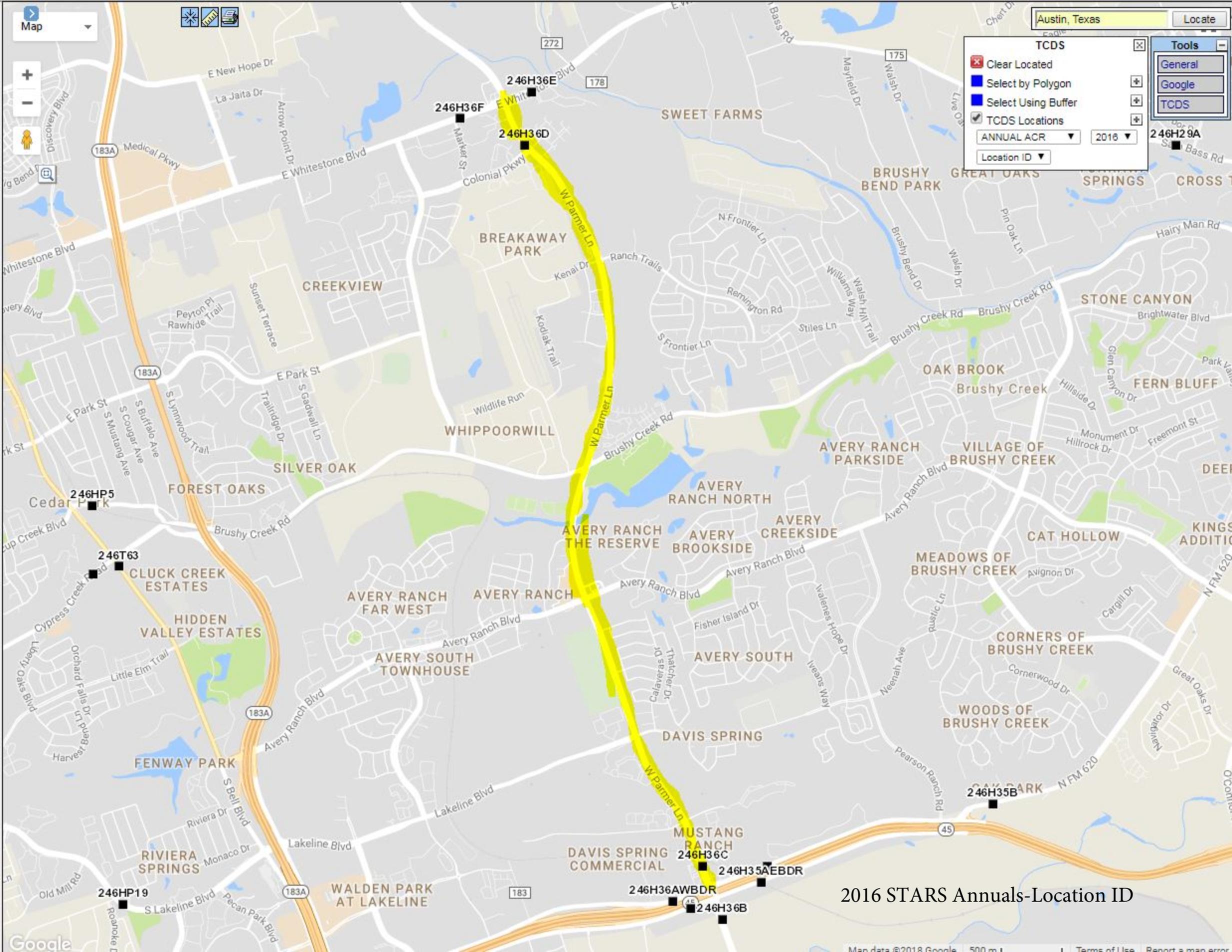
ANNUAL ACR  2016

AADT

**Tools**

- General
- Google
- TCDS

Map



**TCDS**

- Clear Located
- Select by Polygon
- Select Using Buffer
- TCDS Locations

ANNUAL ACR: 2016

Location ID: 246H29A

**Tools**

- General
- Google
- TCDS

2016 STARS Annuals-Location ID

**Corridor Analysis Worksheet: 1 Section, 2 Forecast Years, Air & Noise**

Project	FM 734		District	Austin			
Rd Type	FM		County	Williamson			
Direction	Two-Way		CSJ	3417-02-030			
Project Limits	From RM 1431 (East Whitestone Boulevard)		Analyst	GAC			
	To SH 45						
Date: Request	1/24/2018	Received	1/26/2018	Started	5/8/2018	Completed	5/8/2018
District Contact	Carmen Ramos		Phone #	512-832-7075			

	Year	ADT's	"DRAFT"	% Trks ADT	% Trks DHV
Count	2016	42683		4.6	3.5
Base	2023	49900		# Trks	2295
Forecast	2043	69100			
Forecast	2053	77700			

SPR Station	S-119	MC Strn	M-1307	% Trks	7.6
Year	2016	Dir	NB	Num Trks	846
Peak Hour	13.0	Year	2016	Axle Factor	2.31
DD	57	ADT	11166	% Single Axles	0.71
100-DD	43				
K-Factor	10.8				

Main Road Growth Rate	2.4	TDM Assignment	
Growth Rate after 20 Years	2.0		
20 Year Growth Factor	1.924		
30 Year Growth Factor	1.857		LOD 99999
Design Period 1	20		
Design Period 2	30		

		# Lanes	
Structural Number (SN)	3	Existing	4
Slab Thickness (ST)	8	Proposed	6

Past Projects	
Project	FM 734
From	RM 1431 (East Whitestone Boulevard)
To	SH 45
Date	1/3/2018
County	Williamson
CSJ	3417-02-030

Items Done on This Project			
Straight Line Turning Movements		Detailed Schematic Turning Movements	
Traffic Analysis for Highway Design	X	Field Trip	
Vehicle Mix	X	Travel Demand Model Used	
Manual Count Worksheet	X		

**NOTES:**

Draft traffic projections were provided as a guide for the project's limits.

There is an HP station (246HP29) on Palmer Lane with 2017 data for trucks. 2017 data is still under review and has not been released yet.

**DATA CALCULATIONS FOR USE IN AIR & NOISE ANALYSIS**

FHWA Format Vehicle Class. Counts		
<b>Light Duty Vehicles</b>	Motorcycles	37
	Passenger	6789
	Pickup or Van	3494
<b>Single Units</b>	Buses	52
	Other 2 Axle	426
	3 Axles	111
	4 Axles or more	3
<b>Truck Combs.</b>	3-4 Axles	26
	5 Axles	211
	6 Axles or more	13
<b>Semi-Trailer-Trailer</b>	5 Axles or less	4
	6 Axles	0
	7 Axles or more	0

	Number	%
Light	<b>10320</b>	<b>92.4</b>
Medium	<b>491</b>	<b>4.4</b>
Heavy	<b>355</b>	<b>3.2</b>
Trucks	<b>846</b>	<b>7.6</b>
<b>SECTION 1</b>		
<b>FM</b>		
	<b>ADT</b>	<b>DHV</b>
Light	<b>95.4</b>	<b>96.5</b>
Medium	<b>2.7</b>	<b>2.0</b>
Heavy	<b>1.9</b>	<b>1.5</b>
Total Vehicles		<b>11166</b>
Total Trucks		<b>846</b>
Total Singles		<b>1379.0</b>
Total Tandems		<b>575.0</b>
AXLE FACTOR		<b>2.31</b>
SINGLE AX FACT		<b>0.71</b>

