Texas Department of Transportation

PRESIDIO TEXAS

CITY of ALPINE BREWSTER COUNTY 1882

THE CITY OF MAREA MAREA, TEXAS

US 67 CORRIDOR MASTER PLAN

APPENDIX E

FEBRUARY 2020

OUR 67

US 67 CORRIDOR MASTER PLAN

This page intentionally left blank.

Memorandum

To: *Rebecca Reyes, TxDOT Project Manager*
Christopher Weber, TxDOT Alpine Area Engineer

From: *CDM Smith*

Date: *February 2020*

Subject: *US 67 Corridor Master Plan Traffic Projections Methodology Technical Memorandum*

1.0 Introduction

The purpose of this technical memorandum is to summarize the approach for projecting traffic volumes along the US 67 Corridor Master Plan study corridor.

The US 67 corridor stretches 142 miles from Interstate 10 (I-10) west of Fort Stockton to the Presidio/Ojinaga Port of Entry (POE) on the United States (U.S.)/Mexico border. **Figure 1** shows the study corridor. US 67 provides access to the towns of Alpine, Marfa, Presidio, and surrounding communities, as well as Big Bend National Park, Sul Ross State University, the Marfa Lights, Big Bend Ranch State Park, Fort Leaton State Park, and Fort Davis attractions. This rural area has experienced traffic growth in recent years driven by many factors including tourism growth, international commerce, and Permian Basin oil field development. In response to these trends, the Texas Department of Transportation (TxDOT), in partnership with the communities, is developing a Corridor Master Plan for US 67 to help determine current and future corridor transportation needs. The study objectives are focused on enhancing efficiency, safety, and mobility along the corridor by recommending transportation projects and strategies for short-, mid-, and long-term implementation.

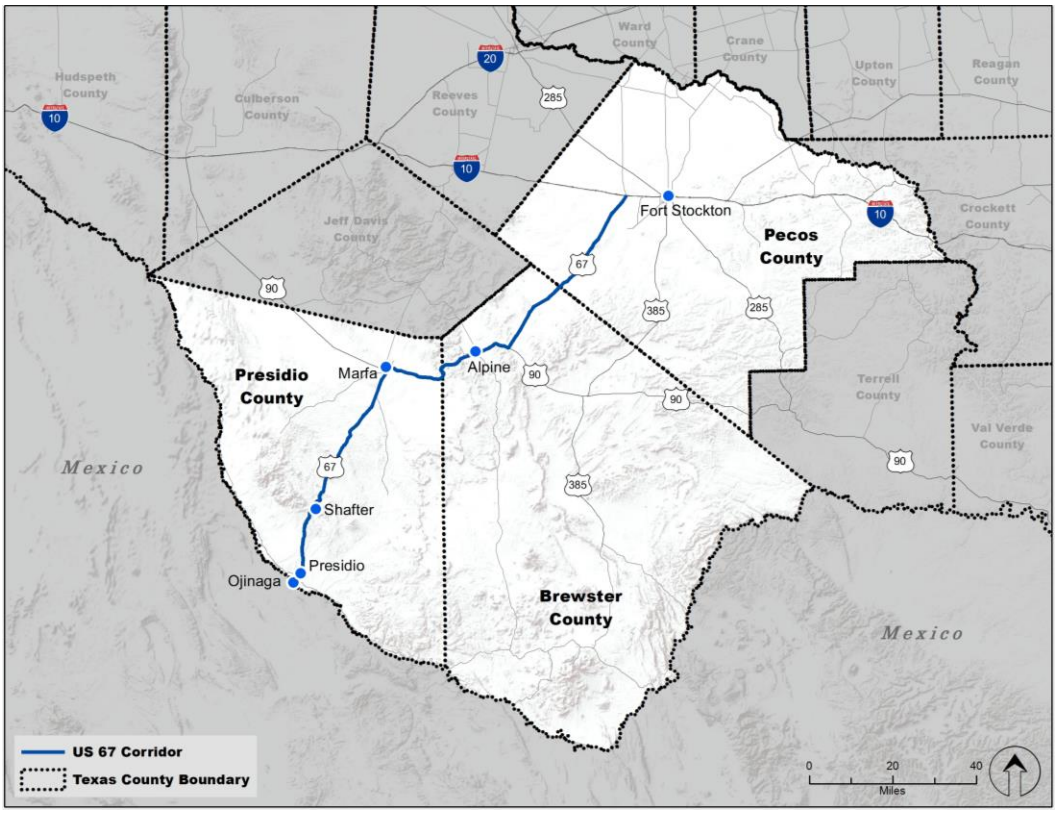


Figure 1: US 67 Corridor Master Plan Study Corridor

The remainder of this document is divided into the following nine sections:

- **Section 2 –** Corridor Segmentation
- **Section 3 –** Future Projects Affecting Corridor Forecasts
- **Section 4 –** Source of Traffic Counts
- **Section 5 –** Source of Traffic Forecasts
- **Section 6 –** Corridor Growth Trend Comparison
- **Section 7 –** Corridor Growth Trend Recommendations
- **Section 8 –** Growth Rate Sensitivity Analysis
- **Section 9 –** Project Forecast Methodology
- **Section 10 –** Summary

2.0 Corridor Segmentation

The US 67 corridor was split into seven segments encompassing the three communities (based on city limits) and major interchanges as listed below. These segments are presented graphically in **Figure 2**:

- Segment 1 Presidio: US 67 within Presidio city limits
- Segment 2 Presidio to Marfa: US 67 between Presidio city limits and Marfa city limits
- Segment 3 Marfa: US 67 within Marfa city limits
- Segment 4 Marfa to Alpine: US 67 between Marfa city limits and Alpine city limits
- Segment 5 Alpine: US 67 within Alpine city limits
- Segment 6 Alpine to US 90: US 67 between Alpine city limits and the US 90/US 67 interchange east of Alpine
- Segment 7 US 90 to I-10: US 67 from US 90/US 67 interchange east of Alpine to I-10

Among the seven segments, Segments 1, 3, and 5 are within the communities of Presidio, Marfa, and Alpine, respectively, while Segments 2, 4, 6, and 7 are rural segments outside of these communities.

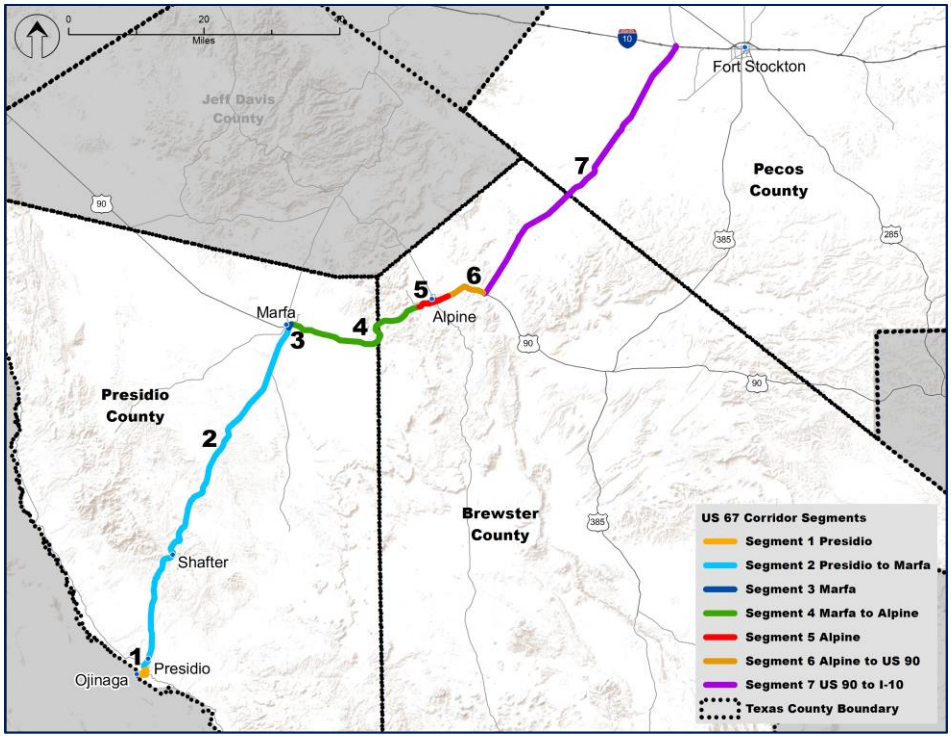


Figure 2: US 67 Corridor Segmentation

3.0 Future Projects Affecting Corridor Forecasts

The study team looked at future projects that may affect the US 67 corridor traffic through discussions with community leaders and stakeholder interviews. The only significant project with the potential to affect the corridor in the future is the expansion of the Presidio/Ojinaga POE. Currently, the POE has one 12-foot-wide lane in each direction and a 5-foot-wide sidewalk on each side. The Presidio/Ojinaga POE project will provide a second bridge structure for southbound traffic into Mexico. The new 26-foot-wide bridge would have two southbound lanes and a 10-foot pedestrian walkway. The current bridge would be restructured to accommodate only northbound traffic coming into the U.S. The expansion would improve mobility by preventing the disruption of southbound traffic when large cargo vehicles are crossing the bridge. The expansion of this POE could decrease bi-national congestion between the U.S. and Mexico by expediting the flow of trucks and passenger cars across the border.

However, through stakeholder interviews, it was found that additional POE infrastructure and operational improvements would be required to support significant truck traffic growth. For instance, many types of fresh produce require an onsite U.S. Department of Agriculture (USDA) inspector, cold storage facilities, and phytosanitary labs, none of which currently exist in Presidio. In addition, the POE is open to commercial traffic only during the daytime from Monday to Friday, which limits its commercial capacity. Therefore, the Presidio POE bridge expansion in and of itself may not be sufficient to support significant new truck traffic.

4.0 Source of Traffic Counts

Traffic count data were analyzed from two sources; a 2017 traffic count program conducted as part of the US 67 Corridor Master Plan study, reported in **Section 4.1**, and TxDOT historical counts from the Statewide Traffic Analysis and Reporting System (STARS II) website (https://txdot.ms2soft.com), reported in **Section 4.2**.

4.1 2017 Traffic Counts (Existing Conditions)

A comprehensive traffic data collection was conducted along the study corridor in October and November 2017. This count program included one hundred turning movement counts performed during the 2-hour morning and 2-hour evening peak periods at key intersections and at connecting roads, thirty-six 24-hour average daily traffic (ADT) counts, and eleven 24-hour classification counts. **Figure 3** shows daily volume and vehicle classification count locations where data was collected that are cited in this memorandum. A table of these locations which includes ADT, the design hourly volume (DHV), percent of trucks, the directional (D) factor, and the K-factor (the proportion of average daily traffic occurring in an hour) is included in **Attachment A**.

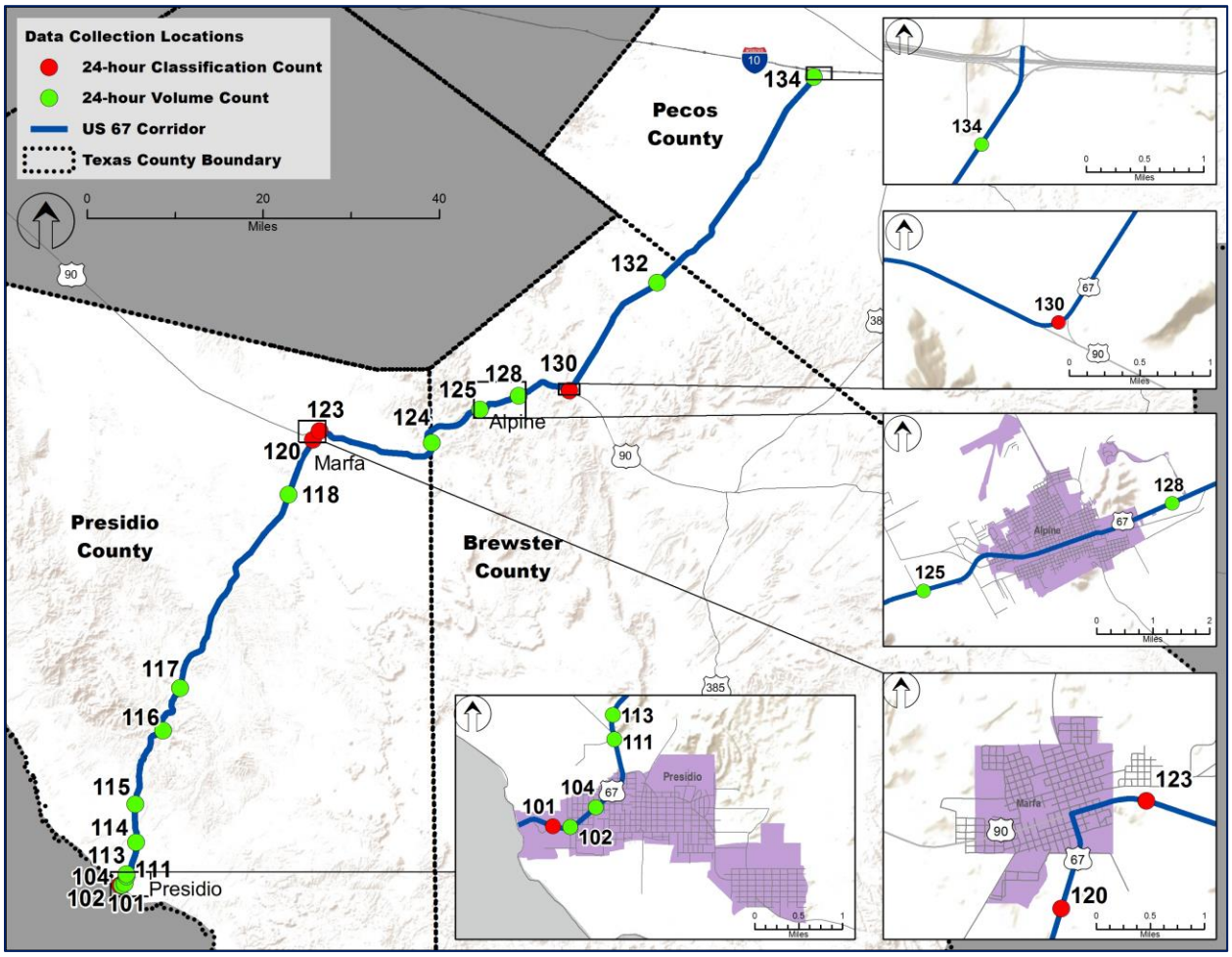


Figure 3: 2017 ADT and Classification Counts along the US 67 Corridor

4.2 TxDOT Historical AADT Counts

TxDOT STARS II annual historical traffic count data from 1996 to 2017 at 23 locations along the corridor, as seen in **Figure 4**, were compiled and analyzed to evaluate the long-term growth trends along the corridor. Permanent count station data could not solely be used for this purpose as there was only one such station, north of Presidio, within the entire study limits. Due to the long length of the corridor, traffic was analyzed by segments as shown in **Figure 2**. A table of these locations which includes annual average daily traffic (AADT) from 2010 to 2017, the DHV, percent of passenger cars and trucks, the D-factor, and the K-factor, for available years based on the STARS II website, is included in **Attachment A**.

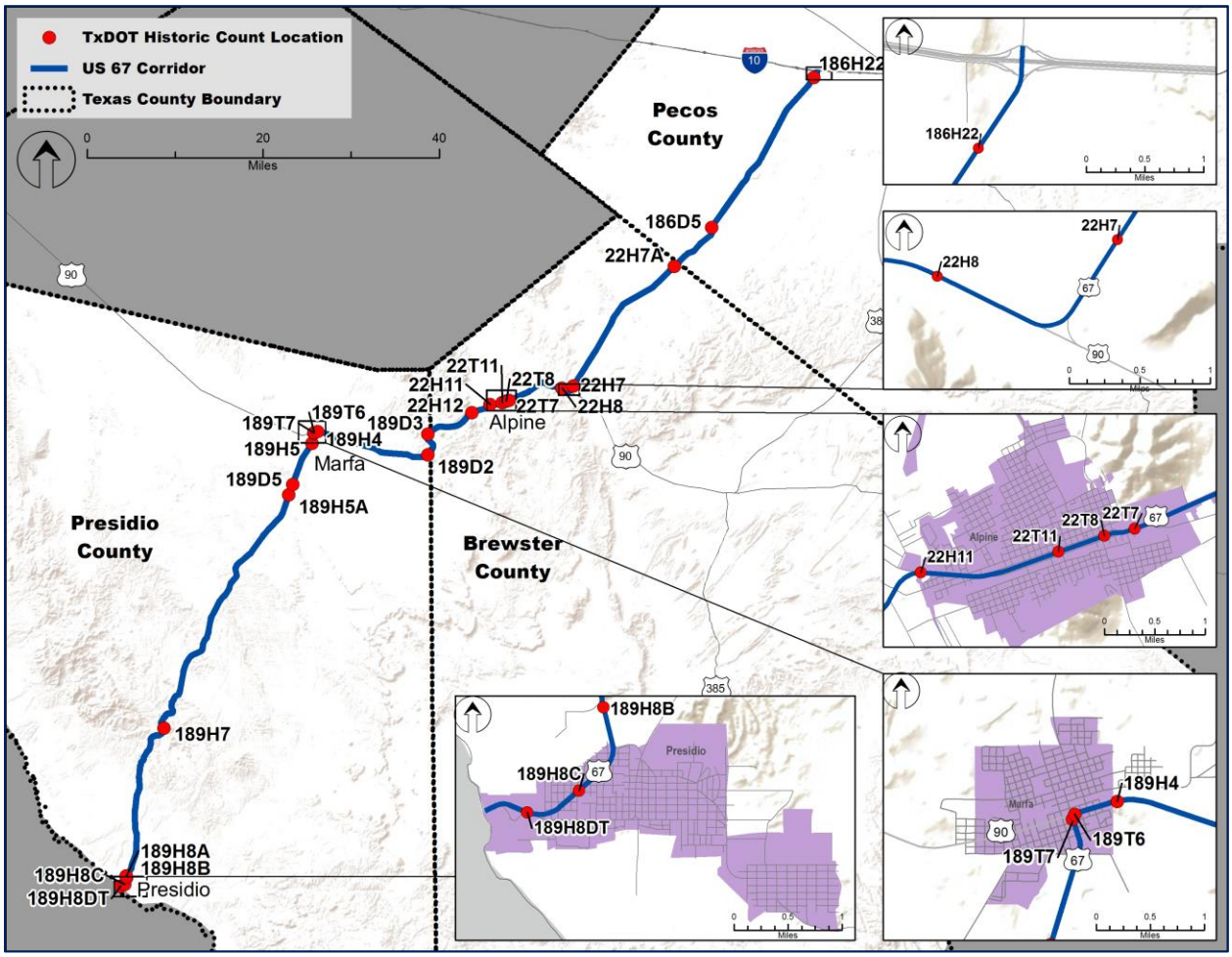


Figure 4: TxDOT STARS II Historical AADT Count Locations

Figure 5 shows TxDOT STARS II historical traffic growth trends for each segment. As shown in the figure, most of the locations show low to moderate traffic growth during the past 21 years, except for the locations in Alpine (Segment 5), which show negative to low growth trends.

