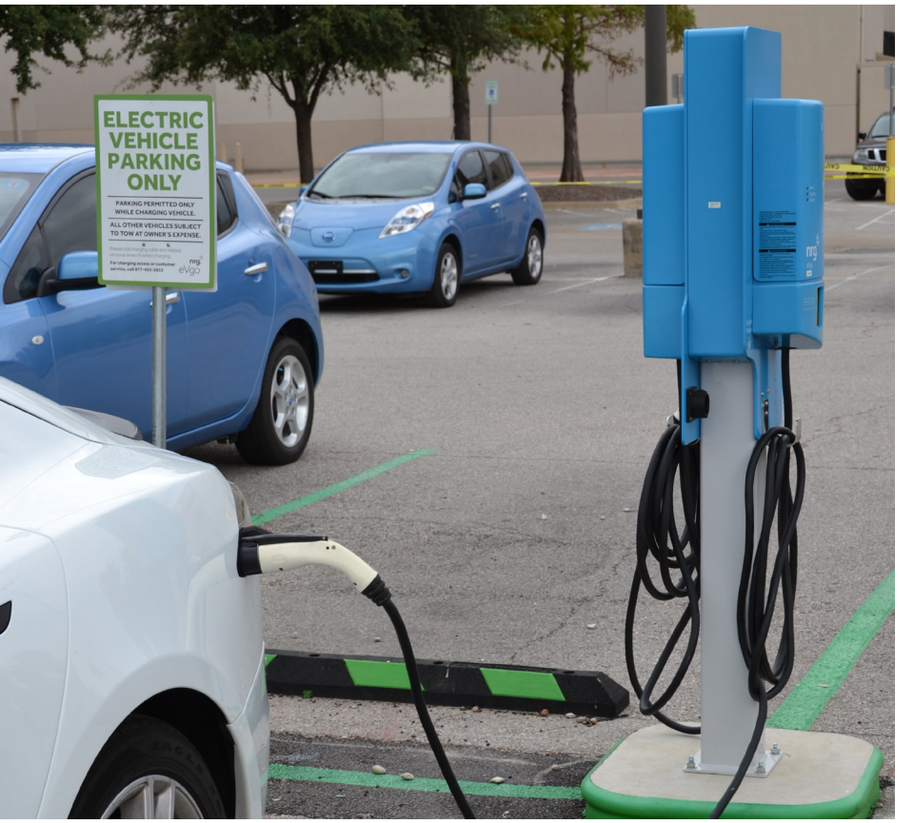


2022 Transportation Conformity

Mobility 2045: The Metropolitan Transportation Plan for North Central Texas - 2022 Update

2023-2026 Transportation Improvement Program for North Central Texas

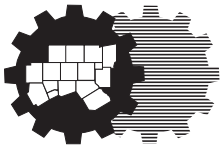
North Central Texas
Council of Governments

What is NCTCOG?

The **North Central Texas Council of Governments** (NCTCOG) is a voluntary association of, by, and for **local governments** within the 16-county North Central Texas Region. The agency was established by state enabling legislation in 1966 to assist local governments in **planning** for common needs, **cooperating** for mutual benefit, and **coordinating** for sound regional development. Its purpose is to strengthen both the individual and collective power of local governments, and to help them recognize regional opportunities, resolve regional problems, eliminate unnecessary duplication, and make joint regional decisions – as well as to develop the means to implement those decisions.

North Central Texas is a 16-county **metropolitan region** centered around Dallas and Fort Worth. The region has a population of more than 7 million (which is larger than 38 states), and an area of approximately 12,800 square miles (which is larger than nine states). NCTCOG has 229 member governments, including all 16 counties, 167 cities, 19 independent school districts, and 27 special districts.

NCTCOG's **structure** is relatively simple. An elected or appointed public official from each member government makes up the **General Assembly** which annually elects NCTCOG's **Executive Board**. The Executive Board is composed of 17 locally elected officials and one ex-officio non-voting member of the legislature. The Executive Board is the policy-making body for all activities undertaken by NCTCOG, including program activities and decisions, regional plans, and fiscal and budgetary policies. The Board is supported by policy development, technical advisory and study **committees** – and a professional staff led by **R. Michael Eastland**, Executive Director.



NCTCOG's offices are located in Arlington in the Centerpoint Two Building at 616 Six Flags Drive (approximately one-half mile south of the main entrance to Six Flags Over Texas).

North Central Texas Council of Governments
P. O. Box 5888
Arlington, Texas 76005-5888
(817) 640-3300
FAX: (817) 640-7806
Internet: http://www.nctcog.org

NCTCOG's Department of Transportation

Since 1974 NCTCOG has served as the Metropolitan Planning Organization (MPO) for transportation for the Dallas-Fort Worth area. NCTCOG's Department of Transportation is responsible for the regional planning process for all modes of transportation. The department provides technical support and staff assistance to the Regional Transportation Council and its technical committees, which compose the MPO policy-making structure. In addition, the department provides technical assistance to the local governments of North Central Texas in planning, coordinating, and implementing transportation decisions.

Prepared in cooperation with the Federal Highway Administration, US Department of Transportation, and the Texas Department of Transportation.

2022 Transportation Conformity

Mobility 2045: The Metropolitan Transportation Plan for North Central Texas - 2022 Update

2023-2026 Transportation Improvement Program for North Central Texas

North Central Texas
Council of Governments

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Tanya Brooks, Chair
Assistant Director, Traffic Management Division
Transportation and Public Works
City of Fort Worth

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The North Central Texas Council of Governments would like to thank the following agencies for their invaluable assistance in conducting this conformity analysis and preparing this report.

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- Air Quality Planning Section

Federal Highway Administration

Federal Transit Administration

Texas Commission on Environmental Quality
- Air Quality Division

Texas A&M Transportation Institute

Texas Department of Transportation
- Dallas District
- Fort Worth District
- Environmental Affairs Division
- Transportation Planning and Programming Division

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ABSTRACT

TITLE: Transportation Conformity

DATE: June 2022

AUTHORS: Christopher Klaus
Senior Program Manager

Jenny Narvaez
Program Manager

Nick Van Haasen
Air Quality Planner

Vivek Thimmavajjhala
Transportation System Modeler

SUBJECT: Transportation Conformity Determination for the North Central Texas Nonattainment Area, Including Mobility 2045: The Metropolitan Transportation Plan for North Central Texas – 2022 Update and the 2023-2026 Transportation Improvement Program for North Central Texas

SOURCE OF COPIES: Transportation Department
North Central Texas Council of Governments
PO Box 5888
Arlington, Texas 76005-5888
(817) 695-9240

NUMBER OF PAGES: 60

ABSTRACT: This report documents the conformity determination of the Dallas-Fort Worth 10-county nonattainment area. As required under Section 176(c)(4) of the Clean Air Act Amendments of 1990, Metropolitan Planning Organizations and the US 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 the Mobility 2045 – 2022 Update and 2023-2026 Transportation Improvement Program by demonstrating both plans meet the conformity-related requirements of the Clean Air Act (United States Code, Title 42 §7504, §7506 (c) and (d)), State Implementation Plan, and the final conformity rule (Title 40 Code of Federal Regulations, Parts 51 and 93).

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LIST OF EXHIBITS

GLOSSARY OF ABBREVIATIONS

AQ	Air Quality
AD	Attainment Demonstration
APU	Auxiliary Power Unit
ASM	Acceleration Simulation Mode
ASWT	Average School Season Weekday Traffic
ATR	Automatic Traffic Recorder
CAA	Clean Air Act
CAAA	Clean Air Act Amendments of 1990
CFR	Code of Federal Regulations
CMAQ	Congestion Mitigation and Air Quality Improvement Program
CO	Carbon Monoxide
DART	Dallas Area Rapid Transit
DCTA	Denton County Transit Authority
DFW	Dallas-Fort Worth
TAFT	Dallas-Fort Worth Travel Model for the Expanded Area
EPA	Environmental Protection Agency
FAST ACT	Fixing America's Surface Transportation Act
FHWA	Federal Highway Administration
FR	Federal Register
FTA	Federal Transit Administration
FWTA	Fort Worth Transportation Authority
GIS DK	Geographic Information System Developer Kit
HBW	Home-Based Work
HNW	Home-Based Non-Work
HDV	Heavy-Duty Vehicle
HOV	High-Occupancy Vehicle
HPMS	Highway Performance Monitoring System
I/M	Inspection and Maintenance Program
IOP	Increment of Progress
ITS	Intelligent Transportation System
lbs/d	Pounds per Day
LED	Low Emission Diesel
MAP-21	Moving Ahead for Progress in the 21st Century
MITS	Mobility Impaired Transportation Service
MoSERS	Mobile Source Emissions Reduction Strategies
Mobility 2045 – 2022 Update	Mobility 2045: The Metropolitan Transportation Plan for North Central Texas – 2022 Update
MOVES	Motor Vehicle Emissions Simulator
MPA	Metropolitan Planning Area
MPO	Metropolitan Planning Organization
MTP	Metropolitan Transportation Plan
MVEB	Motor Vehicle Emissions Budgets
NAAQS	National Ambient Air Quality Standards
NCT	North Central Texas
NCTCOG	North Central Texas Council of Governments
NHB	Non-Home-Based
NO_X	Nitrogen Oxides
OBD	On-Board Diagnostic Systems
ONI	Off-Network Idle
ppb	Parts per Billion
ppm	Parts per Million
PM	Particulate Matter
RFG	Reformulated Gasoline
RFP	Reasonable Further Progress
RPM	Revolutions per Minute
ROP	Rate of Progress
RTC	Regional Transportation Council
RVP	Reid Vapor Pressure
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SHEI	Source Hours Extended Idling (for diesel combination long-haul trucks hotelling only)
SHI	Source Hours Idling (excluding diesel combination long-haul trucks hotelling)
SHP	Source Hours Parked
SHO	Source Hours Operating
SIP	State Implementation Plan
STTC	Surface Transportation Technical Committee
SUT	Source Use Type
TCM	Transportation Control Measure
TCEQ	Texas Commission on Environmental Quality
TERMS	Transportation Emission Reduction Measures
TIP	Transportation Improvement Program
TNRCC	Texas Natural Resource Conservation Commission
tpd	Tons per Day
TRE	Trinity Railway Express
TSZ	Traffic Survey Zone
TTI	Texas A&M Transportation Institute
TxDMV	Texas Department of Motor Vehicles
TxLED	Texas Low Emissions Diesel
TxDOT	Texas Department of Transportation
USC	United States Code
USDOT	United States Department of Transportation
VDF	Volume Delay Function
VHT	Vehicle Hours of Travel
VMEP	Voluntary Mobile Emissions Reduction Program
VMT	Vehicle Miles of Travel
VOC	Volatile Organic Compounds

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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, for areas designated as nonattainment for the pollutant ozone, to conduct an air quality conformity analysis to ensure Metropolitan Transportation Plans (MTPs) and Transportation Improvement Programs (TIPs) are consistent with the region's air quality goals. The conformity analysis estimates precursors to ozone, nitrogen oxides (NO_X) and volatile organic compounds (VOC), emissions resulting from the region's multimodal transportation system. The analysis must demonstrate the emission totals for the North Central Texas (NCT) 10-county nonattainment area are under the approved Motor Vehicle Emissions Budgets (MVEB) in the State Implementation Plan (SIP), which establishes an emissions ceiling for the regional transportation network.

On November 8, 2016, the Environmental Protection Agency published the *Adequacy Status of the Dallas-Fort Worth, Texas Attainment Demonstration 8-Hour Ozone Motor Vehicle Emission Budgets for Transportation Conformity Purposes*, effective November 23, 2016.[1] This notice of adequacy establishes the use of the 2017 MVEBs for this Transportation Conformity demonstration. The 2017 MVEBs for the NCT 10-county nonattainment area are shown in Exhibit 1.1-1.

Exhibit 1.1-1: MVEBs for the North Central Texas Ozone Nonattainment Area

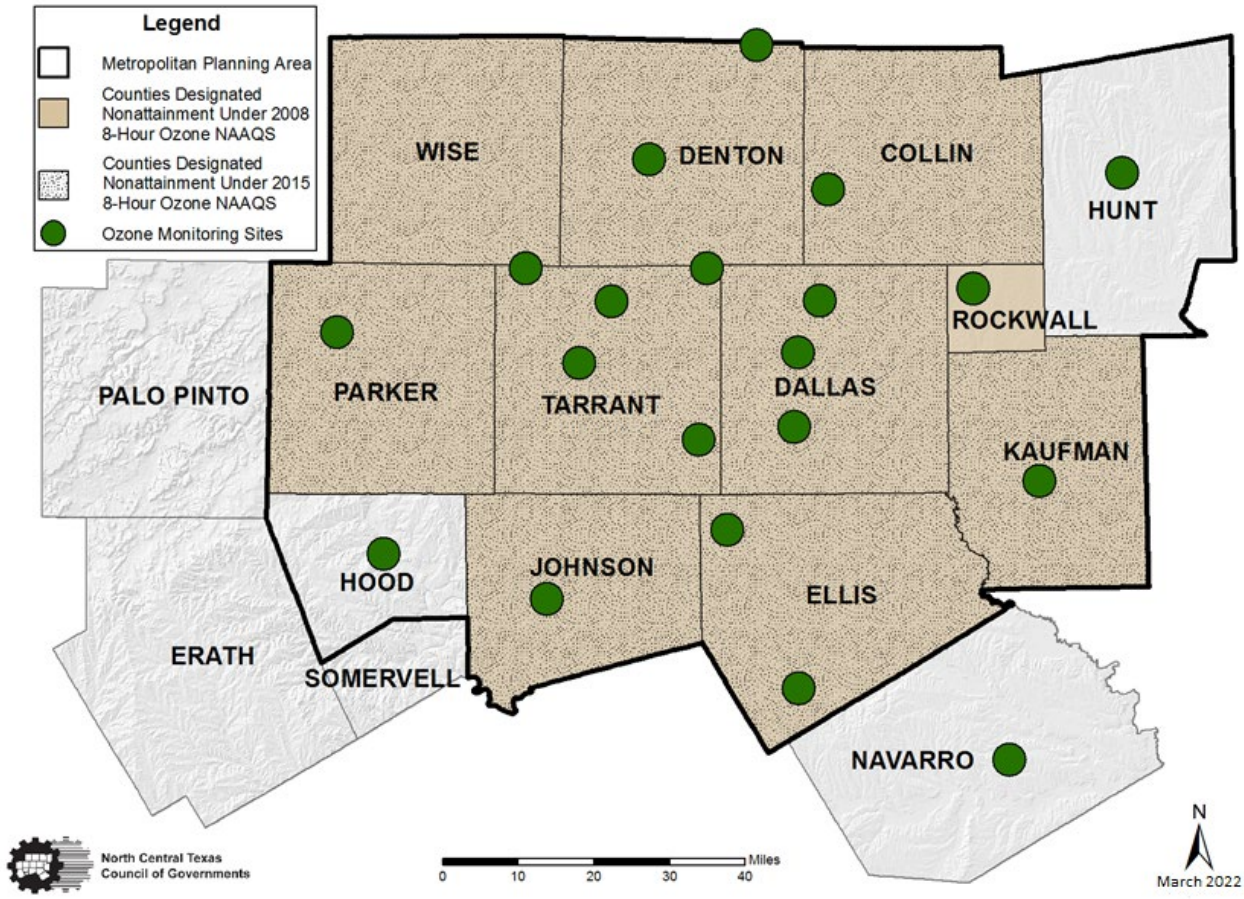
Dallas-Fort Worth Ozone Nonattainment Area	NO_X (tons/day)	VOC (tons/day)
2017 10-County MVEBs (2008 8-Hour Ozone NAAQS)	130.77	64.91

1.2 Nonattainment Area

Ten counties in NCT, Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise, are classified as serious nonattainment. These are expected to be reclassified as a severe nonattainment area for the 2008 8-Hour Ozone NAAQS (≤75 parts per billion, ppb) with an attainment date of July 20, 2027 (attainment year would be 2026). Nine of those 10 DFW nonattainment counties (excluding Rockwall County) are classified as marginal nonattainment. They are expected to be reclassified as a moderate nonattainment area for the 2015 8-Hour Ozone NAAQS (≤70 ppb) with an attainment date of August 03, 2024 (attainment year would be 2023). Exhibit 1.2-1 shows the nonattainment areas under both these ozone standards. The North Central Texas Council of Governments, which serves as the Dallas-Fort Worth region's Metropolitan Planning Organization, is responsible for conducting the air quality conformity analysis to address the 2008 and 2015 ozone NAAQS. This emissions analysis for determining conformity was performed under the Code of Federal Regulations Title 40, Part §93.109(c)(2)(ii)(B). Since the 2015 8-hour ozone nonattainment area covers a smaller geographic area within the 2008 8-hour ozone nonattainment area, the approved 2017 attainment demonstration SIP MVEBs, shown in Exhibit 1.1-1, may be used to determine conformity for the 2015 8-Hour Ozone NAAQS.

[1] 81 FR 78591

Exhibit 1.2-1: North Central Texas Nonattainment Area and Metropolitan Planning Area



1.3 Analysis

This emissions analysis is being conducted to ensure the Mobility 2045 – 2022 Update and the 2023-2026 TIP meet the conformity-related requirements of the CAAA, SIP, and the final conformity rule (Title 40 Code of Federal Regulations, Parts 51 and 93). The analysis years for this conformity are: 2023 (the potential attainment year when the area is reclassified to moderate under the 2015 8-Hour Ozone NAAQS), 2026 (the potential attainment year when the area is reclassified to severe under the 2008 8-Hour Ozone NAAQS), 2036, and 2045 (MTP horizon year). The NO_X and VOC vehicle summer weekday emission results shown in Exhibit 1.3-1 demonstrate the 10-county nonattainment area meets the regional air quality conformity requirements, falling below the MVEBs for the 2008 8-Hour Ozone NAAQS. The 2015 8-Hour Ozone NAAQS 9-county nonattainment area falls within the 2008 8-Hour Ozone NAAQS 10-county nonattainment area.

Exhibit 1.3-1: Summer Weekday Emission Results for the North Central Texas 10-County Nonattainment Area

Analysis Years	NO_X (tons/day)	VOC (tons/day)
2023	77.62	40.60
2026	65.79	35.53
2036	52.24	27.26
2045	58.72	27.50

1.4 Summary

Results of the conformity determination demonstrate *Mobility 2045: The Metropolitan Transportation Plan for North Central Texas – 2022 Update* and the *2023-2026 Transportation Improvement Program for North Central Texas* meet all transportation air quality conformity requirements of the CAAA, the air quality plan, the transportation conformity rule, and transportation conformity-related provisions contained in the United States Code, Title 42 §7506.

For additional Transportation Conformity information, refer to the Transportation Conformity document or visit the North Central Texas Council of Governments air quality website at: www.nctcog.org/trans/air/conformity.

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CHAPTER 2: AIR QUALITY

2.1 Air Pollution

To combat our nation's growing air pollution problem, the Environmental Protection Agency (EPA) sets concentration standards, known as National Ambient Air Quality Standards (NAAQS), for six principal pollutants: ozone, particulate matter, carbon monoxide, sulfur dioxide, nitrogen dioxide, and lead. The North Central Texas (NCT) region's primary focus is ozone due to the EPA's nonattainment designation for the region. Up-to-date regional information is available on the North Central Texas Council of Governments' ozone website, www.nctcog.org/trans/air/ozone.

