



2023 Transportation Conformity

2050 Metropolitan Transportation Plan and
2023-2026 Transportation Improvement Program
for the Alamo Area

What is the Alamo Area MPO?

The Alamo Area Metropolitan Planning Organization (AAMPO) is the designated MPO for the greater San Antonio area. AAMPO develops transportation plans and programs to address the needs of Bexar, Comal, Guadalupe and a portion of Kendall Counties, a region that is home to more than 2.5 million people.

List of Transportation Policy Board and Technical Advisory Committee Members

https://www.alamoareampo.org/Committees/TPB/files/TPB_Membership.pdf
https://www.alamoareampo.org/Committees/TAC/files/TAC_Membership.pdf

Electronic Submittal

Conformity analysis documentation typically requires a significant amount of information to be submitted through an interagency consultation process. All items of this analysis are provided in electronic format. The electronic structure is organized consistent to this document's Table of Contents by chapter, section and appendix for efficient reviewing.

Acknowledgements

Prepared in cooperation with the Texas Department of Transportation and the US Department of Transportation.

Abstract

TITLE: Transportation Conformity

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SUBJECT: Transportation Conformity Determination for the Alamo Area Nonattainment Area including AAMPO's Metropolitan Transportation Plan: *Mobility 2050 (Mobility 2050)* and AAMPO's 2023-2026 Transportation Improvement Program (2023-2026 TIP)

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ABSTRACT: This report documents the conformity determination of the Bexar County nonattainment area. As required under [Section 176\(c\)\(4\)](#) of the Clean Air Act Amendments of 1990, Metropolitan Planning Organizations and the U.S. Department of Transportation are to make conformity determinations on transportation plans and transportation improvement programs before they are adopted, approved or accepted in air quality nonattainment areas. This report documents the conformity determination of AAMPO's *Mobility 2050* and 2023-2026 TIP by demonstrating both meet the conformity-related requirements of the Clean Air Act Amendments of 1990 (United States Code, Title 42 Section 7506), State Implementation Plan, and the final conformity rule (Title 40 Code of Federal Regulations, Parts 51 and 93).

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Glossary of Abbreviations

AT	Area Type	NAAQS	National Ambient Air Quality Standards
ANSWT	Average Non-Summer Weekday Travel	NHB	Non-home based
CAA	Clean Air Act	NO_x	Nitrogen Oxides
CAAA	Clean Air Act Amendments of 1990	ppb	Parts per Billion
CBD	Central Business District	PM	Particulate Matter
CFR	Code of Federal Regulations	RFP	Reasonable Further Progress
CMAQ	Congestion Mitigation and Air Quality Improvement Program	SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
CMP	Congestion Management Process	SHEI	Source Hours Extended Idling
EAC	Early Action Compact	SHP	Source Hours Parked
EPA	Environmental Protection Agency	SHO	Source Hours Operating
FAST Act	Fixing America's Surface Transportation Act	SIP	State Implementation Plan
FHWA	Federal Highway Administration	SUT	Source Use Type
FTA	Federal Transit Administration	TAC	Technical Advisory Committee
FY	Fiscal Year	TAZ	Traffic Analysis Zone
GVWR	Gross Vehicle Weight Rating	TCM	Transportation Control Measure
HBW	Home-based Work	TCEQ	Texas Commission on Environmental Quality
HNW	Home-based Non-work	TERM	Transportation Emission Reduction Measure
HOV	High Occupancy Vehicle	TIP	Transportation Improvement Program
HPMS	Highway Performance Monitoring System	TPB	Transportation Policy Board
IAC	Interagency Consultation	tpd	Tons per Day
I/M	Inspection and Maintenance	TTI	Texas A&M Transportation Institute
ITS	Intelligent Transportation System	TxDMV	Texas Department of Motor Vehicles
MAP-21	Moving Ahead for Progress in the 21 st Century	TxDOT	Texas Department of Transportation
Mobility 2050	<i>Mobility 2050: The Metropolitan Transportation Plan for the Alamo Area</i>	TWG	Technical Working Group for Mobile Source Emissions
MoSERS	Mobile Source Emissions Reduction Strategies	USC	United States Code
MOVES	Motor Vehicle Emissions Simulator	USDOT	United States Department of Transportation
MPA	Metropolitan Planning Area	WOE	Weight of Evidence
MPO	Metropolitan Planning Organization	VHT	Vehicle Hours of Travel
MTP	Metropolitan Transportation Plan	VIA	VIA Metropolitan Transit
MVEB	Motor Vehicle Emissions Budgets	VMT	Vehicle Miles of Travel
		VOC	Volatile Organic Compounds

Chapter 1: Executive Summary

1.1 Conformity Overview

[Section 176\(c\)\(4\)](#) of the Clean Air Act Amendments (CAAA) of 1990 requires Metropolitan Planning Organizations (MPOs) for areas designated as nonattainment for the pollutant ozone to conduct an air quality conformity analysis to ensure metropolitan transportation plans (MTP) and transportation improvement programs (TIP) are consistent with the region’s air quality goals. The conformity analysis estimates two precursors to ozone – nitrogen oxides (NO_x) and volatile organic compounds (VOC) – that result from the area’s multimodal transportation system. The analysis must demonstrate that expected future year emission totals of on-road mobile sources in the Bexar County nonattainment area are under emission totals of a known baseline year, 2017, as well as below the emissions generated if no new projects in the TIP or MTP are completed.

1.2 Nonattainment Area

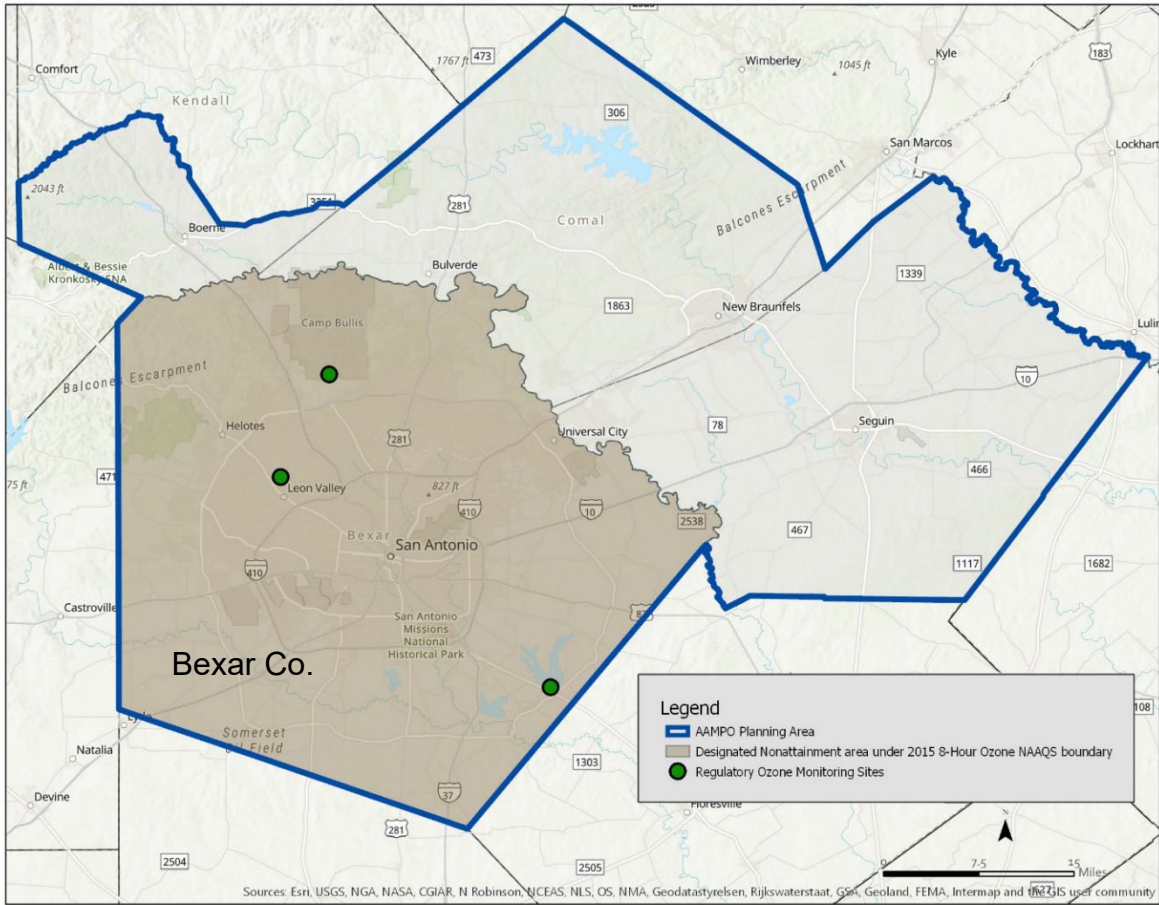
Bexar County is classified as moderate nonattainment under the 2015 8-hour ozone National Ambient Air Quality Standards (NAAQS), shown in Exhibit 1.2-1. The Alamo Area Metropolitan Planning Organization is responsible for conducting the air quality conformity analysis to address the 2015 Ozone NAAQS.

On November 7, 2022, the Environmental Protection Agency (EPA) reclassification of the San Antonio, TX nonattainment area to moderate became effective. The reclassification, due to failing to attain the 2015 Ozone NAAQS¹, took effect 30 days after publication of the final rulemaking in the Federal Register. AAMPO worked with its consultative partners to ensure this document would reflect additional requirements for Moderate nonattainment status prior to the effective reclassification date.

Note: the official title of the nonattainment area in the Alamo Area MPO study area is the “San Antonio, TX nonattainment area.” However, the nonattainment area encompasses only Bexar County, and “Bexar County nonattainment area” and similar are used interchangeably with the official title in this document.

¹ See <https://www.regulations.gov/document/EPA-HQ-OAR-2021-0742-0001> [EPA-HQ-OAR-2021-0742] for full final rule.

Exhibit 1.2-1 Alamo Area Metropolitan Planning Area and Nonattainment Area



1.3 Analysis

This emissions analysis is being conducted to ensure AAMPO’s Metropolitan Transportation Plan, known as *Mobility 2050*, and the 2023-2026 TIP meet the conformity-related requirements of the CAAA, State Implementation Plan (SIP), and the final conformity rule (40 CFR Parts [51](#) and [93](#)). The analysis years for this conformity are: 2017 (baseline year), 2025, 2035, 2045, and 2050 (MTP horizon year). To meet regional air quality conformity requirements as a newly reclassified Moderate nonattainment area, ozone-related emissions in all future analysis years must meet the requirements of two “interim” emissions tests: 1) emission projections for the TIP and MTP (“Action” scenario, below) must be less than emissions of the baseline year and 2) the emissions projections for the TIP and MTP must be less than projections of emissions if only existing and committed transportation projects are implemented (the “Build v. No-Build” test—“Action” scenario less than “Baseline” scenario.) A motor vehicle emissions budget (MVEB) test will be the benchmark for Bexar County regional conformity analysis once the TCEQ submits a SIP revision that includes NOX and VOC MVEBs and the EPA finds them adequate or approves them. Emissions reductions from regional projects account for the difference in emissions found between scenarios, see Chapters 8 and 9. Exhibit 1.3-3 shows a summary of the build v. no-build test that compares “Action” and “Baseline” scenarios, but with emissions reductions from the CMAQ program included in the final tabulation. This analysis demonstrates conformity for *Mobility 2050* and the FY 2023-2026 TIP.

Exhibit 1.3-1 “Action” Scenario Results for the Bexar County Nonattainment Area

Analysis Year	NO _x (tons/day)	VOC (tons/day)
2017 (Baseline)	35.38	22.49
2025	14.61	12.30
2035	9.04	8.38
2045	8.73	8.01
2050	9.29	8.38

Exhibit 1.3-2 “Baseline” Scenario Results for the Bexar County Nonattainment Area

Analysis Year	NO _x (tons/day)	VOC (tons/day)
2017 (Baseline)	35.38	22.49
2025	14.61	12.30
2035	9.01	8.38
2045	8.69	8.02
2050	9.26	8.40

Exhibit 1.3-3 Final Emissions Analysis Results, Including Emissions Reductions from Eligible CMAQ Projects

Year	Build (“Action”) – including CMAQ (tons/day)		No-Build (“Baseline”) (tons/day)	
	NO _x	VOC	NO _x	VOC
2017	35.38	22.49	N/A	N/A
2025	14.52	12.26	14.61	12.30
2035	8.93	8.34	9.01	8.38
2045	8.62	7.97	8.69	8.02
2050	9.18	8.34	9.26	8.40

1.4 Summary

Results of the transportation conformity determination demonstrate AAMPO’s *Mobility 2050* and 2023-2026 TIP meet all transportation air quality conformity requirements of the Clean Air Act Amendments and the final conformity rule ([40 CFR Parts 51 and 93](#)). More information on what conformity is and the regulations that apply to it can be found at: https://www.fhwa.dot.gov/environment/air_quality/conformity/index.cfm. This conformity determination involved a pre-analysis consensus plan agreed upon by the Interagency Consultation (IAC) partner agencies (Chapter 10) and a public comment period (Chapter 11).

