

Appendix P: Air Quality

Carbon Monoxide Traffic Air Quality Analysis



Carbon Monoxide Traffic Air Quality Analysis

I-35 Capital Express Central Project

Travis County, Texas
Austin District
CSJ: 0015-13-388

August 2022

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

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1.0 Introduction

The Texas Department of Transportation (TxDOT) Austin District is proposing improvements to Interstate Highway 35 (I-35) from US Highway 290 East (US 290E) to State Highway 71 (SH 71)/Ben White Boulevard (CSJ: 0015-13-388). See **Appendix A** for a Project Location Map.

Modeled Scenarios

The project is evaluating improvements between two potential build alternatives, referred to as Build Alternative 2 (Alt 2) and Modified Build Alternative 3 (Alt 3 Mod). Alt 2, Alt 3 Mod, and the No Build Alternative were modeled for this carbon monoxide (CO) analysis for the estimated time of completion (ETC) year (2030) and design year (2050), in accordance with TxDOT's *Environmental Guide: Volume 2 Activity Instructions* (September 2021).

2.0 Background Information

CO is a primary pollutant from motor vehicles that is largely emitted from a vehicle's exhaust system; thus, there is a federal requirement to model localized CO concentrations for proposed highway projects. Projects that are adding capacity may result in an increase of CO emissions; therefore, TxDOT requires the completion of a project-level CO analysis for added capacity projects that exceed an annual average daily traffic (AADT) volume of 140,000 vehicles per day (vpd).

Since the project would add capacity and the design year traffic volume is above 140,000 vpd (see **Table 1** below), a CO traffic air quality analysis (TAQA) is required to assess whether the project would adversely affect local air quality by contributing to CO levels that exceed the 1-hour or 8-hour CO National Ambient Air Quality Standard (NAAQS).

3.0 Analysis Methodology

CO concentrations for the No Build Alternative, Alt 2, and Alt 3 Mod were modeled for the ETC and design years using the CAL3QHC dispersion model. The supplied traffic data includes 24-hour average annual volumes for the years of 2030 and 2050. Traffic for the ETC and design year is shown by section in **Table 1**. See **Appendix B** for the complete traffic data provided by TxDOT Austin District.

Table 1: Projected AADT and DHV

I-35 Sections: Mainlanes	AADT		DHV	
	2030 (ETC)	2050 (Design)	2030 (ETC)	2050 (Design)
Section 1: S of William Cannon Dr Ramp to N of 32 nd St Ramps	181,550	238,300	12,708	16,681
Section 2: N of 32 nd St Ramps to N end of project	245,200	305,900	14,466	18,048
I-35 Sections: Frontage Roads	AADT		DHV	
	2030 (ETC)	2050 (Design)	2030 (ETC)	2050 (Design)
Section 3: S of William Cannon Drive Ramp to N of Lady Bird Lake (S of Holly St Off Ramp)	78,900	103,550	5,523	7,248
Section 4: N of Lady Bird Lake (S of Holly St Off Ramp) to S of 32 nd St Off Ramp	71,050	89,450	4,973	6,261
Section 5: S of 32 nd Street Off Ramp to N of Airport Blvd Ramps	48,400	60,200	2,855	3,551
Section 6: N of Airport Blvd Ramps to S of US 290 INTX Ramps	84,400	104,500	4,979	6,165

DHV – Design Hourly Volume

The CO analysis includes modeled free-flow areas, as well as select intersections. The free-flow segments (segments 1 through 4) modeled in the CO analysis were chosen based on the areas of the project with the highest AADT and a narrow ROW. Each of the segments were modeled for both alternatives in both the ETC and design year. The modeled segment limits and their respective traffic sections are as follows:

- Segment 1: South of 51st St to N of Airport Blvd (within Traffic Section 2 (Mainlanes) and Section 6 (Frontage Roads))
- Segment 2: North of Dean Keeton to Manor Rd (within Traffic Section 1 (Mainlanes) and Section 4 (Frontage Roads))
- Segment 3: Holly St to north of Lake Austin Dr (within Traffic Section 1 (Mainlanes) and Section 4 (Frontage Roads))
- Segment 4: Woodward St to south of Oltorf St (within Traffic Section 1 (Mainlanes) and Section 3 (Frontage Roads))

Intersection segments (segments 5 through 6) were modeled and chosen based on their Level of Service (LOS) rating (either D, E, or F, with F being the worst LOS). LOS for all the intersections within the Alt 2 and Alt 3 Mod study area were identified for the ETC and design year, as well as AM and PM peak periods. From this,

the two intersections with the most prevalent “F” rated LOS across the peak periods and analyzed years were chosen as the segments for this CO analysis.