Alpine has the highest population of the three cities along the US 67 study corridor and, therefore, tends to have higher traffic volumes than the rest of the corridor. Despite having the highest AADT along the corridor, the traffic counts within Alpine show the most volatility with the overall trend for the past 21 years, generally showing a slight decrease.

In addition, for all count locations, 2017 AADT either decreased from, or stayed the same as, the 2016 AADTs. For a few locations, the 2017 AADT was noted in the STARS II data as being "carried forward from the most recent of previous 3 years" meaning new count data was not collected in 2017.

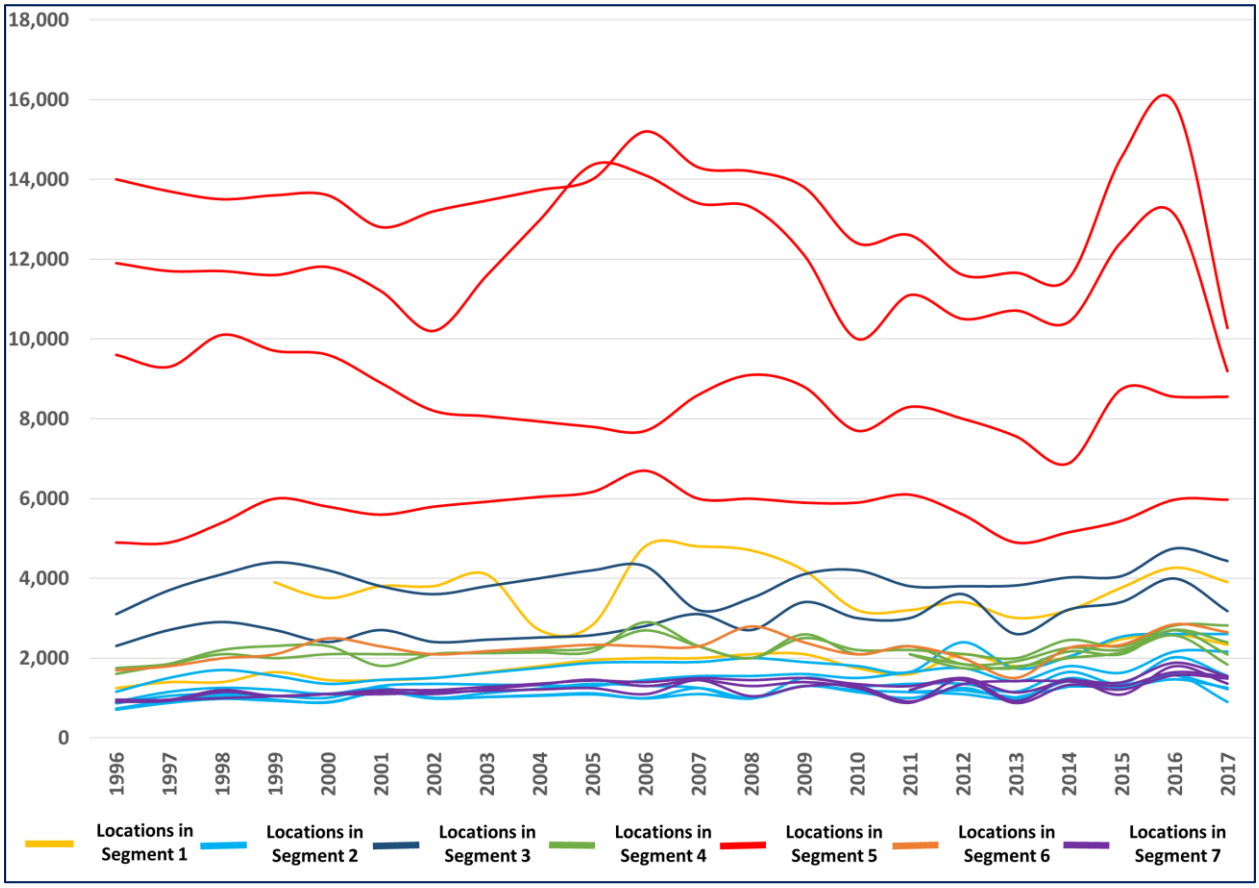


Figure 5: TxDOT Historical Traffic Growth Trends for the US 67 Corridor Segments

4.3 Comparison of TxDOT AADT and Data Collection Program Counts

Table 1 shows a comparison of the 2017 study counts taken as part of the data collection program for the US 67 Corridor Master Plan and 2017 TxDOT AADTs. Please note that only study counts along US 67 which had a nearby TxDOT AADT count location are included in the table. When comparing the 2017 study counts to the 2017 TxDOT AADT counts, most locations have similar volumes, except for study locations 116, 124, and 70/71 (the US 67 westbound and eastbound one-way streets in Alpine, respectively), which all have volume differences of over 1,000. Data for locations 30 and 70/71, which were turning movement count locations for which 24-hour data was received prior to conducting the entire US 67 data collection program, was used for comparative purposes in this table. As seen in **Figure 5**, all the 2017 TxDOT AADT counts decrease or are the same as the 2016 TxDOT AADT counts. When comparing the 2017 study counts to the 2016 TxDOT AADT counts, the ratio between the two is closer to 1.0 than the ratio between the 2017 study counts and the 2017 TxDOT AADT counts except for location 30 in Marfa. Due to the unexpected decrease in 2017 TxDOT AADT and the better comparison between the 2017 study counts and the 2016 TxDOT AADT, the 2017 TxDOT AADT counts were not taken into consideration for further analysis.

Table 1: Comparison of Existing 2017 Study Counts and TxDOT AADT Counts

Study Count Location ID	Location	TxDOT AADT Location ID	2017 Study Count	2017 TxDOT AADT	2016 TxDOT AADT	Ratio of 2017 TxDOT AADT to 2017 Study Count	Ratio of 2016 TxDOT AADT to 2017 Study Count
101	US 67 West of O'Reilly St.	189H8DT	4,200	3,900	4,300	0.93	1.02
104	US 67 between Harrington St. and Lafayette St.	189H8C	2,500	2,300	2,600	0.92	1.04
111	US 67 South of Utopia Rd.	189H8B	2,700	2,600	2,600	0.96	0.96
113	US 67 North of FM 170 Utopia Rd.	189H8A	2,200	2,200	2,200	1.00	1.00
116	US 67 South of Cibolo Creek Rd.	189H7	1,900	900	1,600	0.47	0.84
118	US 67 South of FM 169	189H5A	1,800	1,300	1,500	0.72	0.83
120	US 67 South of Madrid St.	189H5	2,100	1,600	2,000	0.76	0.95
30*	US 67 South of San Antonio St. (Intersection of US 67 and San Antonio St.)	189T7	3,400	3,200	4,000	0.94	1.18
30*	US 67 East of Highland Ave. (Intersection of US 67 and San Antonio St.)	189T6	4,500	4,400	4,700	0.98	1.04
123	US 67 East of Aparejo St.	189H4	2,500	2,800	2,800	1.12	1.12
124	US 67 South of Paisano Dr.	189D2	2,800	1,800	2,600	0.64	0.93
125	US 67 West of Driveway into U.S. Border Patrol Alpine Station	22H12	3,000	2,400	2,700	0.80	0.90
70/71*	US 67 West of 5th St. (Intersection of US 67 and 5th St.)	22T11	13,800	10,300	15,900	0.75	1.15
132	US 67 South of Hovey Rd.	22H7A	1,700	1,400	1,800	0.82	1.06
134	US 67 South of I-10	186H22	2,200	1,500	1,600	0.68	0.73

**These are turning movement count locations for which 24-hour data was received.*

Source: US 67 Corridor Master Plan Data Collection and TxDOT Statewide Traffic Analysis and Reporting System (STARS II)

5.0 Source of Traffic Forecasts

Traffic forecasts were evaluated from growth rates based on two sources, including historical TxDOT AADT data (**Section 5.1**) and the last two versions of the Statewide Analysis Model (SAM) (**Section 5.2**).

5.1 Growth Rates from Historical TxDOT Counts

An assessment of growth trends based on historical TxDOT counts was conducted as one measure of traffic growth. This evaluation was performed using TxDOT historical traffic count data between 1996 and 2016. **Figure 6** through **Figure 12** depict the historical growth trends for each of the seven segments along the US 67 corridor.

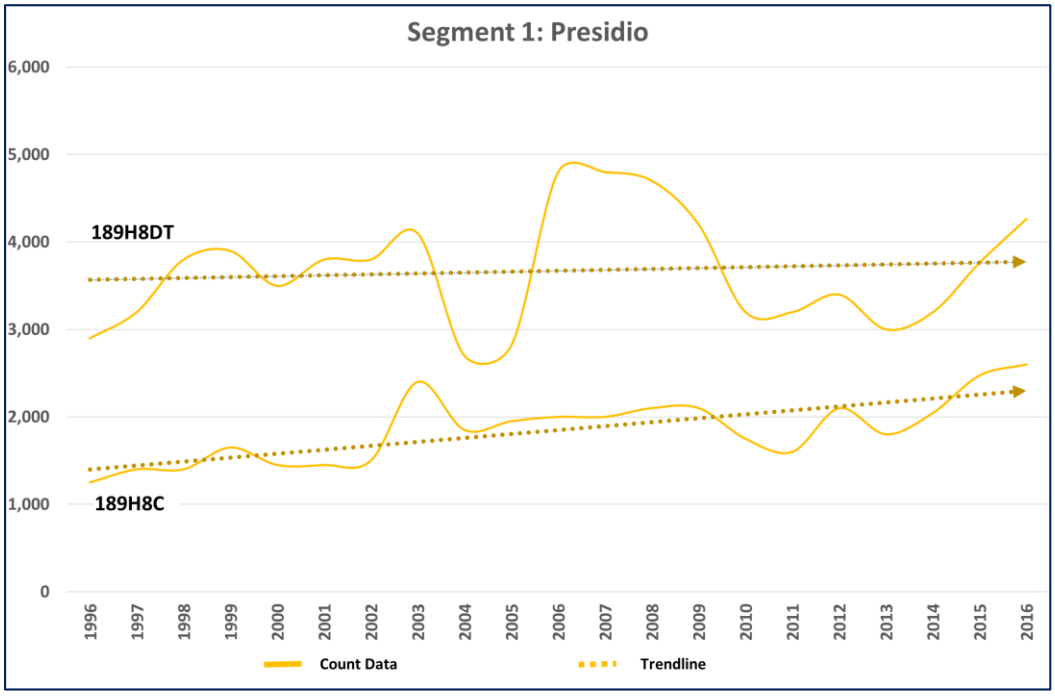


Figure 6: Growth Trends – Segment 1

Source: TxDOT Statewide Traffic Analysis and Reporting System (STARS II)

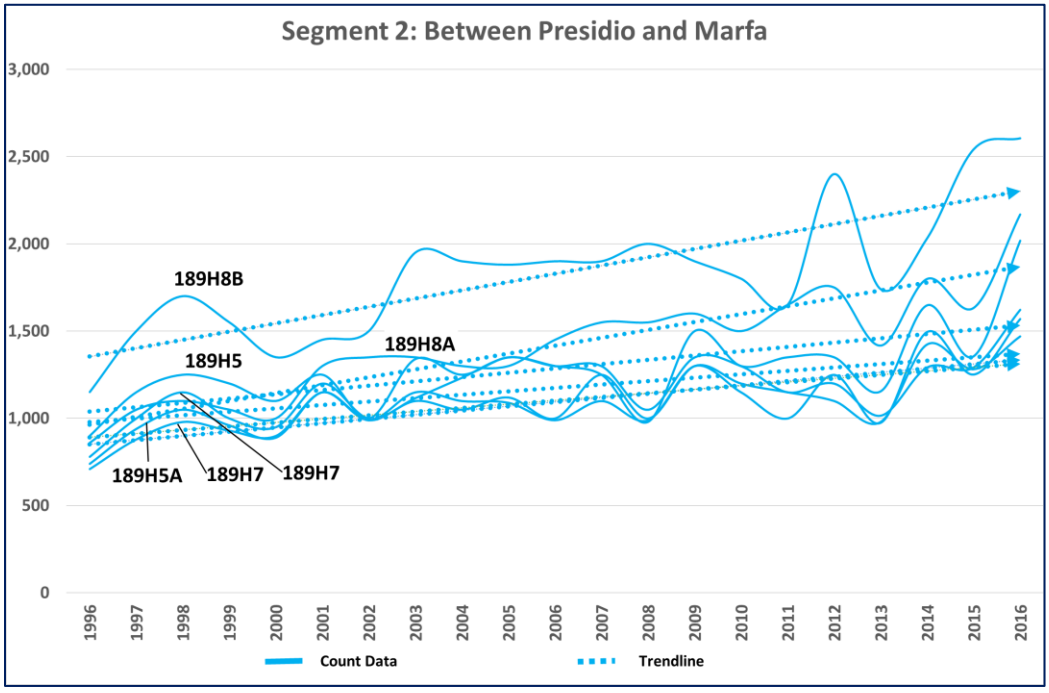


Figure 7: Growth Trends – Segment 2

Source: TxDOT Statewide Traffic Analysis and Reporting System (STARS II)

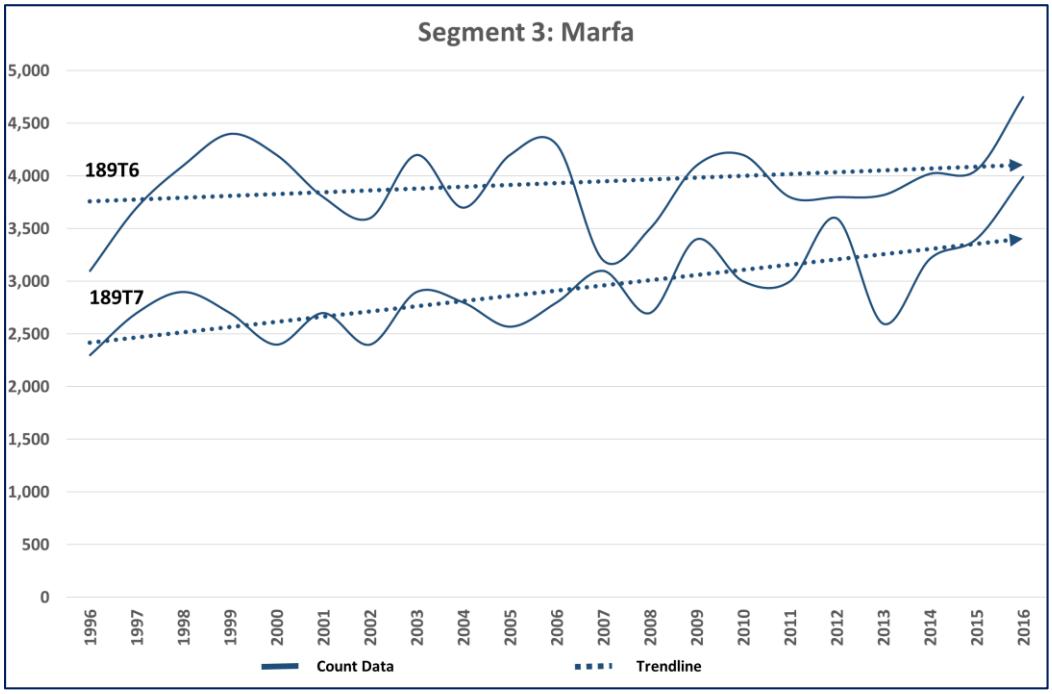


Figure 8: Growth Trends – Segment 3

Source: TxDOT Statewide Traffic Analysis and Reporting System (STARS II)

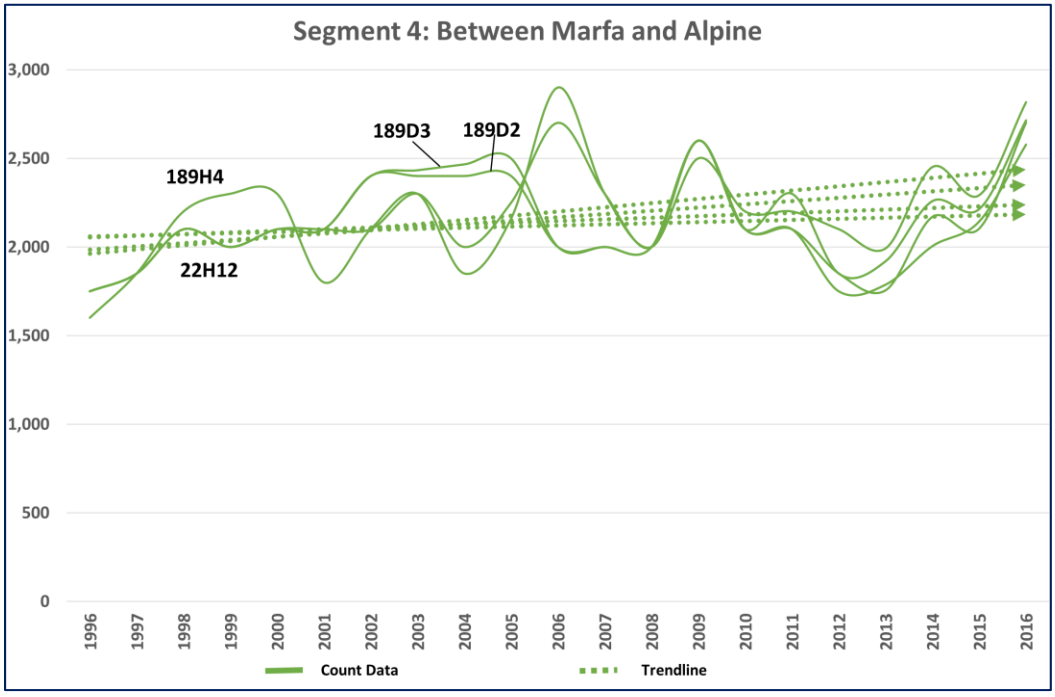


Figure 9: Growth Trends – Segment 4

Source: TxDOT Statewide Traffic Analysis and Reporting System (STARS II)