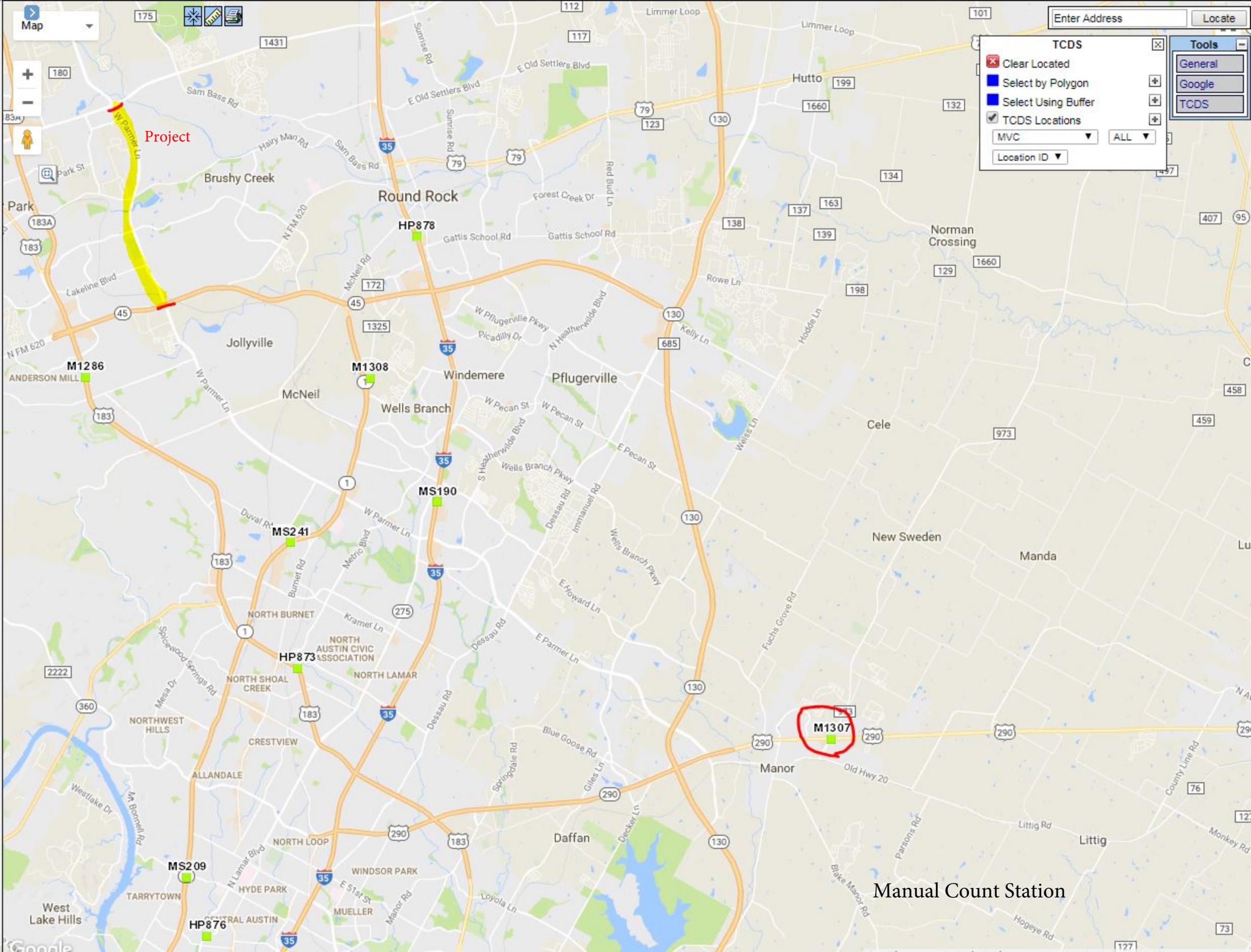
**INPUT DATA FOR KIPS: AUTOMATIC**

SN, ST	3, 8				
Design Periods	1	2			
Year 1	23	23			
Year 2	43	53			
ADT	49900	49900			
% Trks	4.6	4.6			
Growth Rate	1.924	1.857			
Years	20	30			
Facil Type	C	C			
S.N.	3	3			
SLAB	8	8			
Weight Sta	99999	99999			
Axle Factor	2.31	2.31			
Single Axle	0.71	0.71			

**OUTPUT DATA FROM KIPS: ENTER FOR TAHD FORM**

SN, ST	3, 8				
Design Periods	1	2			
ATHWLD					
% T in ATHWLD					
FLEXIBLE					
RIGID					





Project

Manual Count Station

TCDS

- Clear Located
- Select by Polygon
- Select Using Buffer
- TCDS Locations

MVC    ALL

Location ID

Tools

- General
- Google
- TCDS

Location ID	M1307_NB	Located On	FM 973	Community	Manor
Counted By		Between		County	Travis
Start Date	10/18/2016	And		Module	
Start Time	12:00:00 AM	Direction	NB	Agency	Texas DOT
		Source		Owner ID	Bertha.Arellano

### FHWA-Scheme F Classification

Start Time	Motor cycle	Car	Light Truck	Bus	2A SU	3A SU	>3A SU	<5A 2U	5A 2U	>5A 2U	<6A >2U	6A >2U	>6A >2U	14	15	Total
12:00 AM	0	29	13	0	0	0	0	0	2	0	0	0	0	0	0	44
1:00 AM	0	20	6	0	0	0	0	0	1	0	1	0	0	0	0	28
2:00 AM	0	15	6	0	0	0	0	0	4	0	0	0	0	0	0	25
3:00 AM	0	39	6	0	1	0	0	1	2	0	1	0	0	0	0	50
4:00 AM	0	75	28	0	4	0	0	2	6	0	0	0	0	0	0	115
5:00 AM	2	216	154	1	21	1	0	0	18	0	0	0	0	0	0	413
6:00 AM	4	608	328	11	30	8	1	1	10	0	0	0	0	0	0	1001
7:00 AM	1	536	237	5	40	4	0	2	15	2	0	0	0	0	0	842
8:00 AM	3	394	196	3	26	6	0	1	15	0	1	0	0	0	0	645
9:00 AM	2	251	146	2	22	10	0	0	19	0	0	0	0	0	0	452
10:00 AM	2	224	159	0	20	10	0	0	22	1	0	0	0	0	0	438
11:00 AM	1	225	140	1	21	10	2	2	16	1	0	0	0	0	0	419
12:00 PM	0	252	176	1	41	11	0	3	11	0	0	0	0	0	0	495
1:00 PM	0	232	153	2	28	13	0	2	17	0	0	0	0	0	0	447
2:00 PM	1	319	172	4	27	4	0	0	8	8	1	0	0	0	0	544
3:00 PM	1	391	231	7	19	12	0	1	11	0	0	0	0	0	0	673
4:00 PM	9	551	274	5	27	4	0	1	8	1	0	0	0	0	0	880
5:00 PM	3	685	296	6	20	6	0	0	8	0	0	0	0	0	0	1024
6:00 PM	5	634	304	2	31	3	0	4	5	0	0	0	0	0	0	988
7:00 PM	1	370	188	0	23	3	0	3	4	0	0	0	0	0	0	592
8:00 PM	2	312	114	2	12	6	0	2	2	0	0	0	0	0	0	452
9:00 PM	0	205	98	0	9	0	0	0	2	0	0	0	0	0	0	314
10:00 PM	0	136	53	0	3	0	0	0	1	0	0	0	0	0	0	193
11:00 PM	0	70	16	0	1	0	0	1	4	0	0	0	0	0	0	92
<b>TOTAL</b>	<b>37</b>	<b>6789</b>	<b>3494</b>	<b>52</b>	<b>426</b>	<b>111</b>	<b>3</b>	<b>26</b>	<b>211</b>	<b>13</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>11166</b>

## MANUAL COUNT DESIGN DATA - FHWA FORMAT

Station Number M-1307 Direction NB  
 Optional Misc. Info. (loc., etc.) \_\_\_\_\_

Year 2016

Type of Truck	Number of Trucks	Single Axles Mult.	Tandem Axle Sets Mult.
Single Units			
Buses 4	52	2	104
2-D 5	426	2	852
3-Axle 6	111	1	111
4-Axle 7	3	1	3

Single Trailer	Number of Trucks	Single Axles Mult.	Tandem Axle Sets Mult.
3-4-Axle 8	26	2.5	65.0
5-Axle 9	211	1	211
6-Axle 10	13	1	13

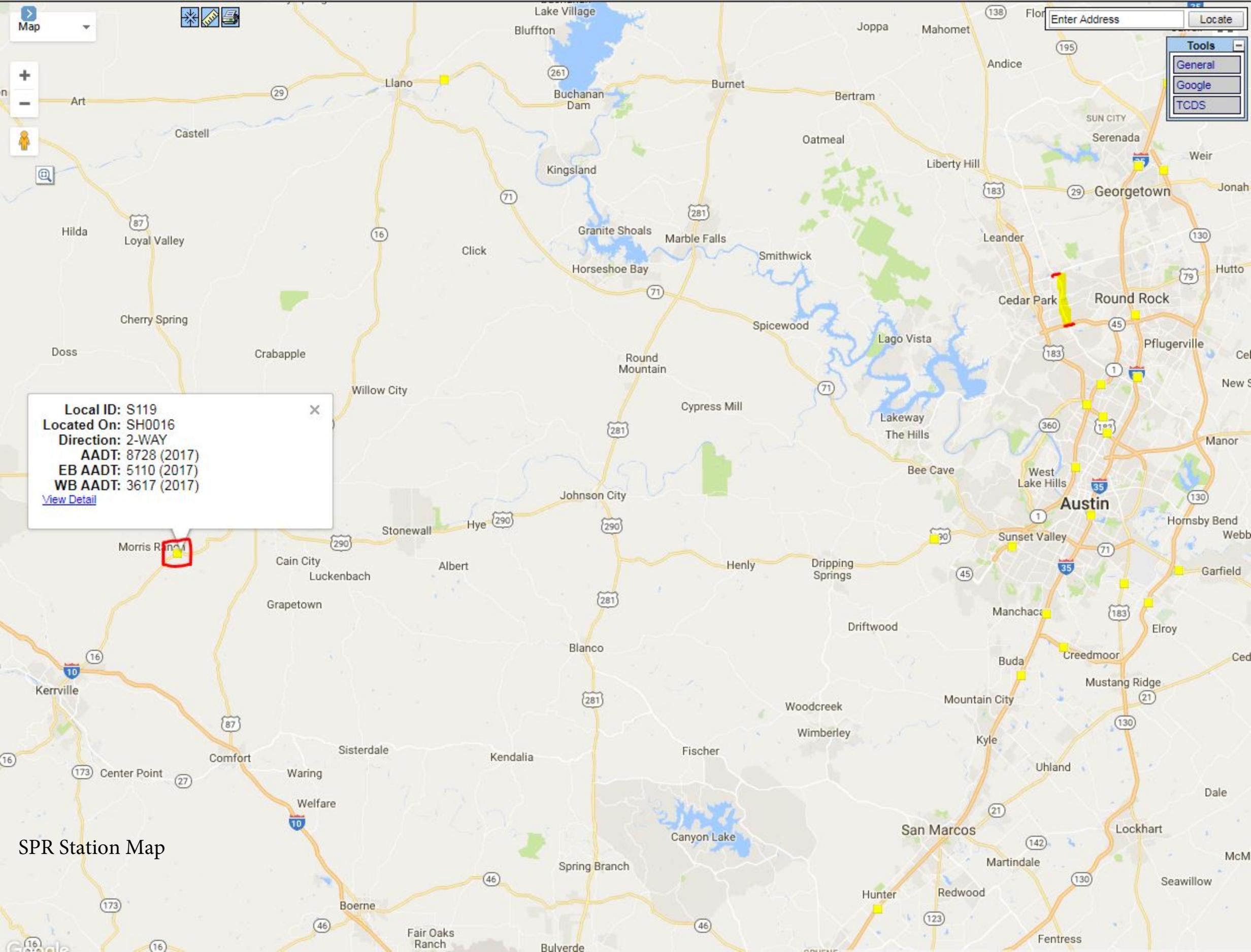
Multi-Trailers	Number of Trucks	Single Axles Mult.	Tandem Axle Sets Mult.
5-Axle 11	4	5	20
6-Axle 12	0	4	0
7-Axle 13	0	3	0

