

On January 20, 2025, President Trump signed Executive Order (E.O.) 14148 --Initial Rescissions of Harmful Executive Orders and Actions and E.O. 14154 – Unleashing American Energy. The E.O.s revoked E.O. 13990 – Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis (January 20, 2021) and E.O. 14008 – Tackling the Climate Crisis at Home and Abroad (January 27, 2021). Subsequently on January 29, 2025, Secretary Duffy signed a Memorandum for Secretarial Offices and Heads of Operating Administrations – Implementation of Executive Orders Addressing Energy, Climate Change, Diversity, and Gender. On February 25, 2025, the Council on Environmental Quality (CEQ) published an Interim Final Rule removing the CEQ’s National Environmental Policy Act (NEPA) implementing regulations, effective April 11, 2025 (90 Fed. Reg. 10610). As a result of these actions, FHWA will not include greenhouse gas emissions and climate change analyses in the federal environmental review process. Any purported greenhouse gas emissions and climate change impacts were not considered in the federal decision. Accordingly, no greenhouse gas emissions or climate change analyses are included in this EA.

Also on January 20, 2025, President Trump signed Executive Order (E.O.) 14148 --Initial Rescissions of Harmful Executive Orders and Actions and E.O. 14154 – Unleashing American Energy. The E.O.s revoked E.O. 14096 – Revitalizing Our Nation’s Commitment to Environmental Justice for All (April 21, 2023). Subsequently on January 21, 2025, President Trump signed E.O. 14173 – Ending Illegal Discrimination and Restoring Merit-Based Opportunity. This E.O. revoked E.O. 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (February 11, 1994). On February 25, 2025, the Council on Environmental Quality (CEQ) published an Interim Final Rule removing the CEQ’s National Environmental Policy Act (NEPA) implementing regulations, effective April 11, 2025 (90 Fed. Reg. 10610).

As a result of these actions, all federal environmental justice requirements are revoked and no longer apply to the federal environmental review process. FHWA, FTA and FRA’s Joint NEPA regulations (23 CFR part 771) and the agencies Interim Final Guidance on “Section 139 Environmental Review Process: Efficient Environmental Reviews for Project Decision-making and One Federal Decision” (12/17/2024) do not require an environmental justice analysis. Accordingly, no analysis of environmental justice is included in this EA. Any purported environmental justice impacts were not considered in the federal decision. Social, economic, and community impacts will continue to be disclosed where applicable in accordance with 23 CFR 771.

As a result of E.O. 14148, E.O. 14154, E.O. 14173, and the removal of the Council on Environmental Quality’s regulations, all federal environmental justice requirements are revoked and no longer applicable to the federal environmental review process. Accordingly, this EA does not consider public comments regarding environmental justice.



AIR QUALITY TECHNICAL REPORT

I-24 SOUTHEAST CHOICE LANES

DAVIDSON AND RUTHERFORD COUNTIES

PIN: 134727.01

PROJECT NUMBER: R3BVAR-50-051

November 2025

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ISSUE AND REVISION RECORD

Revision	DATE	Preparer(s)	PMC Reviewer(s) ¹	PMC Approver ²	Description/NOTES
			TDOT REVIEWER(S)	TDOT APPROVER	
0	10/09/2025	Patrick Curwen, Tom Buchanan, Deborah Jones	Kai Zuehlke	Erin McGehee	Updated based on revised design refinements and ETSA.
			NA	NA	
1	10/24/2025	Patrick Curwen, Tom Buchanan, Deborah Jones	Kai Zuehlke	Erin McGehee	Updated per PMC comments and review.
			NA	NA	
2	10/28/2025	Patrick Curwen, Tom Buchanan, Deborah Jones	Kai Zuehlke	Erin McGehee	Updated per PMC comments and review. Provided to TDOT for review and approval.
3	11/03/2025	Patrick Curwen, Tom Buchanan, Deborah Jones	Kai Zuehlke	Erin McGehee	Updated per TDOT comments.