Chapter 2: Air Quality

2.1 Air Pollution

Based on the 1970 Clean Air Act and subsequent Amendments (CAAA), the U.S. Environmental Protection Agency (EPA) sets national standards, known as National Ambient Air Quality Standards (NAAQS), for six criteria pollutants: ozone, particulate matter, carbon monoxide, sulfur dioxide, nitrogen dioxide and lead. In Bexar County, the primary pollutant issue is ozone. Up-to-date regional information is available on the Alamo Area Metropolitan Planning Organization (AAMPO) website at www.alamoareampo.org/airquality.

2.1.1 Ground Level Ozone

Ground level or “bad” ozone is not emitted directly into the air. It is created when nitrogen oxides (NO_x) and volatile organic compounds (VOC) chemically react in the presence of sunlight. The Texas Commission on Environmental Quality (TCEQ), in concert with AAMPO, is responsible for the part of the State Implementation Plan (SIP) that describes the amount of NO_x and VOC emitted by on-road vehicles.

Ground level ozone is known to trigger a variety of health problems. It is particularly harmful for children, older adults and people of all ages who have lung diseases, such as asthma.

2.2 Background on the Bexar County Ozone Nonattainment Area

The EPA regulates ground level ozone based on the three-year average of the fourth-highest, eight-hour average ozone concentration at regulatory monitoring sites within the region. This is referred to as the area’s design value. The Alamo Area has three regulatory monitoring sites called Continuous Air Monitoring Stations (CAMS).

On April 15, 2004, the EPA designated Bexar, Comal and Guadalupe Counties in violation, or “nonattainment”, of the eight-hour ozone standard. That standard was set at 80 parts per billion (ppb).

The area entered into an Early Action Compact (EAC) with the EPA that deferred nonattainment status for three years. As part of the EAC, the EPA would designate the area in attainment for ozone, if the area’s air quality could comply with the 80 ppb ozone NAAQS during the 2005-2007 monitoring period. The area succeeded in the EAC, and, in 2008, the EPA proposed and ultimately designated the Alamo Area in attainment.

In late 2008, the EPA set a new ozone standard of 75 ppb. The Alamo Area violated this standard by 2012. With a new ozone NAAQS due in 2015, the EPA refrained from designating areas newly in violation of the outgoing standard.

2.2.1 Current Ozone Standard

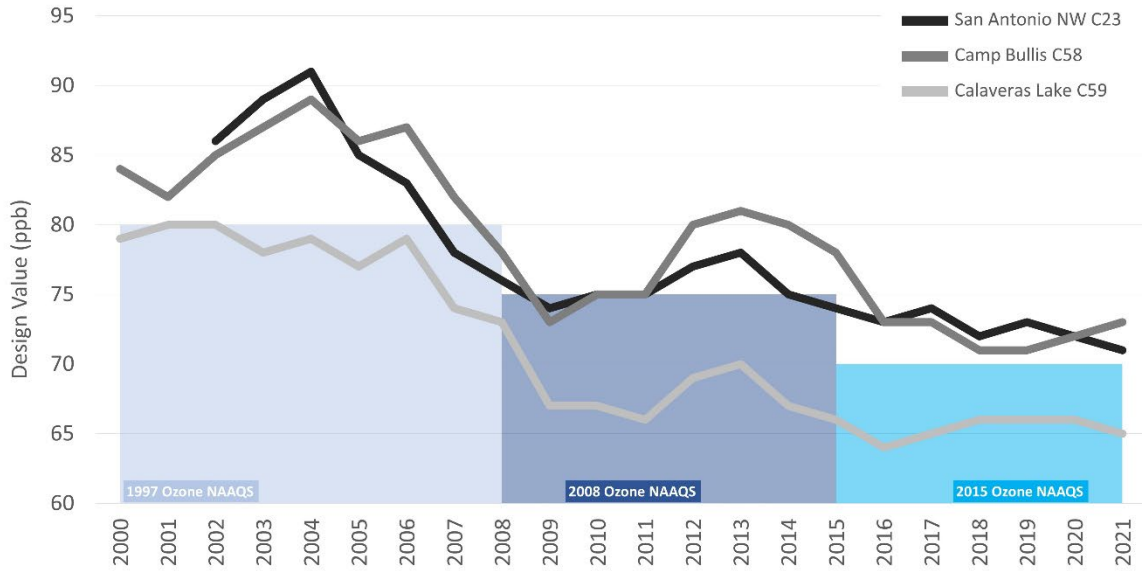
While ozone levels in the Alamo Area have declined since 2012, the levels did not meet the most recent ozone NAAQS set in 2015 of 70 ppb. In 2018, the EPA designated Bexar County as marginal nonattainment, effective September 24, 2018 with a baseline year of 2017. Under this marginal classification, Bexar County had until September 24, 2021 to attain the 2015 ozone NAAQS but failed to do so. Effective November 7, 2022, the Environmental Protection Agency (EPA) reclassified the San Antonio, TX nonattainment area to moderate for failing to attain the 2015 Ozone NAAQS². AAMPO worked with its consultative partners to ensure this document would reflect additional requirements for Moderate nonattainment status prior to the effective reclassification date. The new attainment date for the San Antonio, TX nonattainment area is September 24, 2024. Though “San Antonio, TX nonattainment area” is the official name of the nonattainment area in the AAMPO study area, “Bexar County nonattainment area” and similar are used interchangeably with the official name throughout this document.

Exhibit 2.2.1-1 summarizes the area’s declining design value compared against the 1997, 2008, and 2015 eight-hour ozone NAAQS.

² See <https://www.regulations.gov/document/EPA-HQ-OAR-2021-0742-0001> [EPA-HQ-OAR-2021-0742] for full final rule.

Exhibit 2.2.1-1 Alamo Area Design Value in Parts Per Billion

Bexar County Design Value (2000-2021)



Source: Texas Commission on Environmental Quality

Design Value: The fourth-highest eight-hour average ozone concentration averaged over a consecutive three-year period

NAAQS: National Ambient Air Quality Standards
ppb: parts per billion

Chapter 3: Conformity

3.1 What is Transportation Conformity

Transportation conformity ensures federal funding and approval go to transportation activities consistent with air quality goals. Before the metropolitan transportation plan (MTP) and transportation improvement program (TIP) can be adopted, approved, or accepted in nonattainment areas, Metropolitan Planning Organizations (MPOs) and the U.S. Department of Transportation must make transportation conformity determinations on the proposed projects listed in these documents. As described in [Section 176\(c\)\(1\)](#) of the Clean Air Act Amendments (CAAA) of 1990, transportation conformity is granted when the following conditions are met:

(A) conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the national ambient air quality standards and achieving expeditious attainment of such standards; and

(B) that such activities will not –

(i) cause or contribute to any new violation of any standards in any area;

(ii) increase the frequency or severity of any existing violation of any standard in any area; or

(iii) delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

In certain nonattainment areas, including moderate nonattainment areas for ozone, a Motor Vehicle Emission Budget (MVEB) is required to be established by the state in the State Implementation Plan ("SIP") for air quality. An MVEB is "that portion of the total allowable emissions defined in the submitted or approved control strategy implementation plan revision or maintenance plan for a certain date for the purpose of meeting reasonable further progress milestones or demonstrating attainment or maintenance of the NAAQS, for any criteria pollutant or its precursors, allocated to highway and transit vehicle use and emissions."³ Since an MVEB is not yet established for the San Antonio/Bexar County area, interim emissions tests are the key analytic component of the transportation conformity process. For a moderate nonattainment area for ozone, two tests are conducted to demonstrate that expected future year emission totals of on-road mobile sources in the Bexar County nonattainment area will improve based on planned transportation activity. One requires that projected emissions totals from the TIP and MTP are less than emissions totals of a known baseline year. The second requires that these totals are less than those projected if new projects in the

³ See 40 CFR § 93.101 - Definitions

TIP and MTP are not implemented. When this can be demonstrated through an emissions analysis, transportation activities are determined to be consistent with air quality goals identified in the State Implementation Plan (SIP).

The determination of the analysis is a two-step process in metropolitan areas. The first step is for AAMPO to make the initial transportation conformity determination at the local level. For the Bexar County area, AAMPO's Transportation Policy Board (TPB) makes this determination. The second step is for the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) to make a joint transportation conformity determination at the federal level. Upon federal approval, a four-year window begins. During this timeframe projects, programs and policies identified in the MTP and TIP may move toward implementation.

3.2 Purpose

This transportation conformity was prompted by the development of a new TIP (2023-2026 TIP) and MTP (*Mobility 2050*).

3.3 Conformity Criteria

As stipulated by the Clean Air Act Amendments of 1990, transportation conformity involves the following requirements:

- Use of the latest planning assumptions ([40 CFR Part 93.110](#));
- Analysis based on the latest emission estimation model available ([40 CFR Part 93.111](#));
- Interagency consultation and a public involvement process conducted during the analysis ([40 CFR Part 93.112](#));
- Timely implementation of Transportation Control Measures (TCMs) ([40 CFR Part 93.113](#));
- An MTP and TIP that are consistent with the Motor Vehicle Emissions Budget (MVEB) established in the applicable SIP (if there is an adequate or approved SIP budget – this requirement currently does not apply to Bexar County or AAMPO efforts) ([40 CFR Part 93.118](#)); and
- Inclusion of all regionally significant projects expected in the nonattainment and maintenance area in the MTP and TIP ([40 CFR Part 93.114](#) & [115](#)).
- For moderate (and above) ozone nonattainment areas without established Motor Vehicle Emissions Budgets, two interim emissions tests are satisfied (i.e. both “Action” less than baseline year and “Action” less than “Baseline” tests)([40 CFR Part 93.119\(b\)\(1\)](#).)

3.4 Checklist

In an effort to improve the efficiency of the conformity determination review process for Texas, a checklist was developed as a guideline for preparing and reviewing transportation conformity documents. Exhibit 3.4-1 is the checklist detailing information relevant to this transportation conformity document.

Exhibit 3.4-1 Information Required for Transportation Conformity Review

Item	Regulation Reference	Format	Report Location
Documents			
<i>Mobility 2050: The Metropolitan Transportation Plan (MTP)</i>	40 CFR Part 93 Subpart A	Independent Self-Supporting Document (Electronic File)	Appendix 12.2
2023-2026 Transportation Improvement Program (TIP)	40 CFR Part 93 Subpart A	Independent Self-Supporting Document (Electronic File)	Appendix 12.3
2023 Conformity document for the MTP and TIP	40 CFR Part 93 Subpart A	Independent Self-Supporting Document (Electronic File)	This document serves as the conformity document
Emission Model			
Guidance Supporting MOVES Input Development (SIP Consistency, EPA's Information Sheets, etc.)		Discussion Contained in Conformity Document. EPA information in Appendix	Chapter 7 Appendix 12.10
Description of Version of MOVES Model Being Used	40 CFR Part 93.111	Discussion Contained in Conformity Document	Chapter 7
MOVES Input and Output Files		Electronic (XML files and MYSQL Databases)	Appendix 12.11
MOVES Emission Factors		Electronic (MYSQL Databases and text file format)	Appendix 12.12
MOVES External Reference Files (Estimated Hourly Emissions and Activity)		Electronic (Text file format)	Appendix 12.13
Mobile Source Emissions Reduction Strategies (MoSERS)			

Item	Regulation Reference	Format	Report Location
MoSERS Methodology and Calculation Descriptions		Electronic File	Chapter 8
MoSERS Project Listing		Electronic File	N/A
Travel Demand Model			
Highway Performance Monitoring System Adjustment(s), Factors, Approach	40 CFR Part 93.122(b)(3)	Discussion Contained in Conformity Document	Chapter 5
Description of Travel Demand Model Validation, Including Validation Year	40 CFR Part 93.106(a)(1)(ii)	Discussion Contained in Conformity Document	Chapter 5 Appendix 12.4
Vehicle Miles of Travel (VMT) (August Midweek 24-hour by Roadway Type)		Discussion Contained in Conformity Document	Appendix 12.5
Average Loaded Speeds (August Midweek 24-hour by Roadway Type)		Discussion Contained in Conformity Document	Appendix 12.5
Centerline Mile Summaries for Each Analysis Year		Discussion Contained in Conformity Document	Appendix 12.5
Definition of Regionally Significant Roadway System		Discussion Contained in Conformity Document	Appendix 12.6
Network Link Listing for Each Analysis Year		Discussion Contained in Conformity Document (Electronic File) (Electronic Files should include TransCAD Files, SHAPE Files, and Spreadsheet Files)	Chapter 5 Appendix 12.7 Appendix 12.8
Files Containing Hourly Distribution By County, Roadway Type, and Vehicle Type for: <ul style="list-style-type: none"> • Vehicle Miles of Travel • Vehicle Hours • Average Operational Speed • Vehicle Population 		Electronic Files in Tab Delimited Summary Tables	Appendix 12.14