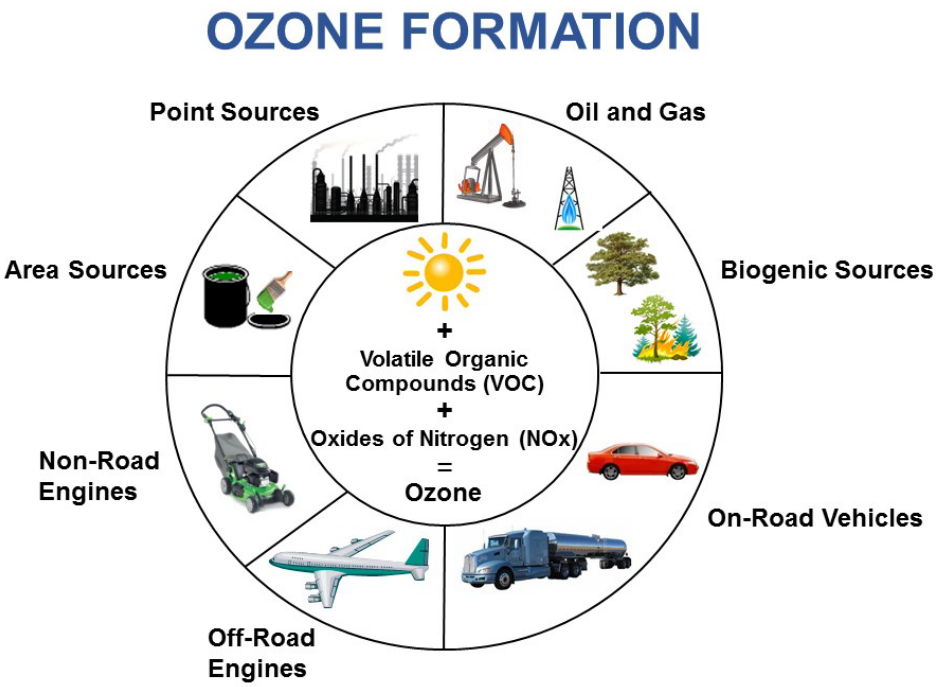
2.1.1 Ground Level Ozone

Unlike the protective ozone layer in the stratosphere, ground level ozone is associated with numerous adverse effects to animal and plant life. Populations most at risk to suffer effects due to increased ozone concentrations include children, elderly, adults who are active outdoors, and people with respiratory problems.

Ground level ozone is a colorless compound formed photochemically (caused by sunlight) in the lower atmosphere when volatile organic compounds (VOC) react with nitrogen oxides (NO_X). Meteorological conditions, including humidity, wind speed, and temperature, impact ozone formation and how long it remains in the atmosphere. Calm weather days with low wind speeds and warm temperatures are favorable conditions for ground level ozone formation. This process is illustrated in Exhibit 2.1.1-1.

As expected, daily ozone concentrations are highest during the summer months, which is why the period between March 1 and November 30 is designated as "Ozone Season" in NCT. The intensity of sunlight necessary for photochemically initiated reactions is highest during this time period.

Exhibit 2.1.1-1: Ozone Precursors (NO_X and VOC) Sources



Source: NCTCOG Transportation Department

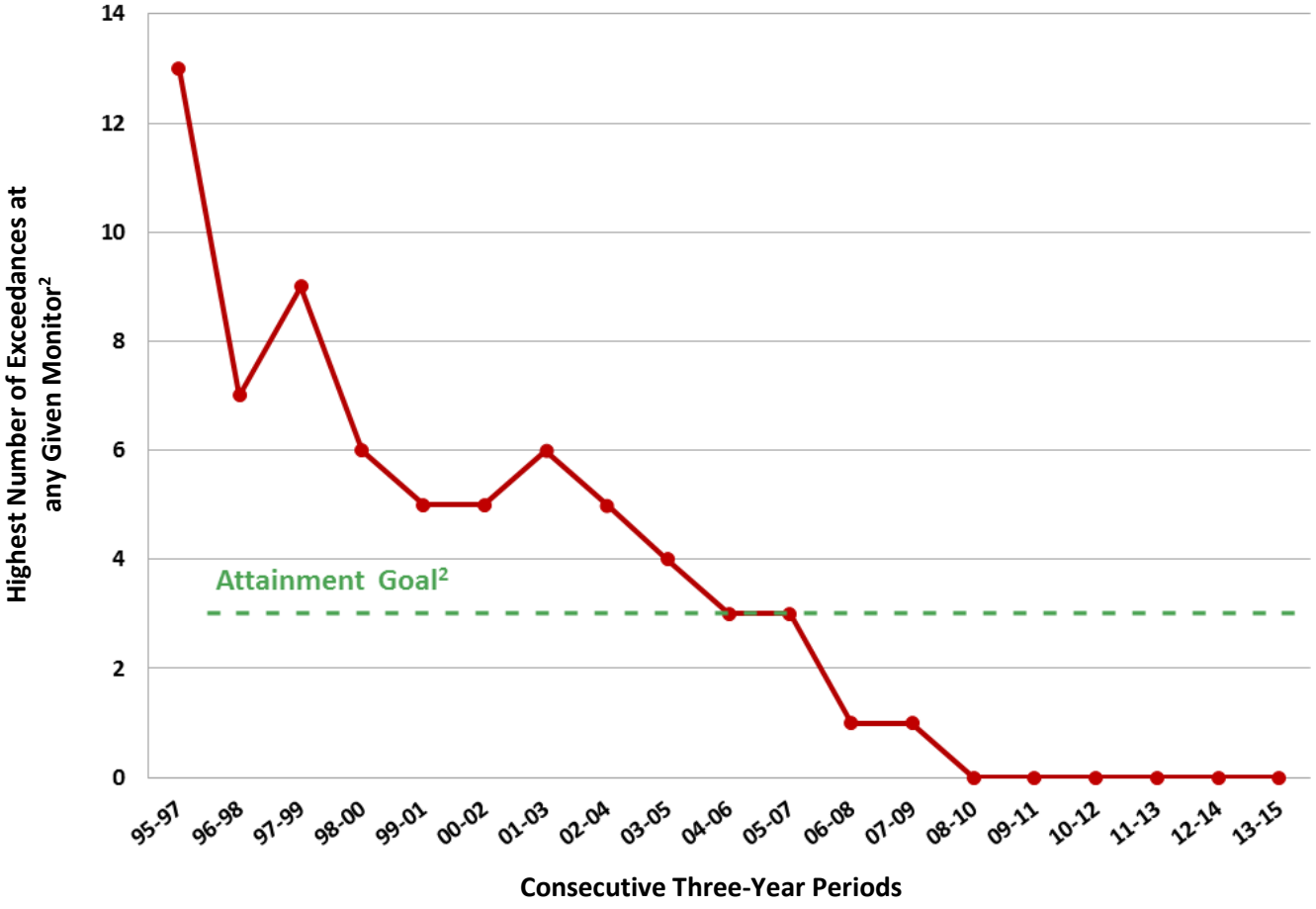
2.2 Background on the North Central Texas Ozone Nonattainment Area

2.2.1 1-Hour Ozone NAAQS

In 1991, four counties in the Dallas-Fort Worth (DFW) area were classified as "moderate" nonattainment in accordance with the Federal Clean Air Act Amendments of 1990 under the 1-Hour Ozone NAAQS. This standard set a maximum limit concentration of 125 parts per billion (ppb). Under the 1-Hour Ozone NAAQS, no air quality monitoring site in Collin, Dallas, Denton, and Tarrant counties was allowed to have more than three exceedances of the set concentration limit over a consecutive three-year period.

As indicated by ozone monitoring, the Dallas-Fort Worth 1-hour ozone nonattainment area came into attainment following the 2006 ozone season, and the region continues to remain in attainment. The decreasing exceedance trend line, shown in Exhibit 2.2.1-1, along with the region coming into attainment under this NAAQS, illustrates the effectiveness of the many air quality projects and programs developed and implemented in our region.

Exhibit 2.2.1-1: 1-Hour Ozone Historical Trends



Source: NCTCOG Transportation Department

[2] Attainment Goal - According to the US EPA NAAQS, attainment is reached when there are no more than three exceedances per monitor within a consecutive three-year period. An exceedance occurs when the ozone concentration is ≥ 125 ppb average over a one-hour period.

2.2.2 8-Hour Ozone NAAQS

After careful review of human health effects brought about by long-term exposure to ozone, the EPA decided to replace the 1-Hour Ozone NAAQS with a more stringent 1997 8-Hour Ozone NAAQS, less than 85 ppb. The EPA also introduced the concept of a design value to determine a region's attainment status. The design value is defined as the fourth-highest 8-hour average ozone concentration averaged over a consecutive three-year period.

On April 30, 2004, the EPA published air quality designations and classifications for the 1997 8-Hour Ozone NAAQS, with an effective date of June 15, 2004.[3] The EPA classified nine counties, Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant as "moderate" nonattainment, with an attainment date of June 15, 2010. As a result of not reaching the "moderate" attainment deadline, the NCT nonattainment area was reclassified as a "serious" nonattainment area for the 1997 8-Hour Ozone NAAQS by the EPA on December 20, 2010, with an effective date of January 19, 2011.[4] Under the "serious" designation, the NCT nonattainment area had until June 15, 2013 to reach attainment for the 1997 8-Hour Ozone NAAQS.

On March 27, 2008, the EPA revised the 8-Hour Ozone NAAQS from <85 ppb to ≤75 ppb; however, the EPA did not finalize the designations under this new standard until 2012. On May 21, 2012, the EPA published air quality designations for the 2008 8-Hour Ozone NAAQS, effective July 20, 2012.[5] The Dallas-Fort Worth region was classified as "moderate" nonattainment for the 2008 8-Hour Ozone NAAQS, Wise County was added as the tenth nonattainment county, and the EPA revoked the 1997 8-Hour Ozone NAAQS for Transportation Conformity. Under this revised standard, the US Department of Transportation approval of a Transportation Conformity determination for the 10 counties was required by July 20, 2013, and the region had to reach attainment by December 31, 2018.

On December 23, 2014, a District of Columbia Circuit Court opinion[6] reversed the December 31 attainment date established in the EPA's 2008 8-hour ozone implementation rule to July 20. For the Dallas-Fort Worth "moderate" nonattainment area, the new attainment date was July 20, 2018, exactly six years from the official date of designation. The EPA published the State Implementation Plan requirements for the 2008 8-Hour Ozone NAAQS on March 6, 2015, and also revoked the 1997 8-Hour Ozone NAAQS.[7]

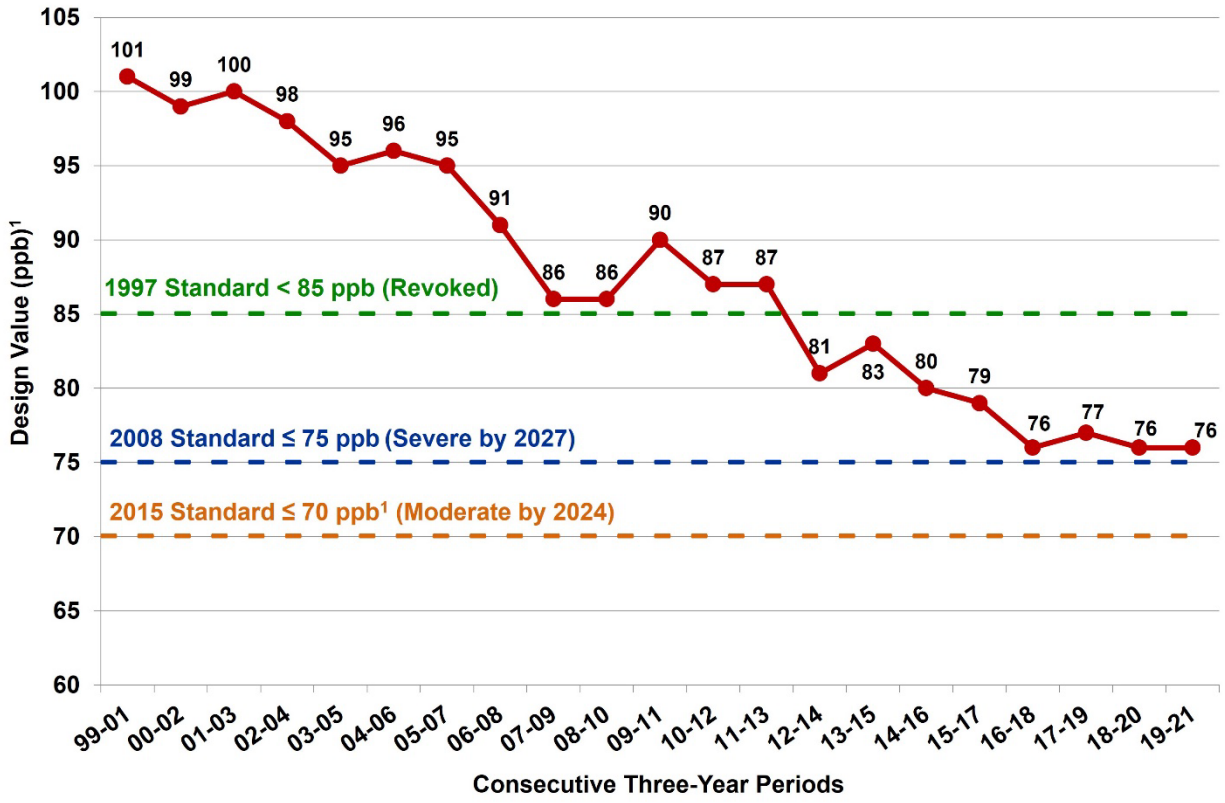
On September 1, 2015, the EPA published a Clean Data Determination for the nine counties designated as nonattainment for the 1997 8-Hour Ozone NAAQS.[8] The following month, on October 23, the EPA published the final rule revising the 8-Hour Ozone NAAQS to ≤70 ppb.[9] On November 8, 2016, the EPA published the final rule approving the DFW Redesignation Substitute Report, providing a finding of attainment for the 1-Hour and 1997 8-Hour Ozone NAAQS, effective December 8, 2018.[10] The EPA's revocation of the 1997 8-Hour Ozone NAAQS was challenged in the US Court of Appeals for the District Court of Columbia Circuit. The EPA filed a request for a panel rehearing on April 23, 2018 to overturn the Court's decision to vacate the 2008 8-Hour Ozone NAAQS implementation rule, which revoked the 1997 8-Hour Ozone NAAQS.[11]

[3] 69 FR 23858
[4] 75 FR 79302
[5] 77 FR 30087
[6] https://www.cadc.uscourts.gov/internet/opinions.nsf/E97A64FFBFE4DC1D85257DB70054D5EE/$file/12-1321-1528834.pdf
[7] 80 FR 12263
[8] 80 FR 52630
[9] 80 FR 65291
[10] 81 FR 78668
[11] http://www.texastwg.org/wp-content/uploads/2018/04/2018-04-Petition_for_Panel_Rehearing-as-filed.pdf

Effective August 3, 2018,[12] nine counties (Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Tarrant, and Wise) were classified as marginal nonattainment for the 2015 8-Hour Ozone NAAQS. Under this marginal classification, the region had until August 3, 2021 to reach attainment. The region did not reach the 2008 NAAQS attainment by July 20, 2018 and was reclassified to "serious," with an effective date of September 23, 2019, and a July 20, 2021 attainment date. The region did not attain either the 2008 or 2015 standards by the set attainment dates and are in the process of being reclassified to "severe" and "moderate," respectively.

Despite the region being above the concentration goal, there continues to be steady progress towards compliance as a result of many expanded or new emissions reduction control strategies. Exhibit 2.2.2-1 shows the historical design values in relation to the different 8-Hour Ozone NAAQS and Exhibit 2.2.2-2 shows the number of exceedance days, based on the 2008 and 2015 Ozone NAAQS.

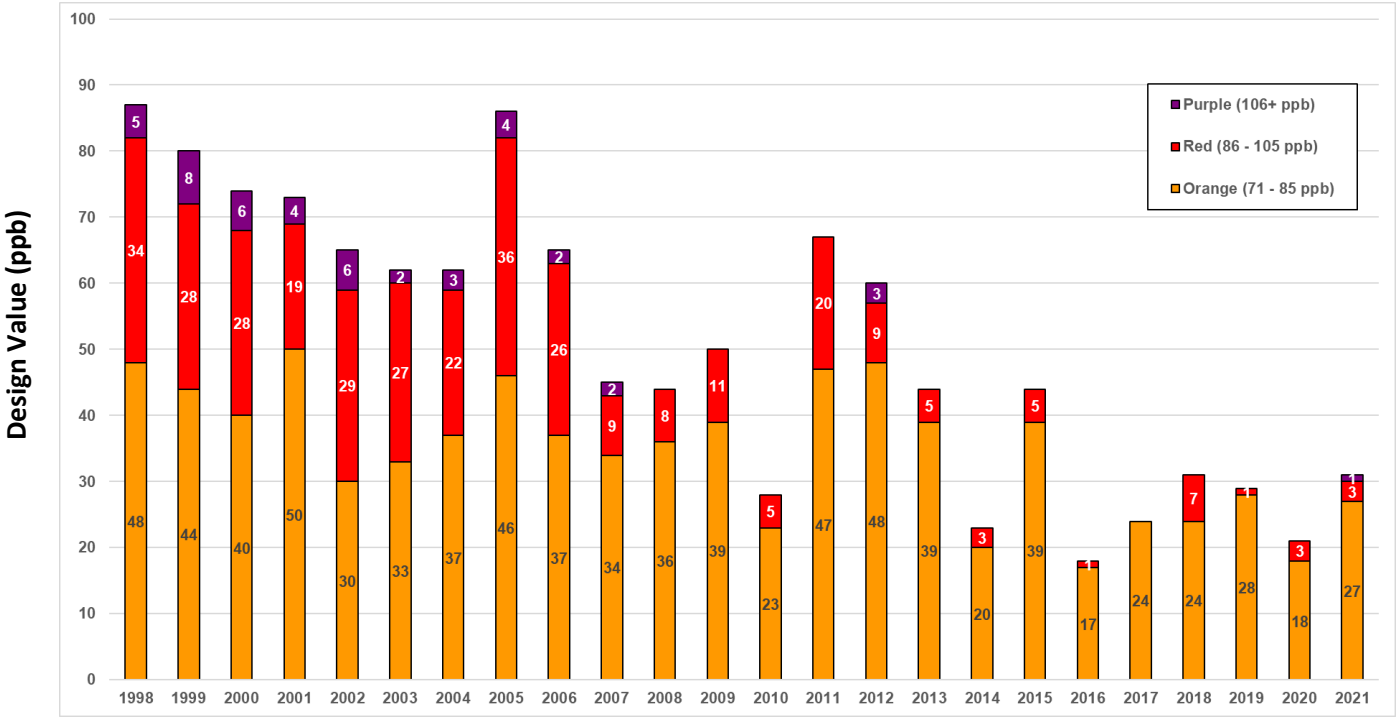
Exhibit 2.2.2-1: 8-Hour Ozone Historical Trends



[12] 83 FR 25776

[13] Attainment Goal - According to the US EPA National Ambient Air Quality Standards, attainment is reached when, at each monitor, the *Design Value* (three-year average of the annual fourth-highest daily maximum 8-hour average ozone concentration) is ≤70 ppb.

Exhibit 2.2.2-2: North Central Texas Nonattainment Area Annual Exceedance Days for the 2008 and 2015 Ozone NAAQS



[14] Exceedance level indicates daily maximum 8-hour average ozone concentration, and are based on Air Quality Index thresholds established by the EPA for the revised ozone standard of ≤70 ppb.