Total      846      1379.0      575.0

(Singles + Tandems) / Total Trucks = Axle Factor	2.31
(Singles Axles / (Singles + Tandems))	0.71

<b>Light Duty Vehicles</b>	Motorcycles	37
	Passenger Cars	6789
	Pickup or Van	3494
<b>Single Units</b>	Buses	52
	Other 2 Axle	426
	3 Axles	111
	4 Axles or more	3
<b>Single Trailer</b>	3-4 Axles	26
	5 Axles	211
	6 Axles or more	13
<b>Multi-Trailers</b>	5 Axles or less	4
	6 Axles	0
	7 Axles or more	0

<b>Light</b>	10320
<b>Medium</b>	491
<b>Heavy</b>	355
<b>Trucks</b>	846
<b>Total Vehicles</b>	11166
<b>%T of Tot. Veh.</b>	7.6
<b>Num. of Trucks</b>	846
<b>Axle Factor</b>	2.31
<b>% Single Axles</b>	0.71



Local ID: S119  
Located On: SH0016  
Direction: 2-WAY  
AADT: 8728 (2017)  
EB AADT: 5110 (2017)  
WB AADT: 3617 (2017)  
[View Detail](#)

SPR Station Map



Transportation Planning and Programming Division's  
Statewide Traffic Analysis and Reporting System II

**High Hourly Volumes for Year for 1/1/2016 - 12/31/2016**

**District :** Austin

**County :** Gillespie

**Community :** Fredericksburg

**Route :** 8.9 miles southwest of US0087

**On Road:** SH0016

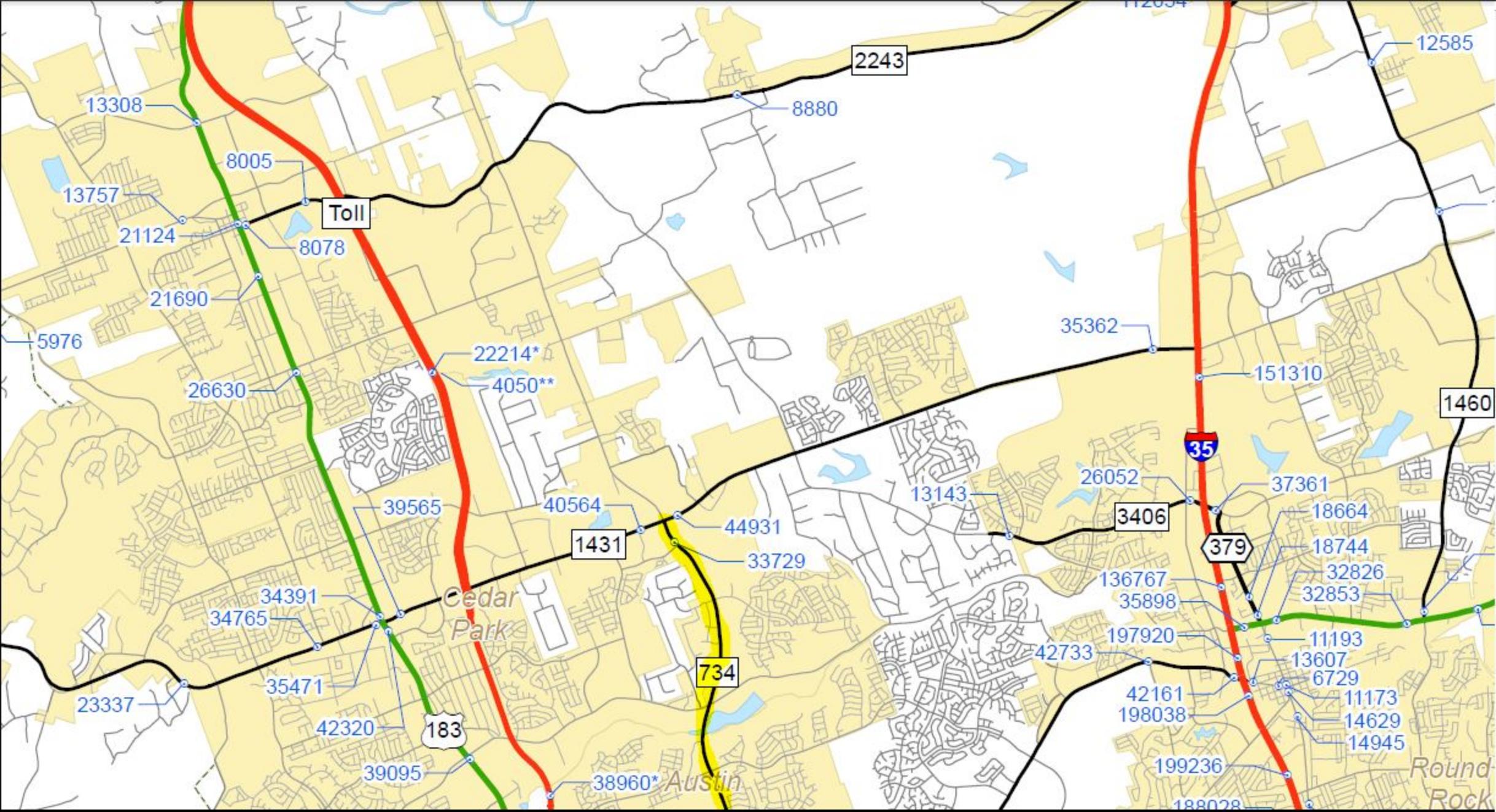
**Location ID :** S119

**Collection Type :** PERM

**AADT:** 6,949

**Roadbed :** ML

Ordinal High Hour	Date	Day of Week	Hour	Volume	K Factor	Peak Direction	Directional Distribution
1	5/13/2016	Friday	5pm-6pm	900	13	EB	53
2	4/1/2016	Friday	4pm-5pm	875	12.6	WB	62
3	8/5/2016	Friday	4pm-5pm	846	12.2	WB	61
4	5/13/2016	Friday	4pm-5pm	834	12	WB	58
5	9/2/2016	Friday	5pm-6pm	821	11.8	WB	61
6	5/27/2016	Friday	5pm-6pm	817	11.8	WB	63
7	2/19/2016	Friday	4pm-5pm	800	11.5	WB	56
8	4/22/2016	Friday	4pm-5pm	797	11.5	WB	64
9	7/1/2016	Friday	2pm-3pm	797	11.5	WB	58
10	4/15/2016	Friday	4pm-5pm	796	11.5	WB	61
20	7/29/2016	Friday	5pm-6pm	762	11	WB	62
25	3/4/2016	Friday	4pm-5pm	751	10.8	WB	56
30	8/12/2016	Friday	5pm-6pm	748	10.8	WB	57
35	8/12/2016	Friday	4pm-5pm	740	10.6	WB	61
40	3/17/2016	Thursday	5pm-6pm	730	10.5	WB	60
45	5/20/2016	Friday	4pm-5pm	723	10.4	WB	58
50	5/28/2016	Saturday	2pm-3pm	721	10.4	WB	52
75	3/25/2016	Friday	5pm-6pm	706	10.2	WB	63
100	7/29/2016	Friday	2pm-3pm	691	9.9	WB	53
125	1/22/2016	Friday	5pm-6pm	677	9.7	EB	51
150	5/28/2016	Saturday	4pm-5pm	667	9.6	WB	54
175	2/19/2016	Friday	3pm-4pm	656	9.4	WB	57
200	7/2/2016	Saturday	2pm-3pm	649	9.3	WB	51



with an asterisk (\*) include  
 with a double asterisk (\*\*)  
 and volumes only.