Item	Regulation Reference	Format	Report Location
<ul style="list-style-type: none"> • NO_x Emissions • VOC Emissions 			
SIP Requirements			
TCMs in SIP Including Emission Reductions, Methodologies, Implementation Dates, etc.		N/A	N/A
Timely Implementation of TCMs (progress)	40 CFR Part 93.113	N/A	N/A
Project Listings			
Congestion Mitigation and Air Quality Projects Containing: Emission Benefits, Methodologies, and Implementation Dates		Identified in TIP: Independent Self-Supporting Document (Electronic File)	Appendix 12.3
Roadway System (Capacity Staging)		Electronic File	Appendix 12.7
List of Non-Federal Projects	In response to March 2, 1999, court ruling	Identified in TIP: Independent Self-Supporting Document (Electronic File)	Appendix 12.3
List of Exempt Projects	40 CFR Part 93.105(c) 40 CFR Part 93.126 40 CFR Part 93.127 ⁴ 40 CFR Part 93.128	Identified in TIP: Independent Self-Supporting Document (Electronic File)	Appendix 12.3
Evidence of Fiscal Constraint	40 CFR Part 93.108	Identified in TIP: Independent Self-Supporting Document (Electronic File)	Appendix 12.3
Evidence of MTP Specifically Describing the Transportation System Envisioned for Each Analysis Year	40 CFR Part 93.106(a)	Included in MTP: Independent Self-Supporting Document (Electronic File)	Appendix 12.2
Public, State and Federal Involvement			

⁴ Projects listed in [40 CFR 93.127](#) are exempt from regional emissions analysis, but not localized emissions (hot-spot) analysis

Item	Regulation Reference	Format	Report Location
Conformity Pre-Analysis Consensus Plan		Electronic File	Appendix 12.15
Documentation of pre-interagency consultation dialogue (conference calls, etc.)	40 CFR Part 93.105(b)	Discussion Contained In Conformity Document	Chapter 10 Appendix 12.15
Questions and comments raised through interagency consultation process and responses	40 CFR Part 93.105(b)(2)	Electronic File	Appendix 12.15
Evidence of Public Participation and Response to Comments	40 CFR Part 93.105(7)(e)	Discussion Contained In Conformity Document. Response to comments (Electronic File)	Chapter 11 Appendix 12.16
General			
Glossary of Abbreviations		Discussion contained in Conformity Document	This conformity document, pg. 10
Endorsements and/or Resolutions		Electronic File	Appendix 12.1

3.5 Emissions Analysis

A regional emissions analysis is a required component of the transportation conformity process. It is conducted to demonstrate regional emissions from on-road mobile sources do not exceed the established area’s MVEB, cause or contribute to violations of the NAAQS, and to ensure transportation activities are consistent with air quality goals identified in the SIP.

3.5.1 Regional Inventory

This conformity analysis of the Bexar County nonattainment area accounts for emissions resulting from the nonattainment area’s MTP (*Mobility 2050*) including all regionally significant projects located within the Bexar County nonattainment area boundary.

3.5.2 Emissions Tests

This conformity determination uses the two interim emissions tests ([40 CFR Part 93.119\(b\)\(2\)](#)) available to nonattainment areas which have no prior ozone NAAQS budgets. Both tests were utilized to demonstrate conformity since the San Antonio, TX

nonattainment area was reclassified as moderate nonattainment effective November 7, 2022.

In the first test, the transportation emissions reflecting the proposed MTP or TIP in the analysis year (the “build” or “action scenario”) must be less than the level of motor vehicle emissions in the baseline year. All conformity determinations using the baseline year test as an interim emissions test must use 2017 as the baseline year ([40 CFR Part 93.119\(e\)\(4\)](#)). Exhibit 3.5.2-1 outlines the baseline NO_x and VOC levels for the Bexar County nonattainment area.

Exhibit 3.5.2-1 Baseline Year Emissions for the Bexar County Nonattainment Area

Nonattainment Area	NO _x (tons/day)	VOC (tons/day)
2017 Baseline	35.38	22.49

As noted, “moderate” non-attainment areas are subject to two interim emissions tests: the aforementioned less-than-baseline-year test, and the build-less-than-no-build test ([40 CFR Part 93.119\(b\)\(1\)](#)). Which uses a no-build “Baseline” scenario including the existing roadway network existing TDM and TSMO programs, projects programmed in the first year of the *current* TIP and MTP, projects under construction, as well as projects which have begun acquisition of right-of-way or completed the NEPA process ([40 CFR Part 93.119\(h\)](#)). This no-build network is analyzed in the Travel Demand Model using the same conditions of the analysis years of the “action” scenario to show the proposed transportation projects in the new MTP and/or TIP will produce lesser emissions than the roadway network that is currently existing and committed in the current conforming TIP and/or MTP.

As of early 2022, and the beginning of the development of AAMPO’s *Mobility 2050* and the FY 2023-2026 Transportation Improvement Program, the Bexar County non-attainment area was classified as “marginal,” thus requiring a conformity demonstration using only one of the two interim emissions tests. In consultation with the interagency consultative partners, AAMPO determined it would be in the region’s best interest to conduct both interim tests since reclassification was imminent. This approach has allowed AAMPO, in coordination with the IAC partners, to demonstrate conformity based on requirements for moderate nonattainment areas *prior to* FHWA’s and EPA’s approval of *Mobility 2050* and the FY 2023-2026 Transportation Improvement Program.

3.5.3 Analysis Years

The required analysis years when using an interim emissions test, based on [40 CFR Part 93.119\(g\)\(1\)](#), are:

- A year no more than five years beyond the year in which the conformity determination is being made;
- The last year of the timeframe of the conformity determination, and

- Intermediate years as necessary, such that analysis years are not more than ten years apart.

These requirements and the corresponding years are shown in the table below.

Exhibit 3.5.3-1 Required Analysis Years

Year	Requirement (40 CFR Part 93.119(g))
2017	Transportation conformity baseline year
2025	A year within five years of the year the conformity determination is being made (2022)
2035, 2045	Intermediate year(s)
2050	Last year of the metropolitan transportation plan

3.5.4 Analysis Results

This emissions analysis for determining transportation conformity was performed under [40 CFR Part 93.119](#). The vehicle emission results shown below in Exhibits 3.5.4-1, 3.5.4-2, 3.5.4-3, 3.5.4-4 demonstrate the Bexar County nonattainment area meets the conformity requirements for a moderate nonattainment area. Development of Exhibit 3.5.4-4 uses emissions reductions from Congestions Mitigation and Air Quality projects and its development is further discussed in Chapters 8 and 9.

Exhibit 3.5.4-1 2023 Transportation Conformity for the Bexar County Nonattainment Area Emissions of Nitrogen Oxides

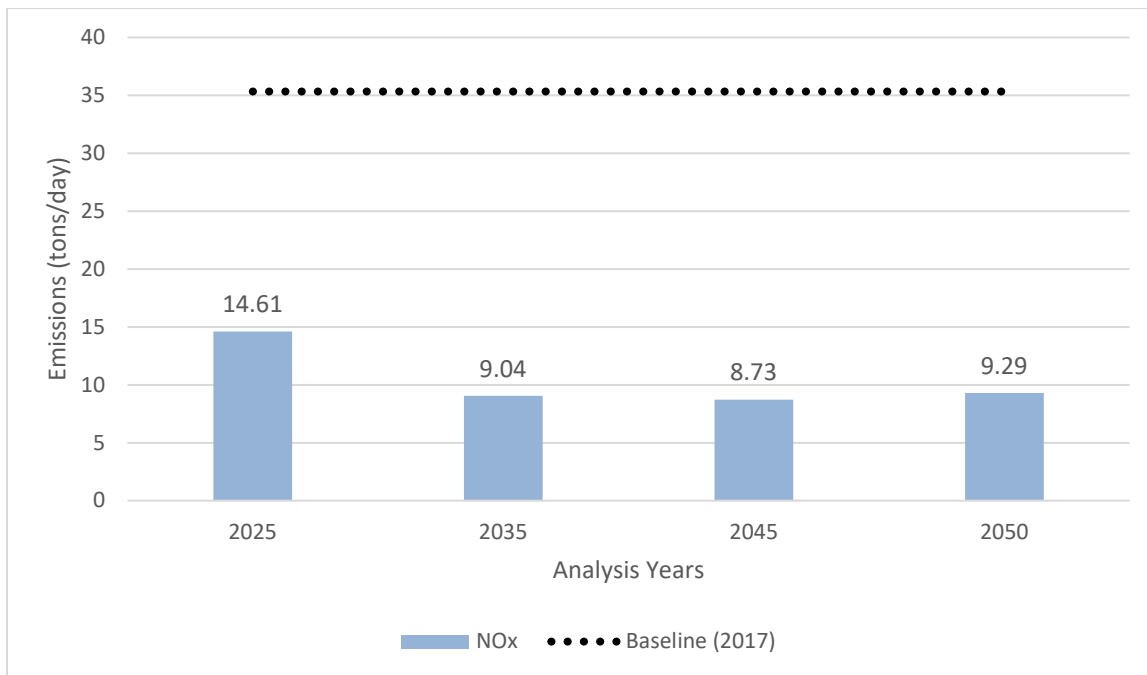


Exhibit 3.5.4-2 2023 Transportation Conformity for the Bexar County Nonattainment Area Emissions of Volatile Organic Compounds

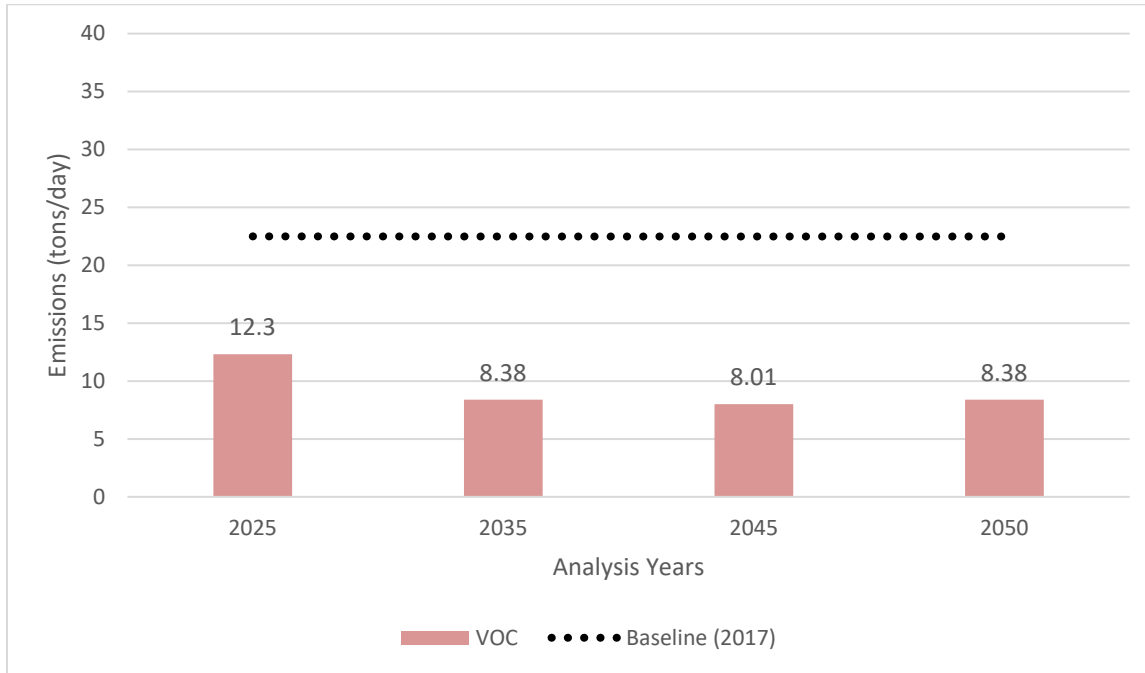


Exhibit 3.5.4-3 2023 Transportation Conformity “Build v. No-Build” Results Summary

Year	Build (“Action”)		No-Build (“Baseline”)	
	NOx	VOC	NOx	VOC
2017	35.38	22.49	N/A	N/A
2025	14.61	12.30	14.61	12.30
2035	9.04	8.38	9.01	8.38
2045	8.73	8.01	8.69	8.02
2050	9.29	8.38	9.26	8.40

Exhibit 3.5.4-4 Final Emissions Analysis Results, Including Emissions Reductions from Eligible CMAQ Projects

Year	Build (“Action”) – including CMAQ (tons/day)		No-Build (“Baseline”) (tons/day)	
	NOx	VOC	NOx	VOC
2017	35.38	22.49	N/A	N/A
2025	14.52	12.26	14.61	12.30
2035	8.93	8.34	9.01	8.38
2045	8.62	7.97	8.69	8.02
2050	9.18	8.34	9.26	8.40

Chapter 4: *Mobility 2050* and FY 2023-2026 TIP

4.1 Overview

The Alamo Area MPO's Metropolitan Transportation Plan (MTP), *Mobility 2050*, reflects the transportation needs of AAMPO's three and one-half county metropolitan planning area. It is a long-range plan that identifies mobility and access goals for our region, strategies to meet these goals, and priority actions to be implemented by 2050. The geographic area covered by this plan includes Bexar County, Comal County, Guadalupe County, and a portion of Kendall County (Exhibit 1.2-1). AAMPO ensures the transportation planning in the Alamo Area is in accordance with Section 112 of the Federal Highway Act of 1973. The Transportation Policy Board (TPB) is AAMPO's policy body and oversees the regional transportation planning process. It continues to be the forum for continuous, comprehensive, and cooperative decisions on transportation planning in the region.

4.2 Submittal Frequency

Bexar County was designated a marginal nonattainment area under the 2015 ozone NAAQS, effective September 24, 2018. The designation triggered the region's first determination of transportation conformity, due by September 24, 2019, from AAMPO and the U.S. Department of Transportation (DOT).

AAMPO and DOT must determine the conformity of an MTP and TIP in nonattainment areas no less frequently than every four years ([40 CFR Part 93.104](#)). Every determination must include a new regional emissions analysis.