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APPENDICES

Appendix A. MSAT Background Information A-1

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1. EXECUTIVE SUMMARY

The Tennessee Department of Transportation (TDOT) proposes to implement Choice Lanes on I-24 from the interchange of I-24 and I-40 near downtown Nashville to the interchange of I-24 and I-840 near Murfreesboro. The Project study area also includes improvements on I-40 associated with the system-to-system interchange improvements at I-24 and I-40 and improvements on I-440 associated with the interchange improvements at the I-24 at I-440 system-to-system interchange. This report documents the air quality analysis and impacts of the proposed Project.

The evaluation was conducted per TDOT's Air Quality Procedures (TDOT, April 2025). The purpose of this analysis is to address the transportation conformity requirements for the proposed Project, the potential Mobile Source Air Toxics (MSAT) effects, and construction air quality, in compliance with the National Environmental Policy Act (NEPA).

The proposed Project is located in Davidson and Rutherford counties. These counties are in attainment of the National Ambient Air Quality Standards (NAAQS) for all regulated transportation-related criteria pollutants. Therefore, this project is not subject to conformity.

The proposed Project is classified as a "Project with High Potential Mobile Source Air Toxic (MSAT) Effects" per the Federal Highway Administration's (FHWA's) "Updated Interim Guidance on Air Toxic Analysis in NEPA Documents," and analysis for MSAT was conducted following FHWA guidance. The analysis indicates that MSAT emissions are expected to increase from the No-Build to the Build scenario in 2045. However, emissions of all MSAT pollutants are expected to be lower in both the 2045 Build and No-Build scenarios than in the 2025 Existing scenario.

Construction activities would generate intermittent and temporary construction-related pollutant emissions and dust. These construction-related impacts would be mitigated through the implementation of Best Management Practices.

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2. INTRODUCTION

2.1. Project Description

The proposed I-24 Southeast Choice Lanes Project is located along approximately 26 miles of I-24 between I-40 near downtown Nashville (Davidson County) and I-840 near Murfreesboro (Rutherford County). The proposed Project would provide I-24 mainline improvements as well as improvements at the system-to-system interchanges at I-40 and I-440.

2.2. Need and Purpose

The purpose of the proposed Project is to provide a cost-feasible transportation option that offers travel time advantages with user participation for both passenger and commercial vehicles along I-24, between I-40 south of downtown Nashville and I-840 near Murfreesboro by addressing the following transportation issues:

1. Capacity
2. Travel time
3. Address limited funding and accelerate project delivery.

2.3. Project Location

The Project location map (**Figure 1**) provides a visual overview of the I-24 Southeast Choice Lanes Project.

2.4. Procedures

The evaluation was conducted per TDOT's Air Quality Procedures (TDOT, April 2025).

2.5. Attainment Designation

Davidson and Rutherford counties are in attainment of the National Ambient Air Quality Standards (NAAQS) for all regulated transportation-related criteria pollutants. Therefore, this project is not subject to conformity.

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3. AIR QUALITY EVALUATION

The purpose of this analysis is to address the transportation conformity requirements for the proposed Project, the potential MSAT effects, and construction air quality. The evaluation was conducted per TDOT's Air Quality Procedures (TDOT, April 2025). The quantitative MSAT evaluates the No-Build alternative and the Build alternative.

3.1. National Ambient Air Quality Standards (NAAQS)

The United States Environmental Protection Agency (EPA) has established allowable concentrations and exposure limits called the National Ambient Air Quality Standards (NAAQS) for various "criteria" pollutants. These pollutants include carbon monoxide (CO), nitrous oxides (NO_x), ozone (O₃), particulate matter (PM₁₀ and PM_{2.5}), sulfur oxides (SO_x) and lead (Pb).

Per the Clean Air Act Amendments of 1990 (CAAA of 1990), EPA identified areas that did not meet the NAAQS for the criteria pollutants and designated them as "nonattainment" areas. Once a nonattainment area meets the NAAQS, it is redesignated as an attainment area under a maintenance plan.

Davidson and Rutherford counties are currently in attainment and not in maintenance for any NAAQS, including the fine particle pollution (PM_{2.5}) primary standard. On February 7, 2024, the EPA finalized lowering the PM_{2.5} standard from 12.0 µg/m³ to 9.0 µg/m³. If the new standard is implemented, and if Davidson County does not meet the new standard at that time, Davidson County may be designated as a PM_{2.5} non-attainment area. Depending on the timing of these actions relative to the Project schedule, an evaluation may be needed at that time.