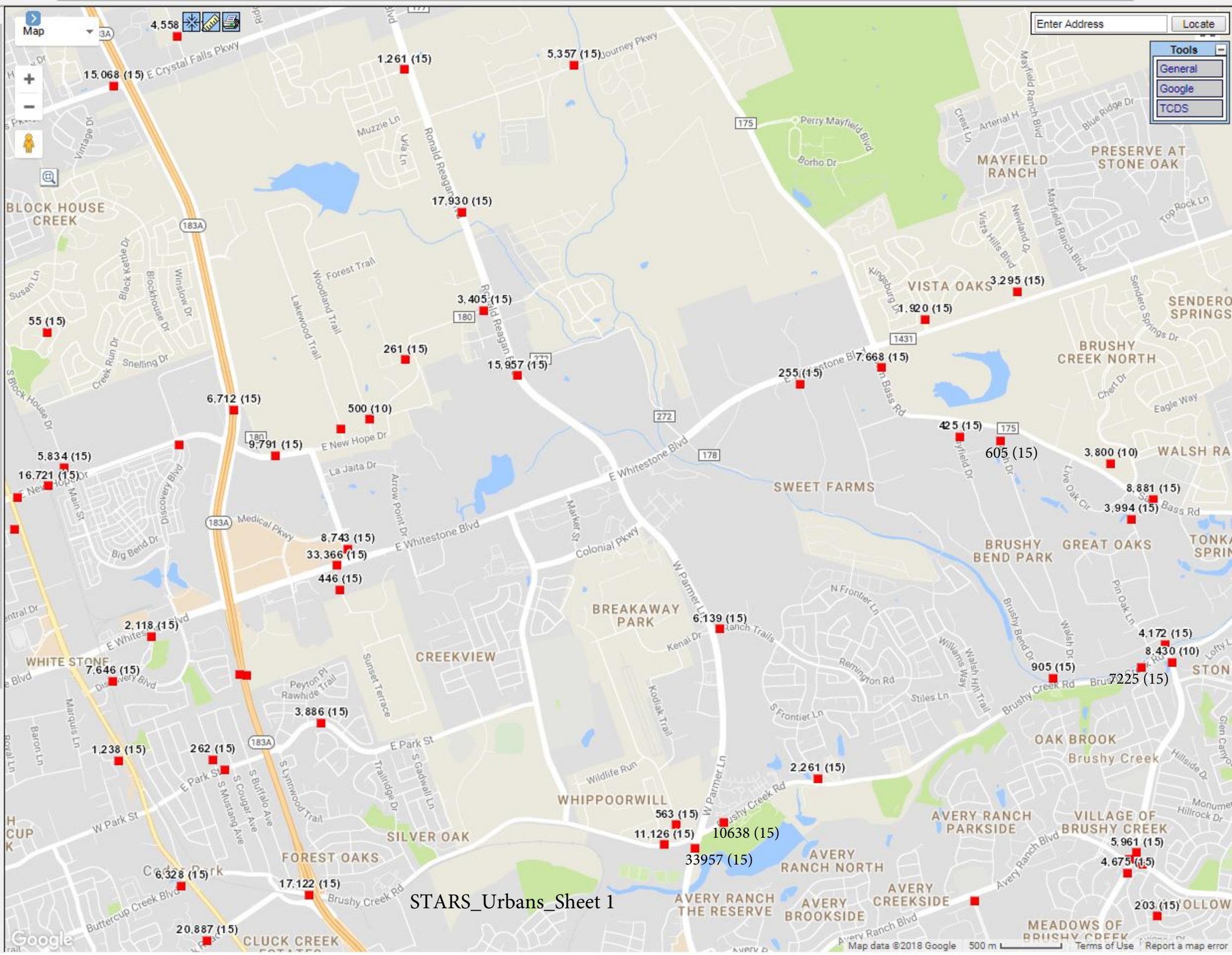
5

# 2016 AUSTIN DISTRICT TRAFFIC

PREPARED BY THE  
 Texas Department of Transportation  
 Transportation Planning and Programming Division  
 Traffic Analysis System Support Branch  
 IN COOPERATION WITH THE

United States Department of Transportation Federal Highway Administration

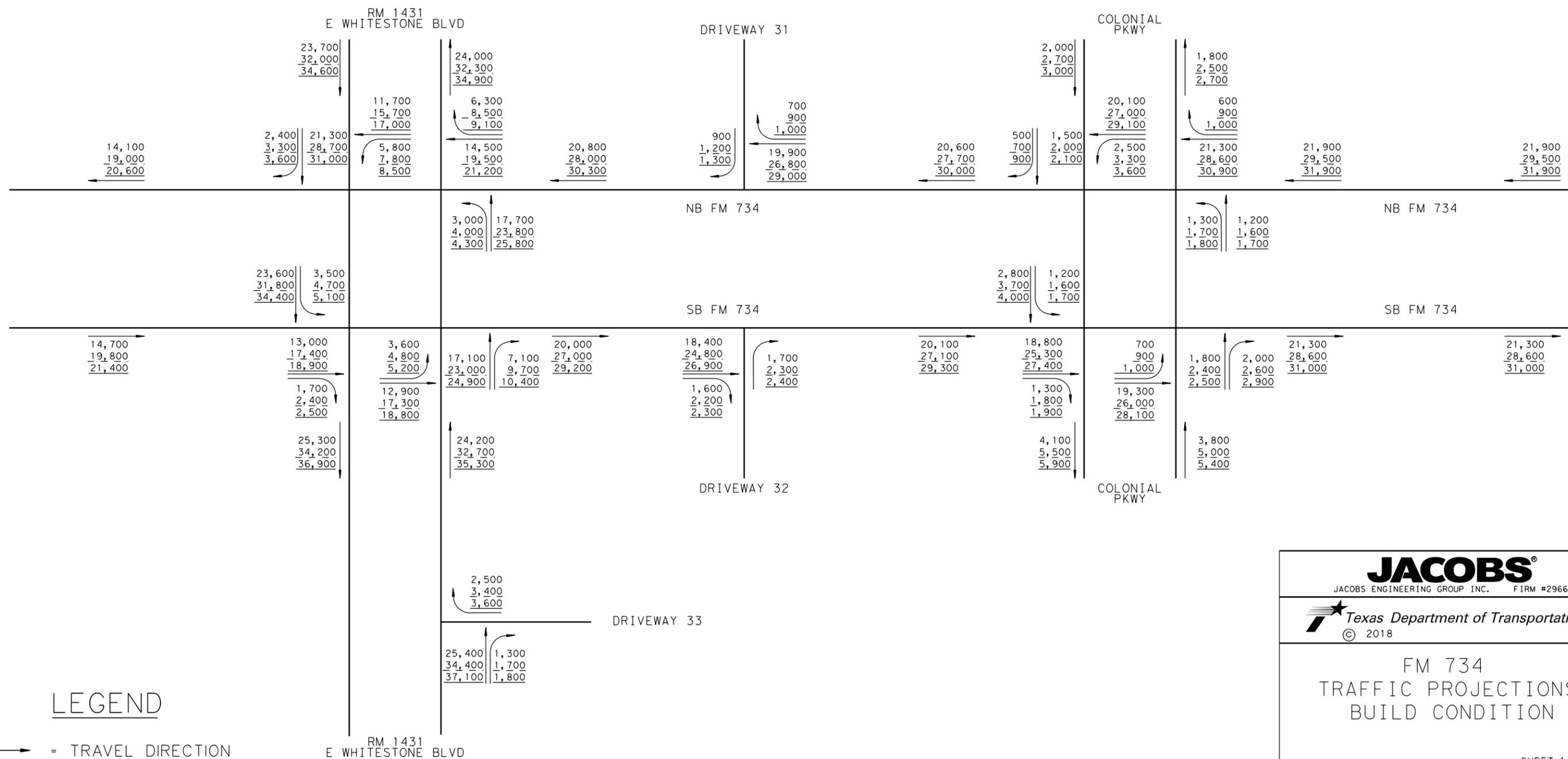
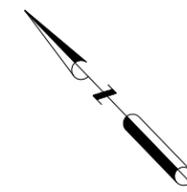




STARS\_Urbans\_Sheet 1



## Attachment 2 - Traffic Project Line Diagrams



### LEGEND

- = TRAVEL DIRECTION
- XX,XXX = YEAR 2023 DAILY TRAFFIC
- XX,XXX = YEAR 2043 DAILY TRAFFIC
- XX,XXX = YEAR 2053 DAILY TRAFFIC

FOR INTERIM REVIEW ONLY  
NOT INTENDED FOR CONSTRUCTION  
BIDDING OR PERMIT PURPOSES



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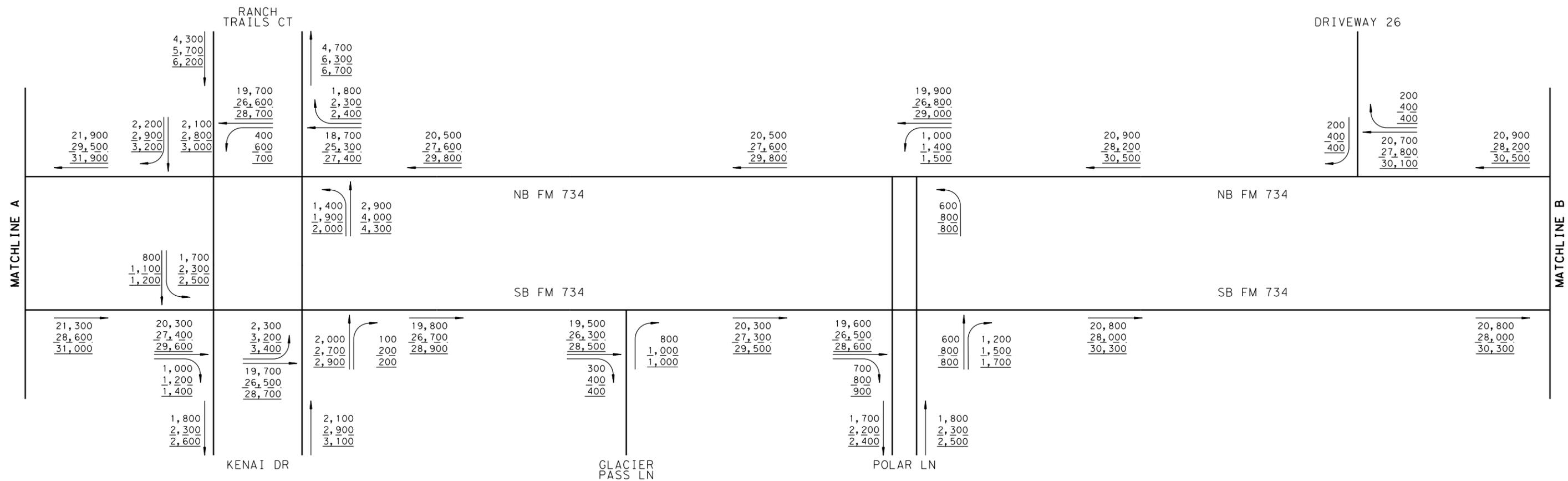
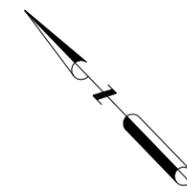
## FM 734