Each new MTP or revision to an MTP must be found to conform before the transportation plan is approved by the MPO or accepted by the DOT. A determination of transportation conformity is based on the MTP and revision taken as a whole. Only revisions listed in [40 CFR Part 93.126](#) or [40 CFR Part 93.127](#) and [40 CFR Part 93.128](#) are exempt from this requirement.

A new or revised TIP must also conform before the TIP is approved by the MPO or accepted by the DOT. A TIP amendment requires a new conformity determination for the entire TIP before the amendment is approved. The only allowable exceptions are those found at [40 CFR Part 93.126](#) or [40 CFR Part 93.127](#) or [40 CFR Part 93.128](#).

Transportation conformity determinations can also be triggered if EPA approves or makes an adequacy determination of State Implementation Plans (SIP) revisions which establish or revise Motor Vehicle Emissions Budgets (MVEB).

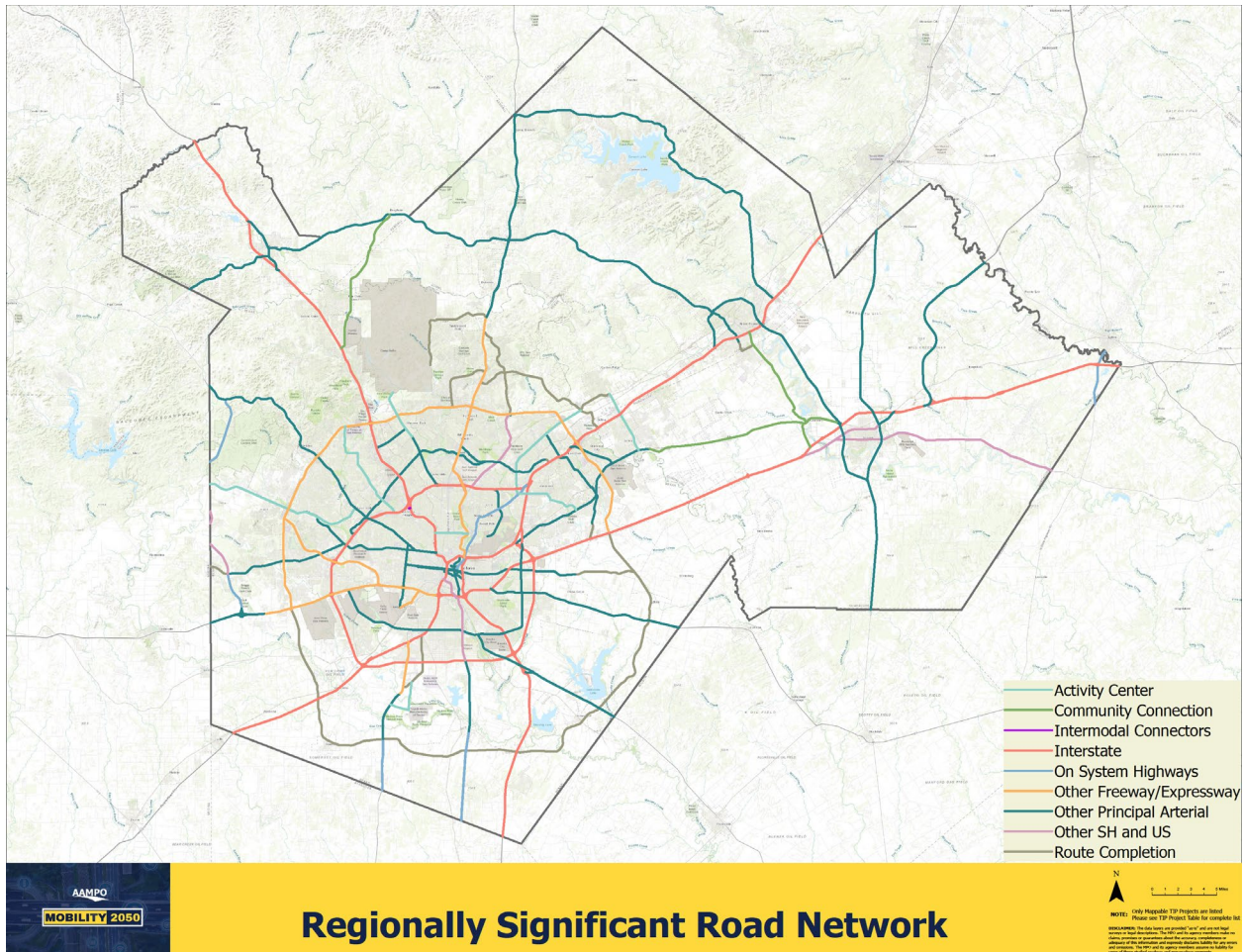
4.3 Regionally Significant Travel Projects/Programs

Projects determined to be regionally significant, except as specifically exempted under [40 CFR Part 93.126](#) and [40 CFR Part 93.127](#), must come from a conforming MTP and TIP, or be individually found to conform prior to the issuance of federal approvals and other actions. AAMPO has developed the following definition to classify projects as regionally significant for transportation conformity purposes:

- Those facilities federally functionally classified as interstate freeways, other freeways or expressways;
- Those facilities federally functionally classified as principal arterials;
- Roadways and intermodal connectors included in the federally adopted National Highway System;
- Roads designated as SH or US routes;
- Community connections that provide direct, continuously signed connections between nearby or adjacent census defined urbanized areas, urban clusters and population centers with more than 5,000 people;
- Roadways between activity centers that serve as primary regional connectors to an otherwise unserved regional activity center;
- Extensions of Regionally Significant Roadways to connect non-connecting termini;
- Fixed guideway transit facilities that offer an alternative to regional highway travel;
- Tollways as documented in the Metropolitan Transportation Plan; and
- Grade-separated interchange projects on Regionally Significant Roadways where no access existed previously.

Exhibit 4.3-1 illustrates the roadway system within Bexar County that meets the definition of regionally significant. These roads are subject to transportation and project-level conformity determinations. All regionally significant roads in the AAMPO study area, including those outside the Bexar County nonattainment area, can be viewed online at: <http://www.alamoareampo.org/imap/> (check “on” the layer titled “Regionally Significant Roads”). Appendix 12.6 describes the local process undergone to identify a regionally significant roadway system.

Exhibit 4.3-1 Regionally Significant Roads in MPO Study Area



4.4 Non-Federal Projects/Programs

The MTP must include the design concept and descriptions for all existing and proposed regionally significant transportation projects, regardless of funding source ([23 CFR Part 450.324\(f\)\(9\)](#)). Further, it must also identify all necessary financial resources from public and private sources that are reasonably expected to be available to carry out the plan. Such regionally significant projects are included within the plan’s conformity determination.

Non-federal projects funded by sources such as local governments and local transportation authorities, such as signal improvements, intersection improvements and local roadway widening, may be of insufficient scale or scope to require inclusion within a transportation conformity regional emissions analysis. These “non-regionally significant” projects that do not require any federal project approval actions (i.e. environmental clearance or permit approvals) are not individually listed within the MTP or TIP.

4.5 Exempt Projects/Programs

Several project types are exempt from the requirement of a transportation conformity determination. Revisions to a conforming MTP or TIP that simply add or delete exempt projects do not trigger a new conformity determination.

Some of the exempt projects listed under [40 CFR Part 93.126](#) include:

- continuation of ridesharing and vanpooling promotion activities at current levels,
- bicycle and pedestrian facilities,
- railroad/highway crossing,
- pavement resurfacing and/or rehabilitation,
- adding medians,
- widening narrow pavements or reconstructing bridges (no additional travel lanes), and
- purchasing new transit vehicles to replace existing vehicles or for minor fleet expansion.

[40 CFR Part 93.127](#) identifies a number of project types exempt from a regional emissions analysis, but that may require project-level conformity in areas that are nonattainment for carbon monoxide or particulate matter. This does not pertain to the Bexar County nonattainment area.

Additionally, [40 CFR Part 93.128](#) exempts traffic signal synchronization projects but requires those which are regionally significant be included in subsequent regional emissions analyses.

4.6 Constraints

One of the key requirements of the MTP and TIP is financial constraint. This constraint is intended to ensure the total estimated cost of projects included in the MTP does not exceed reasonably available estimated revenues. A conformity determination on financially constrained plans ensures conformity findings are based on realistic plans and programs, Transportation Control Measures (TCMs), and other projects that may be beneficial to air quality are funded.

4.6.1 Long-Range Financial Constraint (MTP)

The MTP's financial element must identify all sources of funds reasonably expected to be available and any innovative financial strategies that may be necessary to implement the MTP. The financial element of the MTP is documented in *Mobility 2050: The Metropolitan Transportation Plan for the Alamo Area MPO* and is included as Appendix 12.2.

4.6.2 Short-Range Financial Constraint (TIP)

Financial constraint is also required for a conforming TIP, with funds programmed being equal to the total funds available. The TIP comprises the first four years of transportation activities in the MTP. The requirement of financial constraint ensures those activities committed to be funded in that timeframe have the financial resources available for implementation. The FY 2023-2026 TIP is included as Appendix 12.3.

Chapter 5: Estimation of Vehicle Activity

5.1 Travel Demand Model Overview (Regional SAMM5.0 TDM)

AAMPO’s travel demand model (TDM), called San Antonio Multimodal Model (SAMM 5.0), was validated to 2020 and serves as the source for forecasting vehicle miles of travel (VMT) and other travel characteristics for AAMPO’s five-county model region (Bexar, Comal, Guadalupe, Kendall and Wilson Counties). Although the model is run for the entire 5-county region, subareas such as the AAMPO planning region (Bexar, Comal, Guadalupe, and part of Kendall Counties), individual counties or specific travel corridors can easily be “clipped out” for further processing. This method is used to further process the modeling characteristics for the Bexar County nonattainment area.

The network-based TDM is executed in the TransCAD environment, which is a Geographic Information System-based commercial travel demand software package for transportation planning. AAMPO is responsible for the development and application of the Regional TDM.

SAMM5.0 generates travel for 4 daily time periods outlined in Exhibit 5.1-1.

Exhibit 5.1-1 TDM Daily Time Periods

Time Period	Description
A.M. Peak	6:00AM - 9:00AM
Midday	9:00AM - 3:00PM
P.M. Peak	3:00PM - 7:00PM
Overnight	7:00PM – 6:00AM

The methodology for developing and validating a regional travel demand model involves a number of distinct steps:

- Develop base year (2020) demographic database;
- Develop base year (2020) roadway network database;
- Develop Tripcal5 Trip Generation model;
- Develop Destination Choice Trip Distribution model;
- Develop the Mode Choice model;
- Develop vehicle and transit assignment models; and
- Cycle through the TDM process until the 2020 model is validated as compared to observed 2020 traffic counts and transit riders.

The most recent model calibration and validation was performed for base year 2020. The prior 2015 base year model was re-calibrated/validated using 2020 (pre-COVID19) regional traffic counts and 2019 transit ridership. This effort also included a re-forecast

of county-wide demographic data, which was allocated to individual Traffic Analysis Zones (TAZ) by the AAMPO consultant in cooperation with the Demographics Review Committee. The 2020 county-wide population estimates from the State Data Center were used as the control totals for each of the five counties within the modeling region. TAZ population, households, income and employment were interpolated for all analysis years, 2020 (new base year), and forecast data for 2025, 2030, 2035, 2040, 2045 and 2050.

Network Development was performed to create representations of the five-county highway and transit systems. For the roadway network, both physical and operational characteristics are coded or generated by the model for each link. These include Functional Class, Facility Type, Area Type (zonal density), Lanes, Direction (1-way/2-way), Access (divided/undivided), Average Daily Speed, Congested (loaded) Speed, Capacity and Counted/Forecast traffic volumes. As part of the network requirements for transportation conformity, several other link attributes were added including Annotations (Letting Years), Descriptions (for Projects), TxDOT CSJ ID's, and AAMPO Project IDs. An additional Edits field indicates the origination year of each network link. This, along with the letting year, is used to determine the "open and operational" year so the project can be placed into the correct analysis year network. TransCAD network coding is now performed via the Master Network process, whereby every network project, or change, is present in the Master. This new process expedites the exportation of any year forecast networks and cleans up coding issues with duplicate Link ID's.

For the transit network, Routes, Headways, Stops, Access (walk or park) and Fares are coded. The transit network also contains (auto-generated) dedicated walk links from Centroids to Stops.

The Facility Type Codes outlined in Exhibit 5.1-2 are used for the 2020 and all forecast roadway networks.

Exhibit 5.1-2 Facility Type Codes

Facility Type Code		
1. Radial IH FWY	10. Loop EXPY	19. Collector-Und
2. Radial HOV/Mgd FWY	11. Principal Art-Div	20. Frontage Rd
3. Loop IH FWY	12. Principal Art-CLT	21. Freeway Ramp
4. Loop HOV/Mgd FWY	13. Principal Art-Und	22. Direct Ramp
5. Radial Other FWY	14. Minor Art-Div	23. HOV/Mgd Ramp
6. Radial Other HOV/Mgd	15. Minor Art-CLT	24. Transit Link
7. Loop Other FWY	16. Minor Art-Und	99. Transit Walk
8. Loop Other HOV/Mgd	17. Collector-Div	
9. Radial EXPY	18. Collector-CLT	

In addition to facility type, each network link is associated with an area type (AT). ATs are defined by TAZ density and used to set roadway speeds and capacities. Changes in densities and area types over time enable the model networks to properly represent roadway and transit performance within various types of urban settings. Generally, as urban density increases, roadway speeds decline and capacities increase. Exhibit 5.1-3 outlines the five area types, from highest to lowest density, reading from left to right.