3.2. Transportation Conformity

Transportation conformity is a process required of Metropolitan Planning Organizations (MPOs) under the CAAA of 1990. CAAA requires that transportation plans, programs and projects in nonattainment or maintenance areas that are funded or approved by FHWA conform to the State Implementation Plan (SIP), which represents the state's plan to either achieve or maintain the NAAQS for a particular pollutant.

Projects conform to the SIP if they are included in a fiscally constrained and conforming Long Range Transportation Plan (LRTP) or Transportation Improvement Program (TIP).

Davidson and Rutherford counties are in attainment of the National Ambient Air Quality Standards (NAAQS) for all regulated transportation-related criteria pollutants. Therefore, this project is not subject to conformity.

The project is included in the Nashville MPO's TIP as TIP Project #2025-82-001.

3.3. Mobile Source Air Toxics

On February 3, 2006, the FHWA released “Interim Guidance on Air Toxic Analysis in NEPA Documents.” This guidance was superseded on September 30, 2009, December 6, 2012, October 18, 2016, and most recently on January 18, 2023, by FHWA’s “Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents” (FHWA 2023). The purpose of FHWA’s guidance is to advise on when and how to analyze MSAT in the NEPA process for highways. This guidance is interim because MSAT science is still evolving. As the science progresses, FHWA will continue to revise and update the guidance. Additional information regarding MSAT is provided in **Appendix A**.

FHWA’s Interim Guidance groups projects into the following categories:

- Exempt Projects and Projects with no Meaningful Potential MSAT Effects;
- Projects with Low Potential MSAT Effects; and,
- Projects with Higher Potential MSAT Effects.

This proposed Project qualifies as a “Project with Higher Potential MSAT Effects.” Maximum existing 2025 daily volume forecasts on the Interstate corridor exceed 175,000 vehicles per day (vpd) as outlined in the Traffic Analysis Report. Forecasted volumes within the Project area exceed FHWA’s threshold of 140,000 to 150,000 vpd for “Projects with Low Potential MSAT Effects.” Therefore, a quantitative MSAT analysis was conducted per FHWA’s 2023 updated *Interim Guidance and Frequently Asked Questions (FAQs): FHWA Recommendations for Conducting Quantitative Mobile Source Air Toxics Analysis for FHWA NEPA Documents*.

3.3.1. Analysis Methodology

The purpose of the analysis is to assess how MSAT emissions would be affected under the No-Build and Build Alternatives in the design year. The proposed Project has a design year of 2052. However, analysis year 2045 was selected to represent the design year for Motor Vehicle Emission Simulator (MOVES) modeling because that is the longest-term horizon year available for the adopted regional travel demand model. The latest version of MOVES (MOVES5) was used in the analysis. The MSAT pollutants that were evaluated include acetaldehyde, acrolein, benzene, 1,3-butadiene, diesel particulate matter (DPM), ethylbenzene, formaldehyde, naphthalene and polycyclic organic matter. The following sections detail identifying the affected network and input data preparation needed to analyze MSAT with MOVES.

3.3.2. Identifying the Affected Network

FHWA recommends analyzing all segments associated with the proposed Project, plus those segments expecting meaningful changes in emissions due to the proposed Project (e.g., ± 10 percent or more).

The affected network for the quantitative MSAT analysis includes all the links associated with the proposed Project. Segment links from the travel demand model that meet one or more of the following metrics will also be considered:

- \pm 5 percent or more change in annual average daily traffic (AADT) on congested highway links of level of service (LOS) D or worse;
- \pm 10 percent or more change in AADT on uncongested highway links of LOS C or better; and/or
- \pm 10 percent or more change in travel time.
- \pm 10 percent or more in intersection delay.

These recommendations are not a substitute for Project-specific knowledge and consideration of local circumstances. For example, if traffic modeling shows that some low-volume links far removed from the Project area show a meaningful change in traffic, one would have to consider whether this is a real effect or a modeling artifact. Likewise, when analyzing a project that has no meaningful alternative routes (e.g., upgrading an isolated river crossing), it may not be necessary to evaluate traffic changes on other routes.