- Segment 5: 7th St Intersection (within Traffic Section 1 (Mainlanes) and Section 4 (Frontage Roads)).
- Segment 6: Riverside Dr Intersection (within Traffic Section 1 (Mainlanes) and Section 4 (Frontage Roads))

Background CO concentrations of 1.6 parts per million (ppm) (1-hour) and 1.3 ppm (8-hour) were used for the model in accordance with Appendix B of TxDOT’s *Environmental Guide: Volume 2 Activity Instructions* (September 2021).

Variable emission rates were used in the analysis based on worst-case peak speeds. Worst-case peak traffic speeds range from 3 to 67 mph for both free-flow and intersection scenarios. The rates were derived from the MOVES2014 model, gathered from the TxDOT Running and Idling Emission Rates Lookup Tables (ERLT) for TAQA (TxDOT Air Quality Toolkit, May 2021). Running emissions were used for free-flow road links and idling emissions were used for the intersection idling road links.

The following adverse meteorological conditions are the worst-case assumptions and input parameters used in the analysis, in accordance with Appendix D of TxDOT’s *Environmental Guide: Volume 2 Activity Instructions* (July 2021):

- Averaging time of 60 minutes
- Atmospheric Stability Class of 4 (stable)
- Mixing height of 1,000 meters
- Wind speed of 1 meter per second
- Winds blowing parallel to the roadway

The following input parameters were used in the intersection analysis, in accordance with *User’s Guide to CAL3QHC Version 2.0: A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections (Revised)*:

- Average total signal cycle length
- Average red total signal cycle length
- Clearance lost time
- Approach volume on queue link
- Idle emission factor

- Saturation flow rate
- Signal type
- Arrival rate

4.0 Receptor Locations

Free-flow receptors were modeled on the ROW line for each modeled segment. Intersection receptors were modeled at least 10 feet away from the nearest travel lane and on public use features, such as a sidewalk, and placed at each quadrant of the intersection. A standard height of 5.9 feet was given to the receptors for all models to simulate the average height of a person. **Table 2** and **Table 3** depict the associated ROW, LOS, and traffic at each of the modeled receptors. Aerial maps depicting the receptor locations along the project ROW are found in **Appendix C**.

Table 2: Free-flow Receptor Descriptions

Name	Segment	Distance from Roadway		ROW Width		2030 Total DHV	2050 Total DHV	2030 Total AADT	2050 Total AADT	Traffic Speeds
		Alt 2	Alt 3 Mod	Alt 2	Alt 3 Mod					
Receptor 1 (R1)	Segment 1	58 ft	34 ft	422 ft	422 ft	19,445	24,213	329,600	410,400	4-58 mph
Receptor 2 (R2)	Segment 1	88 ft	79 ft	422 ft	422 ft	19,445	24,213	329,600	410,400	4-58 mph
Receptor 3 (R3)	Segment 2	7 ft	7 ft	216 ft	216 ft	17,681	22,942	252,600	327,750	3-55 mph
Receptor 4 (R4)	Segment 2	9 ft	9 ft	216 ft	216 ft	17,681	22,942	252,600	327,750	3-55 mph
Receptor 5 (R5)	Segment 3	32 ft	30 ft	345 ft	336 ft	17,681	22,942	252,600	327,750	3-67 mph
Receptor 6 (R6)	Segment 3	33 ft	26 ft	345 ft	336 ft	17,681	22,942	252,600	327,750	3-67 mph
Receptor 7 (R7)	Segment 4	34 ft	24 ft	350 ft	350 ft	18,231	23,929	260,450	341,850	3-66 mph

Table 3: Intersection Receptor Descriptions

Name	Segment	Distance from Roadway	LOS	2030 Total DHV	2050 Total DHV	2030 Total AADT	2050 Total AADT	Traffic Speeds
7 th St (7th SE)	Segment 5	11 ft	F	17,681	22,942	252,600	327,750	3-67 mph
7 th St (7th NE)	Segment 5	11 ft	F	17,681	22,942	252,600	327,750	3-67 mph
7 th St (7th NW)	Segment 5	10 ft	F	17,681	22,942	252,600	327,750	3-67 mph
7 th St (7th SW)	Segment 5	21 ft	F	17,681	22,942	252,600	327,750	3-67 mph
Riverside Dr (RS SE)	Segment 6	25 ft	F	18,231	23,929	260,450	341,850	3-67 mph
Riverside Dr (RS NE)	Segment 6	27 ft	F	18,231	23,929	260,450	341,850	3-67 mph
Riverside Dr (RS SW)	Segment 6	12 ft	F	18,231	23,929	260,450	341,850	3-67 mph
Riverside Dr (RS NW)	Segment 6	21 ft	F	18,231	23,929	260,450	341,850	3-67 mph