Exhibit 5.1-3 Area Types

Area Type*				
Central Business District (CBD)	CBD Fringe (Urban Dense)	Urban Residential	Suburban Residential	Rural
*Highest to lowest density from left to right				

A brief description of the 2020 Travel Demand Model steps is provided in section 5.2. Appendix 12.4 provides a more complete description of the TDM model development and calibration/validation.

5.2 Multimodal Transportation Analysis Process

The forecasting techniques used by AAMPO are based on a four-step process designed to model observed travel behavior and predict the level of travel demand by region (5-county), AAMPO’s study area, County (Bexar nonattainment area), and sub-area or specific travel corridors. The four model steps are: Trip Generation, Trip Distribution, Mode Choice, and Roadway/Transit Assignment. A detailed explanation is included in Appendix 12.4.

5.2.1 Trip Generation Model

The basic geographic unit for the travel demand modes is the traffic analysis zone (TAZ). The Trip Generation model (TRIPCAL5), which has been integrated into the SAMM 5.0 TDM estimates trip productions and trip attractions by trip purpose for each internal TAZ. There are 1,317 TAZs in the five-county region modeled by AAMPO. The various trip purposes used in AAMPO’s model are outlined in Exhibit 5.2.1-1.

Exhibit 5.2.1-1 Trip Purposes

Trip Purpose
Home-based Work
Home-based Non-work Retail
Home-based Non-work Other
Home-based Non-work Education (Grades 1-12)
Home-based Non-work Education (College, Trade)
Non-work Airport
Non-home-based
Non-home-based (Visitor/Commuter)
Commercial Truck and Taxi
External-local Commercial Truck
External-local Non-commercial
External Through

TRIPCAL5, the Trip Generation model, estimates zonal trip productions by purpose from zonal households, persons per household, income and household workers. The model next estimates zonal trip attractions from zonal employment and zonal Area Types. The model also ensures total trip productions equal total trip attractions for each trip purpose, so that every completed trip will have two trip ends.

Within the Trip Generation model, the concept of market segmentation is first applied, segmenting (or disaggregating) person trip ends into various trip types, income, and auto sufficiency groups based upon the zonal characteristics from which they originate. These market segments are carried forward into the Trip Distribution and Mode Choice models to improve the estimation of trip destinations (Destination Choice Model) and the estimation of selected travel modes.

5.2.2 Trip Distribution Model

The Trip Distribution Model (Destination Choice) determines the interaction between each zone within the AAMPO study area. Trips are allocated to competing destinations based on observed trip length frequencies and the attractiveness (number of trip attractions) of each TAZ. Using the trip purpose and “market segmentation” by trip purpose and income to inform the destination choice model of the relative characteristics of the traveler, the model estimates appropriate destination choices for the attraction end of the trip. This step produces completed trip interchanges with reasonable overall trip length and travel time characteristics. Again, the market segmentation is carried forward in the form of TAZ to TAZ trip matrices segmented by trip purpose and traveler characteristics. Reasonableness checks are performed after

this step to ensure modeled trip orientation matches (sector-to-sector) observed travel flows.

5.2.3 Mode Choice Model

The Mode Choice (Nested Logit) model subsequently determines the mode of travel selected by travelers. These decisions are based upon characteristics of (1) the trip maker (income and auto sufficiency); (2) the trip (purpose, length and orientation); and (3) the availability and utility of the competing transportation modes. The mode choice model produces travel for each of the four time periods for the modes listed in Exhibit 5.2.3-1.

Exhibit 5.2.3-1 Mode Choices Modeled

Mode Choice
Drive Alone
Shared Ride 2
Shared Ride 3+
Bus Local/Express (walk access)
Bus Local/Express (drive access)
Bicycle
Walk

5.2.3 Roadway & Transit Assignment Model

Finally, the Traffic Assignment model (TransCAD User Equilibrium) loads the travel demand (trips) to the roadway network, calculates delay for congested links and re-assigns as necessary to achieve network equilibrium. For future year networks (containing managed lanes), additional steps are necessary to properly assign travel to the managed facilities.

Two products of the Traffic Assignment Model are the regional traffic loads and transit demand. Analyses of vehicle flow, and current or future congestion, are often used to examine a variety of alternatives for future transportation systems.

The Transit Assignment model (TransCAD) simply assigns the transit riders to the appropriate routes, according to access/egress (stops), and the need for possible transfers between or among modes.

5.3 Speed Estimation Procedure

As part of the TDM calibration process, network (input) speeds are estimated for each roadway facility type and further stratified by area type. The input speeds represent average daily travel speeds, which produce average travel times for weekday travel.

Speeds on facilities that are access controlled (freeways/expressways) are the faster speeds and decline for facilities affected by traffic controls at intersections. Speeds also decline as area types become denser, which is indicative of typical urban, suburban and rural activities affecting travel behavior.

In addition to input speeds, the SAMM5.0 modeling process contains a speed feedback loop. This process degrades the network input speeds through a traditional Bureau of Public Roads (BPR) curve, which is calibrated for the San Antonio region. Thus, speeds are degraded as volume-to-capacity ratios (on a link-by-link basis) increase. The degraded speeds are recycled through model steps 2-4 (distribution, mode choice and assignment) and adjusted through five iterations to achieve a reasonable set of consistent speeds as used by each model step. The final set of (loaded) link speeds produced by the model consists of directional speeds for all facility types, area types and for the four (weekday) daily time periods.

Transit or bus speeds are also estimated by the modeling process. As most of the transit routes operate on roadways, the transit speeds begin with the roadway speeds and are adjusted (within the speed feedback loop). The transit route speeds are also further degraded based upon transit wait and dwell times calculated by transit routes. For those transit routes operating in their own dedicated or restricted transit lanes, the roadway input speeds are not affected by congestion.

5.4 Local Speed VMT

Local streets are not included in the regular roadway network coding, except for those used by transit (transit links). Local street speeds as well as local street VMT are estimated outside the modeling process so total VMT can be reconciled with Highway Performance Monitoring System (HPMS) VMT.

5.5 Model VMT Adjustments

Federal regulations require HPMS VMT to be the primary measure of VMT within a nonattainment area. AAMPO provided TDM data sets, including trip matrices and four-time-period, directional, average non-summer weekday traffic (ANSWT) assignments, to the Texas A&M Transportation Institute (TTI) for emissions analysis. TTI post-processed the data sets to determine average summer weekday, county-coded, hourly, directional network link VMT and volumes consistent with HPMS VMT, and added intrazonal link VMT estimates. The TDM network ANSWT VMT plus intrazonal ANSWT VMT is referred to as “total model VMT”. The methodology followed is consistent with the procedures TTI uses to develop model adjustment factors for the other urban areas within Texas.

The summer weekday and hourly distribution factors were developed using eight-year TxDOT Automatic Traffic Recorder (ATR) traffic count data (2013-2020.)

5.5.1 2017 Historical Year HPMS Consistency and Summer Weekday Adjustments

HPMS consistency: The 2017 historical year total model VMT was adjusted to summer weekday VMT using county-level VMT control totals. The VMT control total is the annual average daily traffic (AADT) HPMS VMT (from TxDOT’s 2017 Roadway Inventory Annual Report) for each county, adjusted to the summer weekday form using the seasonal adjustment. County control total VMT divided by county total model VMT produces the VMT adjustment factor, which is applied per county at the link level to calculate total model VMT.

Seasonal adjustment: The seasonal (summer) weekday factor for converting county AADT HPMS VMT to county summer weekday VMT control totals was calculated as the ratio of the average summer weekday-to-AADT to Automatic Traffic Recorder (ATR) counts.

5.5.2 2025, 2035, 2045, and 2050 Forecast Years HPMS Consistency and Summer Weekday Adjustments

HPMS consistency: TTI applied an HPMS adjustment factor to total model link-level VMT for each year. The validation year HPMS adjustment factor was calculated as 2020 HPMS VMT (first adjusted to ANSWT form using the ANSWT/AADT ATR count ratio using eight-year TxDOT Automatic Traffic Recorder (ATR) traffic count data (2013-2020) divided by 2020 validation year total model VMT.

Seasonal adjustment: A county-level seasonal (summer) weekday factor was produced and used with the 2025, 2035, 2045 and 2050 analysis years. This factor was calculated as the ratio of the summer weekday-to-ANSWT counts.

Exhibits 5.5.2-1 and 5.5.2-2 outline the validation year HPMS factor and analysis year seasonal (summer) weekday factor.

Exhibit 5.5.2-1 HPMS Factor

2020 HPMS AADT VMT	AADT-to-ANSWT Factor ¹	HPMS-Based ANSWT VMT	2020 TDM VMT	HPMS Factor ²
52,940,988.56	1.040896	55,106,088.66	66,910,614.62	0.823578

¹ This is a rounded summary value from the factor used in the calculation.

² This HPMS factor is new (a change from prior analysis), based on the new 2020 TDM validation year, 2020 HPMS AADT VMT, and updated AADT-to-ANSWT factor.

Exhibit 5.5.2-2 Summer Weekday (SWKD) Factors for 2017 Baseline Year and 2025, 2035, 2045 and 2050 Future Years

Year	Seasonal Factor Type	Factor
2017 (Baseline)	AADT-to-SWKD	1.061642
2025 and later	ANSWT-to-SWKD	1.019930

5.5.3 Summer Weekday Hourly VMT Distribution

County level, summer weekday, hourly travel factors were developed and used to allocate the 24-hour link VMT/volume estimates to each hour of the day. A single set was used for all analysis years. In order to maintain VMT proportions within each of the four time periods, the hourly fractions were normalized within each time period. Exhibit 5.5.3-1 outlines the summer weekday hourly VMT distributions.

Exhibit 5.5.3-1 Summer Weekday Hourly VMT Distributions

Period	Hour	24-Hour-Period	Four-Period ¹
AM Peak 3-Hrs.	6-7 a.m.	0.051554	0.300719
	7-8 a.m.	0.063814	0.372235
	8-9 a.m.	0.056068	0.327046
Mid-Day 6-Hrs.	9-10 a.m.	0.049152	0.153713
	10-11 a.m.	0.048929	0.153014
	11 a.m.-12 p.m.	0.051938	0.162426
	12-1 p.m.	0.054943	0.171822
	1-2 p.m.	0.056041	0.175255
	2-3 p.m.	0.058763	0.183770
PM Peak 4-Hrs.	3-4 p.m.	0.066025	0.235632
	4-5 p.m.	0.072216	0.257725
	5-6 p.m.	0.077727	0.277396
	6-7 p.m.	0.064236	0.229247
Overnight 11-Hrs.	7-8 p.m.	0.047652	0.208457
	8-9 p.m.	0.038567	0.168714
	9-10 p.m.	0.032914	0.143987

Period	Hour	24-Hour-Period	Four-Period ¹
	10-11 p.m.	0.024852	0.108716
	11 p.m.-12 a.m.	0.017127	0.074923
	12-1 a.m.	0.010126	0.044297
	1-2 a.m.	0.006897	0.030170
	2-3 a.m.	0.005988	0.026194
	3-4 a.m.	0.006551	0.028658
	4-5 a.m.	0.010707	0.046840
	5-6 a.m.	0.027213	0.119044
¹ To maintain VMT proportions within the four periods, the hourly fractions were normalized within each period.			

5.5.4 Directional Factors

Directional split factors were applied to total link volumes by functional class and area type. The directional factors were created by aggregating TDM link-level volumes by direction for each functional class/area type. Link-level AB directional volumes were divided by total volumes for each functional class/area type to estimate the directional split. This process was used for each TDM analysis year and time period.

5.5.5 Hourly Congested Speeds

TTI estimated directional, hourly operational link speeds using the TTI speed model, which estimates delay on each link as function of volume-to-capacity and applies it to the link's estimated free-flow speed. TTI estimated the local streets category link average operational speeds, represented by the centroid connector links, as centroid connector TDM input speeds and, represented as added intrazonal links, as the zone's average centroid connector input speed.

5.6 Transit System

VIA Metropolitan Transit (VIA) is the only fixed route transit provider within Bexar County, serving an area over 1,220 square miles that includes unincorporated parts of Bexar County as well as Alamo Heights, Balcones Heights, Castle Hills, China Grove, Cibolo (Bexar County portion only), Converse, Elmendorf, Kirby, Leon Valley, Olmos Park, San Antonio, Shavano Park, Sandy Oaks, St. Hedwig, and Terrell Hills. Assumptions regarding the level of transit service for this transportation conformity determination are consistent with VIA's Vision 2040 long-range comprehensive transportation plan.

5.6.1 Transit VMT

The mode choice model forecasts the number and the routing of the transit person trips. (Person Trip Summaries by Mode for all analysis years are outlined in Appendix 12.9.) Transit trips are assigned to the individual transit routes, based upon trip origins and destinations. Buses, which are typically viewed as large commercial vehicles, are accounted for in the traffic assignment model, so transit VMT would be included. The travel demand model does not explicitly estimate VMT made by transit vehicles, but emissions made by transit bus are captured in the vehicle fleet assumptions in the emission model. Usually, however, improved transit service (current or projected) would result in higher transit usage, which would reduce auto driver trips, VMT and emissions.