The MSAT-affected network is shown in **Figure 2**. The affected network includes roadway links that comprise the proposed Project itself, associated general purpose lane interstate mainlines and links meeting the criteria above. Representing portions of the road network anticipated to experience volume and/or congestion increases or decreases in association with the proposed Project, the affected network generally includes the I-24 corridor, major parallel and feeder routes and assorted other roads.

3.3.3. MOVES Inputs

Travel demand and other collected data were processed into MOVES' required input data format. Details of MOVES input and proposed sources are provided in **Table 1**. Defaults were used in case of absence of data from agencies.

3.3.4. MOVES Modeling

MOVES model runs were conducted to estimate the pollutant emissions. Six model runs were performed such as base year, design year No Build and design year Build for Davidson and Rutherford counties. The recommended MOVES model run setup is outlined in **Table 2**.

3.3.5. Results

Annual MSAT emissions for the 2025 Existing, 2045 No-Build and 2045 Build scenarios were calculated from MOVES modeling and shown in **Table 3**. The results were compared to determine the overall trend in emissions over time and to understand how the proposed Project would impact the overall emission levels within the affected transportation

network. As shown in **Table 3**, all MSAT emissions are projected to decrease when the 2045 No-Build and Build scenarios are compared to the 2025 Existing scenario. All MSAT emissions are projected to slightly increase when the Build 2045 scenario is compared to the No-Build scenario. Since the future scenarios are anticipated to have a significant decrease in emission from the existing scenario, the minor emission increase from the 2045 No-Build to 2045 Build scenario is not considered to be significant. The 2045 Build emissions for different MSAT pollutants decrease from 2025 existing emissions between 54.3 percent to 99.6 percent although the vehicles miles traveled (VMT) increases by 29.7 percent. As noted in **Appendix A**, future MSAT emissions are projected to decrease due to vehicle EPA's vehicle emissions and fuel control programs along with fleet turnover¹.

Construction activity may generate temporary increases in MSAT emissions in the Project area.

3.4. Construction Air Quality

Construction activities would generate intermittent and temporary construction-related pollutant emissions and dust.

TDOT's construction specifications will apply to this project. Construction procedures should be governed by the Standard Specifications for Road and Bridge Construction as issued by TDOT and amended by the most recent applicable supplements. All construction equipment shall be maintained, repaired, and adjusted to keep it in full satisfactory condition.

Additionally, there is an air quality monitoring station close to the proposed Project. The closest station is a PM_{2.5} monitoring station on Elm Hill Pike approximately within 1 mile north of the proposed Project.

3.5. Reasonably Foreseeable Effects

The forecasted traffic volumes for most projects typically account for any redistribution of traffic that would occur as a result of the project. The travel demand modeling utilized for the air quality analysis of the proposed I-24 Southeast Choice Lanes project did so. Additionally, the forecast traffic volumes include expected traffic growth and other planned and programmed projects in the area. As a result, the air quality analysis addresses the traffic-related reasonably foreseeable air quality effects of the proposed Project.

¹ US EPA, Regulations for Onroad Vehicles and Engines <https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-onroad-vehicles-and-engines> accessed October 2025.

4. CONCLUSION

The air quality analyses for the proposed project addresses transportation conformity with the NAAQS criteria pollutants, MSAT analysis. The Project is not subject to the transportation conformity requirements. Analysis results show that MSAT emissions increase slightly in the future Build scenario compared to the No-Build scenario (up to 6.6 percent for MSAT emissions). However, the emissions in the Build scenario are lower compared to the 2025 existing scenario (MSAT decreases between 54.3 percent and 99.6 percent depending on pollutant).

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5. REFERENCES

U.S. Environmental Protection Agency (EPA), Final Reconsideration of the National Ambient Air Quality Standards for Particulate Matter (PM), February 7, 2024.

U.S. Environmental Protection Agency (EPA), Most Counties with Monitors Already Meet the Strengthened Particle Pollution Standards, February 2024.

United States Environmental Protection Agency (EPA), Guideline for Modeling Carbon Monoxide From Roadway Intersections, November 1992.

United States Environmental Protection Agency (EPA), Official Release of the MOVES5 Motor Vehicle Emissions Model for SIPs and Transportation Conformity, December 11, 2024.