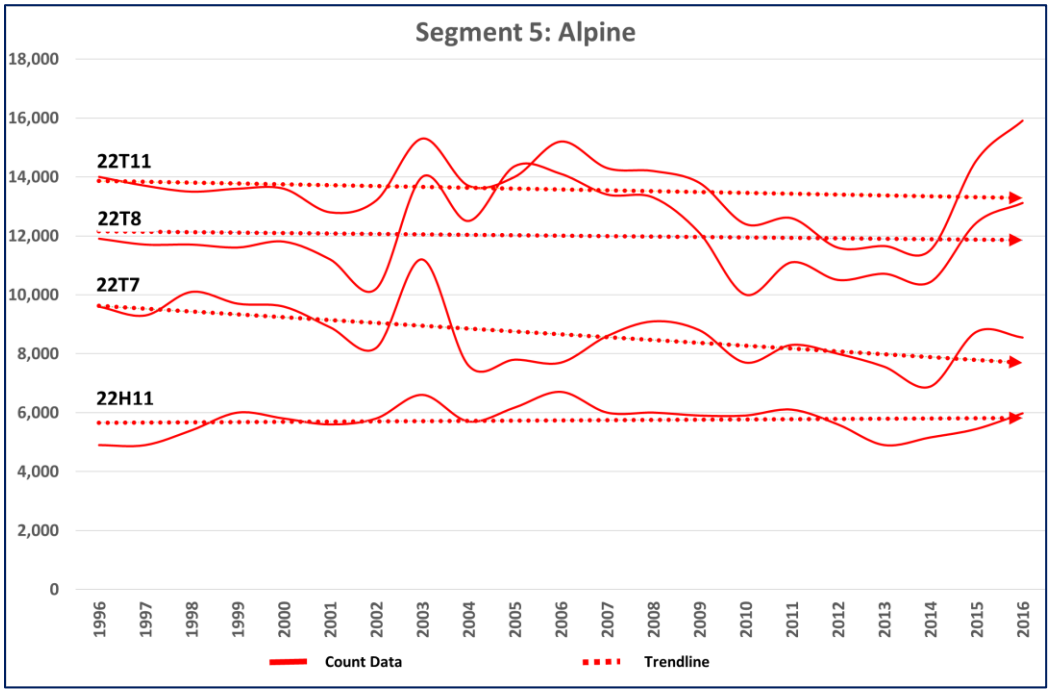


Figure 10: Growth Trends – Segment 5

Source: TxDOT Statewide Traffic Analysis and Reporting System (STARS II)

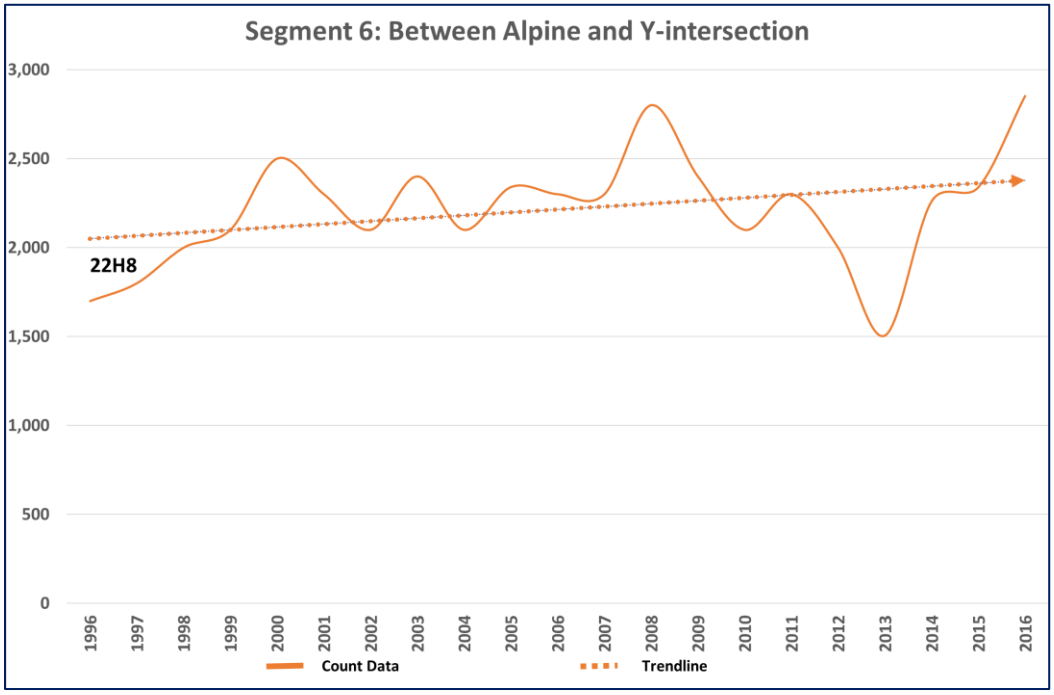


Figure 11: Growth Trends – Segment 6

Source: TxDOT Statewide Traffic Analysis and Reporting System (STARS II)

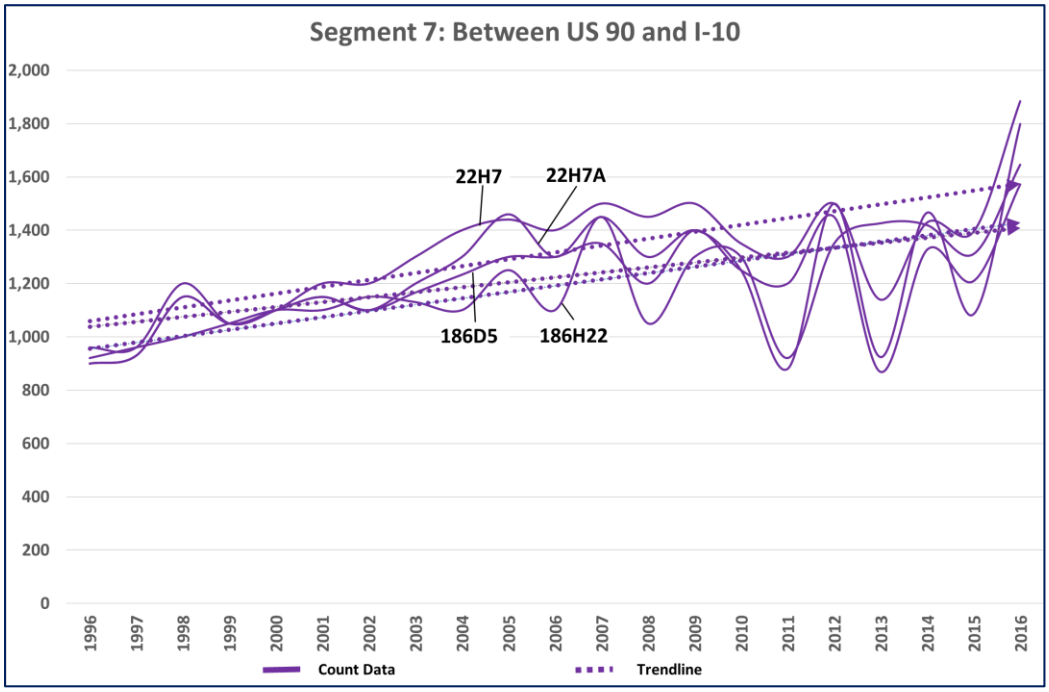


Figure 12: Growth Trends – Segment 7
Source: TxDOT Statewide Traffic Analysis and Reporting System (STARS II)

Table 2 shows the TxDOT AADT data for selected years as referenced, the comprehensive growth rate for each location, and the maximum and average growth rate by segment. **Growth rates were calculated using a linear regression analysis using the traffic data from all years between 1996 and 2016**, as is standard TxDOT Transportation Planning and Programming Division practice. This methodology attempts to model the relationship between two variables and assumes that a constant amount of growth will continue each year.

As shown in **Table 2**, among the segments within the three communities, the Presidio segment shows the highest historical growth rate of 2.0 percent per year. The Marfa segment shows a relatively lower maximum growth rate of 1.4 percent. Compared with the Presidio and Marfa segments, Alpine count locations mostly show decreasing traffic from 1996 to 2016, as depicted in **Figure 5**, except at one location where traffic shows a slight increase with a growth rate of 0.1 percent. For the four rural segments outside of the three communities, Segment 2 between Presidio and Marfa shows a maximum growth rate of 2.4 percent during the past 20 years. Segment 4 and Segment 6 carry traffic from both US 90 and US 67 and show similar growth rates, which are below 1.0 percent. Segment 7 shows a growth rate ranging between 1.2 and 1.7 percent during the past 20 years.

Table 2: TxDOT AADT Historical Count Summary

Location ID	Segment	1996 AADT	2006 AADT	2016 AADT	Linear Annual Growth Rate	Maximum Growth Rate for Each Segment	Average Growth Rate by Segment
189H8DT	1: Presidio	2,900	4,800	4,300	0.3%	2.0%	1.2%
189H8C	1: Presidio	1,250	2,000	2,600	2.0%		
189H8B	2: Between Presidio and Marfa	1,150	1,900	2,600	2.1%	2.4%	1.8%
189H8A	2: Between Presidio and Marfa	860	1,450	2,200	2.4%		
189H7	2: Between Presidio and Marfa	710	990	1,600	1.8%		
189H5A	2: Between Presidio and Marfa	740	1,000	1,500	1.6%		
189D5	2: Between Presidio and Marfa	780	1,300	1,600	1.4%		
189H5	2: Between Presidio and Marfa	900	1,300	2,000	1.6%		
189T7	3: Marfa	2,300	2,800	4,000	1.4%	1.4%	0.9%
189T6	3: Marfa	3,100	4,300	4,700	0.4%		
189H4	4: Between Marfa and Alpine	1,600	2,900	2,800	1.0%	1.0%	0.6%
189D2	4: Between Marfa and Alpine	1,750	2,000	2,600	0.3%		
189D3	4: Between Marfa and Alpine	1,750	2,000	2,700	0.4%		
22H12	4: Between Marfa and Alpine	1,750	2,700	2,700	0.8%		
22H11	5: Alpine	4,900	6,700	6,000	0.1%	0.1%	-0.4%
22T11	5: Alpine	14,000	15,200	15,900	-0.2%*		
22T8	5: Alpine	11,900	14,100	13,100	-0.1%*		
22T7	5: Alpine	9,600	7,700	8,600	-1.3%		
22H8	6: Between Alpine and Y-intersection	1,700	2,300	2,900	0.7%	0.7%	0.7%
22H7	7: Between US 90 and I-10	960	1,400	1,900	1.6%	1.7%	1.5%
22H7A	7: Between US 90 and I-10	900	1,300	1,800	1.3%		
186D5	7: Between US 90 and I-10	900	1,300	1,600	1.2%		
186H22	7: Between US 90 and I-10	920	1,100	1,600	1.7%		

Despite a higher AADT in 2016 than in 1996, the overall trend for this location from 1996 to 2016, as depicted in **Figure 5, is negative.*

Source: TxDOT Statewide Traffic Analysis and Reporting System (STARS II)

To make sure the transportation infrastructure can adequately accommodate future growth and meet future needs, it is important to identify the worst traffic conditions along US 67 by 2045. The Marfa and Alpine segments show slower growth in traffic during the past 20 years but based on recent trends, it is reasonable to expect growing tourist traffic in the two towns over the next 25 years. In addition to tourism, Presidio, Alpine, and Marfa are all mainly served by the US 67 corridor and it is reasonable that the three communities would experience a similar growth pattern. Therefore, like the Presidio segment with a growth rate of 2.0 percent, a growth rate of at least 2.0 percent per year is also recommended for the Marfa and Alpine segments for future traffic projections.

The four rural segments serve both tourist and freight traffic. With increasing tourism to major attractions near the US 67 corridor, traffic along these rural segments is also expected to grow during the next 25 years. As shown in **Table 2**, among the four rural segments, Segment 2 shows the highest growth rate of 2.4 percent during the past 20 years. To identify the worst conditions and plan for future needs, a growth rate of at least 2.0 percent per year is also recommended for all other rural segments.

In summary, for all segments, a growth rate of at least 2.0 percent per year is recommended for future traffic projections. This minimum growth rate is also consistent with the standard practice adopted by the Transportation Planning and Programming Division of TxDOT. Based on TxDOT Transportation Planning and Programming standard practice, a growth rate lower than 2.0 percent or higher than 5.0 percent is not recommended for traffic projections.

5.2 Growth Rates from Statewide Analysis Model

Other sources for growth rate estimates for the US 67 study corridor are the two Statewide Analysis Models (SAM) version 3 (v3) and version 4 (v4). For this analysis, the 2010, 2020, 2030, and 2040 model files from v3 and the 2015, 2025, 2035, and 2045 model files from v4 were obtained from TxDOT. The roadway network coverage area for the SAM is shown in **Figure 13**.

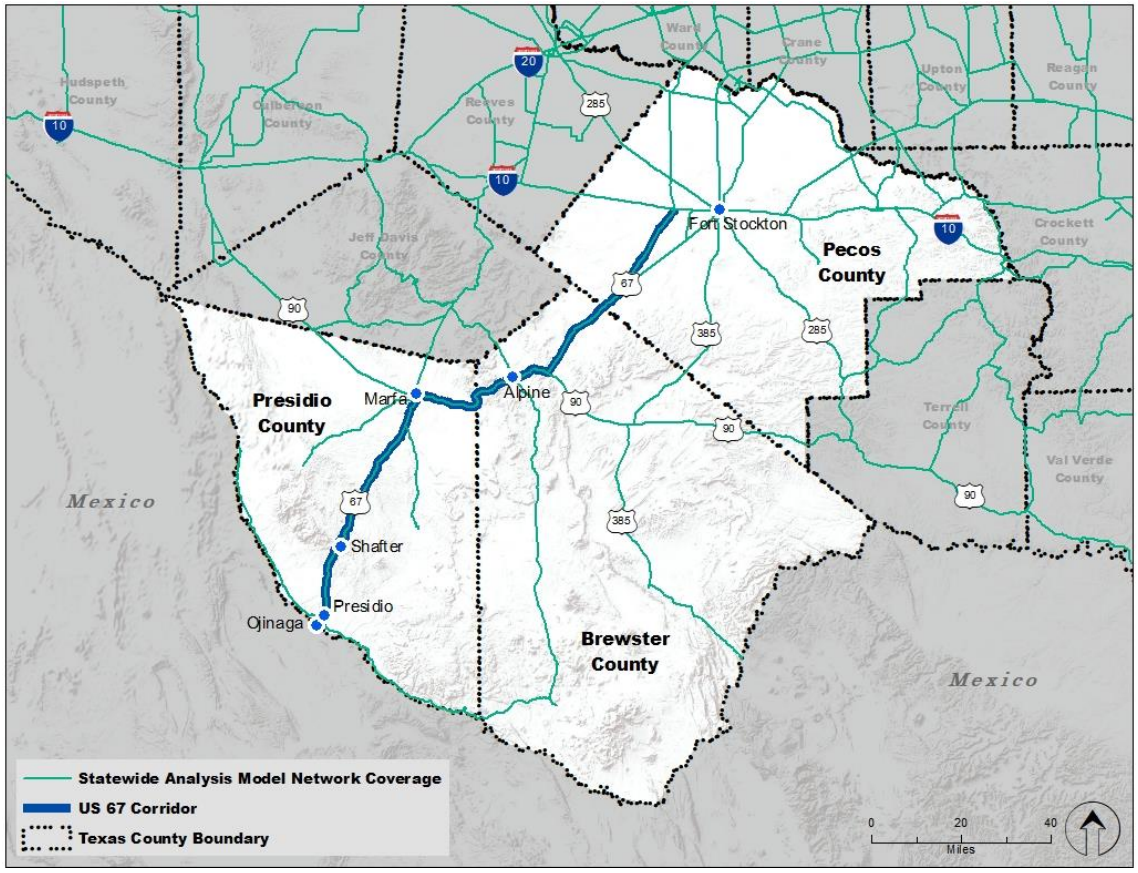


Figure 13: Statewide Analysis Network Model Coverage

In order to check the validation of the SAM and determine its suitability for use as a source for traffic forecasts for the study area, the 2010 SAM v3 and 2015 SAM v4 volumes were compared to the 2010 and 2015 AADT, respectively, based on the available TxDOT AADT data along the US 67 corridor as shown in **Table 3** and **Table 4**. For both SAM v3 and v4, the actual counts and estimated model volumes show significant variation at most locations. The closest ratio for SAM v3 is 0.86, while SAM v4 has three locations with a ratio of 0.93 or better. Based on this review and because of the mostly rural nature of the study area, the SAM does not appear to be well-calibrated for the US 67 corridor; therefore, any projections based on the model forecasts may not be reliable.