Provided in Exhibit 2.2.2-3 is a NCT air quality historical summary for the 1-Hour Ozone NAAQS and the 1997, 2008, and 2015 8-Hour Ozone NAAQS since designation.

Exhibit 2.2.2-3: North Central Texas Ozone Nonattainment Area Air Quality History

1-HOUR OZONE NAAQS		
DATE	**MILESTONE**	**COMMENTS/SOURCE**
November 11, 1990	Clean Air Act Amendments	
November 6, 1991	DFW four-county area designated "moderate" nonattainment.	Collin, Dallas, Denton, and Tarrant counties (56 FR 56694)
1993/1994	Texas Natural Resource Conservation Commission (TNRCC) submitted 15% Rate-of-Progress (ROP) State Implementation Plan (SIP) to EPA.	Phase I provided by TNRCC Phase II provided by TNRCC
September 21, 1994	TNRCC submitted "Moderate" Attainment Demonstration (AD) SIP to EPA.	AD SIP provided by TNRCC
November 28, 1994	EPA issued Final Rule to conditionally approve the NO_X Waiver (Section 182(f)).	Due to SIP focusing on VOC reductions only (59 FR 60709)
November 15, 1996	"Moderate" attainment date	DFW nonattainment area failed to meet NAAQS by this date
February 18, 1998	"Serious" nonattainment reclassification	Requires 9% ROP and AD SIP Effective Date: March 20, 1998 (63 FR 8128)
March 18, 1999	TNRCC submitted revised AD SIP to EPA.	AD SIP provided by TNRCC
June 2, 1999	EPA identified SIP administratively incomplete.	Starts 18-month sanction clock for mandatory application and a two-year sanction clock for a Federal Implementation Plan. Effective Date: May 13, 1999 (64 FR 29570)
October 15, 1999	TNRCC submitted 9% ROP technical correction to EPA.	9% ROP Technical Correction provided by TNRCC
November 15, 1999	Attainment date for "Serious" nonattainment areas.	DFW nonattainment area failed to meet NAAQS by this date.
April 25, 2000	TNRCC submitted AD SIP to EPA.	AD SIP provided by TNRCC
June 23, 2000	EPA determined AD SIP complete.	Begins EPA approval process (6-12 months) Stops sanction clock (EPA letter to Governor)
January 18, 2001	EPA proposed approval of DFW AD SIP.	60-day comment period ending March 19, 2001 (66 FR 4756)
March 18, 2003	Texas Commission on Environmental Quality (TCEQ) adopted AD SIP for the DFW nonattainment area.	AD SIP provided by TCEQ
January 14, 2004	TCEQ approved Transportation Control Measure Substitutions.	EPA concurrence on November 20, 2003 TCEQ Approval

Exhibit 2.2.2-3: North Central Texas Ozone Nonattainment Area Air Quality History (continued)

1-HOUR OZONE NAAQS		
DATE	**MILESTONE**	**COMMENTS/SOURCE**
April 30, 2004	EPA published final rule to revoke the 1-Hour Ozone NAAQS.	Effective one year (June 15, 2005) after an area is designated nonattainment for the 1997 8-Hour Ozone NAAQS (69 FR 23951)
April 22, 2005	EPA approved Memorandum of Agreement between TCEQ and North Central Texas Council of Governments providing emission offsets to the DFW International Airport.	Effective Date: May 23, 2005 (70 FR 20816)
June 15, 2005	Revocation of 1-Hour Ozone NAAQS for DFW nonattainment area.	Federal air quality commitments to reduce ozone are still in effect due to anti-backsliding rules
August 26, 2005	EPA approved DFW Voluntary Mobile Emission Reduction Program.	Effective Date: September 26, 2005 (70 FR 50208)
September 27, 2005	EPA approved Transportation Control measures in the DFW nonattainment area.	Effective Date: October 27, 2005 (70 FR 56374)
October 31, 2006	Region reached attainment of 1-Hour Ozone NAAQS.	
July 11, 2008	EPA proposed determination of attainment of revoked 1-Hour Ozone NAAQS for the DFW nonattainment area.	73 FR 39897
October 16, 2008	EPA published final rule determining attainment of revoked 1-Hour Ozone NAAQS for the DFW nonattainment area.	Suspends requirements for the area to submit AD, ROP, Reasonable Further Progress (RFP), and any other SIPs related to attainment of the 1-Hour Ozone NAAQS. Effective Date: November 17, 2008 (73 FR 61357)
November 8, 2016	EPA published final rule adopting the Redesignation Substitute Report, finding DFW region in attainment for the revoked 1-Hour and 1997 8-Hour Ozone NAAQS.	Effective Date: December 8, 2016 (81 FR 78668}
April 30, 2004	EPA promulgated Phase I ozone implementation rule and designated nine NCT counties as “moderate” nonattainment for the 1997 8-Hour Ozone NAAQS.	Nine counties: Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant Effective Date: June 15, 2004 (69 FR 23951)
April 27, 2005	TCEQ adopted the 5% Increment of Progress (IOP) Demonstration SIP.	Complete 5% IOP (provided by TCEQ)
November 22, 2005	EPA published direct final rule for the control of air pollution from new motor vehicles; revisions to motor vehicle diesel fuel sulfur transition provisions; and technical amendments to the highway diesel, non-road diesel, and Tier 2 gasoline programs.	Effective Date: January 6, 2006 (70 FR 70498)

Exhibit 2.2.2-3: North Central Texas Ozone Nonattainment Area Air Quality History (continued)

8-HOUR OZONE NAAQS		
DATE	**MILESTONE**	**COMMENTS/SOURCE**
November 29, 2005	EPA promulgated Phase II 8-hour implementation rule.	Includes Final Rule for Reformulated Gasoline Effective Date: January 30, 2006 (70 FR 71612)
August 22, 2006	EPA proposed approval of: • SIP revisions of DFW nonattainment area, satisfying 1-Hour Ozone NAAQS "serious" area requirements • 5% IOP • 2002 Base Year Inventory • 2007 Motor Vehicle Emission Budgets (MVEB)	71 FR 48870
May 23, 2007	TCEQ adopted revisions to AD and RFP SIP, including 2008 MVEBs.	AD SIP Provided by the TCEQ RFP SIP Provided by the TCEQ
July 11, 2007	EPA proposed revisions to the 8-Hour Ozone NAAQS.	72 FR 37682
March 27, 2008	EPA published final rule revising 2008 8-Hour Ozone NAAQS.	New Standard is 75 ppb; secondary standards are identical to the revised primary standard Effective Date: May 27, 2008 (73 FR 16436)
January 14, 2009	EPA conditionally approved 1997 8-Hour Ozone AD SIP for DFW nonattainment area.	Effective Date: February 13, 2009 (74 FR 1903)
January 19, 2010	EPA proposed strengthening 2008 8-hour ozone primary standard from 75 ppb to within a range of 60 to 70 ppb, and a secondary standard to within a range of 7 to 15 parts per million (ppm)-hours.	(75 FR 2938)
June 15, 2010	"Moderate" nonattainment date for the 1997 8-Hour Ozone NAAQS.	DFW nonattainment area failed to meet NAAQS for 1997 8-Hour Ozone NAAQS.
July 15, 2010	EPA published final rule disapproving revisions to the New Source Review SIP; Flexible Permits.	Effective Date: August 16, 2010 75 FR 41311
August 9, 2010	EPA proposed reclassifying nine-county nonattainment area from "moderate" to "serious" for the 1997 8-Hour Ozone NAAQS.	75 FR 47746
December 20, 2010	EPA published final rule reclassifying the DFW area to "serious" nonattainment for the 1997 8-Hour Ozone NAAQS.	Effective Date: January 19, 2011 75 FR 79302

Exhibit 2.2.2-3: North Central Texas Ozone Nonattainment Area Air Quality History (continued)

8-HOUR OZONE NAAQS		
DATE	**MILESTONE**	**COMMENTS/SOURCE**
December 7, 2011	TCEQ adopted revisions to the 8-Hour Ozone AD SIP and RFP SIP for reclassification to "serious" nonattainment.	AD SIP provided by the TCEQ RFP SIP provided by the TCEQ
December 9, 2011	EPA proposed designation letter and technical support document for the 2008 8-Hour Ozone NAAQS.	US EPA Letter
January 11, 2012	TCEQ submitted comments regarding 2008 8-hour ozone designations.	TCEQ Letter
April 30, 2012	EPA's final letter for 2008 8-hour ozone designations and classifications.	US EPA Letter
May 21, 2012	EPA published final rule designating 10 counties in NCT as "moderate" nonattainment. Established December 31 of each relevant calendar year as the attainment date for all nonattainment area classification categories.	10 Counties: Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise Effective Date: July 20, 2012 (77 FR 30160)
June 15, 2013	"Serious" nonattainment date for the 1997 8-Hour Ozone NAAQS.	DFW area failed to meet "serious" nonattainment date
December 17, 2014	EPA published proposed rule to strengthen 2008 8-Hour Ozone Primary NAAQS from 0.075 ppm to within a range between 0.065 to 0.070 ppm.	79 FR 75233
December 23, 2014	DC Court of Appeals published consent decree reversing EPA's final rule establishing December 31 as the attainment date based on nonattainment area classification dates.	DC Court of Appeals Consent Decree
March 6, 2015	EPA published final rule implementing the 2008 8-Hour Ozone NAAQS and revoking the 1997 8-Hour Ozone NAAQS.	Effective Date: April 6, 2015 (80 FR 12263)
July 20, 2015	AD SIP submittal for 2008 8-Hour Ozone NAAQS due to EPA.	
September 1, 2015	EPA disapproved the 1997 8-Hour Ozone AD SIP and provided a Clean Data Determination for the nine counties designated nonattainment for the 1997 8-Hour Ozone NAAQS.	Effective Date: October 1, 2015 (80 FR 52630)
October 26, 2015	EPA published final rule revising 8-Hour Ozone NAAQS (2015 8-Hour Ozone NAAQS).	New standard is 0.070 ppm; secondary standards are identical to the revised primary standard Effective Date: December 28, 2015 (80 FR 65291)

Exhibit 2.2.2-3: North Central Texas Ozone Nonattainment Area Air Quality History (continued)

8-HOUR OZONE NAAQS		
DATE	**MILESTONE**	**COMMENTS/SOURCE**
November 8, 2016	EPA published final rule adopting the Redesignation Substitute SIP, finding the DFW region in attainment for the revoked 1-Hour and 1997 8-Hour Ozone NAAQS.	Effective Date: December 8, 2016 (81 FR 78668)
April 30, 2018	EPA signed final rule classifying nine counties in the DFW region as marginal nonattainment for the 2015 8-Hour Ozone NAAQS.	Marginal Counties: Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Tarrant, and Wise https://www.epa.gov/sites/production/files/2018-04/documents/placeholder.pdf
July 20, 2018	"Moderate" attainment deadline for the 2008 8-Hour Ozone NAAQS.	
August 23, 2019	EPA reclassified the 10-county nonattainment area from "moderate" to "serious."	Effective Date: September 23, 2019 (84 FR 44238)
March 4, 2020	TCEQ adopted revisions to the 8-Hour Ozone AD SIP and RFP SIP for reclassification to "serious" nonattainment.	AD SIP provided by the TCEQ RFP SIP provided by the TCEQ
October 9, 2020	EPA proposed approval of the "serious" nonattainment RFP SIP	85 FR 64084
July 20, 2021	"Serious" attainment deadline for the 2008 8-Hour Ozone NAAQS.	
August 3, 2021	"Marginal" attainment deadline for the 2015 8-Hour Ozone NAAQS.	
April 13, 2022	EPA published determinations of attainment by the attainment date, extension of the attainment date, and reclassification of areas classified as serious for the 2008 Ozone NAAQS.	87 FR 21825
April 13, 2022	EPA published determinations of attainment by the attainment date, extension of the attainment date, and reclassification of areas classified as serious for the 2015 Ozone NAAQS.	87 FR 21842

CHAPTER 3: CONFORMITY

3.1 What is Transportation Conformity?

Transportation Conformity is a way to ensure federal funding and approval goes to transportation activities consistent with air quality goals. Before Metropolitan Transportation Plans (MTPs) and Transportation Improvement Programs (TIPs) can be adopted, approved, or accepted in nonattainment areas, Metropolitan Planning Organizations (MPOs) and the US Department of Transportation must make conformity determinations on these documents. Per Section 176(c)(1) of the Clean Air Act Amendments of 1990, 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.*

A regional emissions analysis is the key analytic component of the Transportation Conformity process. It is conducted to demonstrate regional emissions from on-road sources do not exceed the established Motor Vehicle Emission Budgets (MVEB), causing or contributing to violations of the Environmental Protection Agency's (EPA) National Ambient Air Quality Standards (NAAQS), and ensures transportation activities are 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 the MPO to make the initial Transportation Conformity determination at the local level. For the North Central Texas (NCT) nonattainment area, this responsibility falls with the Regional Transportation Council (RTC), the MPO's policy body. The second step is for the Federal Highway Administration and the Federal Transit Administration to make a joint Transportation Conformity determination at the federal level. Upon federal approval, a four-year window begins during which projects, programs, and policies identified in the MTP and TIP may move toward implementation.

Another important goal of conformity is to demonstrate the timely implementation of Transportation Control Measures (TCMs). TCMs are specific projects and programs designed to reduce emissions from transportation sources by reducing or relieving congestion. TCMs in the SIP are contained and funded in the MTP and the TIP. The TCMs are selected through the comprehensive transportation planning process during the development of these documents. Examples, pictured in Exhibit 3.1-1, include Intelligent Transportation System projects and traffic signal progression to help relieve congestion, as well as bike/pedestrian pathways offering alternate commute strategies.

Exhibit 3.1-1: Intelligent Transportation System Message Sign/Traffic Signal/Bike Pedestrian Path

Federal law also requires the state, working with the nonattainment area, to develop additional control measures to meet the Reasonable Further Progress (RFP) and Attainment Demonstration (AD) SIPs. Examples of these programs are included in Chapter 4 in the AD and RFP SIP. In addition, Appendix H of the AD SIP includes locally implemented control strategies adopted by the RTC.[15]

The first Transportation Conformity for NCT occurred in 1998. Exhibit 3.1-2 provides a historical summary of conformity-related activities in NCT.

Exhibit 3.1-2 North Central Texas Ozone Nonattainment Area Conformity History

DATE	MILESTONE	COMMENTS/SOURCE
November 18, 1998	Texas Natural Resource Conservation Commission (TNRCC) adopted Transportation Conformity SIP and Rule Revision.	Transportation Conformity SIP Transportation Conformity Rule
December 10, 1998	TNRCC submitted Transportation Conformity SIP to EPA.	Transportation Conformity SIP Transportation Conformity Rule
February 25, 1999	Favorable Air Quality Conformity Determination on Mobility 2020 and 1999-2001 TIP.	Federal Highway Administration (FHWA)/Federal Transit Administration (FTA) joint determination letter
April 20, 1999	Nitrogen Oxides (NO_X) Waiver Rescinded	Requires conformity conducted on NO_X emissions Effective Date: June 21, 1999 (64 FR 19283)
July 8, 1999	EPA approved Implementation Plan for Texas: Transportation Conformity Rule.	Effective Date: September 7, 1999 (64 FR 36790)

[15] https://www.tceq.texas.gov/airquality/sip/sipplans.html

Exhibit 3.1-2 North Central Texas Ozone Nonattainment Area Conformity History (continued)

DATE	MILESTONE	COMMENTS/SOURCE
January 12, 2000	EPA declared 9% Rate of Progress MVEB adequate.	MVEBs: NO_X = 284.14 tpd and Volatile Organic Compounds (VOC) = 147.22 tpd Effective Date: January 27, 2000 (65 FR 1862)
May 8, 2000	Adequacy Review of AD SIP submissions for conformity.	90-day MVEB review
July 13, 2000	Favorable Air Quality Conformity Determination on Mobility 2025 and 2000-2002 TIP.	FHWA/FTA joint determination letter
October 20, 2000	EPA declared AD SIP MVEB adequate.	Requires conformity analysis within 18 months on new MVEBs: NO_X = 164.30 tpd and VOC = 107.60 tpd Effective Date: November 6, 2000 (65 FR 63074)
October 19, 2001	Favorable Air Quality Conformity Determination on Mobility 2025 Update and 2002-2004 TIP.	FHWA/FTA joint determination letter
January 27, 2003	Favorable Air Quality Conformity Determination on Mobility 2025 and amended 2002-2004 TIP.	FHWA/FTA joint determination letter
April 8, 2004	Favorable Air Quality Conformity Determination on Mobility 2025 Update and 2004-2006 TIP	FHWA/FTA joint determination letter
July 1, 2004	EPA published final Transportation Conformity Rule Amendments for the new 8-hour ozone and Particulate Matter $(PM)_{2.5}$ NAAQS and miscellaneous revisions for existing areas.	Amended to include criteria and procedures for the new 8-hour ozone and $PM_{2.5}$ NAAQS Effective Date: August 2, 2004 (69 FR 40004)
March 8, 2005	Guidance for determining the "attainment year" for Transportation Conformity in new 8-hour ozone and $PM_{2.5}$ nonattainment areas.	EPA Memorandum
June 1, 2005	EPA declared 5% Increment of Progress MVEB adequate.	MVEBs: NO_X = 201.32 tpd and VOC = 104.14 tpd Effective Date: June 16, 2005 (70 FR 31441)
June 3, 2005	Anticipation of a 24-hour Transportation Conformity lapse.	US DOT Letter
June 15, 2005	Conformity Determination due for the nine-county ozone nonattainment area.	Favorable Conformity Determination received on June 16, 2005
June 16, 2005	Favorable Air Quality Conformity Determination on Mobility 2025 Update and 2006-2008 TIP.	One day lapse in conformity FHWA/FTA joint determination letter FHWA/FTA joint determination letter (correction)
August 10, 2005	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)	Extends three-year clock on long-range plans to four years.