United States Environmental Protection Agency (EPA), Official Release of the MOVES4 Motor Vehicle Emissions Model for SIPs and Transportation Conformity, September 12, 2023.

United States Environmental Protection Agency (EPA), Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards, December 30, 2021.

Federal Highway Administration (FHWA), Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents, January 18, 2023.

Federal Highway Administration (FHWA), Frequently Asked Questions (FAQs): FHWA Recommendations for Conducting Quantitative Mobile Source Air Toxics (MSAT) Analysis for FHWA NEPA Documents, January 2023.

Tennessee Department of Transportation (TDOT), Air Quality Procedures, April 2025.

Tennessee Department of Transportation (TDOT), Standard Specifications for Road and Bridge Construction, January 1, 2021.

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6. TABLES

Table 1: MOVES Input and Sources

DATA TAB	DATA SOURCE INPUT TABLE	SOURCE
Source Type Population	SourceTypeYear	TDOT 2023 Data, GNRC Growth
Vehicle Type VMT	HPMSTypeYear	Travel Demand Model (TDM)
	monthVMTFraction	TDOT
	dayVMTFraction	TDOT
	hourVMTFraction	TDM, MOVES
I/M Programs	IMCoverage	TDOT
Fuel	Avft	TDOT, MOVES
	FuelSupply	MOVES
	FuelFormulation	MOVES
	FuelUsageFraction	MOVES
Meteorology	ZoneMonthHour	MOVES
Road Type Distribution	RoadTypeDistribution	TDM
Age Distribution	sourceTypeAgeDistribution	MOVES
Average Speed Distribution	avgSpeedDistribution	TDM, MOVES

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Table 2: MOVES Inputs for Runspec

MOVES INPUT SECTION	MODELED PARAMETERS	DESCRIPTION
Description	--	Varies by scenario
Scale	Model	On-road
	Domain/Scale	County
	Calculation Type	Inventory
Time Spans	Time Aggregation Level	Hour
	Years	2025, 2045
	Days	Weekday and Weekend
	Months	All 12 months
	Start Hour	0:00 - 0:59
	End Hour	23:00 - 23:59
Geographic Bounds	Region	County – Davidson & Rutherford
Vehicles/Equipment-On Road Vehicle Equipment	Selections	All permissible source use types with Compressed Natural Gas, Diesel Fuel, Ethanol and Gasoline
Road Type	Selected Road Types	<ul style="list-style-type: none"> • Urban Restricted Access • Urban Unrestricted Access • Rural Restricted Access • Rural Unrestricted Access
Pollutants and Processes	Pollutants	<ul style="list-style-type: none"> • Total Gaseous Hydrocarbons (chained to other pollutants) • Non-Methane Hydrocarbons (chained to other pollutants) • Volatile Organic Compounds (chained to other pollutants) • Primary Exhaust PM₁₀ Total • Primary PM_{2.5} Organic Carbon (chained to other pollutants) • Primary PM_{2.5} Elemental Carbon (chained to other pollutants) • Primary PM_{2.5} Sulfate Particulate (chained to other pollutants) • Primary PM_{2.5} Organic Carbon (chained to other pollutants)

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MOVES INPUT SECTION	MODELED PARAMETERS		DESCRIPTION
			<ul style="list-style-type: none"> • Total Energy Consumption (chained to other pollutants) • Benzene • 1,3-Butadiene • Formaldehyde • Acetaldehyde • Acrolein • Polycyclic Aromatic Hydrocarbons (PAH) <ul style="list-style-type: none"> ○ Acenaphthene particle, gas ○ Acenaphthylene particle, gas ○ Anthracene particle, gas ○ Benz(a)anthracene particle, gas ○ Benzo(a)pyrene particle, gas ○ Benzo(b)fluoranthene particle, gas ○ Benzo(g,h,i)perylene particle, gas ○ Benzo(k)fluoranthene particle, gas ○ Chrysene particle, gas ○ Dibenzo(a,h)anthracene particle, gas ○ Fluoranthene particle, gas ○ Fluorene particle, gas ○ Indeno(1,2,3,c,d)pyrene particle, gas ○ Napthalene particle, gas ○ Phenanthrene particle, gas • Pyrene particle, gas
	Processes		Running Exhaust, Crankcase Running Exhaust, Evaporation Permeation, and Evaporation Fuel Leaks
Output-General Outputs	Units	Mass Units	Grams
		Energy Units	Joules
		Distance Units	Miles
	Activity	<ul style="list-style-type: none"> • Distance Travelled • Population 	
	Time		Hour