Table 3: 2010 TxDOT AADT vs. 2010 Statewide Analysis Model v3 Volumes

TxDOT Location ID	2010 TxDOT AADT	2010 SAM Volume	Ratio of 2010 SAM Volume to 2010 TxDOT AADT
189H8DT	3,200	5,080	1.59
189H8C	1,750	380	0.22
189H7	1,150	950	0.83
189H5A	1,200	690	0.58
189D5	1,300	690	0.53
189H5	1,300	690	0.53
189T7	3,000	690	0.23
189T6	4,200	3,620	0.86
189H4	2,200	3,620	1.65
189D2	2,100	3,620	1.72
189D3	2,100	3,620	1.72
22H12	2,100	3,620	1.72
22H11	5,900	3,620	0.61
22T11	12,400	3,620	0.29
22T8	10,000	1,330	0.13
22T7	7,700	4,350	0.56
22H8	2,100	4,350	2.07
22H7	1,350	3,680	2.73
22H7A	1,250	3,680	2.94
186D5	1,250	3,670	2.94
186H22	1,300	3,070	2.36

Source: TxDOT Statewide Traffic Analysis and Reporting System (STARS II) and TxDOT Statewide Analysis Model v3

Table 4: 2015 TxDOT AADT vs. 2015 Statewide Analysis Model v4 Volumes

TxDOT Location ID	2015 TxDOT AADT	2015 SAM Volume	Ratio of 2015 SAM Volume to 2015 TxDOT AADT
189H8DT	3,770	3,610	0.96
189H8C	2,470	3,610	1.46
189H8B	2,540	3,640	1.43
189H8A	1,630	3,640	2.23
189H7	1,250	400	0.32
189H5A	1,280	390	0.30
189D5	1,290	390	0.30
189H5	1,360	390	0.29
189T7	3,400	390	0.11
189T6	4,060	2,220	0.55
189H4	2,290	2,220	0.97
189D2	2,140	1,980	0.93
189D3	2,100	550	0.26
22H12	2,210	550	0.25
22H11	5,450	550	0.10
22T11	14,560	550	0.04
22T8	12,440	8,430	0.68
22T7	8,740	3,160	0.36
22H8	2,340	3,160	1.35
22H7	1,400	3,080	2.20
22H7A	1,090	3,080	2.83
186D5	1,210	3,080	2.55
186H22	1,310	3,010	2.30

Source: TxDOT Statewide Traffic Analysis and Reporting System (STARS II) and TxDOT Statewide Analysis Model v4

To perform a further review of the validation of the SAM, 2017 traffic volumes were linearly interpolated using the assigned volumes from the 2010 and 2020 SAM v3 models and the 2015 and 2025 SAM v4 models. The interpolated 2017 traffic volumes from the two versions of the SAM were then compared with the 2017 traffic counts collected along the US 67 corridor for this study as shown in **Table 5**. As shown in the table, the SAM v3 appears to under-assign traffic along the southern segments of the study corridor and over-assign traffic along the northern segments. SAM v4 appears to over-assign, under-assign, and then over-assign again moving south to north along the corridor.

Table 5: 2017 US 67 Study Counts vs. 2017 Statewide Analysis Model Interpolated Volumes – Daily Traffic

Study Count Location ID	Location	US 67 Study Data Collection Count	2017 SAM v3 Volume	Ratio of SAM v3 Volumes to US 67 Counts	2017 SAM v4 Volume	Ratio of SAM v4 Volumes to US 67 Counts
101	US 67 West of O'Reilly St.	4,200	5,450	1.30	3,660	0.87
102	US 67 between Puerto Rico St. and Howard St.	2,400	460	0.19	3,660	1.53
104	US 67 between Harrington St. and Lafayette St.	2,500	460	0.18	3,660	1.46
111	US 67 South of Utopia Rd.	2,700	410	0.15	3,690	1.37
113	US 67 North of FM 170/Utopia Rd.	2,200	410	0.19	3,690	1.68
114	US 67 South of Driveway into Presidio Lely International Airport	1,900	590	0.31	3,690	1.94
115	US 67 South of Garcia Rd.	1,900	590	0.31	3,690	1.94
116	US 67 South of Cibolo Creek Rd.	1,900	1,690	0.89	410	0.22
117	US 67 South of Driveway into Airstrip	1,900	1,690	0.89	410	0.22
118	US 67 South of FM 169	1,800	1,170	0.65	400	0.22
120	US 67 South of Madrid St.	2,100	1,170	0.56	400	0.19
123	US 67 East of Aparejo St.	2,500	5,080	2.03	2,260	0.90
124	US 67 South of Paisano Dr.	2,800	5,080	1.81	2,000	0.71
125	US 67 West of Driveway into US Border Patrol Alpine Station	3,000	5,080	1.69	560	0.19
128	US 67 West of Paso Del Norte Rd.	4,000	4,990	1.25	3,220	0.81
130	US 67 North of US 90 (Left Leg)	2,100	4,030	1.92	3,130	1.49
132	US 67 South of Hovey Rd.	1,700	4,030	2.37	3,130	1.84
134	US 67 South of I-10	2,200	3,350	1.52	3,050	1.39

Source: US 67 Corridor Master Plan Data Collection and TxDOT Statewide Analysis Model

To estimate the growth rates for each corridor segment based on SAM forecasts, model links from the SAM were combined based on the segments that were used for summarizing TxDOT counts, as shown in **Figure 2**. A weighted average of 2017 volume from both SAM v3 and v4 was calculated for each segment based on the length of each link within the segment. The same analysis was performed using the traffic volume forecasts from the 2040 (v3) and 2045 (v4) SAM models. Linear growth rates were calculated between the 2017 interpolated volumes and 2040/2045 forecasted volumes from the model, as shown in **Table 6** and **Table 7**. For SAM v3, the growth rates vary widely along the corridor with higher growth forecasted at the southern end of the US 67 corridor and lower growth along the northern end. This is partly due to the fact that the model validation was not consistent along the corridor, as previously mentioned. For SAM v4, the growth rates are more consistent and range between 0.3 and 1.1 percent.

Table 6: Growth Rates Based on 2017 Interpolated Volumes and 2040 Forecasted Volumes (SAM v3)

Segment	2017 Volume	2040 Volume	Annual Linear Growth Rate
1: Presidio	2,160	2,760	1.2%
2: Between Presidio and Marfa	1,350	4,200	9.2%
3: Marfa	2,050	5,930	8.2%
4: Between Marfa and Alpine	5,080	10,160	4.4%
5: Alpine	4,020	7,990	4.3%
6: Between Alpine and Y-intersection	4,990	6,660	1.5%
7: Between US 90 and I-10	3,780	4,540	0.9%

Source: TxDOT Statewide Analysis Model

Table 7: Growth Rates Based on 2017 Interpolated Volumes and 2045 Forecasted Volumes (SAM v4)

Segment	2017 Volume	2045 Volume	Annual Linear Growth Rate
1: Presidio	3,670	4,680	1.0%
2: Between Presidio and Marfa	1,050	1,310	0.9%
3: Marfa	820	1,000	0.8%
4: Between Marfa and Alpine	1,480	1,600	0.3%
5: Alpine	1,110	1,340	0.7%
6: Between Alpine and Y-intersection	3,220	4,220	1.1%
7: Between US 90 and I-10	3,110	4,060	1.1%

Source: TxDOT Statewide Analysis Model

6.0 Corridor Growth Trend Comparison

A comparison of the maximum annual growth rates based on TxDOT historical AADT data and the SAM data is presented in **Table 8**. Growth rates forecasted by SAM v3 vary between 0.9 percent and 9.2 percent along the corridor, while the historical AADT data from 1996 to 2016 shows more moderate annual growth rates ranging from 0.1 percent to 2.4 percent. Thus, the future growth rates based on the SAM v3 projections vary significantly from the historical growth patterns. For five of the seven segments, the forecasted growth rates are more than twice as high as the growth rates that have been experienced historically, while the two segments at the opposite ends of the corridor are projected to have significantly lower growth than historical trends.

SAM v4 shows more moderate growth when compared to the historical AADT growth rates. In contrast to SAM v3, SAM v4 has five out of seven segments with lower forecasted growth rates than those that have been observed historically and only range between 0.3 percent and 1.1 percent.

Table 8: Growth Rates Comparison

Segment	TxDOT Historical AADT Growth Rate	SAM v3 Estimated Future Growth Rate	SAM v4 Estimated Future Growth Rate
1: Presidio	2.0%	1.2%	1.0%
2: Between Presidio and Marfa	2.4%	9.2%	0.9%
3: Marfa	1.4%	8.2%	0.8%
4: Between Marfa and Alpine	1.0%	4.4%	0.3%
5: Alpine	0.1%	4.3%	0.7%
6: Between Alpine and Y-intersection	0.7%	1.5%	1.1%
7: Between US 90 and I-10	1.7%	0.9%	1.1%

Source: TxDOT Statewide Traffic Analysis and Reporting System (STARS II) and TxDOT Statewide Analysis Model

7.0 Corridor Growth Trend Recommendations

Data presented in **Table 8** provides an indication of potential traffic growth trends along the US 67 corridor. Due to high variability in the growth rates projected by the SAM v3, as well as inconsistencies in the 2010 (v3) and 2015 (v4) model volumes when compared to the TxDOT data, it is recommended that the growth rates from the historical TxDOT counts be used for developing future traffic forecasts for the US 67 corridor, rather than the growth rates calculated from the SAM.

As previously stated, a growth rate of at least 2.0 percent per year is recommended to identify the worst condition and prepare for future needs. Also, as mentioned earlier, it is typical Transportation Planning and Programming Division practice to not use growth rates lower than 2.0 percent or higher than 5.0 percent unless there are identified reasons to do so. Thus, a growth rate of 2.0 percent per year is recommended for the entire corridor to grow the existing traffic to year 2045.

8.0 Growth Rate Sensitivity Analysis

A traffic operations analysis was conducted employing Synchro, a macroscopic analysis and optimization software application, using the 2017 AM and PM peak period turning movement counts collected at key intersections along the US 67 study corridor, as seen in the straight-line diagrams in **Attachment B**. Currently, all of the intersections along US 67 are either two-way stop controlled or all-way stop controlled. When reporting the worst approach for each intersection using the *Highway Capacity Manual 6th Edition* guidelines, all intersections along the US 67 corridor have a level-of-service (LOS) of C or better under existing conditions.

To evaluate future conditions, the recommended annual growth rate of 2.0 percent was applied to the 2017 observed traffic volumes to generate "trend" 2045 volumes for both the AM and the PM peak period. Using this growth rate, a total of nine intersections went from LOS B or C to a failing LOS of E or F. These failing intersections are listed in **Table 9** and depicted in **Figure 14**. All these intersections are located within Alpine.

Table 9: Operations Analysis using Different Growth Rates

ID	Main Street	Cross street	2017				2045 with 2% Growth Rate				2045 with 4% Growth Rate			
			AM		PM		AM (E or F only)		PM (E or F only)		AM (E or F only)		PM (E or F only)	
			Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
30	US 67	S Highland Ave	9.8	A	10.8	B	-	-	-	-	69.1	F	147.3	F
43	US 67	FM 1703	11.7	B	13.0	B	-	-	-	-	-	-	73	F
46	US 67	Peach Street	12.9	B	13.7	B	-	-	-	-	-	-	61.8	F
47	US 67	Orange Street	13.5	B	14.9	B	-	-	-	-	-	-	60.8	F
48	US 67	Cherry Street	14.8	B	16.9	C			38.5	E	59.6	F	231.6	F
59	W Avenue E	11th Street	15.9	C	16.3	C	36.7	E	44.5	E	582.8	F	762.9	F
60	Holland Avenue	11th Street	15.6	C	16.5	C	42.9	E	54.8	F	439.2	F	506.1	F
61	W Avenue E	10th Street	14.1	B	12.9	B	-	-	-	-	39.7	E	-	-
64	W Avenue E	8th Street	14.0	B	14.4	B	-	-	-	-	41.8	E	52.0	F
66	W Avenue E	7th Street	14.5	B	15.3	C	-	-	-	-	72.7	F	204.6	F
67	Holland Avenue	7th Street	13.5	B	12.9	B	-	-	-	-	66.1	F	53.4	F
68	W Avenue E	6th Street	10.3	B	11.6	B	-	-	-	-	-	-	81.7	F
70	E Avenue E	5th Street	16.0	C	15.5	C	65.8	F	64.7	F	203.5	F	196.6	F
71	Holland Avenue	5th Street	16.2	C	14.9	B	65.9	F	57	F	191.7	F	175.4	F
72	E Avenue E	4th Street	16.0	C	13.9	B	-	-	-	-	91.9	F	38.9	E
73	Holland Avenue	4th Street	13.0	B	12.7	B	-	-	-	-	35.1	E	-	-
74	E Avenue E	3rd Street	13.6	B	13.5	B	-	-	-	-	47.3	E	37.3	E
76	E Avenue E	2nd Street	16.2	C	15.2	C	-	-	-	-	314.6	F	241.8	F
77	Holland Avenue	2nd Street	13.3	B	12.3	B	-	-	-	-	55.6	F	-	-
79	E Avenue E	Garnett Street	17.1	C	15.8	C	-	-	-	-	251.5	F	53.9	F
80	Holland Avenue	Garnett Street	13.7	B	14.0	B	-	-	-	-	98.7	F	63.0	F
81	E Avenue E	Phelps Street	14.6	B	13.7	B	-	-	-	-	147.4	F	86.9	F
82	Holland Avenue	Phelps Street	13.9	B	13.3	B	-	-	-	-	44.3	E	-	-
83	E Avenue E	Cockrell Street	18.2	C	22.1	C	97.7	F	268.5	F	712	F	1759.9	F
84	Holland Avenue	Cockrell Street	13.4	B	12.1	B	47.5	E	-	-	163.3	F	112.2	F

ID	Main Street	Cross street	2017				2045 with 2% Growth Rate				2045 with 4% Growth Rate			
			AM		PM		AM (E or F only)		PM (E or F only)		AM (E or F only)		PM (E or F only)	
			Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
85	E Avenue E	Walker Street	13.0	B	11.9	B	-	-	-	-	61.1	F	-	-
86	Holland Avenue	Walker Street	14.3	B	12.1	B	-	-	-	-	55.3	F	-	-
87	E Avenue E	Harrison Street	19.3	C	16.4	C	233.7	F	81.8	F	458.8	F	422	F
88	Holland Avenue	Harrison Street	19.4	C	16.9	C	112.3	F	64.6	F	1201.7	F	652.2	F

Source: US 67 Corridor Master Plan Data Collection

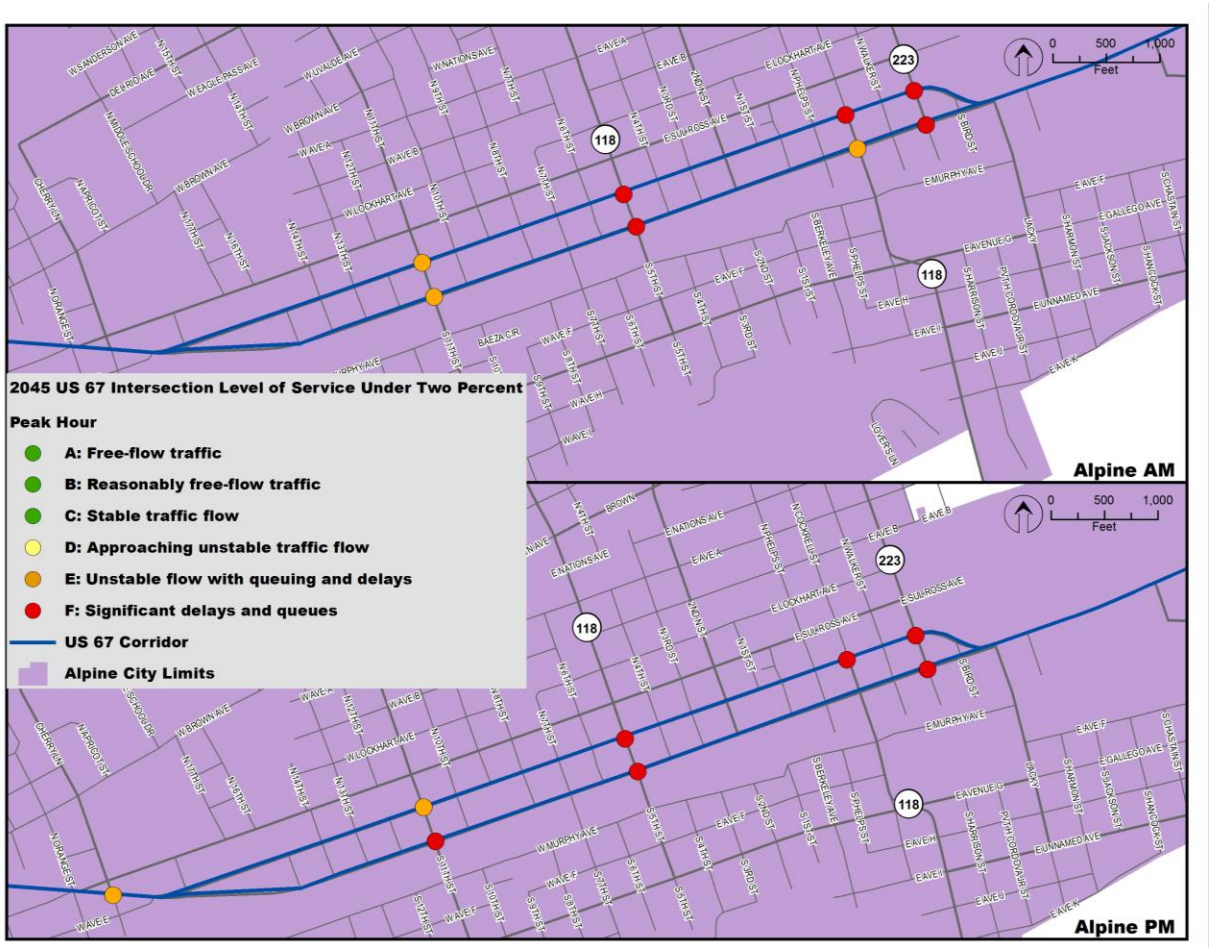


Figure 14: Operational Analysis Results for Year 2045 Based on Two Percent Growth Rate

Note: Only LOS E or F are shown on the map.

To further assess future traffic growth as a sensitivity test, a growth rate of 4.0 percent per year (twice the recommended annual growth rate), was applied to the 2017 observed traffic volumes to generate "worst case" traffic demand in 2045. Intersections that fail under this growth rate are also listed in **Table 9** and are depicted in **Figure 15**. A total of 29 intersections either during the AM or the PM period fail under these conditions. Again, these intersections are all located in Alpine except location 30 which is the intersection of Highland Avenue and San Antonio Street in Marfa where US 67 merges with US 90.