Exhibit 3.1-2 North Central Texas Ozone Nonattainment Area Conformity History (continued)

DATE	MILESTONE	COMMENTS/SOURCE
June 8, 2007	Texas Commission on Environmental Quality (TCEQ) adopted a rule revision to align state transportation conformity requirements with SAFETEA-LU.	TCEQ Rule Revision
June 12, 2007	Favorable Air Quality Conformity Determination of Mobility 2030 and Amended Fiscal Year 2006-2008 TIP.	FHWA/FTA joint determination letter
January 24, 2008	Transportation Conformity Rule Amendments to Implement SAFETEA-LU Provisions.	EPA updates the Transportation Conformity Rule to make it consistent with the Clean Air Act as amended by SAFETEA-LU. (73 FR 4420)
March 21, 2008	EPA declared 2009 AD SIP MVEB adequate for Transportation Conformity purposes.	MVEBs: NO_X = 186.81 tpd and VOC = 99.09 tpd Effective Date: April 7, 2008 (73 FR 15152)
March 2, 2010	Official release of the Motor Vehicle Emission Simulator (MOVES) 2010 Motor Vehicle Emissions Model for Emissions Inventories in SIPs and Transportation Conformity.	Effective Date: March 2, 2010 (75 FR 9411)
May 21, 2012	EPA published final rule revoking the 1997 8-Hour Ozone NAAQS for Transportation Conformity purposes.	Effective Date: July 20, 2012 (77 FR 30160)
July 6, 2012	Moving Ahead For Progress in the 21st Century Act (MAP-21) signed into law.	Funds surface transportation programs and creates a streamlined and performance-based surface transportation program
February 1, 2013	EPA declared 2011 and 2012 RFP SIP MVEB adequate for Transportation Conformity purposes.	2011 MVEBs: NO_X = 197.05 tpd and VOC = 89.54 tpd 2012 MVEBs: NO_X = 195.39 tpd and VOC = 82.20 tpd Effective Date: February 19, 2013 (78 FR 7429)
July 19, 2013	Favorable Air Quality Conformity Determination on Mobility 2035 – 2013 Update and 2013-2016 TIP.	FHWA/FTA joint determination letter
July 31, 2014	Initial release of the MOVES2014 for Emissions Inventories in SIPs and Transportation Conformity.	http://www.epa.gov/otaq/models/moves/
October 7, 2014	Official release of MOVES2014 for use outside of California. Update to the July version of MOVES2014 to fix user-reported issues.	(79 FR 60343)
December 23, 2014	DC Court of Appeals published consent decree reversing EPA's final rule revoking the 1997 8-Hour Ozone NAAQS for the purpose of Transportation Conformity.	DC Court of Appeals Consent Decree

Exhibit 3.1-2 North Central Texas Ozone Nonattainment Area Conformity History (continued)

DATE	MILESTONE	COMMENTS/SOURCE
May 29, 2015	Favorable Air Quality Conformity Determination on Mobility 2035 – 2014 Amendment and 2015-2018 TIP.	FHWA/FTA joint determination letter
November 4, 2015	MOVES2014a released	
December 2015	MOVES2014a update released	
December 4, 2015	Fixing America's Surface Transportation Act, (FAST Act) signed into law.	Provides long-term funding for surface transportation and streamlines approval process for new transportation projects.
January 11, 2016	EPA declared 2017 RFP SIP MVEB adequate for Transportation Conformity purposes.	2017 MVEBs: NO_X = 148.36 tpd and VOC = 77.18 tpd Effective Date: January 26, 2016 (81 FR 1184)
September 7, 2016	Favorable Air Quality Conformity Determination on Mobility 2040 and 2015-2018 TIP.	FHWA/FTA joint determination letter
November 8, 2016	EPA declared 2017 AD SIP MVEB adequate for Transportation Conformity purposes.	2017 MVEBs: NO_X = 130.77 tpd and VOC = 64.91 tpd Effective Date: November 23, 2016 (81 FR 78591)
November 17, 2016	MOVES2014a update released	
December 11, 2017	MOVES2014a update released	
January 7, 2021	MOVES3 released	86 FR 1106
March 12, 2021	MOVES3 update released	
September 13, 2021	MOVES3 update released	
January 11, 2022	MOVES3 update released	

This report contains conformity determinations conducted for Mobility 2045 – 2022 Update, with supporting 2023-2026 TIP, with both documents meeting the requirements of the Clean Air Act (United States Code, Title 42 §7504, 7506 (c) and (d)) as amended on November 15, 1990, the applicable SIP, and the conformity rule (40 CFR Part 93). This conformity determination was conducted with the support of the North Central Texas Council of Governments' RTC.

3.2 Conformity Criteria

Specific criteria must be met in order for an MTP, TIP, or regionally significant projects to be found to conform. The criteria, listed in Exhibit 3.2-1, vary based upon the action under review, the pollutant of concern, and the status of the SIP. Further information on each criteria may be found within the text of this document**.**

Exhibit 3.2-1: North Central Texas Nonattainment Area Applicable Conformity Criteria

All Actions at All Times	40 CFR 93	Chapter
Latest Planning Assumptions	93.110	4/5
Latest Emissions Model	93.111	7
Consultation	93.112	10
Metropolitan Transportation Plan		
Timely Implementation of TCMs	93.113(b)	8.1.1
Emissions Budget or Emissions Reduction	93.118	8
Transportation Improvement Program		
Timely Implementation of TCMs	93.113(c)	8.1.1
Emissions Budget or Emissions Reduction	93.118	8
Project (from a Conforming Plan or TIP)		
Currently Conforming Plan and TIP	93.114	4
Project from a Conforming Plan or TIP	93.115	4
Carbon Monoxide (CO) and PM_{10} Hot Spots	93.116	Not Applicable
PM_{10} Control Measures	93.117	Not Applicable
Project (not from a Conforming Plan or TIP)		
Timely Implementation of TCMs	93.113(d)	8.1.1
Currently Conforming Plan and TIP	93.114	4
CO and PM_{10} Hot Spots	93.116	Not Applicable
PM_{10} Control Measures	93.117	Not Applicable

3.3 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 3.3-1 is the checklist detailing information relevant to this conformity document.

Exhibit 3.3-1: Information Required for Transportation Conformity Review

Item	Regulation Reference	Format	Report Location
Documents			
Mobility 2045: The Metropolitan Transportation Plan for North Central Texas – 2022 Update (Mobility 2045 – 2022 Update)	Part 93 Subpart A	Independent Self-Supporting Document (Electronic File)	Appendix 12.4
2023-2026 Transportation Improvement Program (2023-2026 TIP)	Part 93 Subpart A	Independent Self-Supporting Document (Electronic File)	Appendix 12.5
Conformity Document for Mobility 2045 – 2022 Update and the 2023-2026 TIP	Part 93 Subpart A	Independent Self-Supporting Document (Electronic File)	This document

Exhibit 3.3-1: Information Required for Transportation Conformity Review (continued)

Item	Regulation Reference	Format	Report Location
MOVES			
Guidance Supporting MOVES Input Development (SIP Consistency, EPA's Information Sheets, etc.)		Discussion Contained in Conformity Document and Appropriate Appendices	Section 7.2 Appendix 12.6 Appendix 12.13
Description of Version of MOVES Model Being Used (MOVES3, updated January 2022)		Discussion Contained in Conformity Document	Section 7.2
MOVES Input and Output Files		Electronic (ASCII or txt File Format)	Appendix 12.14
MOVES Input Parameters		Electronic (ASCII or txt File Format)	Appendix 12.15
MOVES Emission Factors		Electronic (ASCII or txt File Format)	Appendix 12.16
MOVES External Reference Files		Electronic (ASCII or txt File Format)	Appendix 12.21
Mobile Source Emissions Reduction Strategies (MoSERS)			
MoSERS Methodology and Calculation Descriptions		Electronic File	Appendix 12.18
MoSERS Project Listing		Electronic File	Appendix 12.19
Travel Demand Model			
Highway Performance Monitoring System Adjustment(s), Factors, Approach	40 CFR 93.122(b)(3)	Discussion Contained in Conformity Document (Electronic File)	Section 5.5.1
Description of Travel Demand Model Validation, Including Validation Year	40 CFR 93.106(a)(1)(ii)	Discussion Contained in Conformity Document (Electronic File)	Chapter 5 Appendix 12.7
Vehicle Miles of Travel (August Midweek 24-Hour by Roadway Type)		Electronic File	Appendix 12.9
Average Loaded Speeds (August Midweek 24-Hour by Roadway Type)		Electronic File	Appendix 12.10
Centerline Mile Summaries for Each Analysis Year		Electronic File	Appendix 12.11
Definition of Regionally Significant Roadway System		Electronic File	Appendix 12.22
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)	Exhibit 5.2-1 Appendix 12.8 Appendix 12.24

Exhibit 3.3-1: Information Required for Transportation Conformity Review (continued)

Item	Regulation Reference	Format	Report Location
Travel Demand Model (continued)			
Files Containing Hourly Distribution by County, Roadway Type, and Vehicle Type for: - Vehicle Miles of Travel - Vehicle Hours - Average Operational Speed - Vehicle Population - NO_X Emissions - VOC Emissions		Electronic Files in Tab Delimited Summary Tables	Appendix 12.23
SIP Requirements			
TCMs in SIP, Including Emission Reductions, Methodologies, Implementation Dates, etc.		Electronic File	Appendix 12.17
Timely Implementation of TCMs (progress)	40 CFR 93.113	Discussion Contained in Conformity Document	Section 8.1
Project Listings			
Congestion Mitigation and Air Quality Projects Containing Emission Benefits, Methodologies, and Implementation Dates		Identified in TIP: Independent Self-Support Document (Electronic File)	Appendix 12.5
Roadway System (Capacity Staging)		Electronic File	Appendix 12.8
List of Non-Federal Projects	In Response to March 2, 1999 Court Ruling	Identified in TIP: Independent Self-Supporting Document (Electronic File)	Appendix 12.5
List of Exempt Projects	40 CFR 93.105(c) 40 CFR 93.126 40 CFR 93.127[16] 40 CFR 93.128	Identified in TIP: Independent Self-Supporting Document (Electronic File)	Appendix 12.5
Evidence of Fiscal Constraint	40 CFR 93.108	Identified in TIP: Independent Self- Supporting Document (Electronic File)	Appendix 12.5
Evidence of MTP Specifically Describing the Transportation System Envisioned for Each Analysis Year	40 CFR 93.106(a)	Included in MTP: Independent Self- Supporting Document (Electronic File)	Appendix 12.4
Public, State, and Federal Involvement			
Evidence of Public Participation and Response to Comments	40 CFR 93.105	Discussion Contained in Conformity Document (Electronic File)	Chapter 11 Appendix 12.20

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

Exhibit 3.3-1: Information Required for Transportation Conformity Review (continued)

Item	Regulation Reference	Format	Report Location
General			
Glossary of Abbreviations		Discussion Contained in Conformity Document	Preface
Endorsements and/or Resolutions		Electronic File	Appendix 12.1
Memorandum of Agreements		Electronic File	Appendix 12.2
Applicable Federal Register Notices and Related Documents		Electronic File	Appendix 12.3
Interagency Consultation		Electronic File	Appendix 12.12

3.4 Emissions Analysis

A regional emissions analysis is the key analytic component of the Transportation Conformity process. It is conducted to demonstrate regional emissions from on-road sources do not exceed the established MVEBs, causing or contributing to violations of EPA NAAQS, and ensures transportation activities are consistent with air quality goals identified in the SIP.

3.4.1 Regional Inventory

This conformity analysis of the NCT nonattainment area accounts for emissions resulting from the nonattainment area's MTP (Mobility 2045 – 2022 Update), including all regionally significant projects located within the 10-county NCT nonattainment area, and the effects of emission control programs adopted by an enforcing jurisdiction; for example, an Inspection and Maintenance Program.

3.4.2 Emissions Tests

Conformity determinations must demonstrate consistency between expected emissions from implementing the MTP and TIP with the MVEBs in the applicable implementation plan. To meet this requirement, conformity determinations in nonattainment areas with adequate MVEBs from an applicable SIP must perform an MVEB test. For the MVEB test, the emissions analysis must demonstrate the estimated emissions are less than the MVEBs in the applicable implementation plan. On November 8, 2016, the EPA published the *Adequacy Status of the Dallas-Fort Worth, Texas Attainment Demonstration 8-Hour Ozone Motor Vehicle Emission Budgets for Transportation Conformity Purposes*, effective November 23, 2016.[17] This allowed for the establishment of the 2017 MVEBs for use in Transportation Conformity demonstrations. Applicable MVEBs for the NCT 10-county nonattainment area are shown in Exhibit 3.4.2-1. A copy of the EPA's *Federal Register* notice on MVEB adequacy can be found in Appendix 12.3.

[17] 81 FR 78591

Exhibit 3.4.2-1: Motor Vehicle Emissions Budgets for the North Central Texas Nonattainment Area

DFW 10-County Nonattainment Area	NO_X (tons/day)	VOC (tons/day)
2017 Motor Vehicle Emission Budgets	130.77	64.91

3.4.3 Analysis Years

The regional emission analysis must be performed for the years for which MVEBs are established, the area's attainment year(s), if within the timeframe of the plan/conformity, the MTP horizon year, and interim years so that no interval is greater than 10 years. The existing 10 DFW nonattainment counties are expected to be reclassified as severe for the 2008 8-hour Ozone NAAQS with an attainment year of 2026. 9 of those 10 DFW nonattainment counties (excluding Rockwall County) are expected to be reclassified as moderate for the 2015 8-hour Ozone NAAQS with an attainment year of 2023. Therefore, the selected analysis years for this conformity determination are 2023 (the attainment year for the 2015 ozone NAAQS), 2026 (the attainment year for the 2008 ozone NAAQS), 2036 (the interim year), and 2045 (the MTP horizon year).

The Dallas-Fort Worth Travel Model for the Expanded Area (TAFT) and the EPA's MOVES emissions models were used for this conformity analysis. The EPA's MOVES model produces emission factors for mobile sources. TAFT predicts regional vehicle activity due to human behavior and the EPA's emission model estimates vehicle emission rates. TAFT estimates vehicle activity in three time periods: AM Peak (6:30 AM to 8:59 AM), PM Peak (3:00 PM to 6:29 PM), and Off-Peak (9:00 AM to 2:59 PM and 6:30 PM to 6:29 AM) to better account for human driving behavior as a result of capacity availability fluctuations throughout a day.

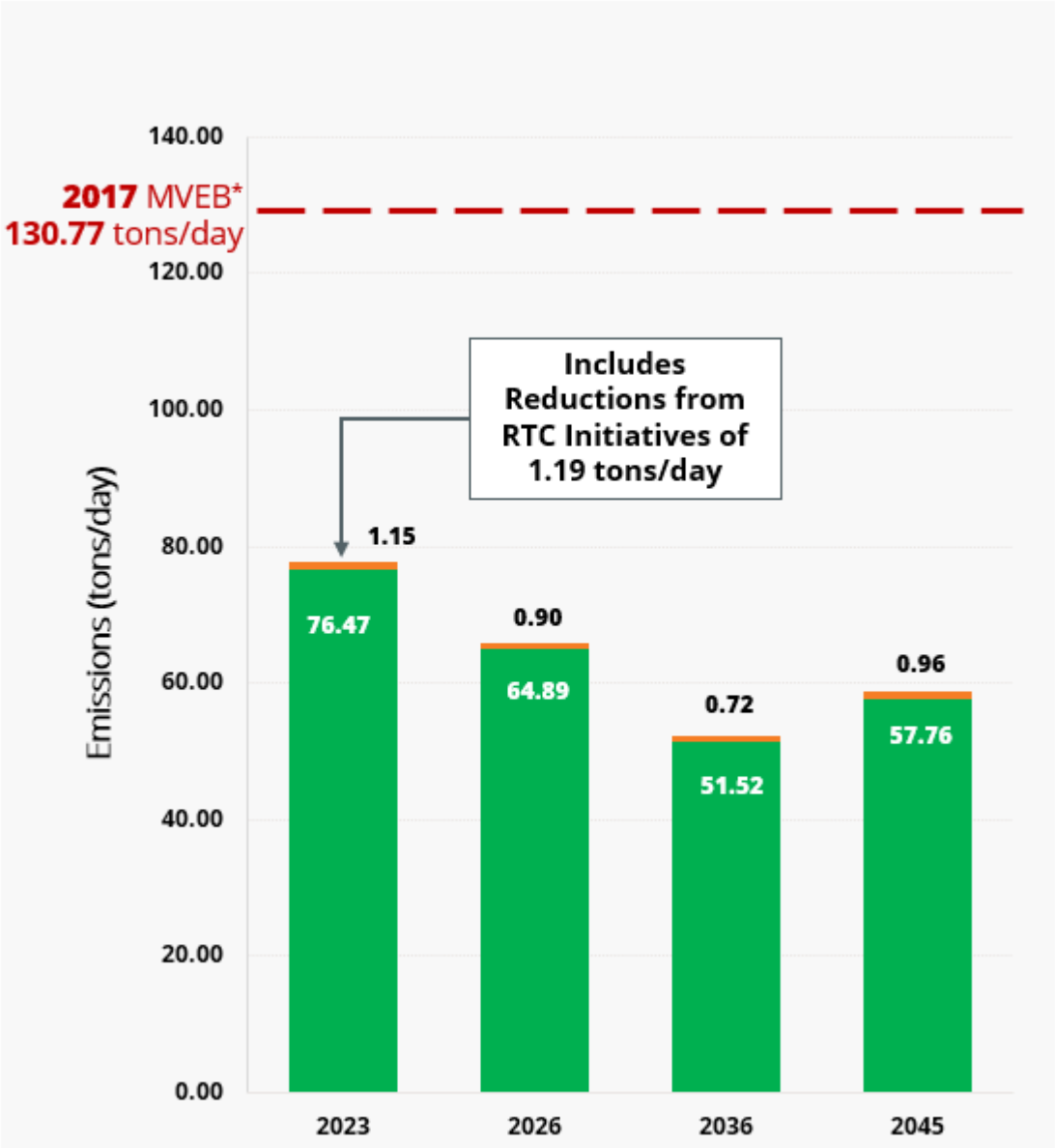
Vehicle Emissions = Vehicle Activity x Emission Rates

3.4.4 Analysis Results

This emissions analysis for determining conformity was performed under the Code of Federal Regulations Title 40, Part §93.109(c)(2)(ii)(B). Since the 2015 8-hour ozone nonattainment area covers a smaller geographic area within the 2008 8-hour ozone nonattainment area, the approved 2017 AD SIP MVEBs, shown in Exhibit 3.4.2-1, may be used to determine conformity for the 2015 8-Hour Ozone NAAQS.

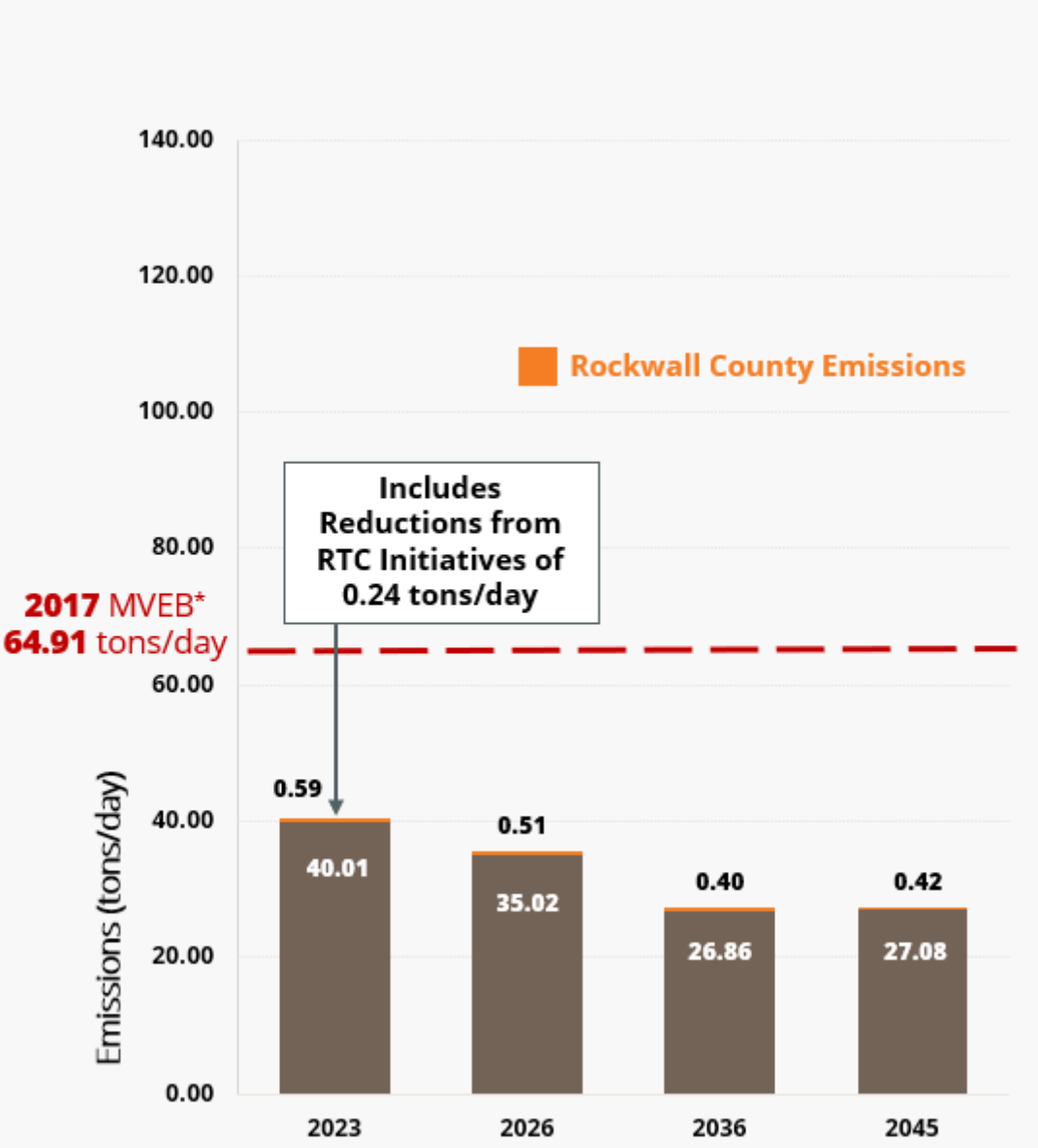
The vehicle summer weekday emission results shown in Exhibits 3.4.4-1 and 3.4.4-2 demonstrate the NCT nonattainment area meets the regional air quality conformity requirements of the 2017 MVEBs test established for the 10-county nonattainment region. The Exhibits also show the summer weekday emission results for the 2015 ozone nine-county (excluding Rockwall County) nonattainment region meets the conformity requirements for a newly designated nonattainment region. Exhibits 3.4.4-1 and 3.4.4-2 also depict RTC initiatives for NO_X and VOC for the analysis year 2023. These initiatives include projects and programs put in place to improve air quality. The magnitude of RTC initiatives demonstrates the region's commitment to reducing air pollution by minimizing vehicle emissions while improving mobility and the overall quality of life.