5.0 Analysis Results

The 1-hour CO NAAQS is 35 ppm, while the 8-hour NAAQS is 9 ppm, which are not to be exceeded more than once in a year. Modeling results indicate that local concentrations of CO are not expected to exceed national standards at any time along any segment of the project. While emission rates are expected to decrease over time, some model results show a slight increase in CO concentrations from 2030 to 2050. These increases can be explained with the worsening traffic speeds predicted for 2050.

The highest CO concentration result and percent of the 1-hour and 8-hour NAAQS along the I-35 project for all scenarios and intersections are recorded in **Tables 4 through 7**. The highest modeled CO concentrations consistently occur in Segment 2, from north of Dean Keaton to Manor Road, and represents the worst-case results for the project. Though the AADT for Segment 2 is the lowest, it has the slowest speeds and narrowest ROW by 120 feet. In contrast, the lowest modeled CO concentrations occur in Segments 1 and 4, which have the widest ROW.

The projected CO concentrations are relatively consistent between the 7th St and Riverside intersections, with the highest CO concentration result occurring at 7th Street in the Alt 3 Mod 2050 scenario. Results showed that neither 2030 nor 2050 CO concentrations at the worst ranking LOS intersections for the project (peaking

at 2.0 ppm) do not surpass the free-flow segment CO concentrations for any of the build alternatives (peaking at 2.3 ppm).

Among all modeled segments, receptor proximity to roadway section tends to be a standout determining factor for CO concentrations. Peak speed limit is the obvious contributing factor for any variance in expected CO concentrations between ETC and Design scenarios since they vary with year while AADT between the scenarios grow in tandem.

The associated input and output CAL3QHC files have been submitted with this technical report for inclusion in the project files.

Table 4: Free-flow No Build, Alt 2, and Alt 3 Mod 1-Hour and 8-Hour CO Concentrations (ETC Year)

ETC Year: 2030							
No Build							
Receptor	Modeled Segment	1-Hour CO Concentration (Grams/Mile)	1-Hour CO Background Concentration (Grams/Mile)	8-Hour CO Background Concentration (Grams/Mile)	8-Hour CO Concentration (Grams/Mile)	1-Hour % NAAQS	8-Hour % NAAQS
Receptor 1 (SB)	Segment 1	1.9	1.6	1.3	1.5	5.4%	16.7%
Receptor 2 (NB)	Segment 1	1.8	1.6	1.3	1.4	5.1%	15.6%
Receptor 3 (SB)	Segment 2	2.1	1.6	1.3	1.7	6.0%	18.9%
Receptor 4 (NB)	Segment 2	2.1	1.6	1.3	1.7	6.0%	18.9%
Receptor 5 (SB)	Segment 3	1.9	1.6	1.3	1.5	5.4%	16.7%
Receptor 6 (NB)	Segment 3	2.0	1.6	1.3	1.6	5.7%	17.8%
Receptor 7 (SB)	Segment 4	2.0	1.6	1.3	1.6	5.7%	17.8%
Receptor 8 (NB)	Segment 4	1.9	1.6	1.3	1.5	5.4%	16.7%
Alt 2							
Receptor	Modeled Segment	1-Hour CO Concentration (Grams/Mile)	1-Hour CO Background Concentration (Grams/Mile)	8-Hour CO Background Concentration (Grams/Mile)	8-Hour CO Concentration (Grams/Mile)	1-Hour % NAAQS	8-Hour % NAAQS
Receptor 1 (SB)	Segment 1	1.8	1.6	1.3	1.4	5.1%	15.6%
Receptor 2 (NB)	Segment 1	1.8	1.6	1.3	1.4	5.1%	15.6%
Receptor 3 (SB)	Segment 2	2.1	1.6	1.3	1.7	6.0%	18.9%
Receptor 4 (NB)	Segment 2	2.3	1.6	1.3	1.8	6.6%	20.0%
Receptor 5 (SB)	Segment 3	1.9	1.6	1.3	1.5		