### TRAFFIC PROJECTIONS

### BUILD CONDITION

SHEET 1 OF 6

DESIGN	FED. RD. DIV. NO.			HIGHWAY NO.
x				IH 20
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
x				1
GRAPHICS	TX			
x				
CHECK	CONTROL	SECTION	JOB	
x				



### LEGEND

- = TRAVEL DIRECTION
- XX,XXX = YEAR 2023 DAILY TRAFFIC
- XX,XXX = YEAR 2043 DAILY TRAFFIC
- XX,XXX = YEAR 2053 DAILY TRAFFIC

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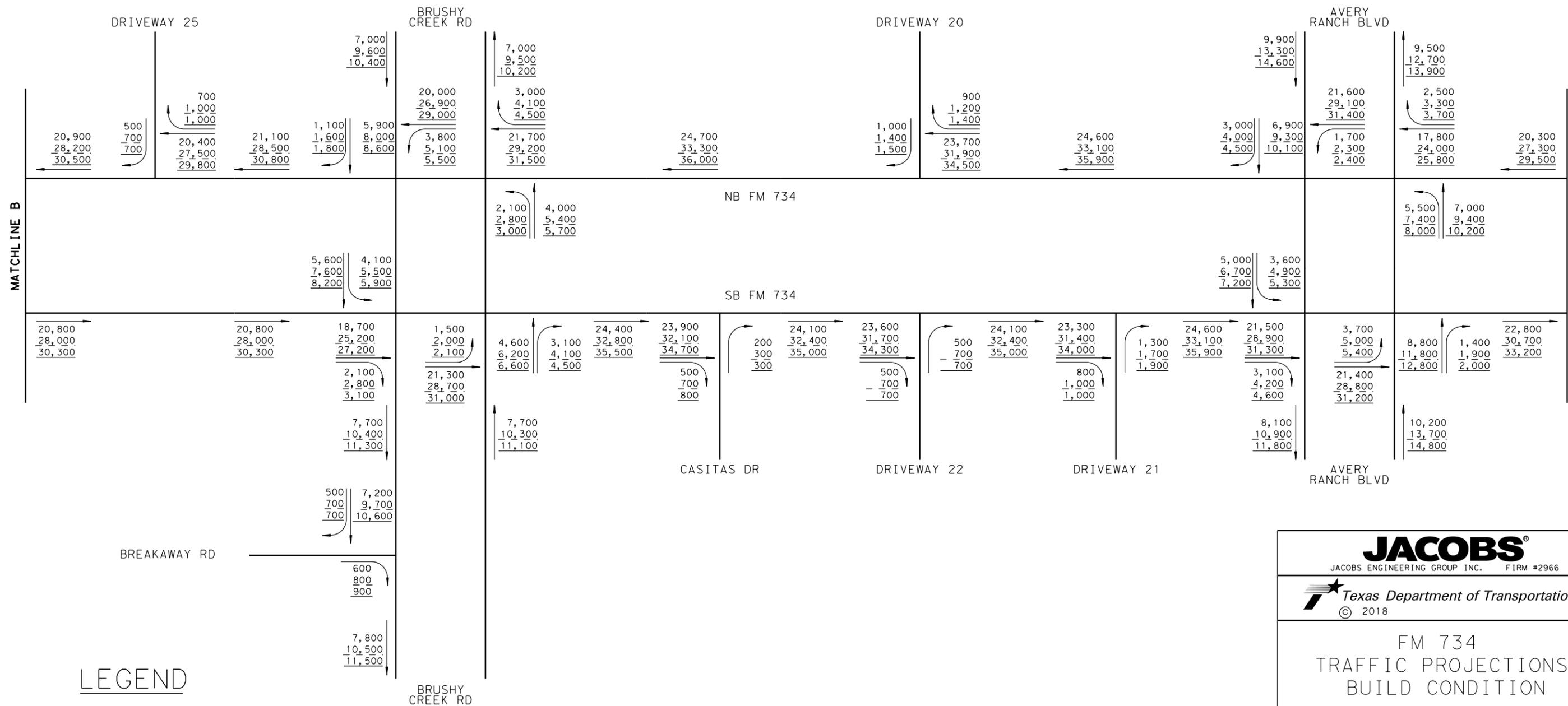
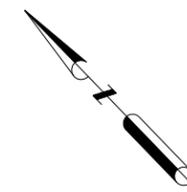
## FM 734

### TRAFFIC PROJECTIONS

### BUILD CONDITION

SHEET 2 OF 6

DESIGN	FED. RD. DIV. NO.			HIGHWAY NO.
x				IH 20
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
x	TX			2
CHECK	CONTROL	SECTION	JOB	
x				



**LEGEND**

- = TRAVEL DIRECTION
- XX,XXX = YEAR 2023 DAILY TRAFFIC
- XX,XXX = YEAR 2043 DAILY TRAFFIC
- XX,XXX = YEAR 2053 DAILY TRAFFIC

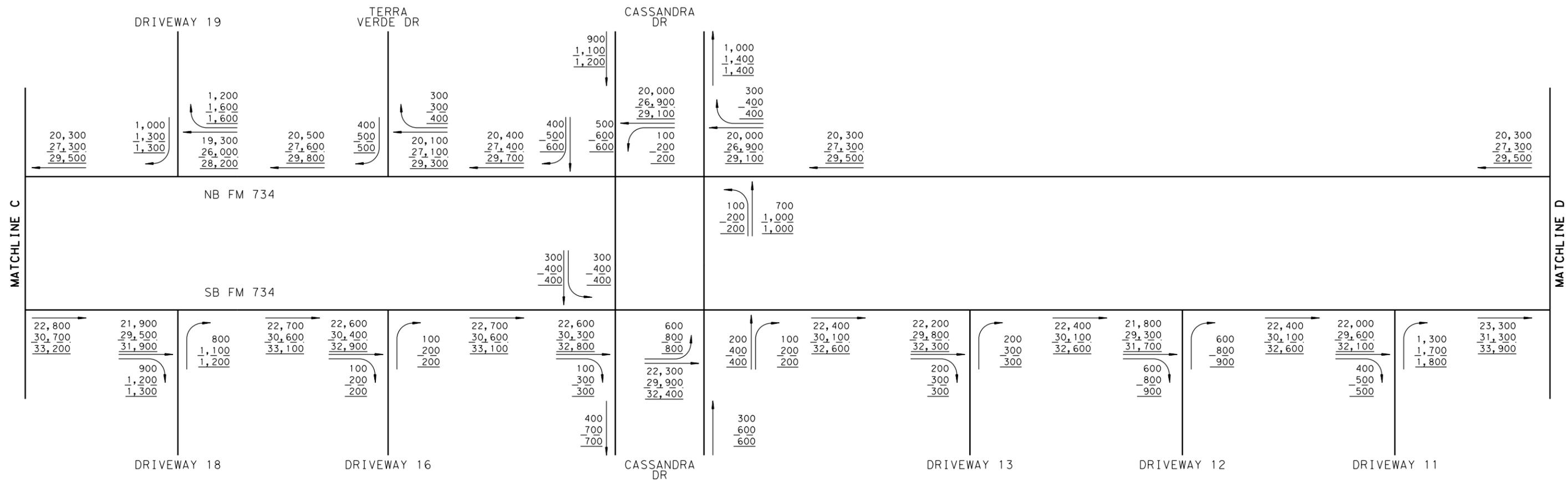
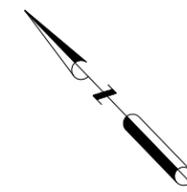
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FM 734  
TRAFFIC PROJECTIONS  
BUILD CONDITION

SHEET 3 OF 6

DESIGN	FED. RD. DIV. NO.			HIGHWAY NO.
CHECK				IH 20
GRAPHICS	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK	TX			3
	CONTROL	SECTION	JOB	



### LEGEND

- = TRAVEL DIRECTION
- XX,XXX = YEAR 2023 DAILY TRAFFIC
- XX,XXX = YEAR 2043 DAILY TRAFFIC
- XX,XXX = YEAR 2053 DAILY TRAFFIC