Figure 15: Operational Analysis Results for Year 2045 Based on Four Percent Growth Rate

Note: Only LOS E or F are shown on the map.

As seen in **Section 5** of this memorandum, the highest historical growth rate in Alpine is 0.1 percent. Alternatively, Presidio had the highest community annual growth rate of 2.0 percent and remains unaffected by a larger growth rate. Due to the large difference between the 0.1 percent historical growth rate in Alpine and the extreme 4.0 percent growth rate used in the sensitivity analysis, as well as the fact that the LOS in Presidio does not fail even at the higher rate, the assumption of a 2.0 percent per year traffic growth rate is still deemed reasonable for this corridor.

9.0 Final Study Traffic Forecasts

The traffic forecast methodology used for this study followed the procedure used by the Texas Planning and Programming Division of TxDOT which considers historical forecast trends. Baseline 2017 peak-hour traffic volumes, including turning movements (**Attachment B**), were developed using the data from the traffic count program, which included turning movement counts and vehicle classification counts as well as daily traffic counts throughout the corridor. Due to the long length of the corridor, the turning movement analysis was split by community (Presidio, Marfa, and Alpine).

The estimated No-Build 2045 peak-hour traffic volumes, including turning movements (**Attachment C**), were developed by using the 2.0 percent annual growth rate and applying it to the 2017 baseline peak-hour traffic volumes, which were then balanced. Two sets of traffic forecasts were developed for 2045 volumes along the US 67 study corridor by applying the 2.0 percent annual growth rate to the 2017 observed traffic volumes and classification counts from the US 67 Corridor Master Plan traffic count program and to the 2016 TxDOT AADT data directly as seen in **Table 10** and **Table 11**, respectively. It is important to note that there are some differences in volumes between the two sources due to the location of the counts. For instance, the volume in Alpine for the TxDOT AADT based counts are higher than that from the 2017 data collection program. This is because the TxDOT AADT counts are located closer to the center of Alpine whereas the data collection counts are located closer to the outer edges of town. Please see **Figure 3** and **Figure 4** for the location of traffic counts.

All traffic factors (as seen in **Attachment A**) were assumed to remain consistent through future years. This includes the K-factors used to calculate the 2045 DHV and the percentage of trucks. Build volumes were assumed to be the same as No-Build volumes considering that no new roadway expansion or travel pattern changes are anticipated relative to the No-Build but turning movements were reconfigured to match the recommended alternatives' intersection design. Most of the recommended alternatives did not require major intersection reconfiguration, except two locations in Alpine: US 67 at Orange Street and Sul Ross Avenue and US 67 at Harrison Street near Sul Ross University.

Table 10: Forecasted 2045 ADT Based on 2017 US 67 Corridor Master Plan Traffic Counts

Location ID of Volume and Class Counts	Location Description	Count Volume on Monday November 6, 2017	Segment	2045 ADT Projection	2045 DHV
101	US 67 West of O Reilly Street	4,200	1: Presidio	6,600	570
102	US 67 between Puerto Rico Street and Howard Street	2,400	1: Presidio	3,700	310
104	US 67 between Harrington Street and Lafayette Street	2,500	1: Presidio	3,900	330
111	US 67 South of Utopia Road	2,700	2: Between Presidio and Marfa	4,200	370
113	US 67 North of FM 170/Utopia Road	2,200	2: Between Presidio and Marfa	3,400	340
114	US 67 South of Driveway into Presidio Lely International Airport	1,900	2: Between Presidio and Marfa	3,000	280
115	US 67 South of Garcia Road	1,900	2: Between Presidio and Marfa	3,000	270
116	US 67 South of Cibolo Creek Road	1,900	2: Between Presidio and Marfa	3,000	300
117	US 67 South of Driveway into Airstrip	1,900	2: Between Presidio and Marfa	3,000	280
118	US 67 South of FM 169	1,800	2: Between Presidio and Marfa	2,800	280
120	US 67 South of Madrid Street	2,100	2: Between Presidio and Marfa	3,300	300
123	US 67 East of Aparejo Street	2,500	4: Between Marfa and Alpine	3,900	390
124	US 67 South of Paisano Drive	2,800	4: Between Marfa and Alpine	4,400	380
125	US 67 West of Driveway into US Border Patrol Alpine Station	3,000	4: Between Marfa and Alpine	4,700	390
128	US 67 West of Paso Del Norte Road	4,000	5: Alpine	6,200	530
130	US 67 North of US 90 (Left Leg)	2,100	6: Between Alpine and Y-intersection	3,300	310
132	US 67 South of Hovey Road	1,700	7: Between US 90 and I-10	2,700	250
134	US 67 South of I-10	2,200	7: Between US 90 and I-10	3,400	290

Source: US 67 Corridor Master Plan Data Collection

Table 11: Forecasted 2045 AADT Based on 2016 TxDOT AADT Counts

Location ID	Segment	2016 AADT	2045 AADT Projection	2045 DHV*
189H8DT	1: Presidio	4,300	6,800	480
189H8C	1: Presidio	2,600	4,100	370
189H8B	2: Between Presidio and Marfa	2,600	4,100	330
189H8A	2: Between Presidio and Marfa	2,200	3,500	250
189H7	2: Between Presidio and Marfa	1,600	2,500	200
189H5A	2: Between Presidio and Marfa	1,500	2,400	220
189D5	2: Between Presidio and Marfa	1,600	2,500	280
189H5	2: Between Presidio and Marfa	2,000	3,200	290
189T7	3: Marfa	4,000	6,300	570
189T6	3: Marfa	4,700	7,400	670
189H4	4: Between Marfa and Alpine	2,800	4,400	400
189D2	4: Between Marfa and Alpine	2,600	4,100	410
189D3	4: Between Marfa and Alpine	2,700	4,300	390
22H12	4: Between Marfa and Alpine	2,700	4,300	390
22H11	5: Alpine	6,000	9,500	860
22T11	5: Alpine	15,900	25,100	2,010
22T8	5: Alpine	13,100	20,700	1,660
22T7	5: Alpine	8,600	13,600	1,220
22H8	6: Between Alpine and Y-intersection	2,900	4,600	410
22H7	7: Between US 90 and I-10	1,900	3,000	300
22H7A	7: Between US 90 and I-10	1,800	2,800	280
186D5	7: Between US 90 and I-10	1,600	2,500	200
186H22	7: Between US 90 and I-10	1,600	2,500	300

**The 2016 K-factor was used to calculate DHV.*

Source: TxDOT Statewide Traffic Analysis and Reporting System (STARS II)

10.0 Summary

Several sources of current, historical, and forecast traffic volumes were analyzed to develop average annual growth rates for the US 67 corridor, including 2017 study counts and turning movements, TxDOT AADT data (STARS II), and the TxDOT SAM. Review of TxDOT AADT counts for 2017 showed that they were inconsistent with the trend, so the 2016 TxDOT AADT counts were used as the latest available data. Based on the analysis that conforms to the standard TxDOT Transportation Planning and Programming Division procedures, a minimum annual growth rate of 2.0 percent was adopted for the corridor. A sensitivity analysis using the 2.0 percent and a worst-case 4.0 percent growth rate showed that the adopted growth rate was reasonable.

The selected growth rate was applied to the 2017 study traffic counts collected along the corridor and to the 2016 TxDOT AADT counts, and the two forecasts showed similar projections of 2045 volumes. This demonstrated that the count data from the two sources was generally consistent. Therefore, the more detailed 2017 counts collected along the corridor can confidently be used to estimate the 2045 volumes for intersection turning movements.

Attachment A
Existing Traffic Data

A.1 TxDOT Counts

The TxDOT Statewide Traffic Analysis and Reporting System (STARS II) reports existing traffic data information for each station as shown in **Table A-1**. This data includes annual average daily traffic (AADT), design hourly volume (DHV), K-factor, D-factor, and percent of passenger vehicles (PA) and business/commercial vehicles (BC).

TxDOT describes these attributes as follows:

- AADT = Annual Average Daily Traffic
  - Calculation: AADT = VOL x SF x AF (if applicable)
    - VOL = 24-hour volume count
    - SF = applicable month/day combination seasonal factor
    - AF = applicable axle-correction factor
    - Note: Each count interval is multiplied by the SF (and AF if needed) for that day of the week and month of the year. A 24-hour count may have been taken over two different days and thus use two different sets of factors. The sum of the factored intervals equals the AADT.
- DHV-30: Design Hour Volume – For Permanent Stations, this is the 30th Highest Hour for the year. For non-Perm Stations, this is the highest hour. The accuracy of either of them are dependent on when and how much raw data was collected.
- K%: K-Factor – DHV as a percentage of the AADT
- D%: Directional Factor – Percentage of peak hour volume (24-hour peak) in the peak direction during that hour
- PA: Passenger vehicles (FHWA Class 1-3) shown as number of vehicles and percentage of AADT
- BC: Business/commercial vehicles (FHWA Class 4 and above) shown as number of vehicles and percentage of AADT

The 2016 K-factor for each station was used to estimate the 2045 design hourly volume.

Table A-1: TxDOT Station Data from the Statewide Traffic Analysis and Reporting System (2010 – 2017)

Location ID	Year	AADT	DHV-30	K%	D%	PA	BC
189H8DT	2017	3,905	324	8		3,686 (94%)	219 (6%)
	2016	4,265	305	7		4,116 (97%)	149 (3%)
	2015	3,766	312	8	53	3,306 (88%)	460 (12%)
	2014	3,198	339	10	53	3,140 (98%)	58 (2%)
	2013	3,002	292	10	53		
	2012	3,400	500	11	53	3,264 (96%)	136 (4%)
	2011	2,011	3200	269	11	51	1,506 (47%)
	2010	2,010	3200				
189H8C	2017	2,336	221	9		2,220 (95%)	116 (5%)
	2016	2,599	224	9		2,296 (88%)	303 (12%)
	2015	2,474	206	8	53	2,183 (88%)	291 (12%)
	2014	2,045	205	10	53	2,006 (98%)	38 (2%)
	2013	1,801	191	11	53		
	2012	2,100	309	11	53	2,012 (96%)	88 (4%)
	2011	2,011	1600	269	11	51	1,506 (94%)
	2010	2,010	1750				
189H8B	2017	2,605				2,483 (95%)	122 (5%)
	2016	2,605	198	8		2,301 (88%)	304 (12%)
	2015	2,542		10	53	2,244 (88%)	298 (12%)
	2014	2,032	226	10	53	1,996 (98%)	36 (2%)
	2013	1,740	174	10	53		
	2012	2,400	353	11	53	2,302 (96%)	98 (4%)
	2011	2,011	1650	160	11	51	900 (55%)
	2010	2,010	1800				
189H8A	2017	2,168				2,054 (95%)	114 (5%)
	2016	2,168	162	7		1,906 (88%)	262 (12%)
	2015	1,633	120	7	53	1,423 (87%)	210 (13%)
	2014	1,799	201	10	53	1,767 (98%)	32 (2%)
	2013	1,417	139	10	53		
	2012	1,750	274	11	53	1,675 (96%)	75 (4%)
	2011	2,011	1650				
	2010	2,010	1500				

Location ID	Year	AADT	DHV-30	K%	D%	PA	BC
2404 (Permanent Count Station)	2017	1,919	251	13	56	1,807 (94%)	111 (6%)
	2016	1,910	252	13	50	1,824 (95%)	85 (4%)
	2015	1,693	255	14	75	1,600 (95%)	92 (5%)
	2014	1,588	237	15	82	1,479 (93%)	109 (7%)
	2013	1,603	199	12	90	1,484 (93%)	119 (7%)
	2012	1,572					
	2011						
	2010						
189H7	2017	903	93	10		858 (95%)	45 (5%)
	2016	1,570	130	8		1,366 (87%)	204 (13%)
	2015	1,252	109	9	53	1,078 (86%)	174 (14%)
	2014	1,496	162	10	53	1,467 (98%)	28 (2%)
	2013	975	88	9	53		
	2012	1,250	184	11	53	1,193 (95%)	57 (5%)
	2011	2,011	1000	160	11	51	900 (90%)
	2010	2,010	1150				
189H5A	2017	1,258	109	9		1,188 (94%)	70 (6%)
	2016	1,470	126	9		1,275 (87%)	195 (13%)
	2015	1,282	113	9	53	1,105 (86%)	177 (14%)
	2014	1,424	140	10	53	1,398 (98%)	26 (2%)
	2013	980	96	10	53		
	2012	1,100	162	11	53	1,048 (95%)	52 (5%)
	2011	2,011	1150	215	11	51	1,226 (107%)
	2010	2,010	1200				
186D5	2017	1,488	155	10		1,258 (85%)	230 (15%)
	2016	1,572	180	11		1,337 (85%)	235 (15%)
	2015	1,210	112	9	57	1,103 (91%)	107 (9%)
	2014	1,327	135	10	57	1,149 (87%)	171 (13%)
	2013	869	90	10	65		
	2012						
	2011						
	2010						

Location ID	Year	AADT	DHV-30	K%	D%	PA	BC
189H5	2017	1,550	132	9		1,458 (94%)	92 (6%)
	2016	2,018	178	9		1,770 (88%)	248 (12%)
	2015	1,356	110	8	53	1,172 (86%)	184 (14%)
	2014	1,648	159	10	53	1,618 (98%)	30 (2%)
	2013	1,155	113	10	53		
	2012	1,350	198	11	53	1,288 (95%)	62 (5%)
	2011	2,011	1350	351	11	51	1,857 (138%)
	2010	2,010	1300				
189T7	2017	3,175	244	8		3,042 (96%)	133 (4%)
	2016	3,991	341	9		3,553 (89%)	438 (11%)
	2015	3,403	257	8	53	3,022 (89%)	381 (11%)
	2014	3,213	344	10	53	3,155 (98%)	58 (2%)
	2013	2,599	255	10	56		
	2012	3,600					
	2011	2,011	3000	335	11	51	1,768 (59%)
	2010	2,010	3000				
189T6	2017	4,434	374	8		4,008 (90%)	426 (10%)
	2016	4,749	415	9		4,353 (92%)	396 (8%)
	2015	4,057	339	8	53	3,714 (92%)	343 (8%)
	2014	4,021	387	10	53	3,285 (82%)	725 (18%)
	2013	3,819		11	53		
	2012	3,800	559	11	53	3,493 (92%)	307 (8%)
	2011	2,011	3800				
	2010	2,010	4200				
189H4	2017	2,817				2,521 (89%)	296 (11%)
	2016	2,817	262	9		2,563 (91%)	254 (9%)
	2015	2,292	225	10	53	2,075 (91%)	217 (9%)
	2014	2,451	232	10	53	2,002 (82%)	442 (18%)
	2013	1,992	197	10	53		
	2012	2,100	309	11	53	1,907 (91%)	193 (9%)
	2011	2,011	2200				
	2010	2,010	2200				

Location ID	Year	AADT	DHV-30	K%	D%	PA	BC
189D2	2017	1,839	178	10		1,623 (88%)	216 (12%)
	2016	2,577	249	10		2,342 (91%)	235 (9%)
	2015	2,144	217	10	53	1,939 (90%)	205 (10%)
	2014	2,005	195	10	53	1,639 (82%)	361 (18%)
	2013	1,788	189	11	53		
	2012						
	2011						
	2010						
189D3	2017	2,095	199	10	56	1,857 (89%)	238 (11%)
	2016	2,703	246	9	61	2,457 (91%)	246 (9%)
	2015	2,104	205	10	55	1,902 (90%)	202 (10%)
	2014	2,170	208	10	53	1,774 (82%)	391 (18%)
	2013	1,755	188	11	64		
	2012						
	2011						
	2010						
22H12	2017	2,397	226	9		2,136 (89%)	261 (11%)
	2016	2,714	254	9		2,467 (91%)	247 (9%)
	2015	2,214	215	10	53	2,002 (90%)	212 (10%)
	2014	2,259	233	10	53	1,846 (82%)	407 (18%)
	2013	1,920	195	10	53		
	2012	1,850	272	11	53	1,675 (91%)	175 (9%)
	2011	2,011	2300	367	11	51	1,946 (85%)
	2010	2,010	2100				
22H11	2017	5,975				5,425 (91%)	550 (9%)
	2016	5,975	559	9	53	5,492 (92%)	483 (8%)
	2015	5,446	506	9	54	5,001 (92%)	445 (8%)
	2014	5,160	529	10	53	4,219 (82%)	929 (18%)
	2013	4,902	515	11	54		
	2012	5,600	823	11	53	5,169 (92%)	431 (8%)
	2011	2,011	6100				
	2010	2,010	5900				

Location ID	Year	AADT	DHV-30	K%	D%	PA	BC
22T11	2017	10,272				8,661 (84%)	1,611 (16%)
	2016	15,907		8	52	14,447 (91%)	1,460 (9%)
	2015	14,559			53	13,496 (93%)	1,063 (7%)
	2014	11,518		10	53	9,660 (84%)	1,814 (16%)
	2013	11,658		11	53		
	2012	11,600	1705	11	53	10,765 (93%)	835 (7%)
	2011	2,011	12600				
	2010	2,010	12400				
22T8	2017	9,192				7,722 (84%)	1,470 (16%)
	2016	13,112		8	50	11,874 (91%)	1,238 (9%)
	2015	12,441			53	11,518 (93%)	923 (7%)
	2014	10,426		10	53	8,744 (84%)	1,642 (16%)
	2013	10,553		11	53		
	2012	10,500	1544	11	53	9,807 (93%)	693 (7%)
	2011	2,011	11100				
	2010	2,010	10000				
22T7	2017	8,552				7,166 (84%)	1,386 (16%)
	2016	8,552	740	9	59	7,678 (90%)	874 (10%)
	2015	8,744	850	10	51	8,064 (92%)	680 (8%)
	2014	6,888	749	10	53	5,777 (84%)	1,085 (16%)
	2013	7,563	790	10	59		
	2012	8,000	1176	11	53	7,440 (93%)	560 (7%)
	2011	2,011	8300	1325	11	51	7,412 (89%)
	2010	2,010	7700				
22H8	2017	2,654	297	11		2,040 (77%)	614 (23%)
	2016	2,852	257	9		2,429 (85%)	423 (15%)
	2015	2,339	208	9	53	2,078 (89%)	261 (11%)
	2014	2,260	211	10	53	1,895 (84%)	356 (16%)
	2013	1,506	137	9	53		
	2012	2,000	294	11	53	1,774 (89%)	226 (11%)
	2011	2,011	2300	344	19	74	1,074 (47%)
	2010	2,010	2100				