5.7 Roadway Travel & VMT by Time of Day

VMT estimates are provided by functional class and area type. VMT estimates for each analysis year are listed in Appendix 12.5.

5.7.1 Average Loaded Speeds

Average Loaded Speeds are provided by functional class and area type. Final loaded speeds for each analysis year are listed in Appendix 12.5.

5.7.2 Centerline and Lane Miles

Centerline miles and lane miles are provided by functional class and area type for each analysis year are listed in Appendix 12.5.

Chapter 6: Estimation of Off-Network Activity

County-level, hourly estimates of the source-hours-parked (SHP) and starts activity were required for each vehicle type to estimate the off-network (or parked vehicle) emissions. Source hours extended idling (SHEI) and auxiliary power unit (APU) hours estimates were needed for combination long-haul trucks. For estimation of the SHP and vehicle starts, vehicle population estimates were also needed. Appendix 12.13 contains the vehicle population and hourly SHP, starts, SHI and APU hours.

6.1 Estimation of Vehicle Population

Vehicle population estimates are needed to estimate the SHP and starts off-network activity. The vehicle population estimates were based on TxDMV registration data (latest available [2018 end-of-year]), vehicle population factors derived from the VMT mix and county-level VMT-based growth estimates for future years where actual registration data were not yet available.

6.1.1 Vehicle Population Estimates for 2017, 2025, 2035, 2045 and 2050

Since registration data were not available for future year analyses, the most recent TxDMV registration data sets (2018 end-of-year) were used. This data included vehicle population aggregated by vehicle registration category (Exhibit 6.1-1). Since the TxDMV registration data does not include each MOVES source use type and fuel type (SUT/FT) combination, vehicle population factors are developed using the 24-hour VMT mix for the analysis year. These factors are applied to vehicle registrations aggregated by category to split each category into each SUT/FT combination included in the analysis. This resulted in the base (2018) vehicle population estimates.

For each analysis year, VMT-based growth estimates were then calculated by dividing county, analysis year, summer weekday VMT by county, 2018 summer weekday VMT. These growth estimates were applied to the base vehicle population estimates to scale from the 2018 base to each analysis year estimate.

Exhibit 6.1-1 TxDMV Vehicle Registration Aggregations and Associated Vehicle Types for Estimating Vehicle Populations

Vehicle Registration ¹ Aggregation	Associated Vehicle Type ²
Motorcycles	MC_G
Passenger Cars (PC)	PC_G; PC_D
Trucks ≤ 8,500 gross vehicle weight rating (GVWR) (pounds)	PT_G; PT_D; LCT_G; LCT_D
Trucks > 8,500 and ≤ 19,500 GVWR	RT_G; RT_D SUSht_G; SUSht_D MH_G; MH_D IBus_D TBus_G; TBus_D SBus_G; SBus_D
Trucks >19,500 GVWR	CShT_G; CShT_D
NA ²	SULht_G; SULht_D CLht_G; CLht_D
<p>¹ To estimate vehicle populations, TxDMV county registration data extracts were used, consisting of: 1) light-duty cars, trucks, and motorcycles; 2) heavy-duty diesel trucks; and 3) heavy-duty gasoline trucks.</p> <p>² Vehicle population factors are the 24-hour weekday VMT mix fraction for each vehicle type in a category divided by the sum of the VMT mix fractions for all vehicle types in a category, except long-haul trucks. The four long-haul vehicle type populations are estimated using a long-haul-to-short-haul VMT mix ratio applied to the short-haul SUT population estimate.</p>	

6.2 Estimation of Source Hours Parked

The first activity measure needed to estimate the off-network emissions are county-level estimates of SHP by hour and vehicle type. The SHP was estimated as a function of total hours (hours a vehicle exists) minus its hours of operation on roads (source hours operating (SHO) is the same as VHT).

The vehicle type SHP estimates were calculated for each hour of the day based on the link VMT and speeds, the VMT mix used in the link-based emissions analysis, and the vehicle population estimates.

The VMT mix was applied to the link VMT to produce VMT estimates by vehicle type. Link VMT was divided by the link speed to produce SHO estimates. SHO was aggregated across links, then subtracted from source hours (equal to vehicle population since source hours equal number of hours in the period) resulting in SHP estimates by vehicle type. This was performed for each analysis year, county, and hour of day.

6.3 Estimation of Starts

The second activity measure needed to estimate the off-network emissions are county-level estimates of starts by hour and vehicle type. Engine starts were based on the MOVES national default starts per vehicle per hour by vehicle type and the local vehicle type vehicle population estimates.

MOVES default weekday starts per vehicle were calculated using MOVES national scale inventory mode national default run activity output, as vehicle starts (for the MOVES weekday day type) divided by vehicle population. This was performed by hour and SUT/fuel type.

The local vehicle starts activity estimates were calculated as the product of national default starts/vehicle and the local vehicle type population estimates. The weekday vehicle starts estimates for each vehicle type were calculated by county, analysis year, and hour of day.

6.4 Estimation of Source Hours Idling and Auxiliary Power Unit Hours

The final activity measures needed to estimate the off-network emissions are emissions-producing hotelling activities. During hotelling, the truck's main engine is assumed to be in idling mode, its diesel auxiliary power unit is in use, it is using electric power, or no power. Hotelling hours were first estimated followed by the hours attributed to the two emissions-producing hotelling components, SHI and diesel APU hours.

County, analysis year, and summer weekday hotelling hours were first estimated using 24-hour weekday hotelling hour estimates for a 2017 baseline year (new estimates from recent TCEQ extended idling study); baseline and analysis year scenario VMT, speeds, and VMT mix; and analysis year scenario SHP estimation data.⁵

The 2017 baseline year county hotelling hours estimates for a 24-hour weekday from the TCEQ study were scaled to each analysis scenario using the ratio of analysis scenario-to-baseline combination long-haul truck 24-hour VMT (as truck VMT increases, so does the hotelling activity).

The 24-hour hotelling estimates were then distributed to each hour of day using the hotelling hours hourly distribution calculated for the analysis scenario as the inverse of the hourly distribution of VHT (or SHO, from the SHP calculation process) for combination long-haul trucks. Within each hour, SHP and hotelling hours were compared, and if hotelling hours exceeded SHP, hotelling hours were set equal to SHP.

⁵ Baseline estimates of hotelling hours are 2017 winter weekday estimates, developed by TTI as part of the truck extended idling study that produced county 24-hour hotelling estimate totals for all Texas counties, sponsored by TCEQ starting in 2017.

SHI and APU hours components of hotelling hours were then estimated for each hour using the hourly hotelling hours estimates, combination long-haul truck travel fractions (calculated from local age distributions and MOVES default relative mileage accumulation rates) and hotelling activity distributions for each model year (Exhibit 6.4-1)⁶.

The SHI and APU hours activity distribution fractions were each first multiplied by the travel distribution (model year operating mode activity fraction multiplied by the associated model year travel fraction). The product of the SHI fractions and travel fractions were then summed to produce the total SHI fraction, and the same process was performed for APU hours to produce total APU hours fraction. (The sum of the SHI and APU hours fractions subtracted from 1.0, results in the fraction of hotelling hours with electric power or no power in use.)

The total SHI and APU hours fractions were then each multiplied by the hotelling hours for each hour of the day to produce the SHI and APU hours estimates for each hour. This was performed for each analysis scenario (analysis year summer weekday).

Exhibit 6.4-1 Hotelling Activity Distributions by Model Year

First Model Year	Last Model Year	Operating Mode Fraction by ID and Name			
		200	201	203	204
		Extend Idling	Diesel Aux	Battery AC	APU Off
1960	2009	0.8	0	0	0.2
2010	2020	0.73	0.07	0	0.2
2021	2023	0.48	0.24	0.08	0.2
2024	2026	0.4	0.32	0.08	0.2
2027	2050	0.36	0.32	0.12	0.2

⁶ Population and Activity of On-road Vehicles in MOVES3, https://cfpub.epa.gov/si/si_public_file_download.cfm?p_download_id=541844&Lab=OTAOQ

Chapter 7: Emission Factors / MOVES Model

7.1 Overview

This chapter discusses development of the regional motor vehicle emissions analysis for the Bexar County nonattainment area, including all key assumptions used in the process. A regional emissions analysis must be conducted for multiple analysis years to satisfy the requirements of [40 CFR Part 93.109](#) of the conformity rule for ozone nonattainment areas. The following sections discuss the analysis years and a description of the modeling processes used to conduct the analysis.

7.2 Emissions Factor Estimation Model

The United States Environmental Protection Agency (EPA) has developed the Motor Vehicle Emission Simulator (MOVES) model to estimate emissions for mobile sources covering a broad range of pollutants. The latest model is MOVES3. This emission analysis uses the December 2018 MOVES2014b release. Use of MOVES2014b is allowable in lieu of MOVES3 under a grace period effective until January 2023.

As outlined in the Pre-Analysis Consensus Plan included in Appendix 12.15, the Interagency Consultation (IAC) partners approved the use of MOVES2014b to develop 2017 (baseline year), 2025, 2035, 2045 and 2050 vehicle emission factors. Emission factors are one component in determining volatile organic compound (VOC) and nitrogen oxide (NO_x) emissions from the region's on-road vehicles. MOVES2014b input factors are outlined below in Exhibits 7.2-1 – 7.2-5.

Exhibit 7.2-1 MOVES2014b External Conditions

Command and Function	Input Parameter Values	Description
<p>MOVES Model Version Identifies the model version to be utilized for the analysis</p>	<p>MOVES2014b</p>	<p>MOVES2014a was released November 2015, then updated December 2015, November 2016, December 2017, August 2018 and December 2018. Texas A&M Transportation Institute (TTI) is using the latest and final MOVES2014 version, MOVES2014b, in lieu of MOVES3 at AAMPO's request.</p>
<p>Calendar Year Identifies calendar year for which emissions factors are to be calculated (Required to run model)</p>	<p>2017, 2025, 2035, 2045 and 2050</p>	<p>2017 baseline year and plan forecast years</p>
<p>Evaluation Month Provides option of calculating emissions factors for each month of the calendar year</p>	<p>7 (July)</p>	<p>Month of July is used to represent the summer season.</p>

Exhibit 7.2-2 MOVES2014b Input Parameters and Source

Input Parameter Name	Description	Source
Source Type Population	<p>Input the number of vehicles in the geographic modeling domain for each source use type (SUT).</p> <p>(MOVES source/type/year table.)</p>	<p>MOVES defaults for rates runs.</p> <p>TTI estimates local gasoline- and diesel-powered source type populations by analysis year for use external to MOVES in the estimation of county-level vehicle starts and source-hours-parked activity (needed in the external emissions calculations), per TTI's rates-per-activity, TDM-based method. Populations by SUT and fuel type are a function of Texas Department of Motor Vehicles (TxDMV) vehicle registration data (2018 is latest available) and VMT mix and, in the case of future years, population scaling factors.</p>
Source Type Age Distribution	<p>Input that provides the distribution of vehicle counts by age for each calendar year and MOVES source type. TxDMV registration data is used to estimate the age distributions of vehicle types up to 31 years. The distribution of age fractions should sum up to 1.0 for all vehicle types for each analysis year.</p> <p>(MOVES source/type/age/distribution table.)</p>	<p>TTI develops age distributions using TxDMV analysis year-specific vehicle registration data aggregated at the county-level for all vehicle classes except short-haul source types, which use the regional aggregation (five TDM counties), and the long-haul source types, which use the statewide level. All source type age distributions are estimated using the TxDMV data except for refuse trucks, motor homes and buses, which use MOVES defaults for the year of the local data. Latest available 2018 EOY registration data (for age distributions) will be used for the 2017 baseline and all future years.</p>
Vehicle Type VMT	<p>Input county-specific VMT distributed to 5 HPMS vehicle types (by MOVES "HPMSVtypeID").</p> <p>(MOVES hpmsvtype/year table.)</p>	<p>MOVES defaults for rates runs.</p> <p>Local activity estimates are applied in the link-based emissions calculations external to MOVES.</p>
Average Speed Distribution	<p>Input average speed fractions into 16 speed bins by SUT, road type, hour and day-type. The sum of</p>	<p>MOVES defaults for rates runs.</p>