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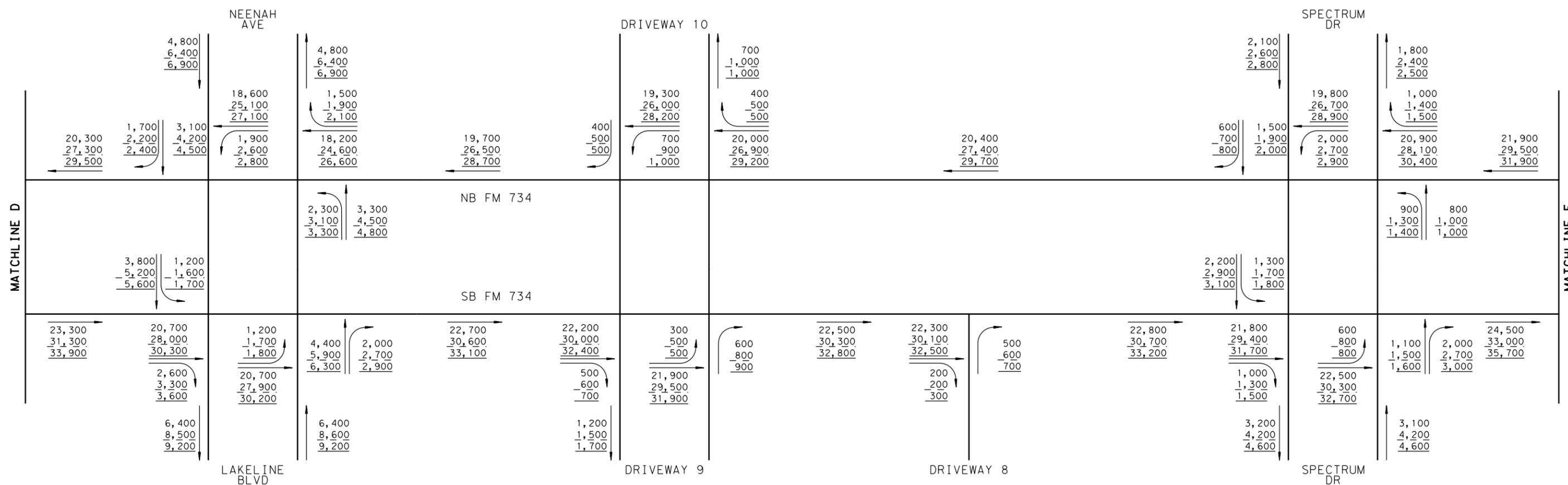
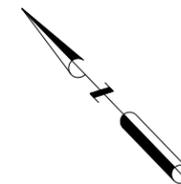
## FM 734

### TRAFFIC PROJECTIONS

### BUILD CONDITION

SHEET 4 OF 6

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x				
GRAPHICS	TX			4
x	CONTROL	SECTION	JOB	
CHECK				
x				



### LEGEND

- = TRAVEL DIRECTION
- XX,XXX = YEAR 2023 DAILY TRAFFIC
- XX,XXX = YEAR 2043 DAILY TRAFFIC
- XX,XXX = YEAR 2053 DAILY TRAFFIC

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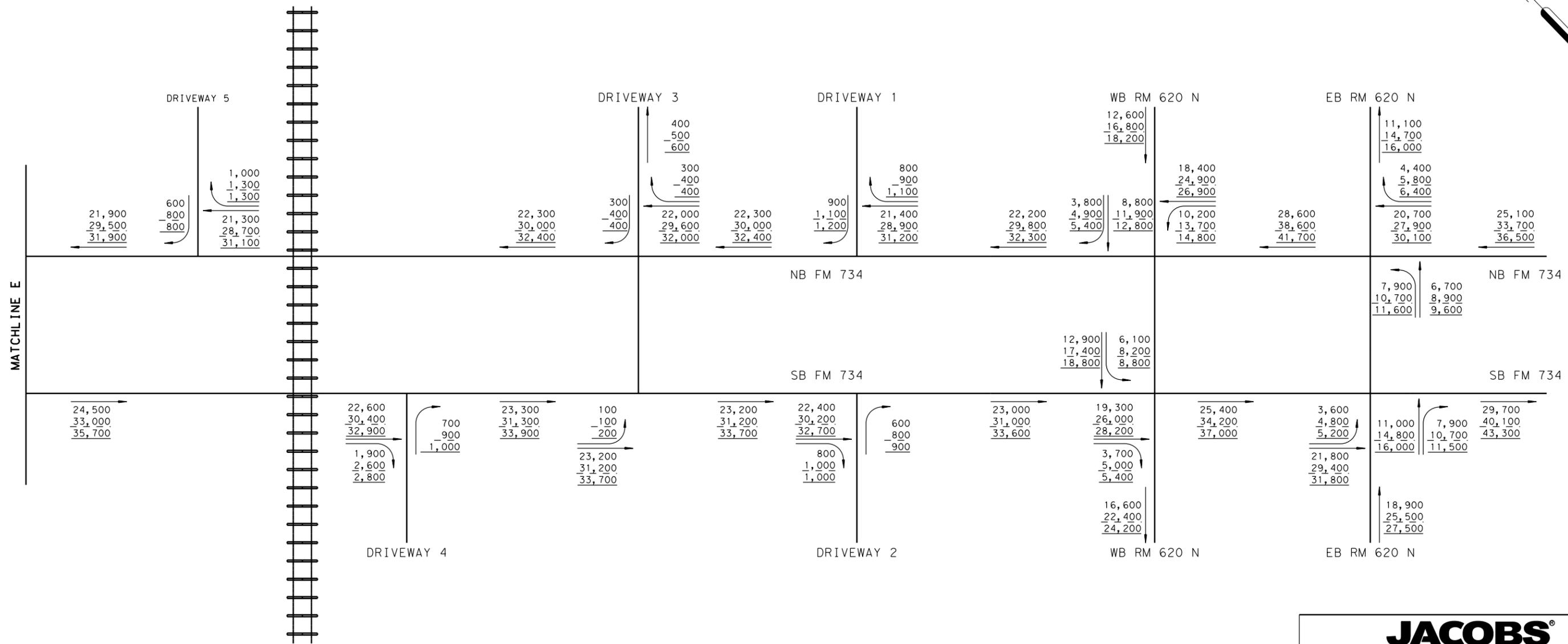
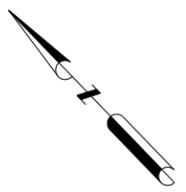
## FM 734

### TRAFFIC PROJECTIONS

### BUILD CONDITION

SHEET 5 OF 6

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x				
GRAPHICS	TX			5
x	CONTROL	SECTION	JOB	
CHECK				



**LEGEND**

- = TRAVEL DIRECTION
- XX,XXX = YEAR 2023 DAILY TRAFFIC
- XX,XXX = YEAR 2043 DAILY TRAFFIC
- XX,XXX = YEAR 2053 DAILY TRAFFIC

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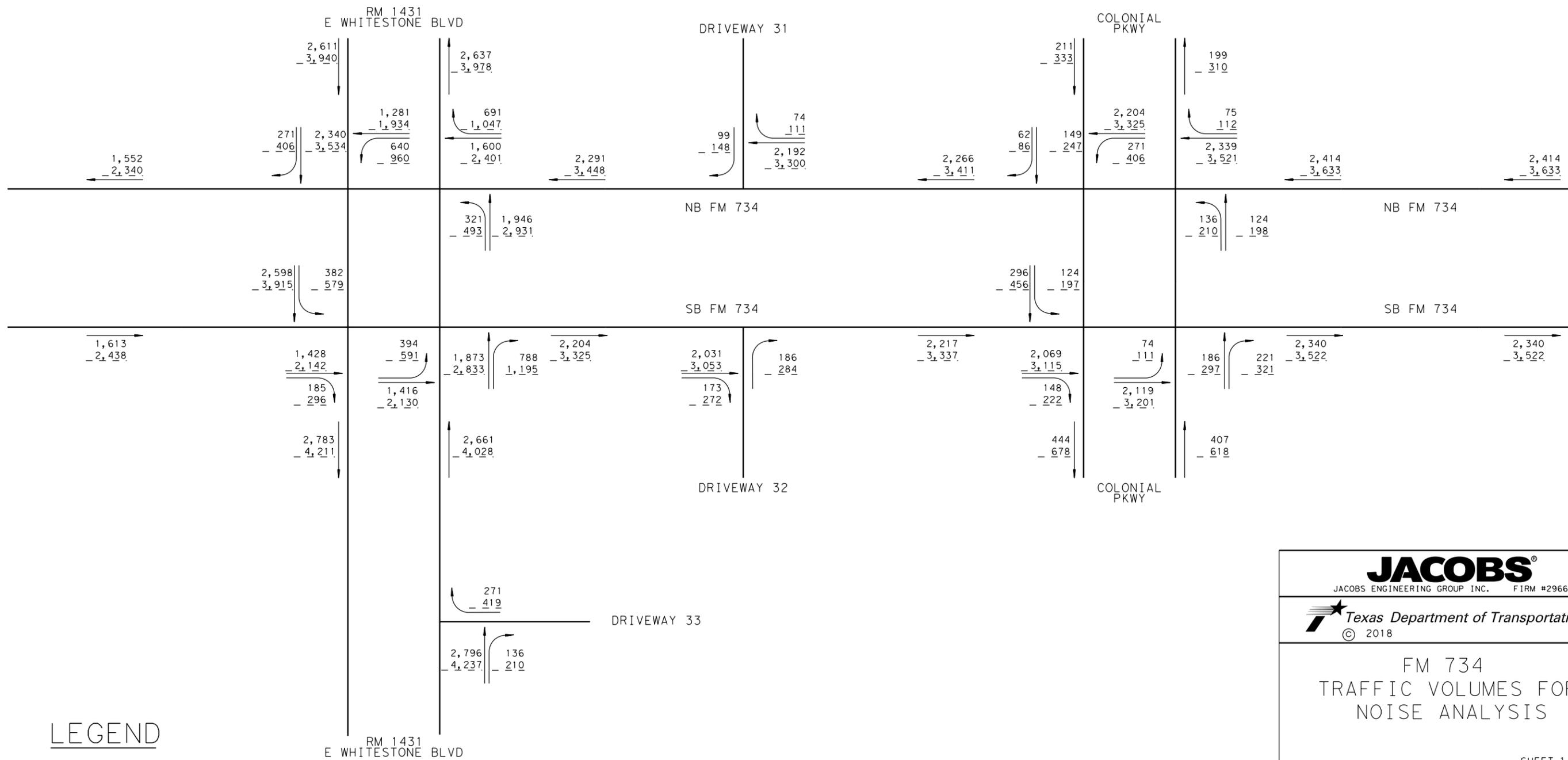