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MOVES INPUT SECTION	MODELED PARAMETERS	DESCRIPTION
Output - Output Emissions Detail	Geographic	County
	For All Vehicle/ Equipment Categories	<ul style="list-style-type: none"> Fuel Type Emission Process
	On Road	<ul style="list-style-type: none"> Road Type Source Use Type

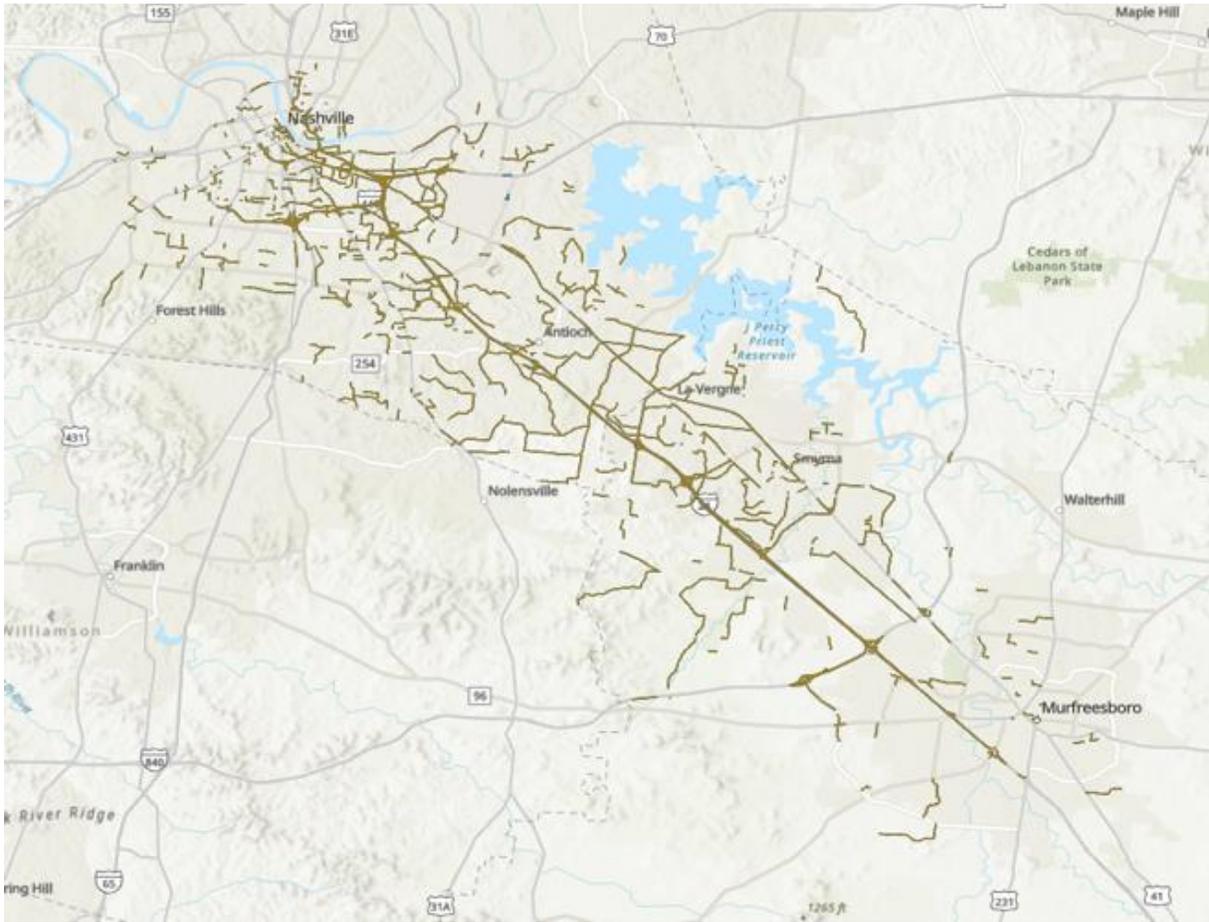
Table 3: Annual MSAT Emissions and VMT

MSAT	SCENARIO			DIFFERENCE (%)		
	2025 Existing	2045 No-Build	2045 Build	2025 Existing to 2045 No-Build	2025 Existing to 2045 Build	2045 No-Build to 2045 Build
Benzene (MT/yr)	4.5237	1.9140	2.0346	-57.7%	-55.0%	6.3%
1,3-Butadiene (MT/yr)	0.2981	0.0013	0.0013	-99.6%	-99.6%	1.1%
Formaldehyde (MT/yr)	3.4168	0.9769	1.0266	-71.4%	-70.0%	5.1%
Acrolein (MT/yr)	0.2091	0.0434	0.0454	-79.2%	-78.3%	4.6%
Naphthalene (MT/yr)	0.3841	0.0880	0.0928	-77.1%	-75.8%	5.4%
Acetaldehyde (MT/yr)	2.0773	0.6113	0.6376	-70.6%	-69.3%	4.3%
Ethyl Benzene (MT/yr)	2.8301	1.2466	1.2933	-56.0%	-54.3%	3.7%
POM (MT/yr)	0.1652	0.0361	0.0384	-78.2%	-76.7%	6.6%
Diesel PM (MT/yr)	11.0463	0.7847	0.8132	-92.9%	-92.6%	3.6%
Vehicle Miles Traveled (Million Vehicle Miles)/yr	2,606	3,094	3,380	18.8%	29.7%	9.2%

Source: Analysis using MOVES

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Figure 2: MSAT Affected Network



This figure depicts the Mobile Source Air Toxics (MSAT) affected network. The travel demand model links shown in green met one or more of the criteria listed in section 2.3.2. They experienced changes in volume, travel time, and/or intersection delay when comparing the Build and No-Build scenarios. Emissions associated with travel activity on the affected network were evaluated for the MSAT analysis.

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APPENDIX A. MSAT BACKGROUND INFORMATION

MOBILE SOURCE AIR TOXICS (MSAT) BACKGROUND

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. The EPA assessed this expansive list in its rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are part of EPA's Integrated Risk Information System (IRIS). In addition, EPA identified nine compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers or contributors and non-cancer hazard contributors from the 2011 National Air Toxics Assessment (NATA). These are *1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter*. While Federal Highway Administration (FHWA) considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules.