Alt 3 Mod							
Receptor	Modeled Segment	1-Hour CO Concentration (Grams/Mile)	1-Hour CO Background Concentration (Grams/Mile)	8-Hour CO Background Concentration (Grams/Mile)	8-Hour CO Concentration (Grams/Mile)	1-Hour % NAAQS	8-Hour % NAAQS
Receptor 1 (SB)	Segment 1	1.7	1.6	1.3	1.4	4.9%	15.6%
Receptor 2 (NB)	Segment 1	1.7	1.6	1.3	1.4	4.9%	15.6%
Receptor 3 (SB)	Segment 2	2.1	1.6	1.3	1.7	6.0%	18.9%
Receptor 4 (NB)	Segment 2	2.3	1.6	1.3	1.8	6.6%	20.0%
Receptor 5 (SB)	Segment 3	1.8	1.6	1.3	1.4	5.1%	15.6%
Receptor 6 (NB)	Segment 3	1.8	1.6	1.3	1.4	5.1%	15.6%
Receptor 7 (SB)	Segment 4	1.8	1.6	1.3	1.4	5.1%	15.6%
Receptor 8 (NB)	Segment 4	1.7	1.6	1.3	1.4	4.9%	15.6%
Note: 8-Hour CO Concentrations have been rounded to the nearest tenth decimal.							

Table 5: Free-flow No Build, Alt 2, and Alt 3 Mod 1-Hour and 8-Hour CO Concentrations (Design Year)

Design Year: 2050							
No Build							
Receptor	Modeled Segment	1-Hour CO Concentration (Grams/Mile)	1-Hour CO Background Concentration (Grams/Mile)	8-Hour CO Background Concentration (Grams/Mile)	8-Hour CO Concentration (Grams/Mile)	1-Hour % NAAQS	8-Hour % NAAQS
Receptor 1 (SB)	Segment 1	1.9	1.6	1.3	1.5	5.4%	16.7%
Receptor 2 (NB)	Segment 1	2.0	1.6	1.3	1.6	5.7%	17.8%
Receptor 3 (SB)	Segment 2	2.1	1.6	1.3	1.7	6.0%	18.9%
Receptor 4 (NB)	Segment 2	2.0	1.6	1.3	1.6	5.7%	17.8%
Receptor 5 (SB)	Segment 3	2.1	1.6	1.3	1.7	6.0%	18.9%
Receptor 6 (NB)	Segment 3	2.2	1.6	1.3	1.7	6.3%	18.9%
Receptor 7 (SB)	Segment 4	1.8	1.6	1.3	1.4	5.1%	15.6%
Receptor 8 (NB)	Segment 4	1.8	1.6	1.3	1.4	5.1%	15.6%
Alt 2							
Receptor	Modeled Segment	1-Hour CO Concentration (Grams/Mile)	1-Hour CO Background Concentration (Grams/Mile)	8-Hour CO Background Concentration (Grams/Mile)	8-Hour CO Concentration (Grams/Mile)	1-Hour % NAAQS	8-Hour % NAAQS
Receptor 1 (SB)	Segment 1	1.9	1.6	1.3	1.5	5.4%	16.7%
Receptor 2 (NB)	Segment 1	1.8	1.6	1.3	1.4	5.1%	15.6%
Receptor 3 (SB)	Segment 2	1.9	1.6	1.3	1.5	5.4%	16.7%
Receptor 4 (NB)	Segment 2	2.1	1.6	1.3	1.7	6.0%	18.9%
Receptor 5 (SB)	Segment 3	2.3	1.6	1.3	1.		

Alt 3 Mod							
Receptor	Modeled Segment	1-Hour CO Concentration (Grams/Mile)	1-Hour CO Background Concentration (Grams/Mile)	8-Hour CO Background Concentration (Grams/Mile)	8-Hour CO Concentration (Grams/Mile)	1-Hour % NAAQS	8-Hour % NAAQS
Receptor 1 (SB)	Segment 1	1.8	1.6	1.3	1.4	5.1%	15.6%
Receptor 2 (NB)	Segment 1	1.7	1.6	1.3	1.4	5.1%	15.6%
Receptor 3 (SB)	Segment 2	2.0	1.6	1.3	1.6	5.7%	17.8%
Receptor 4 (NB)	Segment 2	2.1	1.6	1.3	1.7	6.0%	18.9%
Receptor 5 (SB)	Segment 3	2.0	1.6	1.3	1.6	5.7%	17.8%
Receptor 6 (NB)	Segment 3	1.9	1.6	1.3	1.5	5.4%	16.7%
Receptor 7 (SB)	Segment 4	1.8	1.6	1.3	1.4	5.1%	15.6%
Receptor 8 (NB)	Segment 4	1.9	1.6	1.3	1.5	5.4%	16.7%
Note: 8-Hour CO Concentrations have been rounded to the nearest tenth decimal.							