Location ID	Year	AADT	DHV-30	K%	D%	PA	BC
22H7	2017	1,547	146	9		1,314 (85%)	233 (15%)
	2016	1,884	183	10		1,626 (86%)	258 (14%)
	2015	1,395	120	9		1,280 (92%)	115 (8%)
	2014	1,429	130	9			
	2013	1,139	123	11	55		
	2012	1,500					
	2011	2,011	1300	344	19	74	1,074 (83%)
	2010	2,010	1350				
22H7A	2017	1,360	128	9		1,139 (84%)	221 (16%)
	2016	1,799	171	10		1,545 (86%)	254 (14%)
	2015	1,085	85	8	57	985 (91%)	100 (9%)
	2014	1,466	141	10	57	1,269 (87%)	189 (13%)
	2013	924	103	11	65		
	2012	1,500	334	16	87	1,353 (90%)	147 (10%)
	2011	2,011	880	232	19	74	690 (78%)
	2010	2,010	1250				
189D5	2017	1,228	110	9		1,161 (95%)	67 (5%)
	2016	1,623	134	8		1,414 (87%)	209 (13%)
	2015	1,293		10	53	1,115 (86%)	178 (14%)
	2014	1,293	130	10	53	1,269 (98%)	24 (2%)
	2013	1,016	95	9	53		
	2012						
	2011						
	2010						
186H22	2017	1,533	157	10		1,300 (85%)	233 (15%)
	2016	1,646	191	12		1,405 (85%)	241 (15%)
	2015	1,311	132	10	57	1,200 (92%)	111 (8%)
	2014	1,419	142	10	57	1,228 (87%)	183 (13%)
	2013	1,426	125	9	65		
	2012	1,350	301	16	87	1,211 (90%)	139 (10%)
	2011	2,011	920				
	2010	2,010	1300				

A.2 US 67 Corridor Master Plan Data Collection Program

As mentioned in **Section 4.1** of this memorandum, a comprehensive traffic count program was conducted along the US 67 study area in October and November of 2017. This count program included thirty-six 24-hour average daily traffic (ADT) counts and eleven 24-hour classification counts. Of the 36 ADT counts and 11 classification counts, 11 and 5, respectively, were located along US 67. The ADT, DHV, K factor, directional (D) factor, and the percent of passenger cars, medium trucks, and heavy trucks are included in **Table A-2** and **Table A-3** for these locations. The vehicle classifications are as follows:

- Passenger Cars (light vehicles): Motorcycles, cars, and large goods vehicles (LGV)
- Medium trucks (medium vehicles): Single-Unit trucks and buses
- Heavy Trucks: Articulated Trucks

Table A-2: Traffic Data from the US 67 Corridor Master Plan Data Collection Program – Sunday Counts

Location ID	Count Type	Location Description	Count Volume on Sunday November 5, 2017	DHV	K Factor	D Factor	Percent of Cars	Percent of Medium Trucks	Percent of Heavy Trucks
101	Classification	US 67 West of O'Reilly Street	4,100	290	7.1%	69%	99.8%	0.2%	0.0%
102	Volume	US 67 between Puerto Rico Street and Howard Street	2,700	200	7.4%	72%	-	-	-
104	Volume	US 67 between Harrington Street and Lafayette Street	3,000	230	7.7%	69%	-	-	-
111	Volume	US 67 South of Utopia Road	3,100	260	8.4%	73%	-	-	-
113	Volume	US 67 North of FM 170/Utopia Road	2,900	250	8.6%	75%	-	-	-
114	Volume	US 67 South of Driveway into Presidio Lely International Airport	2,700	220	8.1%	77%	-	-	-
115	Volume	US 67 South of Garcia Road	2,700	230	8.5%	77%	-	-	-
116	Volume	US 67 South of Cibolo Creek Road	2,700	230	8.5%	77%	-	-	-
117	Volume	US 67 South of Driveway into Airstrip	2,700	230	8.5%	76%	-	-	-
118	Volume	US 67 South of FM 169	2,700	220	8.1%	77%	-	-	-
120	Classification	US 67 South of Madrid Street	2,800	220	7.9%	75%	98.6%	1.1%	0.4%
123*	Classification	US 67 East of Aparejo Street	2,500	220	8.8%	61%	97.3%	1.7%	1.0%
124	Volume	US 67 South of Paisano Drive	3,000	250	8.3%	68%	-	-	-
125	Volume	US 67 West of Driveway into US Border Patrol Alpine Station	3,200	260	8.1%	68%	-	-	-
128	Volume	US 67 West of Paso Del Norte Road	4,900	470	9.6%	69%	-	-	-
130	Classification	US 67 North of US 90 (Left Leg)	3,600	340	9.4%	76%	96.3%	3.0%	0.7%
132	Volume	US 67 South of Hovey Road	3,000	290	9.7%	86%	-	-	-
134	Classification	US 67 South of I-10	3,600	360	10.0%	76%	96.0%	3.0%	0.9%

Location 123 was taken on Sunday, November 12, 2017.

Table A-3: Traffic Data from the US 67 Corridor Master Plan Data Collection Program – Monday Counts

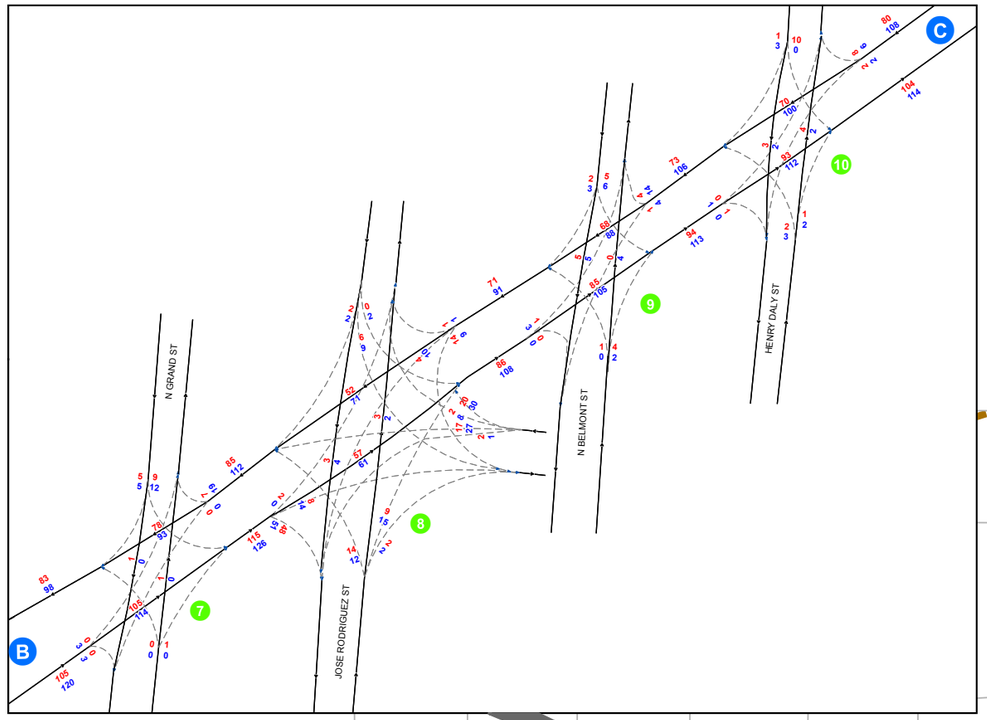
Location ID	Count Type	Location Description	Count Volume on Monday November 6, 2017	DHV	K Factor	D Factor	Percent of Cars	Percent of Medium Trucks	Percent of Heavy Trucks
101	Classification	US 67 West of O'Reilly Street	4,200	360	8.6%	58%	97.2%	0.9%	1.9%
102	Volume	US 67 between Puerto Rico Street and Howard Street	2,400	200	8.3%	63%	-	-	-
104	Volume	US 67 between Harrington Street and Lafayette Street	2,500	210	8.4%	60%	-	-	-
111	Volume	US 67 South of Utopia Road	2,700	240	8.9%	61%	-	-	-
113	Volume	US 67 North of FM 170/Utopia Road	2,200	220	10.0%	63%	-	-	-
114	Volume	US 67 South of Driveway into Presidio Lely International Airport	1,900	180	9.5%	66%	-	-	-
115	Volume	US 67 South of Garcia Road	1,900	170	8.9%	66%	-	-	-
116	Volume	US 67 South of Cibolo Creek Road	1,900	190	10.0%	66%	-	-	-
117	Volume	US 67 South of Driveway into Airstrip	1,900	180	9.5%	66%	-	-	-
118	Volume	US 67 South of FM 169	1,800	180	10.0%	67%	-	-	-
120	Classification	US 67 South of Madrid Street	2,100	190	9.0%	65%	93.8%	3.1%	3.1%
123*	Classification	US 67 East of Aparejo Street	2,500	250	10.0%	53%	92.6%	4.1%	3.2%
124	Volume	US 67 South of Paisano Drive	2,800	240	8.6%	60%	-	-	-
125	Volume	US 67 West of Driveway into US Border Patrol Alpine Station	3,000	250	8.3%	59%	-	-	-
128	Volume	US 67 West of Paso Del Norte Road	4,000	340	8.5%	56%	-	-	-
130	Classification	US 67 North of US 90 (Left Leg)	2,100	200	9.5%	61%	91.6%	3.6%	4.8%
132	Volume	US 67 South of Hovey Road	1,700	160	9.4%	72%	-	-	-
134	Classification	US 67 South of I-10	2,200	190	8.6%	62%	91.9%	2.9%	5.2%

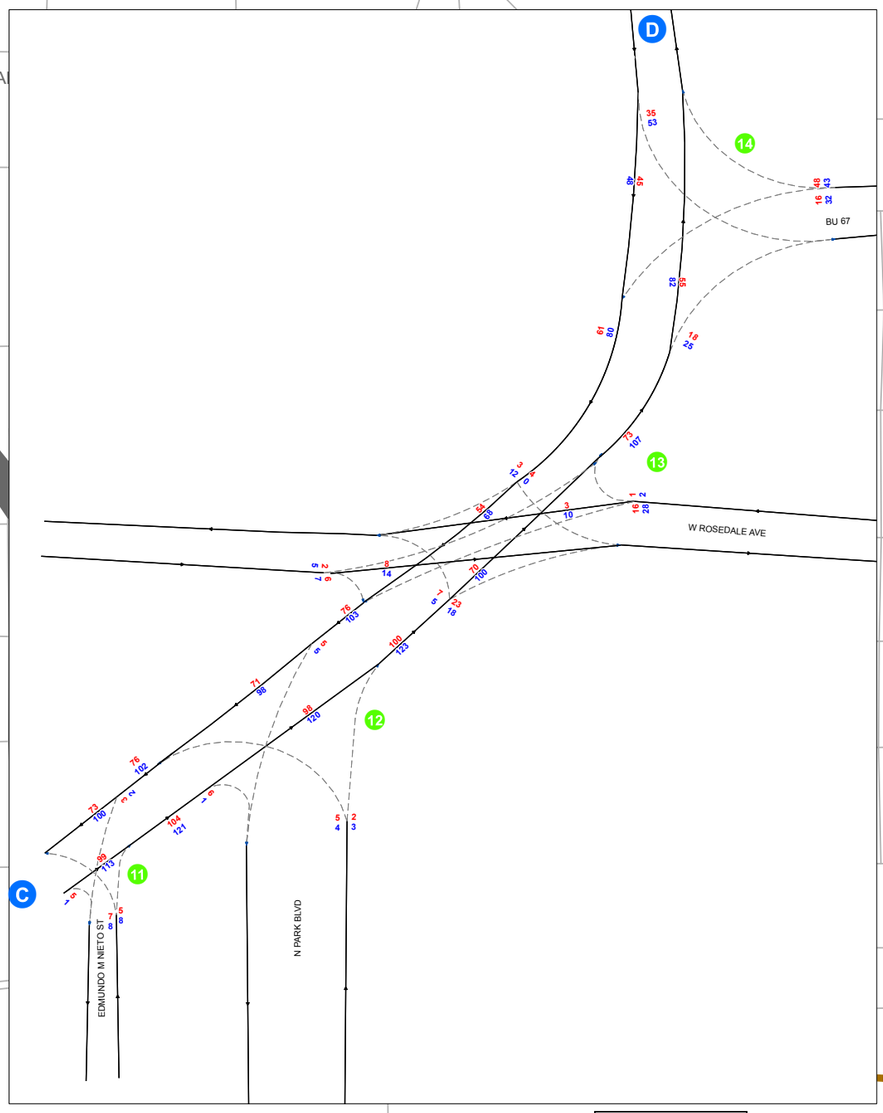
**Location 123 was taken on Monday, November 13, 2017.*

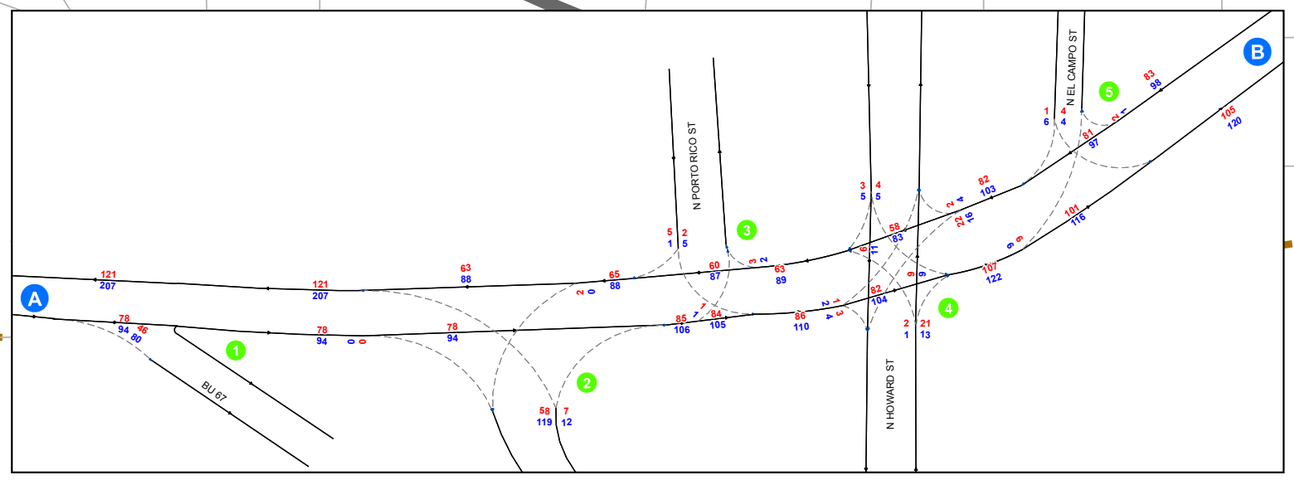
Texas Department of Transportation

February 2020

Attachment B
2017 Straight Line Diagrams



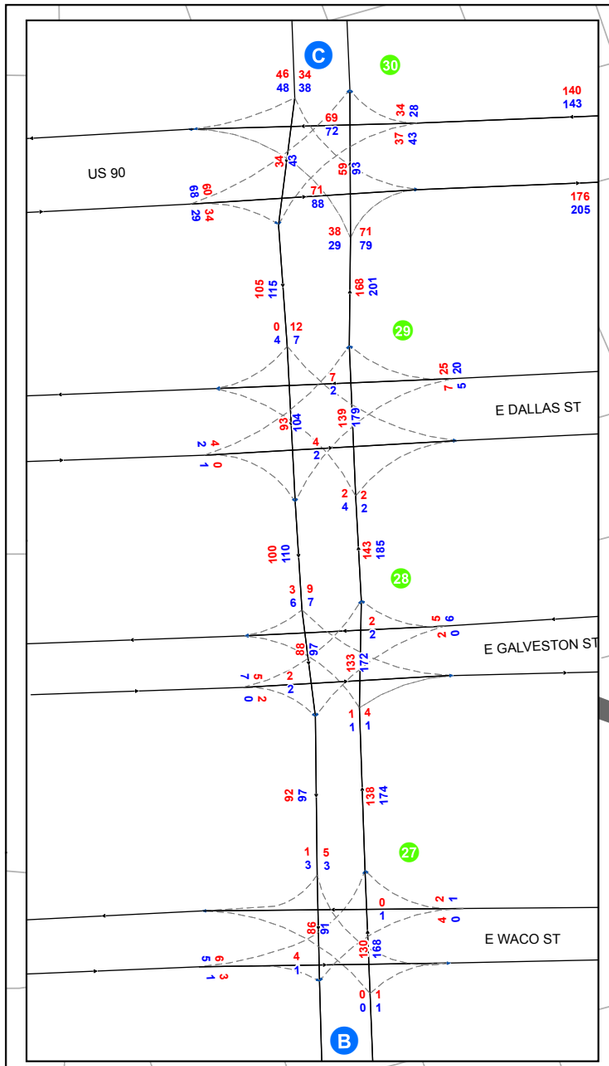




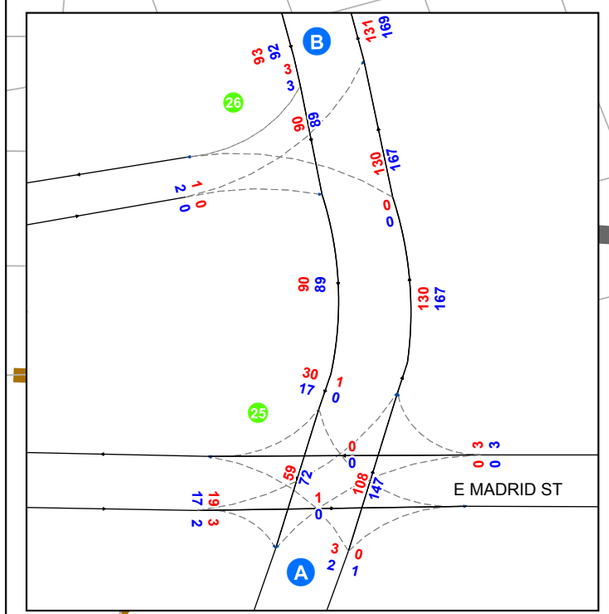
LEGEND

- 0000 AM Peak Hour Traffic Volumes
- 0000 PM Peak Hour Traffic Volumes
- 00 Traffic Count Locations
- X Traffic Count Location Borders
- US 67
- City Boundary