Input Parameter Name	Description	Source
	<p>each speed distribution over the 16 speed bins by SUT, road type, hour and day-type is 1.0.</p> <p>(MOVES avg speed distribution table.)</p>	<p>Local activity estimates are applied in the link-based emissions calculations external to MOVES.</p>
Road Type Distribution (VMT Fractions)	<p>Input county specific VMT by road type. VMT fractions are distributed between the road types and must sum to 1.0 for each SUT.</p> <p>(MOVES road type distribution table.)</p>	<p>MOVES defaults for rates runs.</p> <p>Local activity estimates are applied in the link-based emissions calculations external to MOVES.</p>
Ramp Fraction	<p>Input county specific fraction of ramp driving time on rural and urban restricted roadway types.</p> <p>(MOVES road type table.)</p>	<p>Ramp fractions are set to zero. The restricted access roadway type emission rates output will be 100% restricted access roadway type, exclusive of ramps, which are processed separately. TTI's external link-level emissions calculation procedure applies MOVES unrestricted access roadway type emission rates to individual network links coded as ramps. (Separate ramp roadway type emission rates output is not available from MOVES.)</p>
Meteorology	<p>County specific data on temperature and humidity.</p> <p>(MOVES zone/month/hour table.)</p>	<p>Average June through August, hourly temperature and hourly relative humidity inputs for each county (produced by TCEQ for inventory development using 2017 weather station data) for all analysis years. See Exhibit 7.2-3.</p>
I/M Coverage	<p>Input Inspection and Maintenance (I/M) program coverage record for each combination of pollutants, process, county, fuel type, regulatory class and model year are specified using this input.</p> <p>(MOVES IM coverage table.)</p>	<p>No I/M program to be modeled since none is currently required in the San Antonio region.</p>
Fuel Supply	<p>Input to assign existing fuels to counties, months and years and to assign the associated market share for each fuel type.</p>	<p>For each analysis year and season, the fuel supply will consist of one conventional gasoline formulation</p>

Input Parameter Name	Description	Source
	(MOVES fuel supply table.)	and one conventional diesel formulation. See Exhibit 7.2-4.
Fuel Formulation	Input county specific fuel properties in the MOVES database. (MOVES fuel formulation table.)	Local fuel formulations based on TCEQ 2017 summer fuel survey data for 2017, and latest local survey data (TCEQ 2020 summer fuel survey), with some adjustments to particular future year values made for consistency with future year “expected” values (regulatory standards). See Exhibit 7.2-5.
Fuel Engine Fraction / Diesel Fraction	Input fuel engine fractions (i.e. Gasoline vs. Diesel Engines types in the vehicle population) for all vehicle types. (MOVES avft table.)	Locality-specific and MOVES default. TTI develops the evaluation year-specific local gasoline/diesel fractions for the MOVES single unit and combination truck SUTs using the TxDMV registration data for each analysis year, aggregated to the statewide level. MOVES defaults are used for the other SUTs, except alternative fuel fractions are dropped and the default gasoline/diesel fractions are renormalized.

Exhibit 7.2-3 MOVES2014b Hourly Meteorological Data for Bexar County

Hour	Temperature (degrees F.) ¹	Relative Humidity (%) ¹
12:00 a.m.	78.99	77.90
1:00 a.m.	77.82	81.39
2:00 a.m.	76.91	84.04
3:00 a.m.	76.21	85.87
4:00 a.m.	75.69	87.13
5:00 a.m.	75.26	88.00
6:00 a.m.	74.88	88.78
7:00 a.m.	75.43	87.31
8:00 a.m.	77.66	81.44
9:00 a.m.	80.33	72.68
10:00 a.m.	82.98	64.24
11:00 a.m.	85.47	57.70
12:00 p.m.	87.72	52.12
1:00 p.m.	89.53	48.18
2:00 p.m.	91.03	44.94
3:00 p.m.	92.13	43.00
4:00 p.m.	92.60	42.18
5:00 p.m.	92.48	42.81
6:00 p.m.	91.50	44.95
7:00 p.m.	89.54	50.16
8:00 p.m.	86.61	56.89
9:00 p.m.	84.11	62.97
10:00 p.m.	82.12	68.75
11:00 p.m.	80.42	73.82
Period	Barometric Pressure (Inches of Mercury)	
24-hr	29.049	
Average hourly data (24-hr for pressure) from weather stations within Bexar County June through August 2017 (provided by TCEQ).		

Exhibit 7.2-4 MOVES2014b Fuel Supply

Fuel Formulation ID	Market Share	Market Share CV ⁷
17702, 19702	1.0	\N
30176, 30600	1.0	\N

Exhibit 7.2-5 MOVES2014b Fuel Formulation Inputs for Bexar County

Fuel Type	Units	Summer 2017 ¹		Summer Future Years ¹	
		Gas E	Diesel	Gas E	Diesel
Fuel Formulation ID	-	17702	30176	19702	30600
Fuel Subtype ID ²	-	12	21	12	21
RVP	psi	7.54	0	7.80	0
Sulfur Level	ppm	21.28	6.37	10.00	6.00
ETOH Volume	vol. %	9.66	0	9.56	0
MTBE Volume	vol. %	0	0	0	0
ETBE Volume	vol. %	0	0	0	0
TAME Volume	vol. %	0	0	0	0
Aromatic Content	vol. %	25.35	0	22.22	0
Olefin Content	vol. %	8.33	0	8.69	0
Benzene Content	vol. %	0.76	0	0.61	0
e200	vap. %	49.45	0	49.64	0
e300	vap. %	82.68	0	84.60	0
Vol to Wt Percent Oxy	-	0.3653	0	0.3653	0
BioDieselEster Volume	vol.%	\N	4.68	\N	4.34
Cetane Index ²	-	\N	\N	\N	\N
PAH Content ²	vol.%	\N	\N	\N	\N
T50	°F	203.73	0	202.53	0
T90	°F	327.68	0	319.75	0

⁷ Market Share CV – the coefficient of the market share (“\N” is “null” or not used).

¹TTI produced fuels inputs based on TCEQ’s summer 2017 and 2020 statewide gasoline and diesel surveys. The gasoline properties are by Texas fuel regions; diesel is statewide. For gasoline the formulations are based on samples from the “state 7.8 RVP limit” region, which include Bexar County. The Summer 2017 gasoline properties are actual averages using the 2017 survey data. The future year gasoline properties are summer 2020 (latest) actual averages, except with RVP, sulfur level, and benzene content set to the MOVES defaults (i.e., expected values consistent with the pertinent regulatory standards). Diesel sulfur for 2017 is the statewide actual average using TCEQ’s 2017 fuel data; future year diesel sulfur is set to the expected level (i.e., within the ultra low sulfur diesel average annual standard and consistent with values observed in TCEQ’s last four surveys). The biodiesel (BD) ester volume percentages for 2017 and future years were based on 2017 and the latest available (2019) DOE state-level transportation sector BD consumption estimates.

²Fuel subtype IDs 12 and 21 are 10% ethanol-blend gasoline and biodiesel, respectively. “\N” is “null” value, or not used.

7.2.1 Vehicle Registration Distribution

The vehicle population estimates were based on TxDMV registration data (latest available [2018 end-of-year]), vehicle population factors derived from the VMT mix and county-level VMT-based growth estimates. Exhibit 7.2.1-1 displays the vehicle types associated with aggregated TxDMV registration data. Vehicle population factors developed using the analysis year 24-hour VMT mix were applied to vehicle registrations aggregated by category to split each category into each SUT/fuel type combination included in the analysis, creating the base (2018) vehicle population estimates. For each analysis year, VMT-based growth estimates were calculated by dividing county, analysis year, summer weekday VMT by county, and 2018 summer weekday VMT. These growth estimates were applied to the base vehicle population estimates to scale from the 2018 base to each analysis year estimates.

Exhibit 7.2.1-1 TxDMV Vehicle Registration Aggregations and Associated Vehicle Types for Estimating Vehicle Populations

Vehicle Registration¹ Aggregation	Associated Vehicle Type²
Motorcycles	MC_G
Passenger Cars (PC)	PC_G; PC_D
Trucks ≤ 8,500 gross vehicle weight rating (GVWR) (pounds)	PT_G; PT_D; LCT_G; LCT_D
Trucks > 8,500 and ≤ 19,500 GVWR	RT_G; RT_D SUSht_G; SUSht_D MH_G; MH_D IBus_D TBus_G; TBus_D SBus_G; SBus_D
Trucks >19,500 GVWR	CShT_G; CShT_D

NA ²	SULhT_G; SULhT_D CLhT_G; CLhT_D
<p>¹To estimate vehicle populations, TxDMV county registration data extracts were used, consisting of: 1) light-duty cars, trucks, and motorcycles; 2) heavy-duty diesel trucks; and 3) heavy-duty gasoline trucks.</p> <p>² Vehicle population factors are the 24-hour weekday VMT mix fraction for each vehicle type in a category divided by the sum of the VMT mix fractions for all vehicle types in a category, except long-haul trucks. The four long-haul vehicle type populations are estimated using a long-haul-to-short-haul VMT mix ratio applied to the short-haul SUT population estimate.</p>	

7.3 Adjustments to Emission Factors

7.3.1 Low Emissions Diesel NO_x Adjustment

The nitrogen oxides (NO_x) emission factors calculated by MOVES need to be adjusted due to the use of TxLED, which produces lower NO_x emissions than the national low emission diesel fuel. Post-processing was performed with TxLED NO_x adjustment factors, produced by TTI using TCEQ procedures, to generate emission rates that account for the effects of TxLED on diesel vehicle NO_x emissions. These factors are listed in Table 14 of the MOVES Analysis Notes in Appendix 12.10.

7.3.2 Vehicle Miles of Travel Mix

The VMT mix designates the vehicle categories included in the analysis and specifies the fraction of on-road fleet VMT attributable to each vehicle type. VMT mixes were estimated using TTI's VMT mix method.⁸ The method sets Texas vehicle registration category aggregations for MOVES SUT categories for developing the VMT mixes, as well as for developing other fleet parameters needed elsewhere in the process (i.e. SUT age distributions, vehicle population estimates).

The VMT mixes are produced in five-year increments and applied to analysis years as follows: 2015 VMT mix – 2013 through 2017 analysis years; 2020 VMT mix – 2018 through 2022 analysis years; 2025 VMT mix 2023 through 2027 analysis years, and so on. No seasonal adjustments are made for VMT mix. Average weekday vehicle type VMT mixes by MOVES road type and by four time-of-day periods (AM Peak, Mid-Day, PM Peak, Overnight) were estimated for the TxDOT San Antonio District for use with Bexar County in this analysis.

TTI used the latest available multi-year TxDOT San Antonio District vehicle classification counts (2009-2018) and associated TxDMV year-end registration data

⁸ *Developing MOVES Source Use Types and VMT Mix for Conformity Analysis* (TxDOT Air Quality / Conformity IAC-A - TTI Task 409252-0643: Maintain, Update and Enhance Traffic Activity Estimation and Forecasting Methods), Texas Department of Transportation, Austin, TX, August 2016.

(2018), along with MOVES default data, as needed (i.e., appropriate for each analysis year).

Exhibit 7.3.2-1 lists the vehicle types delineated in the local VMT mix.

Exhibit 7.3.2-1 Vehicle Types Delineated in Local VMT Mix

Source Use Type	Gasoline	Diesel
Motorcycle	MC_G	-
Passenger Car	PC_G	PC_D
Passenger Truck	PT_G	PT_D
Light Commercial Truck	LCT_G	LCT_D
Intercity Bus	-	IBus_D
Transit Bus	-	TBus_D
School Bus	SBus_G	SBus_D
Refuse Truck	RT_G	RT_D
Single Unit Short-Haul Truck	SUSHT_G	SUSHT_D
Single Unit Long-Haul Truck	SULHT_G	SULHT_D
Motor Home	MH_G	MH_D
Combination Short-Haul Truck	CShT_G	CShT_D
Combination Long-Haul Truck	-	CLHT_D

7.4 Modeled Emission Estimation

Modeled emission estimates are calculated using “TTI emission inventory estimation utilities using moves: MOVES2014bUtils”, developed by TTI for MOVES. This utility combines vehicle activity and emissions factors to create emission estimates at the link level.

Chapter 8: Mobile Source Emission Reduction Strategies (MoSERS)

8.1 Overview

Mobile Source Emission Reduction Strategies (MoSERS) are a collection of transportation projects or related activities with identifiable emission reduction benefits. To meet requirements of the State Implementation Plan (SIP), nonattainment areas may make specific commitments in their SIP to implement MoSERS, called Transportation Control Measures (TCMs). Finally, a nonattainment area may include Transportation Emission Reduction Measures (TERMs) in transportation conformity analysis that are outside of commitments in their SIP.

Bexar County does not have an ozone NAAQS budget in the existing SIP. The interim emissions tests described in Chapter 3.1 demonstrated that expected emissions from on-road sources in Bexar County in the analysis years (2025, 2035, 2045 or 2050) do not exceed known emissions in the baseline year (2017.) However, the Build v. No-Build test showed equal or greater emissions in the Action scenario compared to the Baseline scenario. Although no TCMs or TERMS were formally incorporated into this transportation conformity analysis, an estimate of emissions reductions from AAMPO's Congestion Mitigation and Air Quality improvement program was used to show that the Alamo Area will demonstrate conformity via projects not reflected in the TDM. More information is provided in the next section.

8.2 Congestion Mitigation and Air Quality Improvement Program

The Congestion Mitigation and Air Quality Improvement (CMAQ) Program is a categorical funding program created with ISTEA and continued under TEA-21, SAFETEA-LU, MAP-21, the FAST Act, and the recently passed Infrastructure Investments and Jobs Act (IIJA). This program directs funding to projects that contribute to meeting the National Ambient Air Quality Standards (NAAQS). CMAQ funds generally may not be used for projects that result in the construction of new capacity available to single-occupant vehicles. On April 20, 2019, the AAMPO Transportation Policy Board approved CMAQ funding for 12 programs and projects through FY 2022 of the FY 2021-2024 TIP and *Mobility 2045*. More recently, on August 23, 2021, the TPB approved 16 additional CMAQ projects for inclusion in the FY2023-2026 TIP. More information on the local allocation of CMAQ funding can be found at <https://www.alamoareampo.org/AirQuality/#cmaq>.