Exhibit 3.4.4-1: 2022 Transportation Conformity for the North Central Texas Nonattainment Area Summer Weekday Emissions of Nitrogen Oxides



**Adequacy Status of the Dallas-Fort Worth, Texas Attainment Demonstration 8-Hour Ozone Motor Vehicle Emission Budgets (MVEB) for Transportation Conformity Purposes,* 81 FR 78591

Exhibit 3.4.4-2: 2022 Transportation Conformity for the North Central Texas Nonattainment Area Summer Weekday Emissions of Volatile Organic Compounds



**Adequacy Status of the Dallas-Fort Worth, Texas Attainment Demonstration 8-Hour Ozone Motor Vehicle Emission Budgets (MVEB) for Transportation Conformity Purposes,* 81 FR 78591

CHAPTER 4: MOBILITY 2045: THE METROPOLITAN TRANSPORTATION PLAN FOR NORTH CENTRAL TEXAS – 2022 UPDATE AND THE 2023-2026 TRANSPORTATION IMPROVEMENT PROGRAM

4.1 Overview

The North Central Texas Council of Governments (NCTCOG) serves a 16-county metropolitan region, centered around the two urban centers of Dallas and Fort Worth. This region includes the 2008 8-hour ozone 10-county nonattainment area, which covers Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise counties, and the 2015 8-hour ozone 9-county nonattainment area of Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Tarrant, and Wise counties. Exhibit 1.2-1 illustrates the NCTCOG metropolitan region, both 2008 and 2015 8-hour ozone nonattainment areas, and the Metropolitan Planning Area boundary.

In 1974, the Governor of Texas designated NCTCOG as the Metropolitan Planning Organization (MPO) for transportation planning in the Dallas-Fort Worth metropolitan area in accordance with Section 112 of the Federal Highway Act of 1973. The policy body for the MPO, NCTCOG's Regional Transportation Council, is comprised primarily of local elected officials overseeing the regional transportation planning process and continues to be the forum for cooperative decisions on transportation planning. The current Metropolitan Planning Area covers Collin, Dallas, Denton, Ellis, Hood, Hunt, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise counties.

4.2 Submittal Frequency

Conformity determinations and conformity re-determinations for transportation plans, Transportation Improvement Programs (TIPs), and Federal Highway Administration and Federal Transit Administration projects must be produced according to Title 40 Code of Federal Regulations, Part 93.104 (40 CFR 93.104). The MPO and US Department of Transportation (USDOT) must determine the conformity of the Metropolitan Transportation Plan (MTP) and TIP no less than every four years.

Each new MTP, or revision to an MTP, must be found to conform before the MTP is approved by the MPO or accepted by USDOT. The exception to this is if revisions merely add or delete exempt projects listed in 40 CFR 93.126, 93.127, or 93.128. The conformity determination must be based on the MTP and the revision, taken as a whole.

A new TIP must be demonstrated to conform before the TIP is approved by the MPO or accepted by USDOT. A TIP amendment requires a new conformity determination for the entire TIP before the amendment is approved by the MPO or accepted by USDOT. The exception to this is if an amendment merely adds or deletes exempt projects listed in 40 CFR 93.126, 93.127, or 93.128.

According to United States Code, Title 42, §7506 I(2)(E), "The appropriate metropolitan planning organization shall re-determine conformity of existing transportation plans and program not later than two years after the date on which the Administrator: (i) finds a motor vehicle emissions budget to be adequate in accordance with section 93.118(e) (4) of title 40, Code of Federal Regulations (as in effect on October 1, 2004); (ii) approves an implementation plan that establishes a motor vehicle emissions budget if that budget has not yet been determined to be adequate in accordance with clause (i); or (iii) promulgates an implementation plan that establishes or revises a motor vehicle emission budget."

4.3 Regionally Significant Control Program

Each implementation plan submitted by a state under Section 110 of the Clean Air Act Amendments of 1990 shall include enforceable emission limitations and other control measures, means, or techniques, as well as schedules and timetables for compliance to meet the applicable requirements of the Act. No MPO designated under section 134 of Title 23, United States Code, shall give its approval to any project,

program, or plan that does not conform to an implementation plan. On November 8, 2016, the Environmental Protection Agency published a notice of adequacy for the Motor Vehicle Emissions Budgets contained in the Dallas-Fort Worth Attainment Demonstration 8-Hour Ozone State Implementation Plan revisions submitted on August 5, 2016.[18] These budgets were effective on November 23, 2016.

4.4 Regionally Significant Travel Projects/Programs

Regionally significant projects are defined in 40 CFR 93.101 of the conformity rule to mean a "transportation project (other than an exempt project) that is on a facility which serves regional transportation needs (such as access to and from the area outside of the region, major activity centers in the region, major planned developments such as new retail malls, sports complexes, etc., or transportation terminals, as well as most terminals themselves), and would normally be included in the modeling of a metropolitan area's transportation network, including, at a minimum, all principal arterial highways and all fixed guide-way transit facilities that offer an alternative to regional highway travel."

Each travel project is reviewed independently to consider regional significance. A proposed project determined to be regionally significant must be included in the MTP and evaluated in the regional emissions analysis. During previous conformities, MPO staff worked with the interagency consultation partners and a definition for regionally significant projects was approved. This definition is located in Appendix 12.22.

4.5 Non-Federal Projects/Programs

Non-federal projects, funded by sources such as local governments and local transportation authorities, are typically smaller in scale. Example projects include signal improvements, intersection improvements, and local roadway widening. Transportation Conformity is not required for non-federal projects or programs; however, regionally significant non-federal projects must be included in the MTP and TIP, and should go through conformity analysis. These projects are evaluated in the regional emissions analysis.

4.6 Exempt Projects/Programs

40 CFR 93.126 of the final conformity rule identifies a number of project types exempt from the requirement of a conformity determination. When a conforming MTP or TIP is revised with the addition or deletion of an exempt project, a new conformity determination is not required. Some of the exempt projects listed under 40 CFR 93.126 include: continuation of ridesharing and vanpooling promotion activities at current levels, bicycle and pedestrian facilities, railroad/highway crossing, fencing, shoulder improvements, purchasing replacement transit vehicles, and road landscaping. 40 CFR 93.127 of the final conformity rule identifies a number of project types exempt from a regional emissions analysis, but require project-level conformity, including: intersection channelization projects, intersection signalization projects at individual intersections, interchange reconfiguration projects, changes in vertical and horizontal alignment, truck size and weight inspection stations, and bus terminals and transfer points. Additionally, 40 CFR 93.128 of the final conformity rule exempts traffic signal synchronization projects; however, regionally significant traffic signal synchronization projects must be included in subsequent regional emissions analyses. 40 CFR 93.126, 40 CFR 93.127, and 40 CFR 93.128 are located in Appendix 12.3.

4.7 Constraints

One of the key requirements of the MTP and TIP is that they are financially constrained. This requirement ensures projects and programs identified in the MTP and TIP have funds available to allow them to be implemented. Per 40 CFR 93.114 of the conformity regulations, at the time of project

[18] 81 FR 78591

approval, there must be a current conforming MTP and current conforming TIP. Only one conforming transportation plan and TIP may exist in any area at any one time. Conformity determinations of a previous MTP or TIP expire once the current MTP or TIP is found to conform by USDOT.

4.7.1 Long-Range Financial Constraint (MTP)

The plan'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 2045: The Metropolitan Transportation Plan for North Central Texas – 2022 Update*, which is included as Appendix 12.4 of this conformity document.

4.7.2 Short-Range Financial Constraint (TIP)

One of the key requirements for a conforming TIP is that the document is financially constrained, meaning the amount of funds programmed are equal to the total funds available. This requirement ensures transportation projects and programs in the TIP have funds available for implementation. In addition, it emphasizes the need for various local and state entities to work together to ensure particular projects have all the necessary preliminary work completed by the program year. The TIP contains transportation activities financially constrained in the first four years of the MTP. The 2023-2026 TIP document is included as Appendix 12.5 of this conformity document.

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CHAPTER 5: ESTIMATION OF VEHICLE ACTIVITY

5.1 Dallas-Fort Worth Travel Model for the Expanded Area Overview

The Dallas-Fort Worth Travel Model, Transportation Analytical Forecasting Tool (TAFT), validated in 2019, serves as the source for forecasting vehicle miles of travel (VMT) and other travel characteristics for the North Central Texas nonattainment area. The network-based TAFT is executed in the TransCAD environment, which is a Geographic Information System-based commercial travel demand software package for transportation planning. The North Central Texas Council of Governments Transportation Department is responsible for executing TAFT and conducting various planning studies for the region. The department provides technical support and staff assistance to the Regional Transportation Council and its technical committees, which compose the Metropolitan Planning Organization policy-making body.

5.2 Multimodal Transportation Analysis Process

The forecasting technique of TAFT is based on a four-step sequential process designed to model travel behavior and predict the level of travel demand at regional, sub-area, or small area levels. These four steps are: Trip Generation, Trip Distribution, Mode Choice, and Roadway Assignment. A detailed explanation of TAFT is included in Appendix 12.7.

The roadway networks developed for the analysis years contain over 30,000 unique segments constructed to replicate the transportation system of the coverage area. The transportation networks for this inventory were developed specifically for the years 2023, 2026, 2036, and 2045, as shown in Exhibit 5.2-1.

Exhibit 5.2-1: Transportation Network Development Methodology Summary

Network	Contents
2023	2023 analysis year network
	Transportation system improvements from staging of the Metropolitan Transportation Plan operational in the 2023 ozone season
2026	2026 analysis year network
	Transportation system improvements from staging of the Metropolitan Transportation Plan operational in the 2026 ozone season
2036	2036 analysis year network
	Transportation system improvements from staging of the Metropolitan Transportation Plan operational in the 2036 ozone season
2045	2045 analysis year network
	Transportation system improvements from staging of the Metropolitan Transportation Plan operational in the 2045 ozone season

5.3 Model Adjustments

Several adjustment factors were applied to this conformity determination. A Highway Performance Monitoring System (HPMS) factor and a nonrecurring congestion factor were applied to the network-based travel model, and time-of-day factors were developed to convert the network to August weekday. The HPMS and nonrecurring congestion factors methodologies are consistent with model adjustments applied to the 8-Hour Attainment Demonstration (AD) State Implementation Plan (SIP) used to develop the Motor Vehicle Emission Budgets applicable to this Transportation Conformity analysis. The seasonal, daily, and hourly distribution factors methodologies are consistent with the AD SIP and are based on the Texas Department of Transportation's (TxDOT) Automatic Traffic Recorder (ATR) data.

5.3.1 Model VMT Adjustments (HPMS VS TAFT)

Consistent with previous emission inventory practices, the Dallas-Fort Worth Metropolitan Planning Organization used TxDOT's HPMS data to adjust modeled VMT to ensure consistent reporting across the state. This adjustment is based on the Environmental Protection Agency's guidance for emission inventory development. Exhibit 5.3.1-1 shows the calculation performed to develop the new HPMS adjustment factor, 0.9889, based on a comparison of 2014 VMT for HPMS and TAFT.

Exhibit 5.3.1-1: Dallas-Fort Worth and HPMS VMT Analysis

Model VMT Adjustment Factor	
	2014 VMT
HPMS (ASWT[19])	178,714,289
TAFT (ASWT)	180,721,839
HPMS/TAFT Ratio	**0.9889**

Source: NCTCOG

The ATR data collected by TxDOT is used to calculate the necessary conversions for seasonal and daily adjustment factors and hourly distribution factors.

5.3.2 Seasonal and Daily Adjustments

ATR data averaged over five years (2015 to 2019) is organized into five day types: Sunday, Monday, Midweek (Tuesday, Wednesday, and Thursday), Friday, and Saturday. To adjust the representative average school season weekday traffic VMT from TAFT to the specified day types in the summer season, ratios are calculated. The summer portion of the ratio uses traffic volumes recorded for the August month.

5.3.3 Hourly Adjustments

Daily volumes recorded for midweek are aggregated by hour to determine the percent of daily traffic occurring during each hour, representing hourly vehicle activity estimates. The TAFT county midweek is further detailed by utilizing a time period volume for aggregation. These time periods correspond to the time periods used in TAFT, where AM Peak is 6:30 AM to 8:59 AM, PM Peak is 3:00 PM to 6:29 PM, and Off-Peak represents all other hours of the day (12:00 AM to 6:29 AM, 9:00 AM to 2:59 PM, and 6:30 PM to 11:59 PM). Periods split by mid-hour times use an equal division of traffic recorded during the hour.

5.3.4 Non-Recurring Congestion

According to a paper published in the January 1987 Institute of Transportation Engineers' journal by Jeffrey A. Lindley entitled "Urban Freeway Congestion: Quantification of the Problem and Effectiveness of Potential Solutions", congestion due to traffic incidents accounts for twice as much as congestion from bottleneck situations. Congestion due to incidents, or nonrecurring congestion, causes emissions not represented in the VMT-based calculations of the base emissions. In order to include these effects, the delay caused by nonrecurring congestion is added to the freeway travel times and congestion delay due to bottlenecks to obtain an increased freeway travel time, which translates into reduced speed on freeway facilities. Arterial street emissions are not significantly affected by incidents because alternate routes on the arterial system are generally available; therefore, this factor is not applied to non-freeway type facilities.

5.4 Transit Systems

The Dallas-Fort Worth region has three transportation authorities: Dallas Area Rapid Transit (DART)

[19] Average School Season Weekday Traffic

serving the eastern portion of the region, the Denton County Transit Authority (DCTA) serving Denton County, and the Fort Worth Transportation Authority (Trinity Metro) serving the western portion of the region.

Within DART's 700-square-mile service area are a broad range of transportation services, from modern bus and rail services to ridesharing programs, and corporate transportation demand management programs. DART constantly adds and upgrades transit facilities throughout the region by reviewing bus routes to maximize efficiency, especially with regard to the orientation of feeder bus routes to rail station destinations. Local feeder routes improve the potential for increased rail ridership by providing reliable connections from residential areas to rail stations. DART system planners evaluate current routes and design improved cross-town and radial routes to serve current and future rail stations and major destinations. Express routes improve commute time to major destinations by utilizing high-occupancy vehicle lanes and major highways with limited stop time. Express routes serve both transit centers and park-and-ride lots. Improved rail service and ridership are high priorities in DART's attempt to serve the region.

DCTA is a coordinated county transportation authority currently providing express bus service between the cities of Denton, Highland Village, and Lewisville. The service plan includes the A-train, connecting Denton County residents to DART, local fixed-route bus services serving the densest portions of the county, shuttle service for local colleges and universities, a demand-response service to member cities for the elderly and disabled, and a commuter vanpool program.

Trinity Metro provides fixed-route bus service, express bus service, and Rider Request services throughout various cities in the western region. The state-of-the-art Intermodal Transportation Center provides easy access to the Trinity Railway Express (TRE) and Trinity Metro's fixed-route bus service. Trinity Metro operates the TRE jointly with DART to provide regional rail service between Fort Worth and Dallas.

The Rider Request routes offer the choice of having a bus arrive where requested, so long as travel is within the route's designated service area. Trinity Metro's Mobility Impaired Transportation Service (MITS) offers door-to-door transportation anywhere within the cities of Fort Worth, Richland Hills, and Blue Mound. MITS is a transportation service for persons with a verified disability preventing them from riding a fixed-route bus service.

The transit agencies coordinate fare structures to provide riders seamless transfers between service providers and modes.

5.4.1 Transit VMT

Exhibit 5.4.1-1 lists the summer weekday daily regional transit VMT used in TAFT for the identified transit modes for analysis years 2023, 2026, 2036, and 2045. The slight fluctuation of transit service from year to year is a result of roadway project modifications, implementation of future rail lines, and additional bus services identified to support the rail lines.

Exhibit 5.4.1-1: Transit Vehicle Miles of Travel

Transit Name	2023	2026	2036	2045
DART Bus	71,786	74,853	77,369	90,577
Trinity Metro Bus	18,074	22,943	25,439	34,325
DCTA Bus	5,639	5,639	5,647	5,639
Rail	19,146	21,237	21,984	39,811
Total Daily VMT	**114,644**	**124,671**	**130,440**	**170,353**

5.5 Roadway VMT

The summer weekday roadway VMT totals by county and analysis year are in Exhibit 5.5-1. Final VMT estimates are listed in Appendix 12.9.

Exhibit 5.5-1: Roadway Vehicle Miles of Travel

County	2023	2026	2036	2045
Collin	32,253,931	35,010,183	43,573,963	53,415,806
Dallas	92,882,433	99,191,371	110,446,841	122,447,539
Denton	26,727,961	28,845,410	35,417,635	45,243,069
Ellis	9,044,651	9,596,966	11,620,955	13,713,108
Johnson	5,717,034	6,076,868	6,976,306	8,130,319
Kaufman	7,736,090	8,194,899	9,373,918	11,295,787
Parker	6,146,925	6,559,382	7,774,531	9,064,871
Rockwall	3,281,624	3,698,824	4,399,846	5,522,099
Tarrant	61,540,586	66,185,544	77,646,292	87,927,607
Wise	4,115,586	4,326,852	4,901,751	5,596,590
10-County Total Daily VMT	**249,446,821**	**267,686,298**	**312,132,037**	**362,356,795**

5.5.1 Average Loaded Speeds

Average Loaded Speeds are provided by county by functional class. Final average loaded speeds are listed in Appendix 12.10.