0 250 500 Feet


US 90
E DALLAS ST
E GALVESTON ST
E WACO ST


S DEANT ST
S RUSSELL ST
S NEVILL ST
S SPRING ST


E MADRID ST

Marfa
S DEAN ST
S RUSSELL ST
S NEVILL ST
S SPRING ST
W DALLAS ST
W GALVESTON ST
W WACO ST
LEGEND
0000 AM Peak Hour Traffic Volumes
0000 PM Peak Hour Traffic Volumes
00 Traffic Count Locations
Traffic Count Location Borders
US 67
0
250
500
Feet

LEGEND

- 0000 AM Peak Hour Traffic Volumes
- 0000 PM Peak Hour Traffic Volumes
- 00 Traffic Count Locations
- Traffic Count Location Borders
- US 67

FM 1703

N MOSLEY LN

N JOE BAILEY ST

N PLUM ST

N PEACH ST

N ORANGE ST

CHERRY ST

N APPLE ST

Alpine

0 250 500 Feet

LEGEND

- 0000 AM Peak Hour Traffic Volumes
- 0000 PM Peak Hour Traffic Volumes
- Traffic Count Locations
- Traffic Count Location Borders
- US 67

N 15TH ST
N 14TH ST
N 13TH ST
N 12TH ST
N 11TH ST
N 10TH ST
N 9TH ST
N 8TH ST
N 7TH ST
N 6TH ST
N 5TH ST
N 4TH ST
N 3RD ST
N 2ND ST
N 1ST ST
N GARNETT ST
N PHELAS ST
N COCKRELL ST
N WALKER ST
N HARRISON ST
S BIRD ST
S LACKEY ST
BIRD ST
N HARMON ST

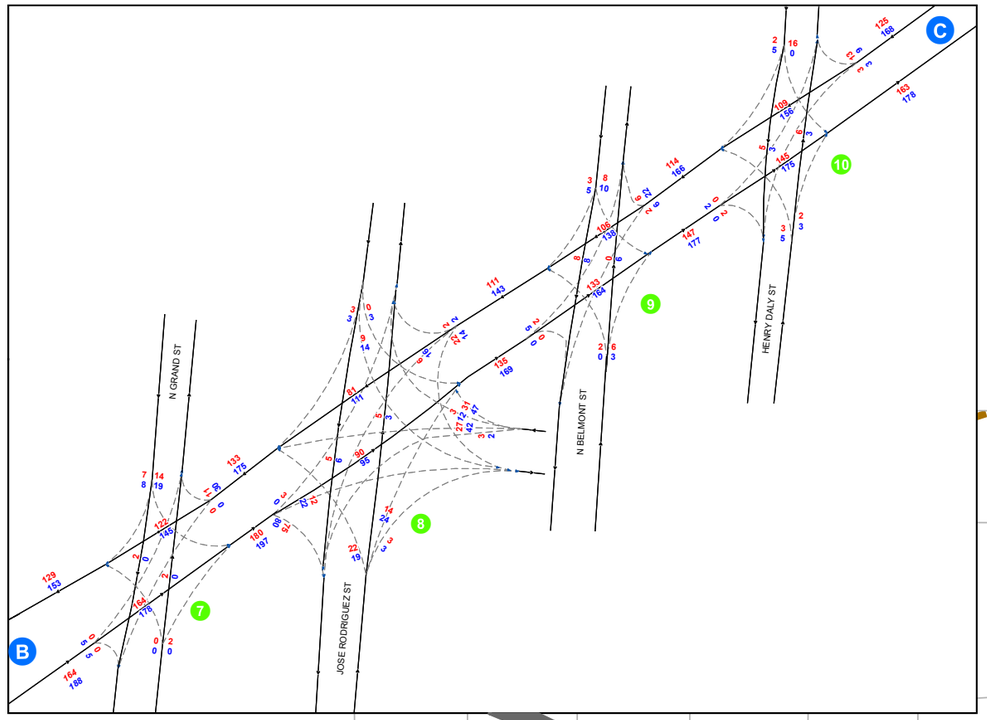
Alpine

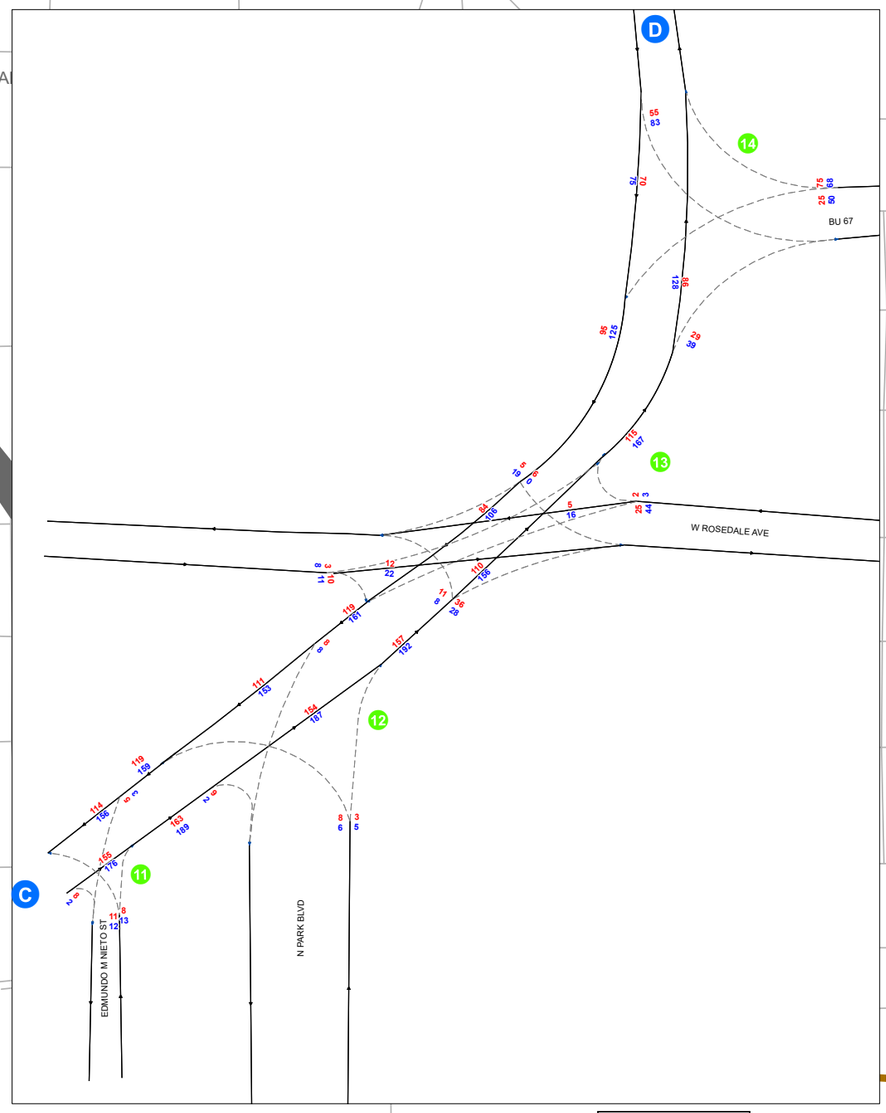
0 250 500 Feet

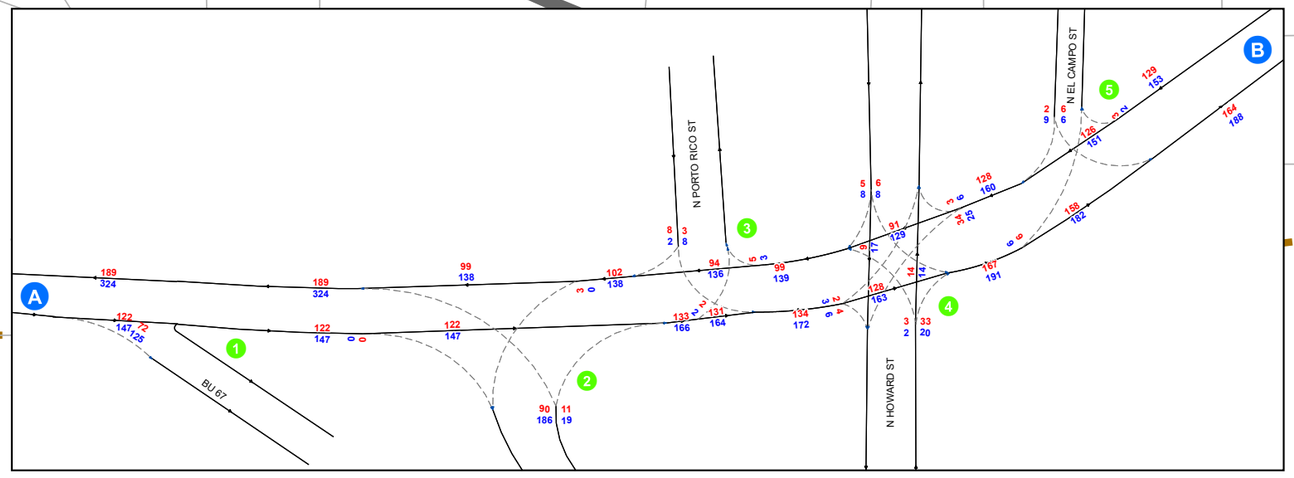
Texas Department of Transportation

February 2020

Attachment C
2045 Straight Line Diagrams







LEGEND

- 0000 AM Peak Hour Traffic Volumes
- 0000 PM Peak Hour Traffic Volumes
- Traffic Count Locations
- Traffic Count Location Borders
- US 67
- City Boundary

0 250 500 Feet

Marfa
No Build

US 90
E DALLAS ST
E GALVESTON ST
E WACO ST
E MADRID ST
S DEANT ST
S RUSSELL ST
S NEVILL ST
S SPRING ST
W DALLAS ST
W GALVESTON ST
W WACO ST

LEGEND

- 0000 AM Peak Hour Traffic Volumes
- 0000 PM Peak Hour Traffic Volumes
- 00 Traffic Count Locations
- X Traffic Count Location Borders
- US 67

0 250 500 Feet

LEGEND

- 0000 AM Peak Hour Traffic Volumes
- 0000 PM Peak Hour Traffic Volumes
- 00 Traffic Count Locations
- Traffic Count Location Borders
- US 67