MOTOR VEHICLE EMISSIONS SIMULATOR (MOVES)

According to EPA, MOVES3 is a major revision to MOVES2014 and improves upon it in many respects. MOVES3 includes new data, new emissions standards, and new functional improvements and features. It incorporates substantial new data for emissions, fleet, and activity developed since the release of MOVES2014. These new emissions data are for light- and heavy-duty vehicles, exhaust and evaporative emissions, and fuel effects. MOVES3 also adds updated vehicle sales, population, age distribution, and vehicle miles travelled (VMT) data. In the November 2020 EPA issued MOVES3 Mobile Source Emissions Model Questions and Answers EPA states that for on-road emissions, MOVES3 updated heavy-duty (HD) diesel and compressed natural gas (CNG) emission running rates and updated HD gasoline emission rates. They updated light-duty (LD) emission rates for hydrocarbon (HC), carbon monoxide (CO) and nitrogen oxide (NO_x) and updated light-duty (LD) particulate matter rates, incorporating new data on Gasoline Direct Injection (GDI) vehicles.

Using EPA's MOVES3 model, as shown in **Figure A-1**, FHWA estimates that even if VMT increases by 31 percent from 2020 to 2060 as forecast, a combined reduction of 76 percent in the total annual emissions for the priority MSAT is projected for the same time period.

MSAT RESEARCH

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a

result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how potential public health risks posed by MSAT exposure should be factored into project-level decision-making within the context of NEPA.

Nonetheless, air toxics concerns continue to arise on highway projects during the NEPA process. Even as the science emerges, the public and other agencies expect FHWA to address MSAT impacts in its environmental documents. FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. FHWA will continue to monitor the developing research in this field.