FM 734  
TRAFFIC PROJECTIONS  
BUILD CONDITION

SHEET 6 OF 6

DESIGN x	FED. RD. DIV. NO.			HIGHWAY NO.
CHECK x	STATE	DISTRICT	COUNTY	IH 20 SHEET NO.
GRAPHICS x	TX			6
CHECK x	CONTROL	SECTION	JOB	

## Attachment 3 - Traffic Volumes for Noise Analysis Line Diagrams



**LEGEND**

- = TRAVEL DIRECTION
- XX,XXX = YEAR 2018 DDHV
- XX,XXX = YEAR 2043 DDHV
- 

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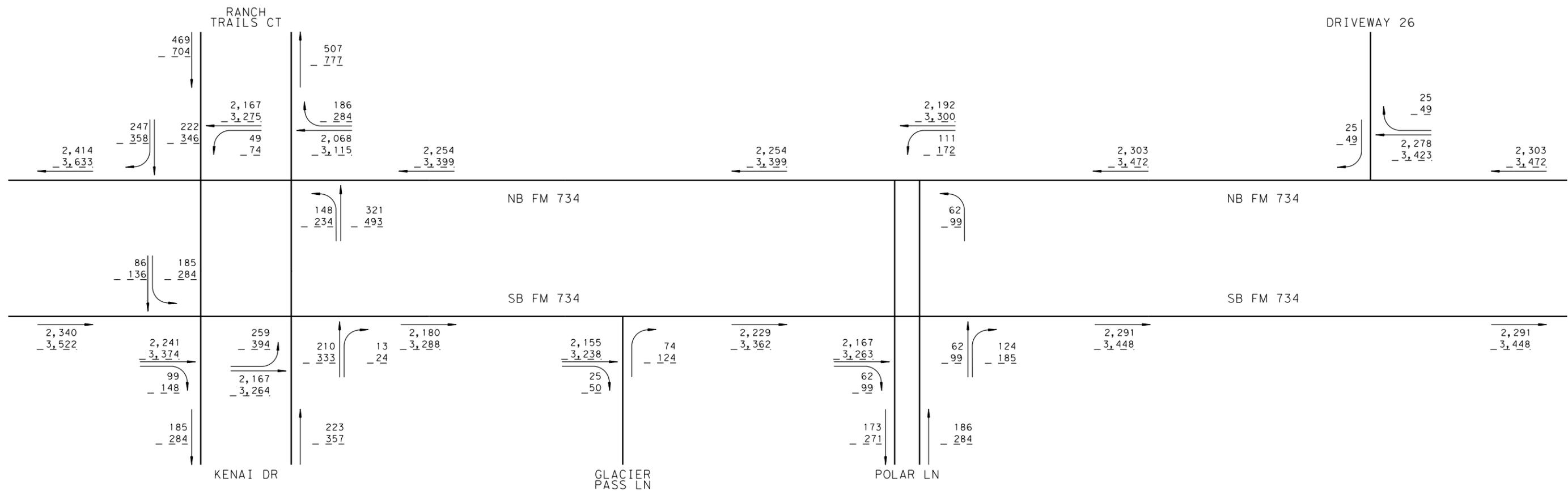


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FM 734  
TRAFFIC VOLUMES FOR  
NOISE ANALYSIS

SHEET 1 OF 6

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x				FM 734
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
x				1
GRAPHICS	TX			
x	CONTROL	SECTION	JOB	
CHECK				
x				



**LEGEND**

- = TRAVEL DIRECTION
- XX,XXX = YEAR 2018 DDHV
- XX,XXX = YEAR 2043 DDHV
- 

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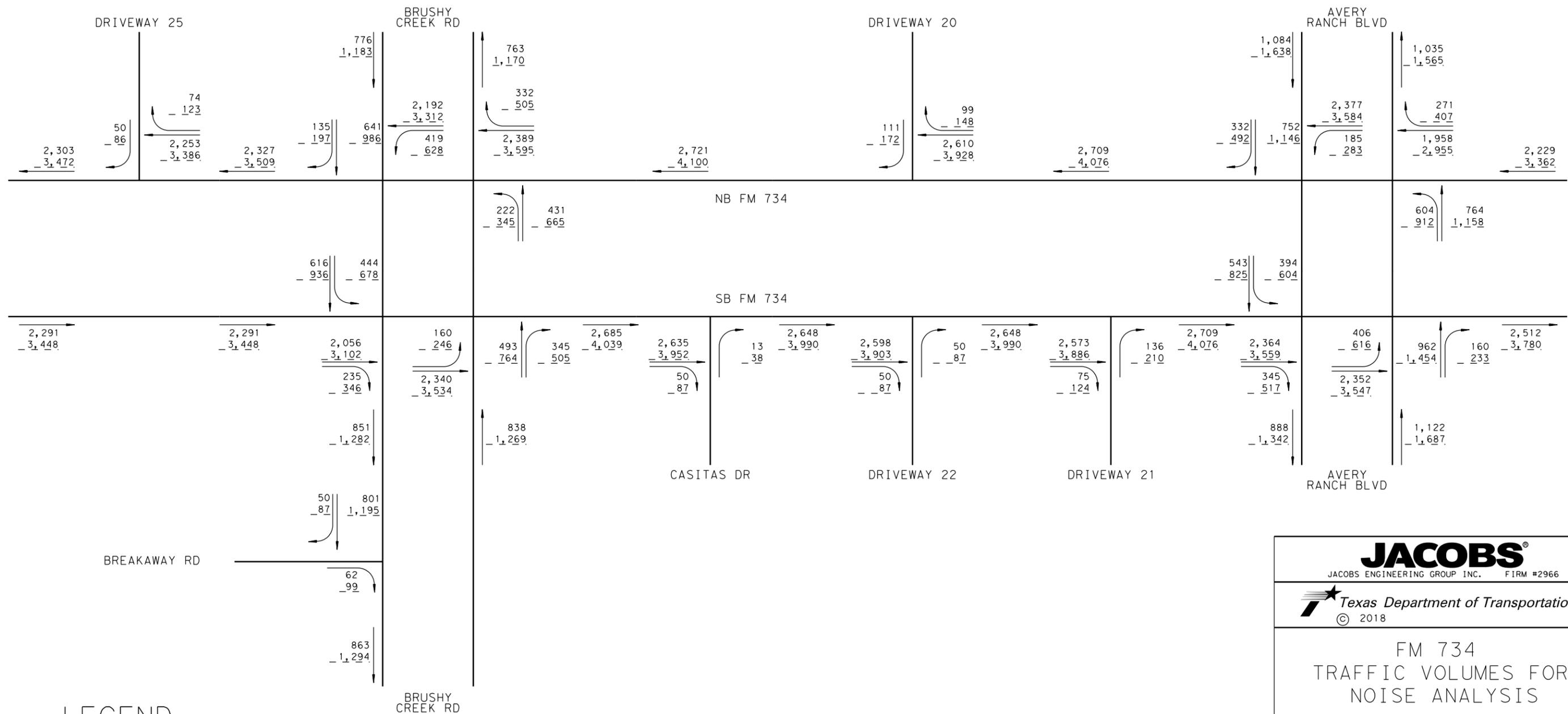


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FM 734  
TRAFFIC VOLUMES FOR  
NOISE ANALYSIS

SHEET 2 OF 6

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x				FM 734
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
x				
GRAPHICS	TX			2
x	CONTROL	SECTION	JOB	
CHECK				
x				