5.5.2 Centerline and Lane Miles

Centerline and Lane Miles are provided by county by functional class. Final mileage estimates are listed in Appendix 12.11.

CHAPTER 6: ESTIMATION OF OFF-NETWORK ACTIVITY

The non-roadway-based inventory estimates (e.g., from vehicle starts, parked vehicle evaporative processes, non-roadway-based vehicle idling, hoteling activity) were calculated as the product of the amount of associated activity and the mass per unit of activity. To estimate the source hours parked (SHP) and vehicle starts activity, vehicle population estimates were needed. Hoteling activity estimates (composed largely of the emissions-producing source hours extended idling [SHEI] and diesel auxiliary power unit [APU] hours) were based on county-specific actual estimates.

Motor Vehicle Emission Simulator (MOVES)3 (utilities) and the methodology provided by the Texas A&M Transportation Institute (TTI) is used to calculate the vehicle population and off-network activity estimates.

6.1 Vehicle Type Populations

NCTCOG based the vehicle population estimates on vehicle registration data, vehicle population factors developed from the vehicle miles of travel (VMT) mix, and additionally for future years, VMT growth estimates. For a historical year, the vehicle population estimates are based on mid-year Texas Department of Transportation (or Texas Department of Motor Vehicles) county registrations data, if available, and regional, all roads-weekday VMT mix-based vehicle type population factors for the analysis year. For future years, vehicle type populations were estimated as a function of base (e.g., latest available, if available, mid-year) registrations, grown to a future value (growth as a function of base and future VMT), and all roads-weekday VMT mix-based vehicle type population factors for the analysis year. This same procedure may be used to back-cast vehicle populations for earlier years for which vehicle registrations are unavailable.

6.2 ONI Hours

Off-Network Idle (ONI) hours (new with MOVES3) are not related to combination truck hoteling activity. These are idling activities that occur while a vehicle is idling in a parking lot, drive-through, driveway, while waiting to pick up passengers, or loading/unloading cargo. ONI applies to all MOVES source types. Emissions are calculated by multiplying the emission rates (exhaust running emissions for MOVES roadType ID “1” or “off-network”) with the corresponding hours of ONI.

NCTCOG estimates ONI activity consistent with the MOVES methodology. This is accomplished, in general, using a formula that calculates ONI as a function of MOVES default relationships on total idling and total operating hours, derived from telematics data, in combination with local roadway network activity estimates (VMT and speeds), and MOVES default road idling fractions (proportions of vehicle idling while operating on roads).

6.3 SHP

SHP was estimated as a function of total hours (hours a vehicle exists) minus its hours operating on roads (source hours operating [SHO]) minus ONI hours. For a historical year, vehicle type SHP estimates are based on VMT mix, link VMT and speeds, and the vehicle population estimates. The VMT mix is applied to the link VMT to produce vehicle-type-specific VMT estimates. Link VMT is divided by the associated speed to produce SHO estimates, which are aggregated by vehicle type and subtracted from associated source hours, resulting in SHP estimates. For a future year, vehicle type SHP was estimated in the same manner as for historical years, except using the future year link VMT and speeds, VMT mix, and vehicle population estimates. This was performed by county and hour.

6.4 Starts

Vehicle starts were estimated using county-level vehicle type populations and data from MOVES representing the average number of vehicle starts per vehicle type per hour. The starts per vehicle were calculated using MOVES with data on the age distribution and fuel fractions of the local fleet.[20] NCTCOG used local age distributions and fuel fractions inputs to MOVES combined with MOVES default parameters, startsageadjustment, startsmonthadjust (three-month seasonal average), and startspervehicle) to produce hourly starts per vehicle output representative of each seasonal period. The MOVES output provided the scenario-specific starts per vehicle defined by the study scope.

For each hour of the day, the MOVES starts per vehicle data were multiplied by the local vehicle type population estimates to produce the total number of starts by vehicle type per hour. The starts per vehicle data were used with constant vehicle type populations (i.e., vehicle type populations were assumed to be constant throughout the calendar year).

6.5 SHEI and APU Hours

The source hours extended idling and APU hours, two of four activity components comprising the diesel combination long-haul truck hoteling hours, were estimated for each county activity scenario using TTI's current procedure and base and activity estimates from the Texas Commission on Environmental Quality's 2017 truck idling study. The North Central Texas Council of Governments used the winter weekday, 24-hour, 2017 base county-level hoteling estimates from the truck idling study, in combination with county scaling factors estimated from the base year and the analysis year link VMT and VMT mixes, to produce 2023, 2026, 2036, and 2045, county, hourly hoteling activity estimates. Hoteling hourly factors (estimated by inverting hourly vehicle hours of travel factors) were then applied to allocate the 24-hour hoteling hours estimates for each county to each hour of the day. Estimated SHEI and APU hours fractions of hoteling hours based on an updated hoteling activity distribution from the truck idling study (which is the same as the MOVES3 default) were used to separate SHEI and APU hours activity from total hoteling hours for each county and hour.

[20] Previously MOVES default start per vehicle (which varied only by MOVES day type) was used in combination with local vehicle populations to estimate vehicle starts activity. In MOVES3, vehicle starts per hour also vary by county (because age distributions also vary by county).

CHAPTER 7: EMISSION FACTORS/MOVES MODEL

7.1 Overview

This chapter discusses development of the regional motor vehicle emissions analysis for the North Central Texas 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 Code of Federal Regulations Part 93.109 (40 CFR 93.109) of the conformity rule for ozone nonattainment areas. Specifically, the regional emissions analysis is used to conduct the emission budget test and to determine any contributions to emission reductions. The procedures for determining regional transportation-related emissions are described in 40 CFR Part 93.118 of the conformity rule. 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 (MOVES3)

According to 40 CFR Part 93.111 of the conformity rule, the determination must be based on the latest emission estimation model. The Environmental Protection Agency (EPA) released the new Motor Vehicle Emission Simulator (MOVES) model, MOVES3, in late 2020, with an effective date of January 7, 2021. The EPA considers MOVES3 as an updated version of the MOVES2014 emissions model. Even though the grace period to use MOVES3 for conformity analysis ends on January 9, 2023, the MOVES3 model will be used for this conformity analysis.

As outlined in the Pre-Analysis Consensus Plan, included in Appendix 12.12, the Interagency Consultation Partners approved the use of MOVES3 to develop 2023, 2026, 2036, and 2045 vehicle emission factors. Emission factors are one component to determine volatile organic compounds and nitrogen oxides (NO_X) emissions from the region's on-road vehicles. MOVES3 input parameters are listed in Exhibits 7.2-1 through 7.2-7 with the appropriate data source and/or methodology applied. Information listed applies to all counties and analysis years unless otherwise specified. Referenced files identifying specific local data and MOVES3 technical reports are included in Appendix 12.13. MOVES3 input databases utilizing these parameters and data for each county are included in Appendix 12.14.

Exhibit 7.2-1: MOVES Model Details and Model Parameter Selections

Command	Function/Description	Input Parameter Values	Description
MOVES Model	Identifies the Model to be utilized for the analysis.	MOVES3	MOVES3, released in late 2020, with an effective date of January 2021
Calendar Year	Identifies calendar year for which emissions factors are to be calculated. (required to run model).	2023, 2026, 2036, 2045	Attainment Demonstration Years and Plan Forecast Years
Evaluation Month	Provides option of calculating emissions factors for each month of the calendar year.	7	Representing summer ozone season

Exhibit 7.2-2: MOVES Input Parameters and Source

Input Parameter Name	Description	Source
Source Type Population	Input the number of vehicles in the geographic area, which is to be modeled for each vehicle, and apply the appropriate growth factors for each analysis year. A methodology similar to Texas A&M Transportation Institute's (TTI's) MOVESpopulationBuild module is used to convert Texas Department of Motor Vehicles (TxDMV) registration data for each county into the MOVES source use type.	End-of-year 2018 TxDMV registration data
Source Type Age Distribution	Input that provides the distribution of vehicle counts by age for each calendar year and vehicle type. TxDMV registration data is used to estimate the age distribution of vehicle types up to 30 years. The distribution of Age fractions should sum up to 1.0 for all vehicle types for each analysis year.	End-of-year 2018 TxDMV registration data; MOVES default used for buses
Vehicle Type VMT	County-specific vehicle miles of travel (VMT) is distributed to Highway Performance Monitoring System vehicle types.	Travel Model Output
Average Speed Distribution	Input average speed data specific to vehicle type, road type, and time of day/type of day into 16 speed bins. The sum of speed distribution to all speed bins for each road type, vehicle type, and time/day type is 1.0.	Travel Model Output
Road Type Distribution (VMT Fractions)	Input county specific VMT by road type. VMT fraction is distributed between the road type and must sum to 1.0 for each source type.	Travel Model Output
Fuel Supply	Input to assign existing fuels to counties, months, and years, and to assign the associated market share for each fuel.	Texas Commission on Environmental Quality (TCEQ), EPA fuel surveys, and default MOVES input where local data is unavailable
Fuel Formulation	Input county-specific fuel properties in the MOVES database.	TCEQ, EPA fuel surveys, and default MOVES input where local data is unavailable
Meteorology	County-specific data on temperature, relative humidity, and barometric pressure.	Regional data from TCEQ[21]
Inspection and Maintenance Coverage	Input Inspection and Maintenance coverage record for each combination of pollutants, process, county, fuel type, regulatory class, and model year are specified using this input.	TCEQ
Fuel Engine Fraction/Diesel Fraction	Input fuel engine fractions (i.e., Gasoline vs. Diesel Engine types in the vehicle population) for all vehicle types.	End-of-year 2018 TxDMV registration data; MOVES default used for light-duty vehicles and buses

[21] Data provided by the Texas Commission on Environmental Quality based on combined data from Leading Environmental Analysis and Display System, NWS, and US Air Force

Exhibit 7.2-3: 2012 Hourly Temperature Data[22]

	Collin	Dallas	Denton	Ellis	Johnson	Kaufman	Parker	Rockwall	Tarrant	Wise
12:00 AM	80.61	81.36	80.23	78.98	79.2	78.9	80.53	79.99	81.15	79.22
1:00 AM	79.47	80.19	78.93	77.86	78.07	77.84	79.14	78.77	80.07	77.97
2:00 AM	78.54	79.19	77.92	76.92	77.11	76.91	77.93	77.72	78.94	77.12
3:00 AM	77.66	78.25	77.05	76.05	76.19	75.95	76.84	76.88	78.02	76.17
4:00 AM	76.86	77.42	76.21	75.19	75.28	75.18	75.83	76.03	77.17	75.07
5:00 AM	76.19	76.63	75.34	74.47	74.43	74.44	75.05	75.42	76.18	74.37
6:00 AM	75.65	76.02	74.71	73.78	73.67	73.98	74.43	74.91	75.61	73.52
7:00 AM	77.00	76.88	75.85	74.48	74.35	75.93	75.03	75.34	76.55	73.68
8:00 AM	79.93	79.45	78.90	77.67	77.46	79.68	77.34	77.28	79.69	76.36
9:00 AM	83.21	82.45	82.20	81.31	81.07	83.16	80.44	79.88	82.88	79.72
10:00 AM	86.03	85.51	85.09	84.61	84.46	86.38	83.39	82.62	85.66	83.04
11:00 AM	88.54	88.15	87.76	87.61	87.43	89.06	86.23	85.36	88.56	85.95
12:00 PM	90.83	90.44	90.11	89.85	89.77	91.29	88.5	87.61	90.77	88.47
1:00 PM	92.48	92.24	91.82	91.57	91.6	92.89	90.13	89.58	92.32	90.44
2:00 PM	93.47	93.57	92.95	92.73	92.64	93.7	91.04	90.78	93.58	91.58
3:00 PM	94.36	94.45	93.50	93.58	93.32	94.38	92.01	91.5	94.22	92.15
4:00 PM	93.99	94.37	93.58	93.92	93.55	94.3	92.52	91.93	94.34	92.64
5:00 PM	93.33	93.82	93.28	93.44	93.41	93.46	92.24	91.68	93.9	92.36
6:00 PM	92.27	92.77	92.42	92.44	92.29	91.82	91.03	91.14	92.8	91.27
7:00 PM	89.96	90.80	90.16	90.22	90.39	89.13	89.25	89.51	90.84	89.38
8:00 PM	86.85	88.04	87.08	86.55	87.17	85.37	86.51	86.81	87.52	86.44
9:00 PM	84.77	85.60	84.80	83.38	84.04	82.98	84.27	84.32	85.44	83.46
10:00 PM	83.21	84.04	83.17	81.53	82.05	81.44	82.85	82.67	83.94	81.64
11:00 PM	81.81	82.70	81.52	80.22	80.63	79.93	81.74	81.03	82.42	80.4

[22] Data provided by TCEQ based on combined data from LEADS, NWS, and US Air Force. County-specific data located in Appendix 12.14

Exhibit 7.2-4: 2012 Hourly Relative Humidity Data[23]

	Collin	Dallas	Denton	Ellis	Johnson	Kaufman	Parker	Rockwall	Tarrant	Wise
12:00 AM	69.54	60.69	63.74	68.35	69.26	68.74	59.71	72.06	61.06	58.01
1:00 AM	71.95	63.47	66.61	71.14	72.59	71.22	62.70	73.33	63.28	60.89
2:00 AM	73.90	65.88	69.07	73.61	75.47	73.47	65.26	75.89	66.62	63.15
3:00 AM	75.91	68.43	71.21	75.98	77.62	75.94	67.84	76.06	69.01	65.89
4:00 AM	76.87	70.70	73.33	78.32	80.95	77.98	70.47	78.94	71.03	68.55
5:00 AM	78.33	73.05	75.80	80.53	83.07	80.09	72.76	79.29	73.78	70.55
6:00 AM	79.91	75.32	77.58	81.96	85.63	81.61	74.83	82.11	75.58	72.98
7:00 AM	76.05	73.87	74.96	81.16	87.13	77.65	74.46	84.11	73.72	72.82
8:00 AM	68.86	68.53	67.64	73.49	82.53	69.49	68.33	83.33	66.39	67.33
9:00 AM	60.83	61.69	60.04	64.50	74.28	61.58	60.86	77.78	59.18	59.99
10:00 AM	54.34	55.04	54.04	55.86	65.85	54.19	53.86	72.00	53.54	53.20
11:00 AM	49.62	49.33	48.75	48.96	57.82	48.52	47.73	65.11	47.36	47.48
12:00 PM	45.36	44.69	44.30	44.72	51.94	44.35	42.99	60.11	43.11	42.15
1:00 PM	42.25	41.33	41.16	40.88	46.45	41.29	39.41	54.26	40.28	38.31
2:00 PM	39.90	38.77	38.63	38.27	42.85	39.36	37.23	50.42	37.83	36.36
3:00 PM	39.08	36.78	37.28	36.61	40.64	38.17	36.31	50.21	36.67	35.52
4:00 PM	40.18	36.67	37.28	35.98	40.19	38.42	35.40	47.42	36.57	34.44
5:00 PM	40.77	37.55	37.94	36.65	39.11	39.64	35.66	47.89	36.83	34.53
6:00 PM	42.98	38.76	38.68	38.31	41.78	42.05	37.25	46.63	38.39	36.45
7:00 PM	47.67	41.66	42.59	42.65	44.07	46.54	40.05	47.11	41.35	39.22
8:00 PM	54.89	47.06	48.33	49.93	49.10	53.77	45.02	53.89	47.37	43.93
9:00 PM	59.93	51.79	52.40	56.98	55.48	58.46	50.16	59.50	51.31	48.91
10:00 PM	63.42	54.67	56.11	61.61	61.49	62.13	54.02	63.94	54.48	52.36
11:00 PM	66.75	57.52	60.57	64.86	64.66	66.05	56.94	71.39	58.01	55.10

[23] Data provided by TCEQ based on combined data from LEADS, NWS, and US Air Force. County-specific data located in Appendix 12.14

Exhibit 7.2-5: 2012 Barometric Pressure Data[24]

County	Barometric Pressure
Collin	29.92
Dallas	29.90
Denton	29.90
Ellis	29.90
Johnson	29.90
Kaufman	29.92
Parker	29.88
Rockwall	29.92
Tarrant	29.90
Wise	29.88

Exhibit 7.2-6: MOVES3 Inspection and Maintenance Descriptive Inputs for Subject Counties

2023			
Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant I/M Data			
Inspection and Maintenance (I/M) Program ID	20	24	MOVES3
Pollutant Process ID	101, 102, 201, 202, 301, 302	112	MOVES3
Source Use Type	21, 31, 32	21, 31, 32	MOVES3
Begin Model Year	1999	1999	Annual testing; program specifications
End Model Year	2021	2021	Annual testing; program specifications
Inspection Frequency	1	1	Annual testing; program specifications
Test Standards Description	Exhaust On-Board Diagnostic (OBD) Systems Check	Evaporative Gas Cap OBD Systems Check	Annual testing; program specifications
Test Standards ID	51	45	MOVES3
I/M Compliance	94.00% for source type 21, 90.35% for source type 31, and 70.74% for source type 32		Expected compliance (%) - MOVES3 Default

[24] Data provided by TCEQ based on combined data from LEADS, NWS, and US Air Force. County-specific data located in Appendix 12.14

Exhibit 7.2-6: MOVES3 Inspection and Maintenance Descriptive Inputs for Subject Counties (continued)

2026			
Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant I/M Data			
I/M Program ID	20	24	MOVES3
Pollutant Process ID	101, 102, 201, 202, 301, 302	112	MOVES3
Source Use Type	21, 31, 32	21, 31, 32	MOVES3
Begin Model Year	2002	2002	Annual testing; program specifications
End Model Year	2024	2024	Annual testing; program specifications
Inspection Frequency	1	1	Annual testing; program specifications
Test Standards Description	Exhaust OBD Check	Evaporative Gas Cap and OBD Check	Annual testing; program specifications
Test Standards ID	51	45	MOVES3
I/M Compliance	94.00% for source type 21, 90.35% for source type 31, and 70.74% for source type 32		Expected compliance (%) - MOVES3 Default

2036			
Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant I/M Data			
I/M Program ID	20	24	Differentiates I/M programs
Pollutant Process ID	101, 102, 201, 202, 301,302	112	Identifies the pollutant and vehicle process
Source Use Type	21, 31, 32	21, 31, 32	Identifies the vehicle type
Begin Model Year	2012	2012	Model year I/M Program begins
End Model Year	2034	2034	Model year I/M Program ends
Inspection Frequency	1	1	Annual testing; program specifications
Test Standards Description	Exhaust OBD Check	Evaporative Gas Cap and OBD Check	Identifies test type
Test Standards ID	51	45	Identifies test with MOVES3 database test standards IDs
I/M Compliance	94.00% for source type 21, 90.35% for source type 31, and 70.74% for source type 32		Expected compliance (%) - MOVES3 Default

Exhibit 7.2-6: MOVES3 Inspection and Maintenance Descriptive Inputs for Subject Counties (continued)

2045			
Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant I/M Data			
I/M Program ID	20	24	Differentiates I/M programs
Pollutant Process ID	101, 102, 201, 202, 301, 302	112	Identifies the pollutant and vehicle process
Source Use Type	21, 31, 32	21, 31, 32	Identifies the vehicle type
Begin Model Year	2021	2021	Model year I/M Program begins
End Model Year	2043	2043	Model year I/M Program ends
Inspection Frequency	1	1	Annual testing; program specifications
Test Standards Description	Exhaust OBD Check	Evaporative Gas Cap and OBD Check	Identifies test type
Test Standards ID	51	45	Identifies test with MOVES3 database test standards IDs
I/M Compliance	94.00% for source type 21, 90.35% for source type 31, and 70.74% for source type 32		Expected compliance (%) - MOVES3 default

Exhibit 7.2-7: MOVES3 Fuel Supply

Fuel Formulation ID	Market Share	Market Share CV[25]
14714/14702	1	0
30600	1	0

[25] Coefficient of Variation

Exhibit 7.2-8 MOVES3 Fuel Properties[26]

Fuel Type	Gasoline		Diesel
County Group	Core	Perimeter	All Counties
Fuel Formulation ID	14714	14702	30600
Fuel Subtype ID	12	12	21
RVP	7.09	7.80	-
Sulfur Level	10.00	10.00	6
ETOH Volume	9.56	9.56	-
MTBE Volume	0	0	-
ETBE Volume	0	0	-
TAME Volume	0	0	-
Aromatic Content	16.96	22.22	-
Olefin Content	10.13	8.69	-
Benzene Content	0.37	0.99	-
e200	47.00	49.64	-
e300	84.95	84.60	-
Vol to Wt Percent Oxy	0.3653	0.3653	-
BioDiesel Ester Volume	-	-	4.86
Cetane Index	-	-	-
PAH Content	-	-	-
T50	210.35	202.53	-
T90	325.30	319.75	-

[26] Fuel subtype ID 12 is E10 gasoline, either conventional (CG) or RFG, with a nominal 10 percent by volume ethanol content. Fuel subtype ID 21 is biodiesel (BD), currently in Texas, ULSD estimated with a near 5% biodiesel ester volume content.