Table 6: Alt 2 and Alt 3 Mod Intersection 1-Hour and 8-Hour CO Concentrations (ETC Year)

2030							
Alt 2							
Receptor	Modeled Segment	1-Hour CO Concentration (Grams/Mile)	1-Hour CO Background Concentration (Grams/Mile)	8-Hour CO Background Concentration (Grams/Mile)	8-Hour CO Concentration (Grams/Mile)	1-Hour % NAAQS	8-Hour % NAAQS
7 th SE	Segment 5	1.9	1.6	1.3	1.5	5.4%	16.7%
7 th NE	Segment 5	1.9	1.6	1.3	1.5	5.4%	16.7%
7 th NW	Segment 5	1.8	1.6	1.3	1.4	5.1%	15.6%
7 th SW	Segment 5	1.8	1.6	1.3	1.4	5.1%	15.6%
RS SE	Segment 6	1.9	1.6	1.3	1.5	5.4%	16.7%
RS NE	Segment 6	1.8	1.6	1.3	1.4	5.1%	15.6%
RS SW	Segment 6	1.8	1.6	1.3	1.4	5.1%	15.6%
RS NW	Segment 6	1.8	1.6	1.3	1.4	5.1%	15.6%
Alt 3 Mod							
Receptor	Modeled Segment	1-Hour CO Concentration (Grams/Mile)	1-Hour CO Background Concentration (Grams/Mile)	8-Hour CO Background Concentration (Grams/Mile)	8-Hour CO Concentration (Grams/Mile)	1-Hour % NAAQS	8-Hour % NAAQS
7 th SE	Segment 5	1.8	1.6	1.3	1.4	5.1%	15.6%
7 th NE	Segment 5	1.8	1.6	1.3	1.4	5.1%	15.6%
7 th NW	Segment 5	1.8	1.6	1.3	1.4	5.1%	15.6%
7 th SW	Segment 5	1.8	1.6	1.3	1.4	5.1%	15.6%
RS SE	Segment 6	1.7	1.6	1.3	1.		

Table 7: Alt 2 and Alt 3 Mod Intersection 1-Hour and 8-Hour CO Concentrations (Design Year)

2050							
Alt 2							
Receptor	Modeled Segment	1-Hour CO Concentration (Grams/Mile)	1-Hour CO Background Concentration (Grams/Mile)	8-Hour CO Background Concentration (Grams/Mile)	8-Hour CO Concentration (Grams/Mile)	1-Hour % NAAQS	8-Hour % NAAQS
7th SE	Segment 5	1.8	1.6	1.3	1.4	5.1%	15.6%
7th NE	Segment 5	1.8	1.6	1.3	1.4	5.1%	15.6%
7th NW	Segment 5	1.9	1.6	1.3	1.5	5.4%	16.7%
7th SW	Segment 5	1.8	1.6	1.3	1.4	5.1%	15.6%
RS SE	Segment 6	1.8	1.6	1.3	1.4	5.1%	15.6%
RS NE	Segment 6	1.9	1.6	1.3	1.5	5.4%	16.7%
RS SW	Segment 6	1.9	1.6	1.3	1.5	5.4%	16.7%
RS NW	Segment 6	1.7	1.6	1.3	1.4	4.9%	15.6%
Alt 3 Mod							
Receptor	Modeled Segment	1-Hour CO Concentration (Grams/Mile)	1-Hour CO Background Concentration (Grams/Mile)	8-Hour CO Background Concentration (Grams/Mile)	8-Hour CO Concentration (Grams/Mile)	1-Hour % NAAQS	8-Hour % NAAQS
7th SE	Segment 5	1.8	1.6	1.3	1.4	5.1%	15.6%
7th NE	Segment 5	1.8	1.6	1.3	1.4	5.1%	15.6%
7th NW	Segment 5	2.0	1.6	1.3	1.6	5.7%	17.8%
7th SW	Segment 5	1.9	1.6	1.3	1.5	5.4%	16.7%
RS SE	Segment 6	1.8	1.6	1.3	1.4	5.1%	15.6%
RS NE	Segment 6	1.9	1.6	1.3			