**LEGEND**

- = TRAVEL DIRECTION
- XX,XXX = YEAR 2018 DDHV
- XX,XXX = YEAR 2043 DDHV
- 

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NOT INTENDED FOR CONSTRUCTION  
BIDDING OR PERMIT PURPOSES



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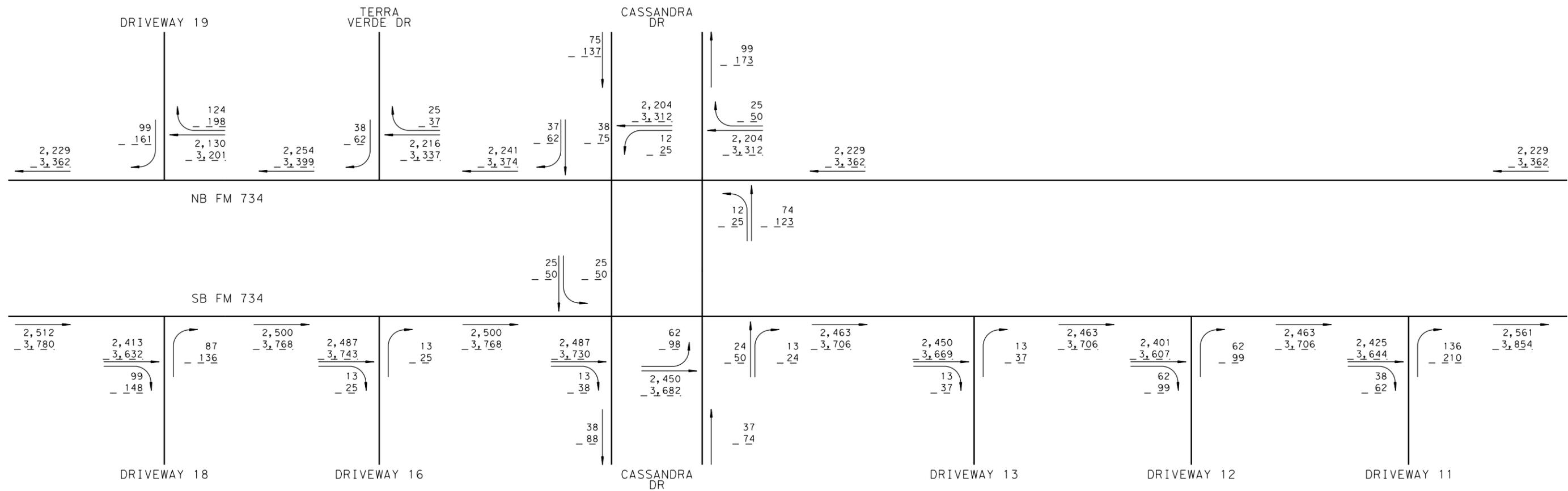


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FM 734  
TRAFFIC VOLUMES FOR  
NOISE ANALYSIS

SHEET 3 OF 6

DESIGN	FED. RD. DIV. NO.			HIGHWAY NO.
x				FM 734
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
x	TX			3
GRAPHICS	CONTROL	SECTION	JOB	
x				



### LEGEND

- = TRAVEL DIRECTION
- XX,XXX = YEAR 2018 DDHV
- XX,XXX = YEAR 2043 DDHV
- 

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 NOT INTENDED FOR CONSTRUCTION  
 BIDDING OR PERMIT PURPOSES



JACOBS ENGINEERING GROUP INC. FIRM #2966

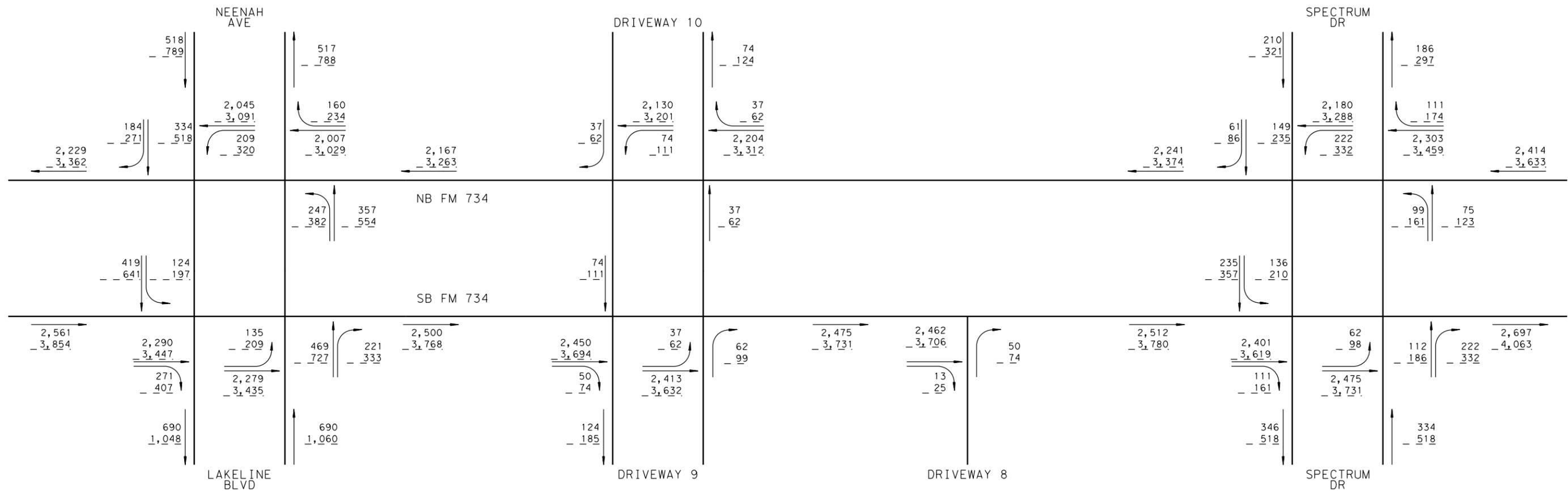


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FM 734  
 TRAFFIC VOLUMES FOR  
 NOISE ANALYSIS

SHEET 4 OF 6

DESIGN x	FED. RD. DIV. NO.			HIGHWAY NO.
CHECK x				FM 734
GRAPHICS x	STATE	DISTRICT	COUNTY	SHEET NO.
CHECK x	TX			4
	CONTROL	SECTION	JOB	



**LEGEND**

- = TRAVEL DIRECTION
- XX,XXX = YEAR 2018 DDHV
- XX,XXX = YEAR 2043 DDHV
- 

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NOT INTENDED FOR CONSTRUCTION  
BIDDING OR PERMIT PURPOSES



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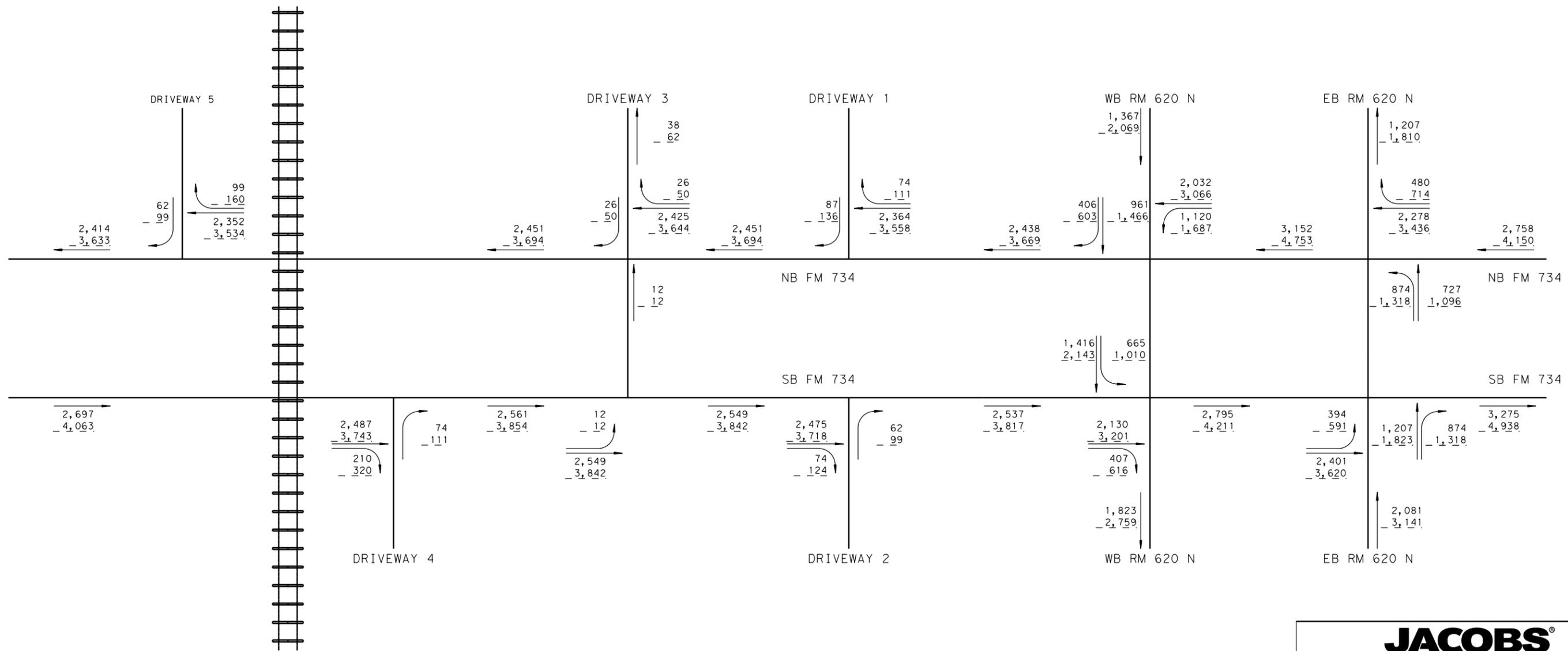


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FM 734  
TRAFFIC VOLUMES FOR  
NOISE ANALYSIS

SHEET 5 OF 6

DESIGN	FED. RD. DIV. NO.			HIGHWAY NO.
x				FM 734
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
x				5
GRAPHICS	TX			
x				
CHECK	CONTROL	SECTION	JOB	
x				



### LEGEND

- = TRAVEL DIRECTION
- XX,XXX = YEAR 2018 DDHV
- XX,XXX = YEAR 2043 DDHV
- 

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FM 734  
 TRAFFIC VOLUMES FOR  
 NOISE ANALYSIS

SHEET 6 OF 6

DESIGN	FED. RD. DIV. NO.			HIGHWAY NO.
x				FM 734
CHECK	STATE	DISTRICT	COUNTY	SHEET NO.
x	TX			6
CHECK	CONTROL	SECTION	JOB	
x				

Attachment 4 - Three Points Development