Gasoline: Texas latest available (2020) summer survey data were the basis of both the CG and RFG input estimates, updated with MOVES defaults as needed, for particular expected future year properties. For RFG, TTI estimated the average fuel properties by fuel grade combined into overall averages using EIA latest available (2019) Texas RFG relative sales volumes by grade. EPA summer 2020 RFG survey data were used (with hundreds of RFG samples) for Dallas and Houston RFG areas, separately. For CG, TTI used the TCEQ summer 2020 CG survey-based regional estimates produced by ERG for TCEQ's fuel study. TTI updated CG and RFG summer 2020 fuel formulations for use in future years by replacing particular fuel property values with the expected future year values (MOVES3 defaults). These include sulfur level for RFG, and RVP, sulfur level, and benzene content for CG.

Diesel: Diesel sulfur for future years is set to the MOVES3 default expected value, which is close to the actual, relatively stable, statewide averages observed in the last four TCEQ fuel surveys (2011, 2014, 2017, 2020). TTI based the estimated biodiesel ester volume content on EIA 2018 (latest available), Texas, transportation sector biodiesel and diesel consumption data.

7.2.1 Vehicle Registration Distribution

Vehicle age distributions are calculated from TxDMV vehicle registration data. End-of-year 2018 data sets are utilized for light- and heavy-duty vehicle classes. MOVES default values are used for bus categories. Light-duty registration data for Collin, Dallas, Denton, Ellis, Hood, Hunt, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise counties are weighted for commute patterns with County-to-County Worker Flow data. Exhibit 7.2.1-1 identifies percentages applied for this weighted adjustment. The 12-county summed heavy-duty vehicle data is used for developing the heavy-duty registration portion for heavy-duty vehicles.

Exhibit 7.2.1-1: County-to-County Worker Flow

	County of Employment									
Resident County	**Collin**	**Dallas**	**Denton**	**Ellis**	**Johnson**	**Kaufman**	**Parker**	**Rockwall**	**Tarrant**	**Wise**
Collin	55.22%	6.48%	13.29%	0.95%	0.67%	7.41%	0.23%	3.70%	0.21%	9.23%
Dallas	37.87%	82.64%	32.35%	36.93%	3.17%	17.36%	5.50%	47.96%	3.45%	49.85%
Denton	3.90%	2.18%	44.30%	0.62%	0.32%	0.62%	0.40%	0.84%	1.10%	0.39%
Ellis	0.05%	0.49%	0.04%	51.18%	0.02%	0.03%	2.50%	1.14%	0.06%	0.11%
Hood	0.00%	0.01%	0.01%	0.07%	65.80%	0.00%	0.93%	0.00%	1.98%	0.19%
Hunt	0.39%	0.10%	0.02%	0.10%	0.53%	61.57%	0.17%	1.02%	0.00%	5.35%
Johnson	0.03%	0.05%	0.06%	0.67%	3.62%	0.19%	45.79%	0.06%	0.98%	0.05%
Kaufman	0.03%	0.36%	0.02%	0.32%	0.00%	2.79%	0.00%	40.42%	0.01%	2.13%
Parker	0.02%	0.02%	0.06%	0.05%	4.89%	0.11%	0.58%	0.01%	45.90%	0.00%
Rockwall	0.47%	0.76%	0.04%	0.13%	0.00%	9.18%	0.00%	3.12%	0.00%	31.39%
Tarrant	2.02%	6.88%	9.55%	8.85%	20.89%	0.73%	43.79%	1.73%	44.87%	1.31%
Wise	0.01%	0.01%	0.25%	0.13%	0.08%	0.00%	0.11%	0.00%	1.45%	0.00%

Source: Census Transportation Planning Products Program (CTPP) 2012 - 2016.

7.3 Adjustments to Emission Factors

Adjustments are applied to emission factors as a post-process step. The Low Emission Diesel NO_X Adjustment is applied to the emission factors.

7.3.1 Low Emission Diesel NO_X Adjustment

NO_X emission factors for diesel vehicle classes are adjusted by adjustment factors developed by the North Central Texas Council of Governments, using the spreadsheet the Texas Commission on Environmental Quality provided, to apply the Texas Low Emission Diesel Program. Exhibit 7.3.1-1 lists the appropriate adjustment for each vehicle class.

Exhibit 7.3.1-1: Texas Low Emissions Diesel NO_X Adjustments

Vehicle Classification	2023	2026	2036	2045
Passenger Car	0.9514	0.9517	0.9520	0.9520
Passenger Truck	0.9489	0.9498	0.9520	0.9520
Light Commercial Truck	0.9485	0.9494	0.9520	0.9520
Intercity Bus	0.9481	0.9494	0.9520	0.9520
Transit Bus	0.9508	0.9512	0.9520	0.9520
School Bus	0.9494	0.9503	0.9520	0.9520
Refuse Truck	0.9495	0.9508	0.9520	0.9520
Single Unit Short-Haul Truck	0.9518	0.9519	0.9520	0.9520
Single Unit Long-Haul Truck	0.9516	0.9518	0.9520	0.9520
Motor Home	0.9467	0.9483	0.9520	0.9520
Combination Short-Haul Truck	0.9513	0.9517	0.9520	0.9520
Combination Long-Haul Truck	0.9507	0.9514	0.9520	0.9520

Source: Texas Commission on Environmental Quality and NCTCOG

7.4 Vehicle Miles of Travel Mix (or Fractions)

The VMT mix designates the vehicle types included in the analysis. It specifies the fraction of on-road fleet VMT attributable to each vehicle type by day type (i.e., average weekday) and MOVES road type.

TTI provided the VMT mixes. TTI estimated the VMT mix based on TTI's 24-hour average VMT mix method, expanded to produce the four-period, time-of-day estimates.[27] The procedure sets Texas vehicle registration category aggregations for MOVES source use type categories to be used in the VMT mix estimates and for developing other fleet parameter inputs needed in the process (e.g., vehicle age distributions). The VMT mix procedure produced a set of four-period, time-of-day average vehicle type VMT allocations by MOVES road type and by day type, estimated for each Texas Department of Transportation (TxDOT) district for use with each county for each year analyzed. The data sources used were recent 2009 to 2018 TxDOT vehicle classification counts, year-end 2018 TxDOT/TxDMV registration data and MOVES default data. Appendix 12.21 includes MOVES external reference files.

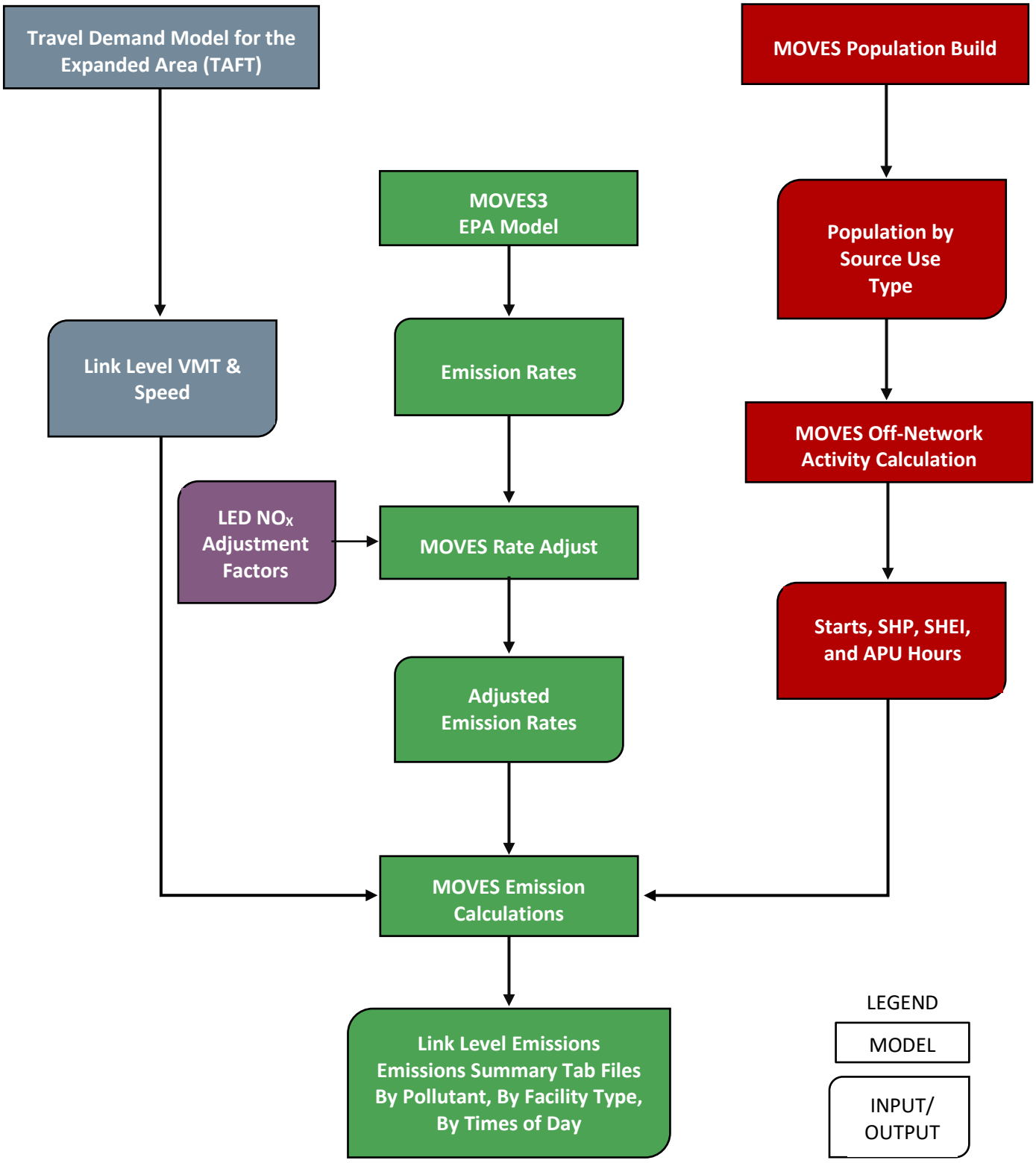
7.5 Modeled Emission Estimation

Emissions estimates are calculated using "TTI emissions inventory estimation utilities using MOVES3 UTL," developed by the Texas A&M Transportation Institute. This software combines vehicle activity and emission factors to create emission estimates.

Exhibit 7.4-1 outlines the emission calculation modeling process that is used to calculate the emissions estimates for the Dallas-Fort Worth ozone nonattainment area.

[27] MOVES Source Use Type and VMT Mix for Conformity Analysis, TTI, August 2017

Exhibit 7.4-1: MOVES3 Emission Modeling Process



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CHAPTER 8: MOBILE SOURCE EMISSION REDUCTION STRATEGIES (MOSERS)

Mobile Source Emission Reduction Strategies (MoSERS) are a collection of transportation projects identified as having emission reduction benefits. These MoSERS are classified as Transportation Control Measures (TCMs), Local Initiatives, or Transportation Emission Reduction Measures (TERM) in the recently submitted Dallas-Fort Worth Attainment Demonstration State Implementation Plan (SIP).[28] Previous SIPs included an additional MoSERS category, Voluntary Mobile Emissions Reduction Program (VMEP); however, on October 14, 2010, the Regional Transportation Council approved the North Central Texas Council of Governments' (NCTCOG) staff recommendations to include all control strategies (TCMs, VMEPs, and TERMs) under the Local Initiatives section in future SIPs to allow greatest flexibility and minimize legal risks towards Transportation Conformity.

8.1 Transportation Control Measures

TCMs are projects, programs, and related activities designed to achieve on-road mobile source emission reductions and are included as control measures in an applicable SIP. TCMs are strategies to reduce vehicle use or change traffic flow and/or congestion conditions to decrease vehicular emissions. The North Central Texas region implements a wide range of TCMs to reduce on-road mobile source emissions, improve air quality, and increase quality of life. The number of TCMs implemented in the region since 1990 is evidence of local governments' commitment to achieve the goals and objectives of the Clean Air Act Amendments of 1990. This commitment is further strengthened by the efforts made to ensure timely and complete implementation of all TCMs.

8.1.1 Timely Implementation of Transportation Control Measures

Section 93.113 of the conformity rule requires the Metropolitan Planning Organization verify the Metropolitan Transportation Plan (MTP) and Transportation Improvement Program (TIP) provide for timely implementation of TCMs in the applicable SIP. The MTP was reviewed to confirm the goals, directives, recommendations, and projects do not negatively contradict specific requirements or commitments of the applicable SIP. The TIP was reviewed to confirm implementation and expected implementation of projects through federal, state, and local funding sources are on schedule.

The emission reduction calculations for all TCMs are based on the most recent information regarding the effectiveness of TCMs following the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies*. Methodologies used to calculate TCM emission reduction benefits are included in Appendix 12.18.

8.1.2 Project Slippage

Timely implementation of TCMs is of prime importance; in some cases, their delay is inevitable. The delays, also termed as 'project slippage,' occur for several reasons: problems with engineering contracts, changes in regulations that impact engineering completed or underway, renegotiations of contracts due to cost overruns, redesign, delays in right-of-way acquisition due to discovery of discrepancies, delays in utility adjustments, high personnel turnover on part of both engineering staff and Texas Department of Transportation staff, funding flow slow down and/or revised cost estimates that require pursuit of additional funding. After a review of all TCMs in the applicable Dallas-Fort Worth SIP, it was determined no project slippage has occurred. TCMs have been completed in a timely manner.

8.2 Local Initiatives

Programs included in the Local Initiatives chapter of the SIP complement existing regulatory programs through voluntary changes in transportation choices and activities. These alternatives to traditional

[28] https://www.tceq.texas.gov/assets/public/implementation/air/sip/sipdocs/2016-AD-DFW/DFWAD_2016_archive.pdf

emission reduction strategies reduce mobile source emissions by engaging communities, employers, and residents in air quality initiatives. Several Local Initiative programs are included in the SIP as on-road emission reduction measures: Employer Trip Reduction Program (ETR), Electric Vehicle Program, and Texas Emission Reduction Program. Emission reductions from Local Initiative measures were not quantified since the additional emission reductions were not needed for this conformity analysis. On October 14, 2010, the Regional Transportation Council approved NCTCOG's staff recommendations to include all control strategies under the Local Initiative section in future SIPs to allow greatest flexibility and minimize legal risks towards Transportation Conformity.

8.3 Transportation Emission Reduction Measures

TERMs are transportation projects and related activities that are designed to achieve on-road mobile source emission reductions but are not included as control measures in the SIP. This conformity analysis includes emission reduction benefits generated by TERMs in the following program areas: grade separations, intersection improvements, Intelligent Transportation Systems (ITS), park-and-ride lots, and vanpool programs.

Grade separations and intersection improvements reduce vehicle idling delay.

The ITS Program incorporates technology and transportation through installation of loop detectors, closed circuit television cameras, dynamic messaging signs, and communication systems. ITS projects reduce emissions from recurring and reduce non-recurring congestion by organizing each individual project to operate as a system, in coordination with multiple technologies.

Park-and-ride facilities promote carpooling and vanpooling. With each occupied parking space at these locations, it can be assumed the otherwise additional "running" emissions from each parked vehicle are eliminated.

Methodologies used to quantify air quality benefits of the program areas used as TERMs is included in Appendix 12.18. Individual project listings and their associated benefits, accounted for in the 2023 analysis year, are included in Appendix 12.19.

8.4 Congestion Mitigation and Air Quality Improvement Program

The Congestion Mitigation and Air Quality Improvement Program is a major funding source for most MoSERS. Several MoSERS and project modifications are listed with associated funding categories in Chapter 7 of the 2023-2026 TIP.

8.5 Summary

An overview of the commitments and emission reductions are outlined in Exhibit 8.5-1. Data is separated for modeled, post-processed, and expired projects for convenience of review. The "Expired" column ensures previously included TCMs, that are now expired, are not to be included as part of the claimed emissions benefits. Benefits are only quantified and applied for analysis year 2023.

Exhibit 8.5-1: Conformity Analysis of the Mobility 2045 Metropolitan Transportation Plan – 2022 Update: Emission Reductions from On-Road Emission Reduction Control Strategies Analysis Year 2023

Program Category	Project Type	Commitments			Expired	2023 Emission Reduction (lbs/day)	
		SIP	Modeled	Post- Processed		NO_x	VOC
						Post-Processed	Post-Processed
SIP TCMs	Bike/Pedestrian (Miles)	459.14	0	447.54	11.60	22.53	26.06
	Grade Separations (Locations)	69	55	0	0	All Modeled	All Modeled
	Rail-Grade Separations (Locations)		14	0	0	All Modeled	All Modeled
	HOV[29] (Miles)	36.9	36.9	0	0	All Modeled	All Modeled
	Intersection Improvements (Locations)	547	0	413	134	89.20	47.78
	Park-and-Ride Lots (Parking Spaces)	3,398	0	0	3,398	0	0
	Rail Transit (Miles)	70.20	70.20	0	0	All Modeled	All Modeled
	Traffic Signal Improvements - ESL and HOV Substitution (Locations)	213	0	0	213	0	0
	Vanpool Programs (Vanpools)	216	0	0	216	0.00	0.00
SIP Local Initiatives	Employee Trip Reduction Program	N/A	Regional Benefit	0	0	Emission reduction benefits not quantified for this program in this analysis year.	
	Texas Emission Reduction Program	N/A	0	Regional Benefit	0		
	Electric Vehicle Program	N/A	0	Regional Benefit	0		
TERMS	Grade Separations (Locations)	N/A	0	7	0	7.25	3.89
	Intersection Improvements (Locations)	N/A	0	209	0	58.45	31.31
	ITS (Regional Benefit)	N/A	0	Regional Benefit	0	2,120.63	346.89
	Park-and-Ride Lots (Parking Spaces)	N/A	0	1,480	0	9.58	3.77
	Vanpool Programs (Vanpools)	N/A	0	181	0	69.27	24.69
					Total (lbs./day)	***2,376.91***	***484.39***
					Total (tons/day)	***1.19***	***0.24***
						NO_x (tons/day)	***VOC (tons/day)***
		Modeled Emissions				78.81	40.84
		Post-Processed Emission Reductions				1.19	0.24
		Final On-Road Emissions				77.62	40.60
		2017 MVEBs (2008 8-Hour Ozone NAAQS)				***130.77***	***64.91***
		Surplus Emission Reductions				53.15	24.31

Source: NCTCOG Transportation Department

[29] HOV lanes identified in the table are converted to HOV/Managed Lanes in future years.