A list of CMAQ projects eligible for inclusion as CMAQ emissions reductions in the “Action” scenario is listed below in Exhibit 8.2-1.⁹ These projects are not included in the regional TDM and their emissions reductions are not accounted for as part of MOVES analysis. These reductions are calculated using a combination of [FHWA’s Emissions Calculator Toolkit](#) and [TTI’s MoSERS tool set](#). This list is used in the following chapter along with the emissions analysis results from MOVES to demonstrate transportation conformity. Chapter 9 addresses how these emissions reductions were applied to regional emissions analysis to demonstrate regional conformity.

Exhibit 8.2-1 CMAQ Emissions Reductions in “Action” Scenario

TIP Year	MPO Project	Type	NOx Reduction lbs/day	VOC Reduction lbs/day
2023	5573.2	Traffic Signal Improvement	31.360	8.557
2023	5573.3	Traffic Signal Improvement	31.360	8.557
2023	5574.1	ITS	13.272	15.587
2023	5574.2	ITS	13.272	15.587
2023	5575.2	Travel Demand Management	10.140	4.947
2023	5575.3	Travel Demand Management	10.140	4.947
2023	5577.3	Bicycle/Pedestrian	0.922	0.628
2023	5580.3	Fleet Replacement	36.092	3.761
2023	5581.3	Transit Improvement	4.156	3.709
2023	9149	Bicycle/Pedestrian	7.170	10.288
2023	9148	Bicycle/Pedestrian	0.058	0.022
2023	9150	Fleet Replacement	27.083	1.194
2024	9154	Bicycle/Pedestrian	0.010	0.007
2024	9155	Transit Improvement	0.163	1.429
2024	9156	Transit Improvement	0.273	0.734
2024	9157	Bicycle/Pedestrian	1.193	1.069
2025	9160	Bicycle/Pedestrian	0.183	0.161
2025	9161	Bicycle/Pedestrian	0.014	0.012
2026	9171	Fleet Replacement	10.774	0.475
2027 (MTP)	9176	Fleet Replacement	18.051	0.796

⁹ For detailed criteria of which projects can be excluded in the “Action” scenario (“Build”) and which should be included in the “Baseline” scenario (“No-Build”) please [see CFR § 93.119 \(h\) and \(i\)](#).

Chapter 9: Determination of Regional Emissions

9.1 Procedure

In order to report final emission analysis results, it is necessary to account for modeled link level emission inventories, emission factor adjustments, and Mobile Source Emission Reduction Strategies (MoSERS) emission benefits.

9.2 Modeled Emissions

Emissions for analysis years 2017 (baseline year), 2025, 2035, 2045 and 2050 are listed in Exhibit 9.2-1. These consist of link level roadway-based modeled emissions for Bexar County. The emissions were calculated by the Texas A&M Transportation Institute (TTI) using the Environmental Protection Agency’s MOVES2014b model.

Exhibit 9.2-1 Modeled Emission Results for the Bexar County Nonattainment Area

Year	Build (“Action”) (tons/day)		No-Build (“Baseline”) (tons/day)	
	NOx	VOC	NOx	VOC
2017	35.38	22.49	N/A	N/A
2025	14.61	12.30	14.61	12.30
2035	9.04	8.38	9.01	8.38
2045	8.73	8.01	8.69	8.02
2050	9.29	8.38	9.26	8.40

9.3 Adjustments to Emission Factors

Post-processing adjustments are applied using the Emission Factor Post-Process utility developed by TTI. These adjustments are applied to establish final emission factors used in emission calculation procedures to establish the model results shown in Exhibit 9.2-1. This process is described in detail in Chapter 7.

9.4 Mobile Source Emission Reduction Strategies

Mobile Source Emission Reduction Strategies (MoSERS) are a collection of transportation projects that have been identified and quantified for having emission reduction benefits. Emissions reductions from AAMPO’s CMAQ program will stand in as MoSERS for this conformity determination. Exhibit 9.4-1 displays the necessary emissions reduction in each year by taking the difference between the “Action” and “Baseline” scenarios. In order to demonstrate conformity, the “Action” scenario must be

below the “Baseline” scenario by a “non-zero” amount, which for the purposes of regional conformity is 0.01 tons per day, or 20 lbs. per day.

Exhibit 9.4-1 Emissions Reductions Needed with Eligible CMAQ Emissions Reductions

By Year	Reduction Needed (lbs./day)		CMAQ Reduction (Cumulative) (lbs./day)	
	NOx	VOC	NOx	VOC
2025	20	20	187	78
2035	80	20	216	83
2045	100	0	216	83
2050	80	0	216	83

9.5 Final Emission Analysis Results

This conformity does not use formal credits from Mobile Source Emission Reduction Strategies, such as voluntary mobile emission reduction programs or TCMs since MVEBs have not been established for the San Antonio, TX nonattainment area. However, the final emission results have been adjusted using CMAQ projects in the FY 2023-2026 TIP. Exhibit 9.5-1 shows the final emission results for this conformity.

Exhibit 9.5-1 Final Emissions Analysis Results, Including Emissions Reductions from Eligible CMAQ Projects

Year	Build (“Action”) – including CMAQ (tons/day)		No-Build (“Baseline”) (tons/day)	
	NOx	VOC	NOx	VOC
2017	35.38	22.49	N/A	N/A
2025	14.52	12.26	14.61	12.30
2035	8.93	8.34	9.01	8.38
2045	8.62	7.97	8.69	8.02
2050	9.18	8.34	9.26	8.40

Chapter 10: Interagency Consultation

10.1 Process Description

Interagency review and comment on the conformity finding was conducted in accordance with [40 CFR Part 93.112](#). Local, state, and federal transportation and air quality agencies affected by this conformity analysis were consulted on the scope, methodologies, and products of the conformity finding. A group of Interagency Consultation (IAC) partners included representatives of each of the following agencies:

- Alamo Area Metropolitan Planning Organization (AAMPO)
- Texas Department of Transportation (TxDOT)
- Texas Commission on Environmental Quality (TCEQ)
- Texas A&M Transportation Institute (TTI)
- Federal Highway Administration (FHWA)
- Federal Transit Administration (FTA)¹⁰
- U.S. Environmental Protection Agency (EPA)

The purpose of this group is to ensure the modeling methodology utilized in this conformity analysis is consistent with the on-road modeling utilized in the State Implementation Plan and that the most recent planning assumptions were used. The IAC partners were consulted regularly during the conformity process, and Exhibit 10.1-1 summarizes the meetings that occurred before local determination of this conformity document by the AAMPO Transportation Policy Board. All IAC partner meeting agendas and a comprehensive summary of decisions are included in Appendix 12.15.

¹⁰ Note: FHWA acts as executive agent for the FTA

Exhibit 10.1-1 Interagency Consultation Meeting Participation

Date	AAMPO	TxDOT	TCEQ	FHWA/ FTA	EPA	Subject
February 10, 2022	Y	Y	Y	Y	Y	FY 2021-2024 TIP Pre-Analysis Consensus Plan (PACP) Review
April 13, 2022	Y	Y	Y	Y	Y	PACP Comment Review and Discussion of Conformity Document and Schedule
May 25, 2022	Y	Y	Y	Y	Y	Discuss EPA Reclassification and Build v. No-Build Timeline
September 28, 2022	Y	Y	Y	Y	Y	Discuss Build v. No-Build Results and TCD Update Schedule
Y=attended mtg						

Chapter 11: Public Participation

11.1 Process Description

Public participation is a cornerstone for all processes undertaken by the Alamo Area Metropolitan Planning Organization (AAMPO). The AAMPO Public Participation Policy (Policy 2), last amended on October 26, 2020, establishes the methods and structure to be followed when engaging and informing the community of AAMPO activities. In addition, AAMPO has adopted a policy regarding Limited English Proficiency (LEP) access, which was last modified in March 2015. AAMPO followed its adopted Public Participation and Limited English Proficiency Plans for the development and adoption of the FY 2023-2026 Transportation Improvement Program, the *Mobility 2050* project list, and the 2023 Transportation Conformity Document.

All meetings of the AAMPO Transportation Policy Board and Technical Advisory Committee are subject to the Texas Open Meetings Act and are open to the public. Meeting notices are sent to the Texas Secretary of State, published in the Texas Register, and posted at the Bexar, Comal, Guadalupe and Kendall County Courthouses and at the AAMPO offices in accordance with the Texas Open Meetings Act. All AAMPO meetings are accessible to persons with disabilities.

During spring 2022, AAMPO sought feedback on the projects covered by the draft FY 2023-2026 Transportation Improvement Program (TIP) and *Mobility 2050* during a series of four public meetings held throughout the AAMPO study area and in an online format. During those meetings, AAMPO also discussed the region's air quality status and the impact to planning processes of the nonattainment designation.

Alamo Area MPO began planning to meet the requirements of moderate nonattainment areas without a Motor Vehicle Emissions Budget under the 2015 NAAQs, primarily an additional emission analysis test. This was done preemptively by AAMPO to mitigate delays in approval of transportation conformity that might occur if review of the determination adopted in June 2022 were not finalized before the effective date of moderate reclassification, November 7, 2022. An additional public meeting was held in November in Bexar County only to provide the public information and comment opportunity on an updated Conformity Determination featuring a second emissions test as required by reclassification to moderate nonattainment status. AAMPO completed all required public involvement for the update, which was approved on December 12, 2022 by the Transportation Policy Board.

All meetings began at 6:00 p.m. and were similar in content and format. The public meeting presentation was recorded and made available on AAMPO's website for public viewing and feedback. Generally, each meeting consisted of an overview presentation, a question-and-answer session, an open house for viewing exhibits and gathering more

information, and various avenues for submitting public comment. The public meeting dates, time and locations are provided below:

- Guadalupe County: Wednesday, April 20, 2022 at the Seguin Public Library located at 313 W. Nolte Street, Seguin, TX 78155
- Comal County: Thursday, April 28, 2022 at the New Braunfels Civic Center, 375 S. Castell Avenue, New Braunfels, TX 78130
- Kendall County: Monday, May 2, 2022, at Kronkosky Place located at 17 Old San Antonio Road, Boerne, TX 78006
- Bexar County: Wednesday, May 18, 2022, at VIA Metropolitan Transit, located at 1021 San Pedro, San Antonio, TX 78212
- Bexar County (updated document): Tuesday, November 15, 2022, at TxDOT San Antonio District Headquarters, Building 2 Training Room, located at 4615 Northwest Loop 410, San Antonio, Bexar County, TX 78229

To advertise the public meetings, newspaper ads were run in the San Antonio Express-News, New Braunfels Herald, Seguin Gazette, Boerne Star and La Prensa. The public meetings were also advertised through AAMPO's e-newsletter, "Fast Track", on Facebook, Twitter and Instagram. AAMPO's partner agencies assisted with outreach for the meetings. For the November public meeting newspaper advertisement was limited to the San Antonio Express-News.

For individuals not able to attend a public meeting in person, AAMPO provided a virtual meeting process online at <https://www.alamoareampo.org/YourMove/> which duplicated the in person public meeting content and format. The online public input ran from Wednesday, April 20, through Thursday, May 20, 2022. Additional public comment was extended from May 18, 2020 to June 20, 2022 to allow time for the public to review and comment on the previous conformity document (Action-Baseline Test analysis only). For the updated document, a public comment period was publicized from October 30, 2022 to December 1, 2022.

Other public input methods during the TIP development process included comment cards at public meetings, an online participation exercise, e-mails, letters, and speaking opportunities at AAMPO's Technical Advisory Committee (TAC) and TPB meetings. The comment cards allowed for input on the transit and roadway project lists as well as the

effectiveness of the public involvement process itself. All materials online and at the in-person public meetings were available in Spanish.

AAMPO received 25 comments during the spring public comment period electronically and via comment card on the Mobility 2050, the FY23-26 TIP, and the 2023 Conformity Document. Six additional comments were received during the second public comment period in the fall. One comment in the spring period was made specifically on the Conformity Document, while all 6 additional comments from the fall pertained to the updated Conformity Document. A full list of comments and AAMPO responses, as well as presentations and outreach materials can be found in Appendix 12.16.

List of Appendices

- 12.1 - [Resolution](#)
- 12.2 - [Mobility 2050](#)
- 12.3 - [2023-2026 Transportation Improvement Program](#)
- 12.4 - [Travel Model Validation](#)
- 12.5 - [VMT, Loaded Speed, and Centerline Mile Summaries](#)
- 12.6 - [Definition of Regionally Significant Roadway System](#)
- 12.7 - Roadway System (Capacity Staging) and Network Link Listing:
[BUILD](#) | [NO-BUILD](#)
- 12.8 - [Roadway Network](#)
- 12.9 - [Mode Choice Model Summaries](#)
- 12.10 - [MOVES Information and Analysis Notes](#)
- 12.11 - [MOVES Input and Output Files \(.zip\)](#)
- 12.12 - [MOVES Emission Factors \(.zip\)](#)
- 12.13 - [Estimated Hourly Emissions and Activity \(.zip\)](#)
- 12.14 - [VMT, Speed, and Emissions Summaries \(.zip\)](#)
- 12.15 - [Interagency Consultation Process](#)
- 12.16 - [Public Involvement Process](#)