FM 1703

N MOSLEY LN

N JOE BAILEY ST

N PLUM ST

N PEACH ST

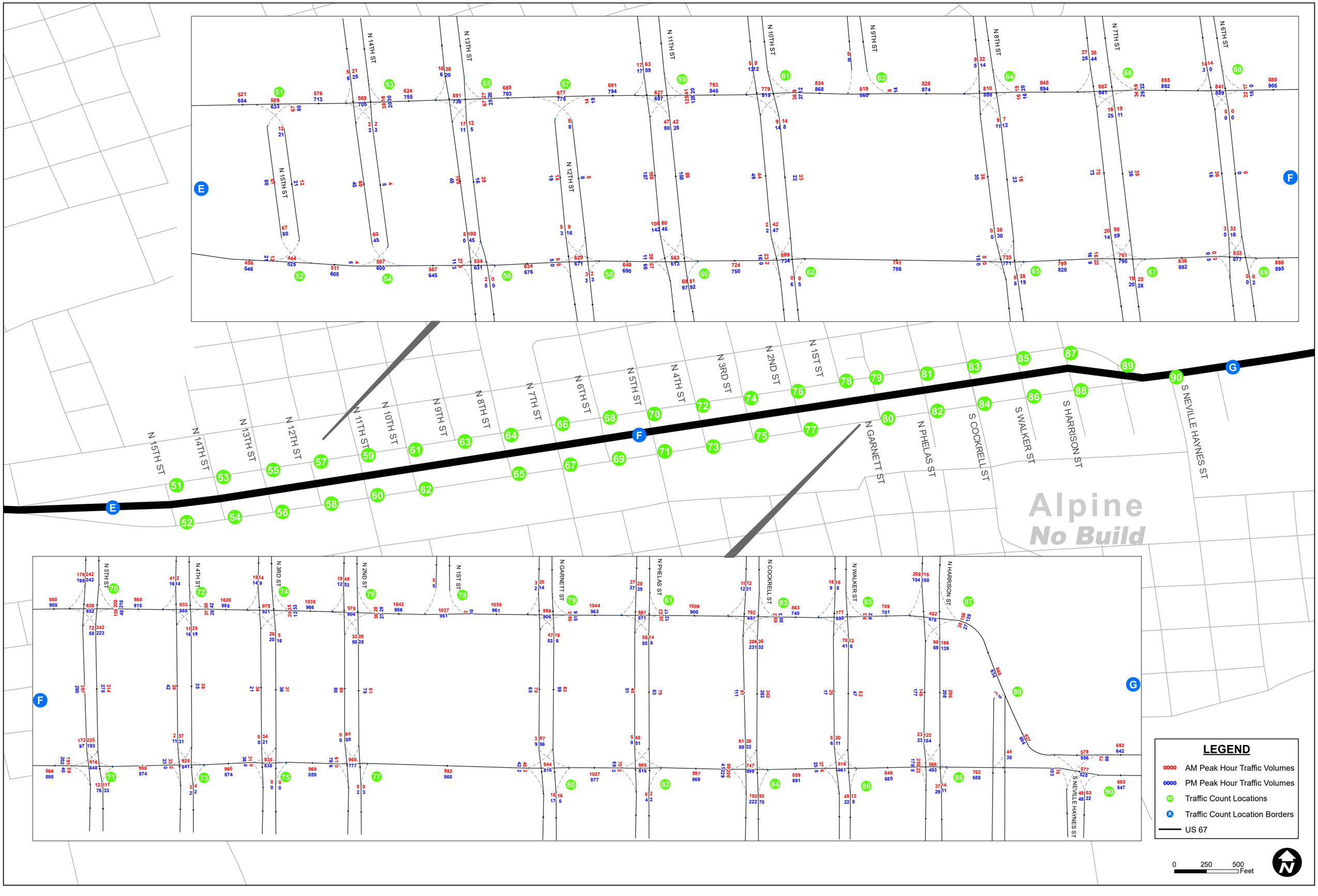
N ORAANGE ST

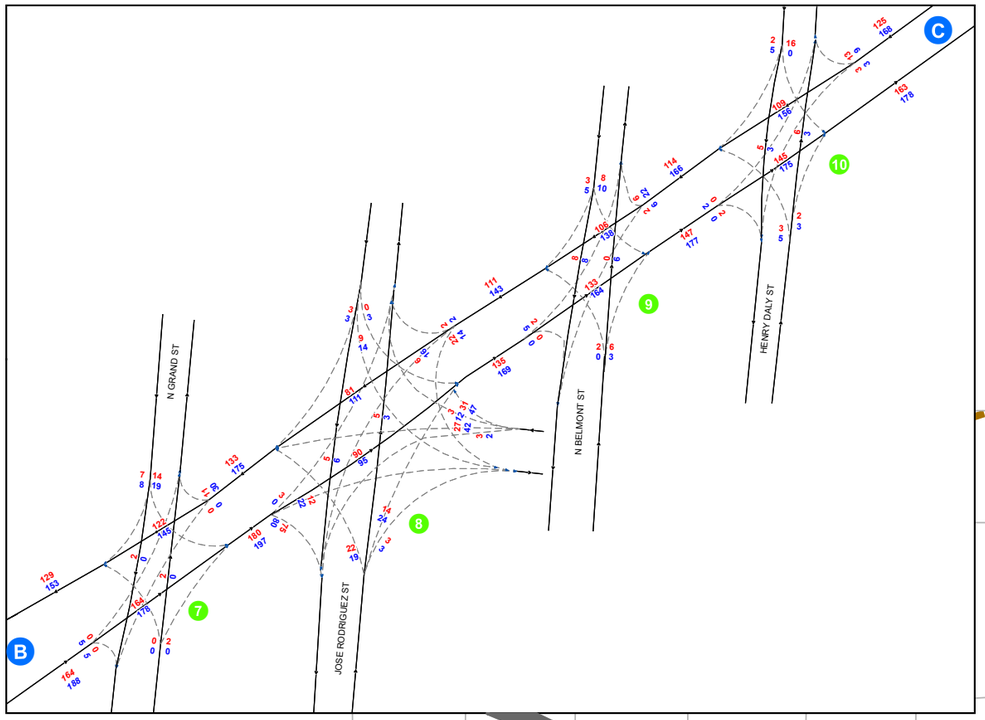
CHERRY ST

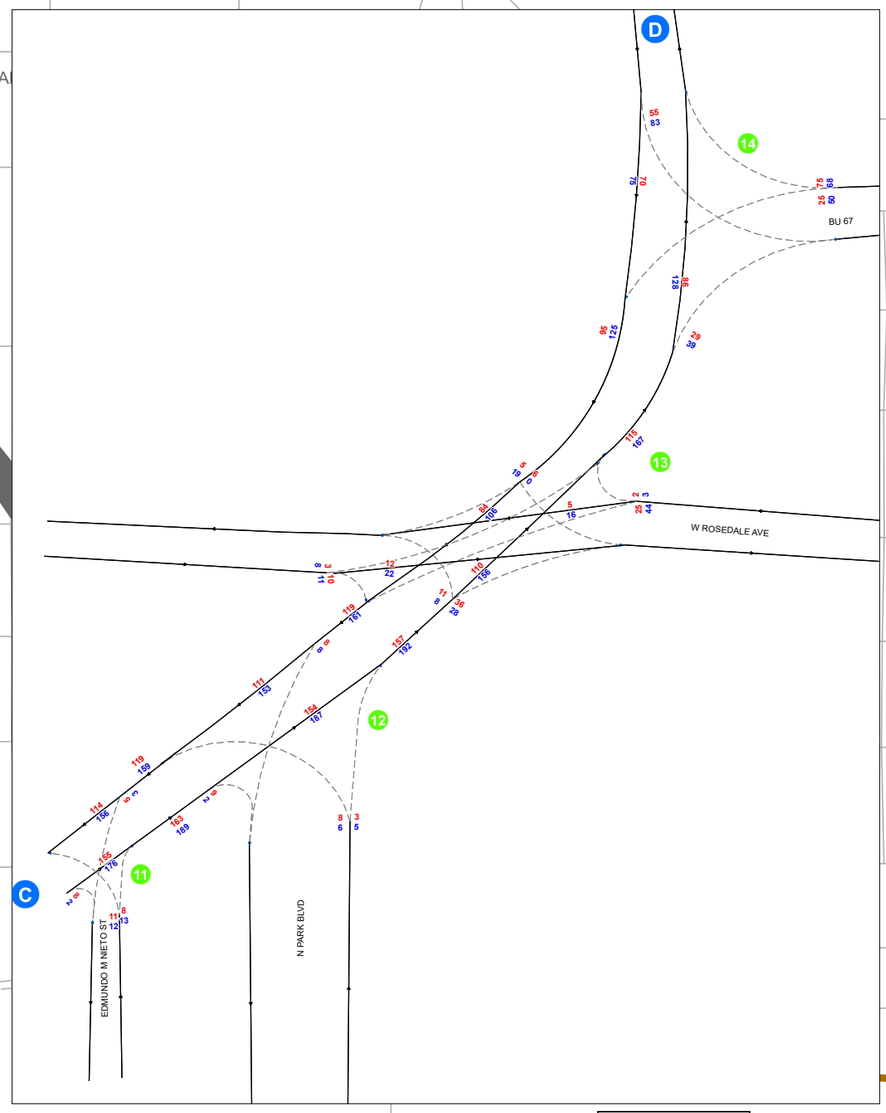
N APPLE ST

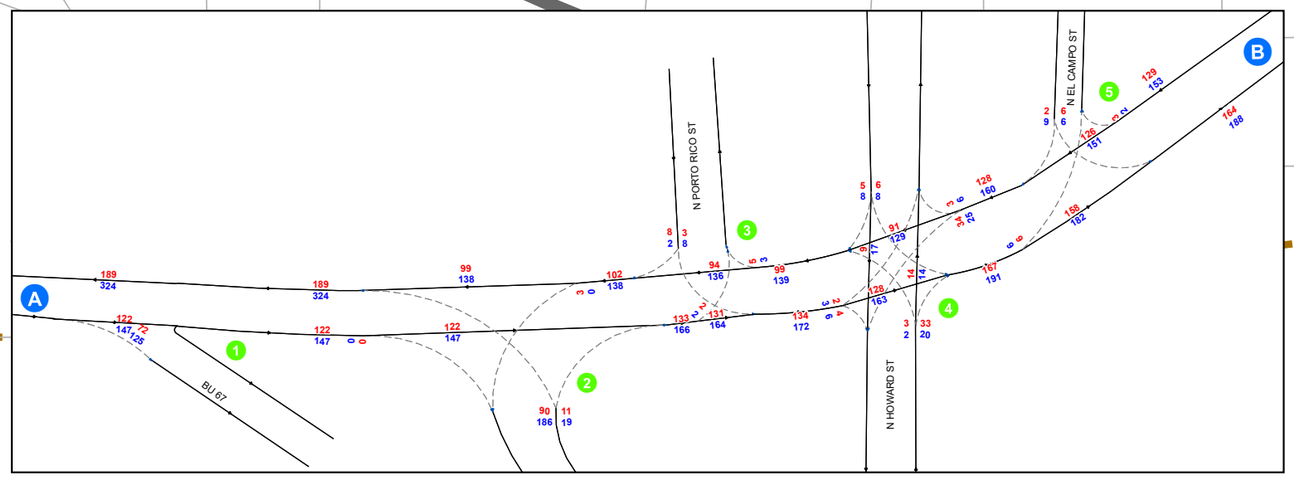
Alpine
No Build

0 250 500 Feet


N 15TH ST
N 14TH ST
N 13TH ST
N 12TH ST
N 11TH ST
N 10TH ST
N 9TH ST
N 8TH ST
N 7TH ST
N 6TH ST
N 5TH ST
N 4TH ST
N 3RD ST
N 2ND ST
N 1ST ST
N GARNETT ST
N PHELAS ST
N COCKRELL ST
N WALKER ST
N HARRISON ST
S NEVILLE HAYNES ST
S COCKRELL ST
S WALKER ST
S HARRISON ST
E
F
G
Alpine
No Build
LEGEND
AM Peak Hour Traffic Volumes
PM Peak Hour Traffic Volumes
Traffic Count Locations
Traffic Count Location Borders
US 67
0
250
500
Feet



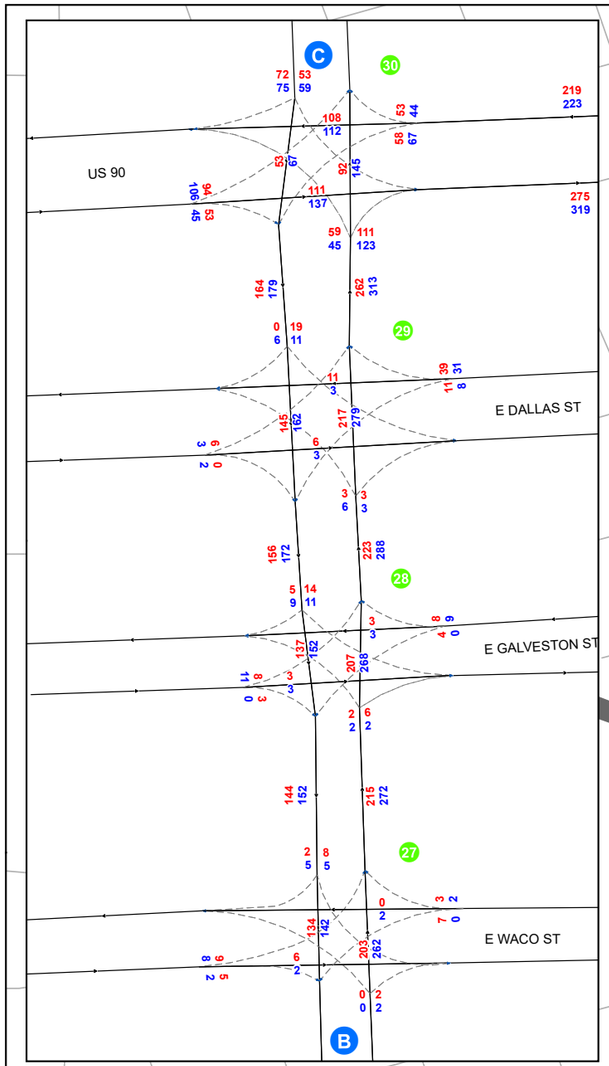


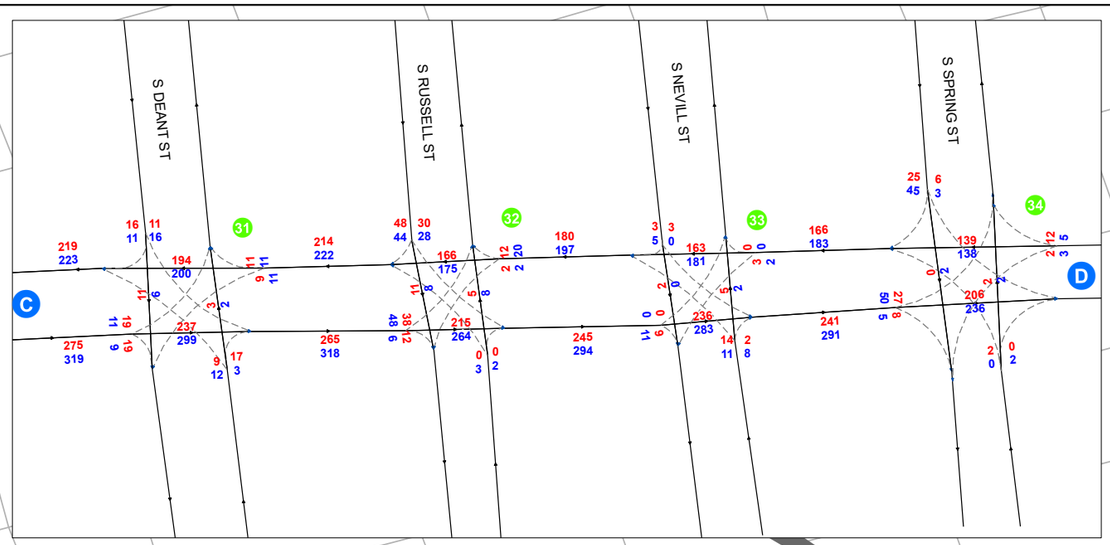


LEGEND

- 0000 AM Peak Hour Traffic Volumes
- 0000 PM Peak Hour Traffic Volumes
- Traffic Count Locations
- Traffic Count Location Borders
- US 67
- City Boundary

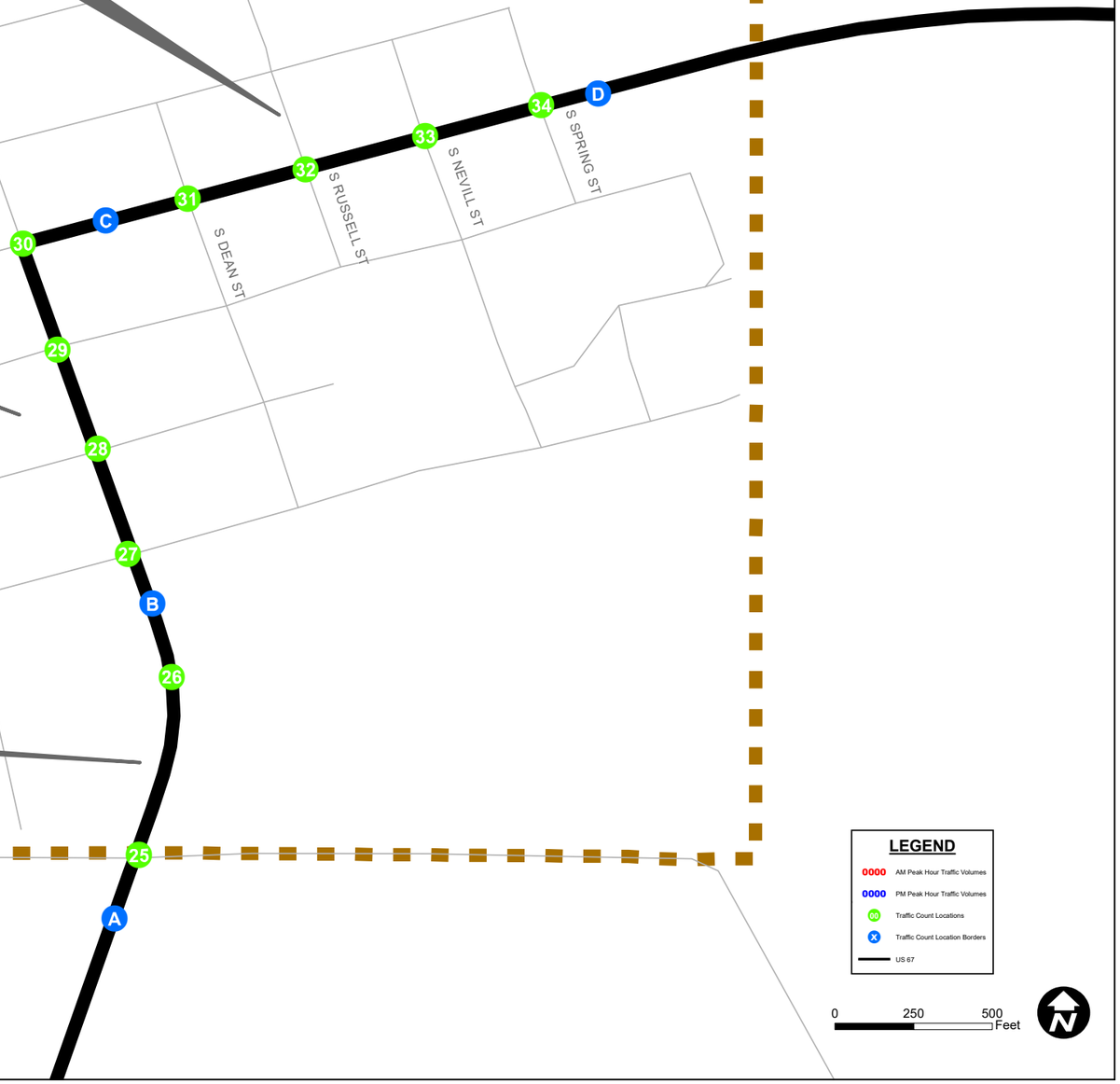
0 250 500 Feet





Marfa

Build



LEGEND

- 0000 AM Peak Hour Traffic Volumes
- 0000 PM Peak Hour Traffic Volumes
- 00 Traffic Count Locations
- X Traffic Count Location Borders
- US 67

0 250 500 Feet

LEGEND

- 0000 AM Peak Hour Traffic Volumes
- 0000 PM Peak Hour Traffic Volumes
- 00 Traffic Count Locations
- Traffic Count Location Borders
- US 67

FM 1703

N MOSLEY LN

N JOE BAILEY ST

N PLUM ST

N PEACH ST

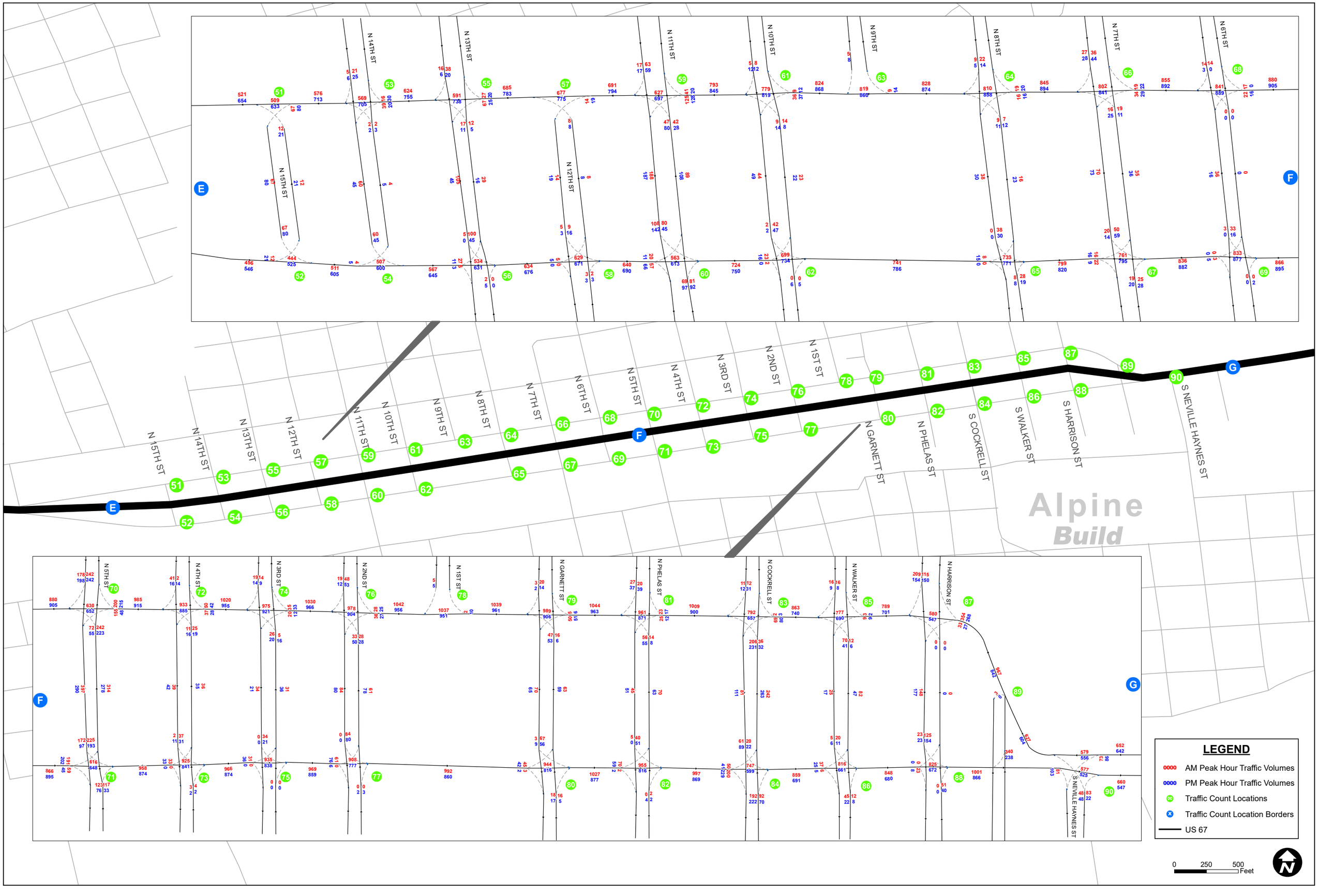
N ORAANGE ST

CHERRY ST

N APPLE ST

Alpine Build

0 250 500 Feet


N 15TH ST
N 14TH ST
N 13TH ST
N 12TH ST
N 11TH ST
N 10TH ST
N 9TH ST
N 8TH ST
N 7TH ST
N 6TH ST
N 5TH ST
N 4TH ST
N 3RD ST
N 2ND ST
N 1ST ST
N GARNETT ST
N PHELAS ST
N COCKRELL ST
N WALKER ST
N HARRISON ST
S NEVILLE HAYNES ST
S COCKRELL ST
S WALKER ST
S HARRISON ST
E
F
G
Alpine
Build
LEGEND
AM Peak Hour Traffic Volumes
PM Peak Hour Traffic Volumes
Traffic Count Locations
Traffic Count Location Borders
US 67
0
250
500
Feet

Texas Department of Transportation

PRESIDIO TEXAS

CITY of ALPINE BROWSTER 1882 COUNTY

THE CITY OF MARFA MARFA TEXAS

OUR 67

US 67 CORRIDOR

MASTER PLAN