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CHAPTER 9: DETERMINATION OF REGIONAL TRANSPORTATION EMISSIONS

9.1 Procedure

In order to report final emission analysis results, modeled link-level emission inventories, model adjustments, and Mobile Source Emission Reduction Strategies (MoSERS), emission benefits must be combined. To simplify results, the following sections will provide summaries of previous chapters.

9.2 Modeled Emissions

Emissions for analysis years 2023, 2026, 2036, and 2045 are listed in Exhibit 9.2-1. These emissions consist of link-level roadway-based modeled emissions for Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise counties using TransCAD and MOVES Utility. Emissions were calculated using the Texas Mobile Source Emission Software developed by the Texas A&M Transportation Institute (TTI) and the Environmental Protection Agency's Motor Vehicle Emissions Simulator version 3 model.

Exhibit 9.2-1: Modeled Emissions

Analysis Year	Nitrogen Oxides (tons/day)	Volatile Organic Compounds (tons/day)
	Modeled	Modeled
2023	78.81	40.84
2026	65.79	35.53
2036	52.24	27.26
2045	58.72	27.50

9.3 Adjustments to Emission Factors

Post-processing adjustments are applied to the emission factor post-process utility developed by TTI. These adjustments are applied either prior to or simultaneously with the emission calculation procedures to establish the model results shown in Exhibit 9.2-1. This process is described in detail in Section 7.3.

9.4 Mobile Source Emission Reduction Strategies

MoSERS results are identified in Exhibit 9.4-1. Chapter 8 has detailed information regarding the strategies used for emission reduction benefits. Benefits have been quantified for the 2023 analysis year. The benefits for the 2026, 2036, and 2045 analysis years were not credited in order for the Metropolitan Planning Organization to take a conservative approach to the application of emission reductions.

Exhibit 9.4-1: Sum of MoSERS

Analysis Year	Post-Processed Total (tons/day)	
	Nitrogen Oxides (tons/day)	Volatile Organic Compounds (tons/day)
2023	1.19	0.24
2026	-	-
2036	-	-
2045	-	-

9.5 Final Emission Analysis Results

Exhibit 9.5-1 shows the final mobile emission results of this conformity analysis. These final emissions are below the maximum allowable level set forth by the 2017 Motor Vehicle Emissions Budgets (MVEB) for nitrogen oxides and volatile organic compounds in the *8-Hour Attainment Demonstration State Implementation Plan.*[30]

Exhibit 9.5-1: Final Emission Analysis Results

Analysis Year	Nitrogen Oxides (tons/day)	Volatile Organic Compounds (tons/day)
2017 10-County MVEBs (2008 8-Hour Ozone National Ambient Air Quality Standards)	130.77	64.91
2023	77.62	40.60
2026	65.79	35.53
2036	52.24	27.26
2045	58.72	27.50

[30] 81 FR 78591

CHAPTER 10: INTERAGENCY CONSULTATION

10.1 Process Description

Title 40 of the Code of Federal Regulations, Part 93.112 (40 CFR 93.112) of the conformity rule includes procedures for interagency consultation, resolution of conflict, and public consultation of the conformity analysis affecting the Metropolitan Transportation Plan and Transportation Improvement Program.

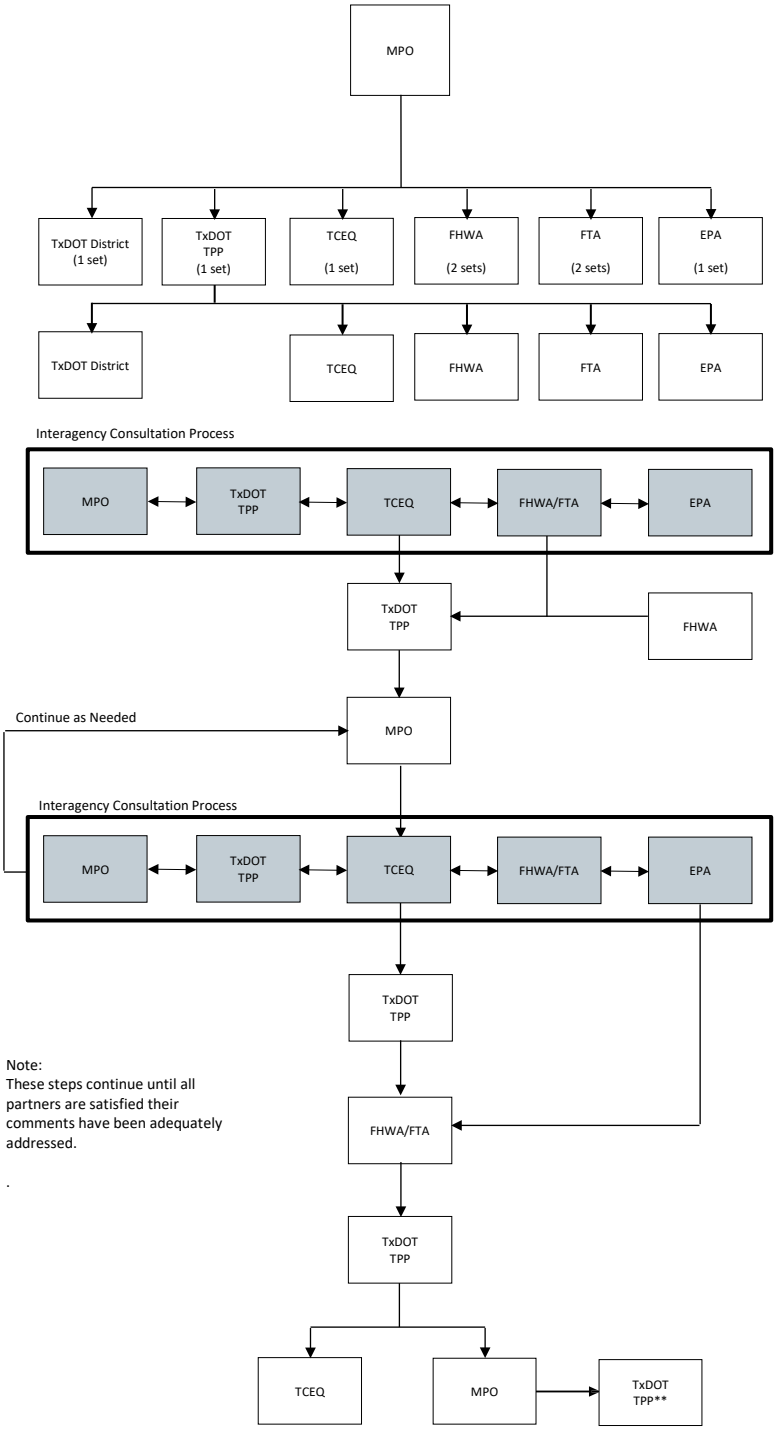
The Metropolitan Planning Organization must provide reasonable opportunity for consultation with federal, state, and local transportation authorities on several issues described in 40 CFR 93.105. In response to this requirement, the Texas Mobile Source Modeling Technical Working Group and its subcommittees meet regularly to address and consult on various conformity-related topics in the state. Issues discussed include evaluating and choosing models and associated methods, determining regional significant project definitions, conformity documentation format, and review process and requirements, to name a few. Establishment of consultation procedures aid in effective communication, provide equal opportunity to all consultation partners to ask questions, and provide comments and/or concerns that help reach consensus with mutual cooperation. Exhibit 10.1-1 summarizes interagency consultation held during this conformity development, review, and approval. Appendix 12.12 contains all interagency consultation correspondence that occurred before local determination of this conformity document by the Regional Transportation Council. Exhibit 10.1-2 illustrates the consultation process as implemented for this conformity analysis following local policy body approval. Successful completion of this consultation process is key to receiving a favorable conformity determination at the federal level.

Exhibit 10.1-1: Interagency Consultation Conference Call Participation

Date	MPO	TxDOT	TCEQ	FHWA	EPA	Subject
January 18, 2022	Y	Y	Y	Y	Y	Conformity Pre-analysis Consensus and TIP and Plan Updates
February 23, 2022	Y	Y	Y	Y	Y	Conformity Pre-Analysis Consensus (Conformity Scenarios – Current MVEB (2017) and Anticipated MVEB (2020)
March 4, 2022	Y	Y	Y	Y	Y	Conformity Pre-Analysis Consensus (Conformity Scenarios – Current MVEB (2017) and Anticipated MVEB (2020)
April 7, 2022	Y	Y	Y	Y	Y	Conformity Document Structure and Appendices Review
August 30, 2022	Y	Y	N	Y	Y	Conformity Review (Appendices 12.3 and 12.6)
October 5, 2022	Y	Y	Y	Y	Y	Conformity Review

**Note: Federal Highway Administration acts as executive agent for Federal Transit Administration on transportation conformity determinations.*
NCTCOG followed up with TCEQ after the August 30, 2022, conference call, since TCEQ was unable to attend

Exhibit 10.1-2: Interagency Consultation Process



	Approximate Timeline 90 Days
	Process Initiation MPO initiates conformity review process by distributing a pre-analysis consensus form and holding a conference call with all Interagency Consultation partners.
1 Week	**Submittal of Document** MPO transmits one (1) CD/DVD to each reviewing agency; printed copies are available upon request.
1 Week	**Formal Submittal Letter** TxDOT-TPP forwards official letter to start formal review process of 30 days.
30 Days	**Beginning of Independent Agency Review & Comment Period*** Initial review and transmittal of comments by Interagency Consultation partners to TxDOT and MPO. Transmittal Process: • EPA to FHWA/FTA • FHWA/FTA to TxDOT • TCEQ to TxDOT
	MPO Response to Comments (see note)* MPO addresses comments received and responds through email, copying all reviewing contacts. MPO may schedule a conference call.
2 Weeks	**Follow-up Review (see note)*** MPO and reviewers follow up with additional questions and responses until all issues are resolved; usually occurs by email.
1 Week	**Concurrence letters to FHWA*** TxDOT on behalf of TCEQ & EPA
1 Week	FHWA/FTA* Joint conformity determination forwarded to TxDOT-TPP
	Transmittal Approval Transmit approval to MPO, copying the other reviewing agency contacts.
	*Informational copy to all parties **Following conformity approval, MPO to transmit one (1) final MTP & TIP to TxDOT

Revised: October 2012

CHAPTER 11: PUBLIC PARTICIPATION

11.1 Process Description

Public participation is recognized as an integral part of the planning process. The North Central Texas Council of Governments' (NCTCOG) Public Participation Plan, approved by the Regional Transportation Council (RTC) on June 1, 1994, and amended on March 12, 2020, outlines a proactive process for an open exchange of information and ideas between the public and transportation decision makers. The public participation process for Transportation Conformity and other transportation plans, projects, and policies includes timely public notice, full public access to technical and policy information, opportunities for early and continuing involvement, and explicit consideration and response to public input.

Public participation strategies and procedures are designed to inform the public on transportation and air quality issues, provide opportunities to involve the public in the decision-making process, and seek public and stakeholder input. Additionally, this process builds support among the public who are stakeholders in transportation investments. Public views and opinions are included in the final Metropolitan Transportation Plan (MTP) and Transportation Improvement Program (TIP) documents and conformity analysis of these documents. The NCTCOG Public Participation Plan directly addresses United States Code, Title 23 requirements, and involvement efforts are shaped through the following components:

Inform and Educate	*Make information relevant, accessible, and understandable to the public*
Engage and Encourage	*Provide a variety of opportunities, both traditional and innovative, for a diverse public to submit input and comments*
Evaluate	*Review and document outreach and communications efforts so transportation decision making reflects public input*

Public meetings are one component of the NCTCOG Public Participation Plan. Public meetings were held prior to seeking RTC approval of the TIP, MTP, and conformity results. Hybrid public meetings provided an opportunity for transportation stakeholders and the general public to submit oral or written comments on transportation and air quality issues and planning activities. Information about air quality conformity was presented when the MTP was discussed at hybrid public meetings held in April 2022 and May 2022. Additionally, a video recording of each meeting was posted online so people could watch the presentation and discussion at a time and place convenient for them. A minimum 30-day comment period was scheduled for the public to respond after the public meetings. The final public comment period prior to seeking RTC policy body action started on May 9, 2022, and ended on June 7, 2022. Public meetings were also advertised in English, Spanish, and Vietnamese newspapers and on department social media channels, including Facebook. Other communication strategies used to announce public meetings are outlined in the Public Participation Plan. A summary of all public comments, oral and written, as provided to the RTC and appropriate committees, are included in Appendix 12.20. Exhibits 11.1-1 and 11.1-2 provide an outline of the public participation activities and

schedule for this 2022 conformity analysis. Public participation activities for the MTP are outlined in that document.

The public participation process incorporates environmental justice elements and Title VI considerations. These populations are sought out for input, and their needs are considered. Title VI Complaint Procedures and a Language Assistance Plan are included as attachments to the Public Participation Plan. Through the Language Assistance Plan, NCTCOG seeks to ensure that all residents have access to provide input on transportation decisions regardless of their ability to read, write, or understand English. The Transportation Department makes every effort to accommodate language translation requests, if provided sufficient notice. Public participation efforts complement the use of Congestion Mitigation and Air Quality Improvement Program funds in the entire 10-county nonattainment area in which the funds can be used to implement projects and programs that reduce pollution from mobile sources. Air quality monitors located throughout the region enable analysis of pollutant levels in all communities. This helps ensure that no particular community is subjected to particularly unhealthy air. These steps are examples of efforts made to ensure healthy air for all citizens of North Central Texas.

Exhibit 11.1-1: Public Involvement/Consultation for Transportation Conformity of Mobility 2045 – 2022 Update and 2023-2026 Transportation Improvement Program

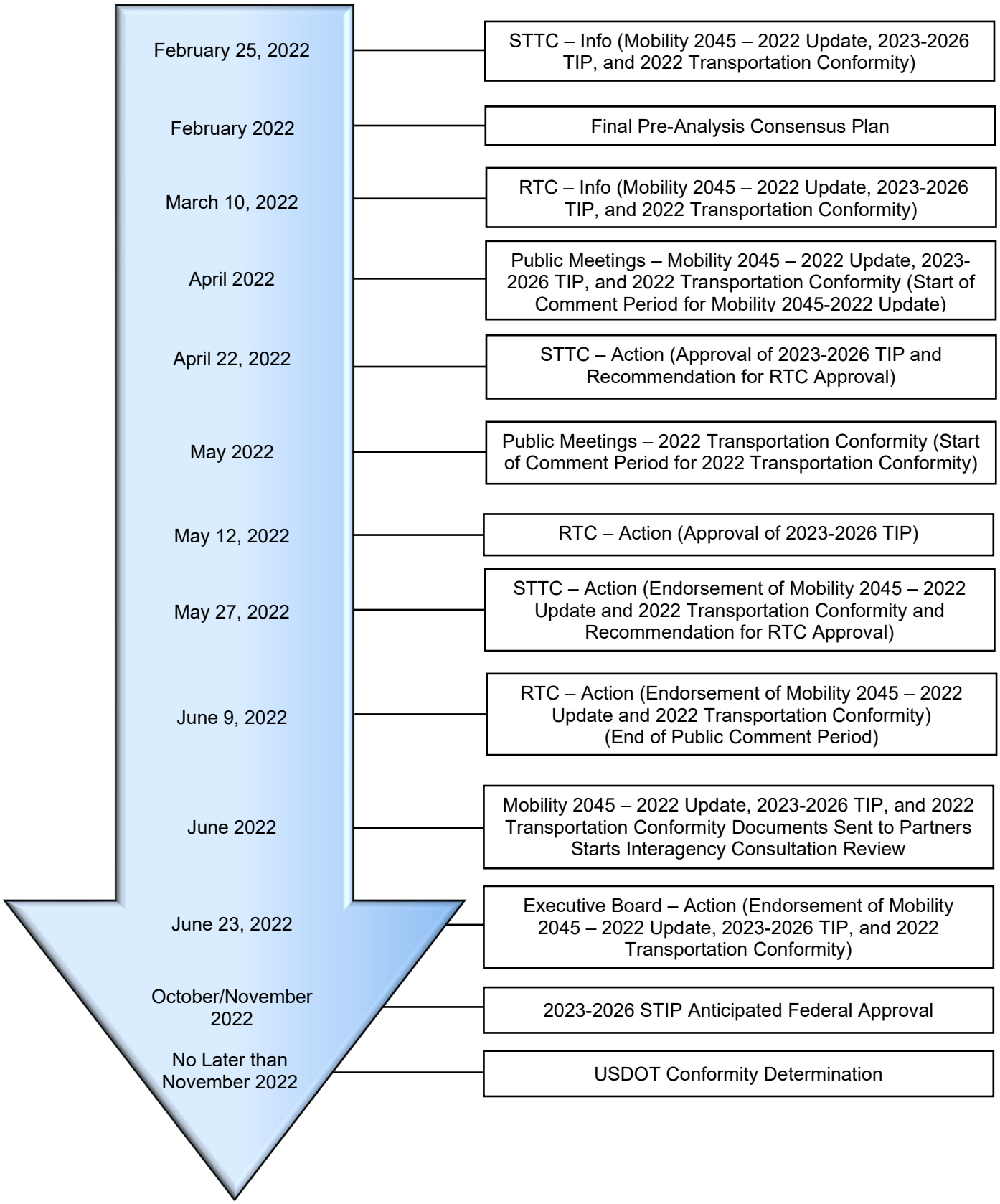
Information/Action Items							
Activity	2022						
	May	June	July	August	September	October	November
NCTCOG Executive Board		A					
Regional Transportation Council	I	A					
Surface Transportation Technical Committee	A						
Public Involvement							
Press Release for Public Meetings	X						
Public Meetings	2						

A - Action agenda item

I - Information agenda item

- Number of technical workshops, media briefings, public meetings, and workshops held

Exhibit 11.1-2: Mobility 2045-2022 Update, 2023-2026 TIP, and 2022 Transportation Conformity Timeline



CHAPTER 12: LIST OF APPENDICES

12.1 Endorsements and/or Resolutions
12.2 Memorandum of Agreements
12.3 Applicable Federal Register Excerpts and Other Documents
12.4 Mobility 2045 – 2022 Update
12.5 2023-2026 Transportation Improvement Program
12.6 Applicable SIP Excerpts
12.7 Travel Model Validation and TAFT
12.8 Roadway System (Capacity Staging) and Network Link Listing
12.9 Vehicle Miles of Travel
12.10 Average Loaded Speeds
12.11 Center-Line Miles and Lane Miles
12.12 Interagency Consultation Process
12.13 MOVES and TTI Information and Fact Sheets
12.14 MOVES Input and Output Files
12.15 MOVES Input Parameters
12.16 MOVES Emission Factors
12.17 Transportation Control Measures in SIP
12.18 MoSERS Methodology/Calculation Descriptions
12.19 MoSERS Project Listing
12.20 Public Involvement Process
12.21 MOVES External Reference Files
12.22 Definition of Regionally Significant Roadway System
12.23 Tab Delimited Files
12.24 Roadway Networks
12.25 Emissions
12.26 Supplement Files