APPENDIX A
Project Location Map

APPENDIX B

Traffic Data

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

Austin District

August 22, 2019

Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2030 to 2050)																					
Description of Location	Base Year				Dir Dist %	K Factor	Percent Trucks	ATHWLD	Percent Tandem Axles in ATHWLD												
	Average Daily Traffic		2030	2050																	
Data for Use in Air & Noise Analysis																					
Vehicle Class	Base Year				Dir Dist %	K Factor	Percent Trucks	ATHWLD	Percent Tandem Axles in ATHWLD												
	Average Daily Traffic		2030	2050																	
Light Duty			89.7				95.4														
Medium Duty			1.8				0.8														
Heavy Duty			8.5				3.8														
Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 30 Year Period (2030 to 2060)																					

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

Austin District

August 22, 2019

Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2030 to 2050)												
Description of Location	Base Year				ATHWLD	Percent Tandem Axles in ATHWLD	Flexible Pavement		SLAB			
	Average Daily Traffic		Dir Dist %	K Factor			S	N				
	2030	2050										
I-35 (Mainlanes)												
Section 2												
Mainlanes Outline Section 2	245,200	305,900	51 - 49	5.9	8.9	4.0	0	3	8"			
Travis County												
Data for Use in Air & Noise Analysis												
Vehicle Class	Base Year											
	% of ADT		% of DHV									
Light Duty	91.1		96.0									
Medium Duty	2.5		1.1									
Heavy Duty	6.4		2.9									

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

Austin District

August 22, 2019

Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2030 to 2050)												
Description of Location	Base Year				ATHWLD	Percent Tandem Axles in ATHWLD	Flexible Pavement		SLAB			
	Average Daily Traffic		Dir Dist %	K Factor			S	N				
	2030	2050										
I-35 (Frontage Roads)												
Section 3												
Frontage Road Outline Section 3	78,900	103,550	51 - 49	7.0	2.6	2.0	0	3	8"			
Travis County												
Data for Use in Air & Noise Analysis												
Vehicle Class	Base Year											
	% of ADT		% of DHV									
Light Duty	97.4			98.0								
Medium Duty	2.3			1.7								
Heavy Duty	0.3			0.3								
Total Number of Equivalent												

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

Austin District

August 22, 2019

Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2030 to 2050)												
Description of Location	Base Year				ATHWLD	Percent Tandem Axles in ATHWLD	Flexible Pavement		SLAB			
	Average Daily Traffic		Dir Dist %	K Factor			S	N				
	2030	2050										
I-35 (Frontage Roads)												
Section 4												
Frontage Road Outline Section 4	71,050	89,450	51 - 49	7.0	2.7	2.0	0	3	8"			
Travis County												
Data for Use in Air & Noise Analysis												
Vehicle Class	Base Year											
	% of ADT		% of DHV									
Light Duty	97.3			98.0								
Medium Duty	2.4			1.8								
Heavy Duty	0.3			0.2								

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

Austin District

August 22, 2019

Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2030 to 2050)												
Description of Location	Base Year				Dir Dist %	K Factor	Percent Trucks		Percent Tandem Axles in ATHWLD			
	Average Daily Traffic		2030	2050			ADT	DHV				
I-35 (Frontage Roads)												
Section 5												
Frontage Road Outline Section 5			48,400	60,200	51 - 49	5.9	3.2	2.4	0			
Travis County												
Data for Use in Air & Noise Analysis												
Vehicle Class	Base Year											
	% of ADT				Dir Dist %		% of DHV					
							97.6					
							2.1					
Light Duty												

TRAFFIC ANALYSIS FOR HIGHWAY DESIGN

Austin District

August 22, 2019

Total Number of Equivalent 18k Single Axle Load Applications One Direction Expected for a 20 Year Period (2030 to 2050)																																														
Description of Location	Base Year				Dir Dist %	K Factor	Percent Trucks		ATHWLD	Percent Tandem Axles in ATHWLD	Flexible Pavement	Rigid Pavement		SLAB																																
	Average Daily Traffic		2030	2050			ADT	DHV				S	N																																	
<u>I-35 (Frontage Roads)</u>																																														
<u>Section 6</u>																																														
Frontage Road Culline Section 6																																														
Travis County																																														
Data for Use in Air & Noise Analysis																																														
Vehicle Class																																														