NEPA CONTEXT

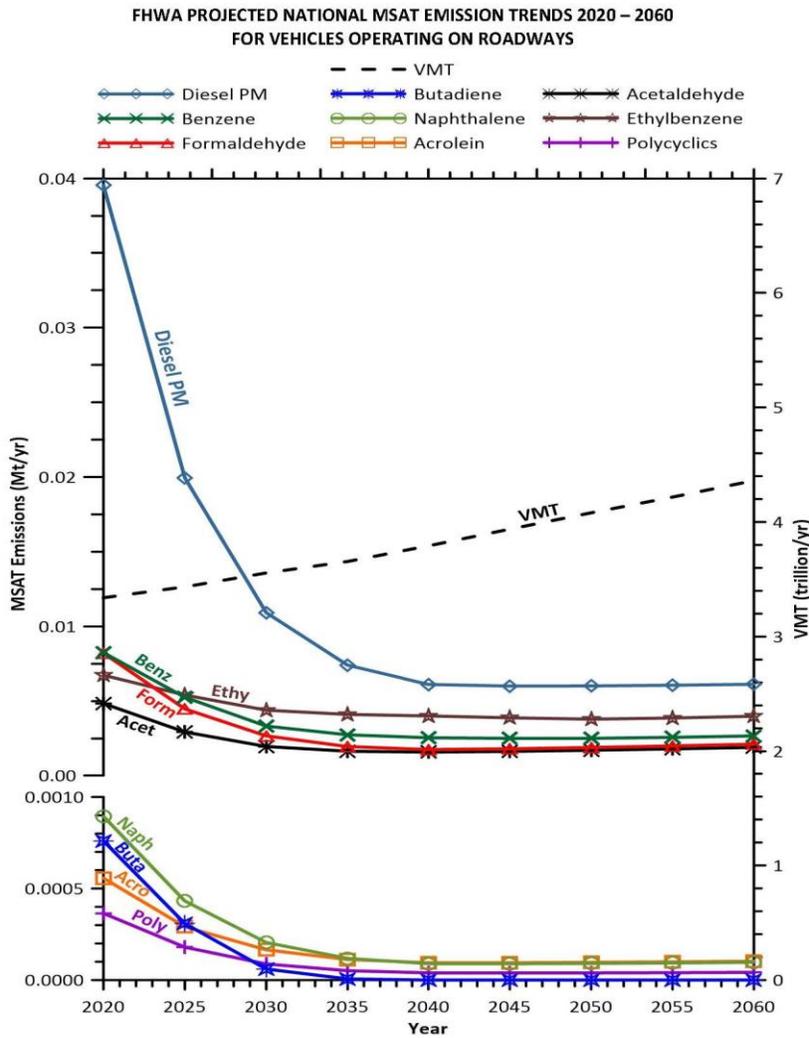
The NEPA requires, to the fullest extent possible, that the policies, regulations, and laws of the Federal Government be interpreted and administered per its environmental protection goals, and that Federal agencies use an interdisciplinary approach in planning and decision-making for any action that adversely impacts the environment (42 USC 4332). In addition to evaluating the potential environmental effects, FHWA must also take into account the need for safe and efficient transportation in reaching a decision that is in the best overall public interest (23 USC 109(h)). The FHWA policies and procedures for implementing NEPA are contained in regulation at 23 CFR Part 771.

INCOMPLETE OR UNAVAILABLE INFORMATION FOR PROJECT-SPECIFIC MSAT HEALTH IMPACTS ANALYSIS

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in mobile source air toxic (MSAT) emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

Figure A-1
FHWA PROJECTED NATIONAL MSAT EMISSION TRENDS 2020 - 2060
FOR VEHICLES OPERATING ON ROADWAYS
USING EPA'S MOVES3 MODEL

3



Note: Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors.
 Source: EPA MOVES3 model runs conducted by FHWA, March 2021.

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The EPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations for hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is “a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects” (EPA, <https://www.epa.gov/iris/>). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Several HEI studies are summarized in Appendix D of FHWA’s Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are: cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI Special Report 16, <https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects>) or in the future as vehicle emissions substantially decrease.

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then a final determination of health impacts – each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways to determine the portion of time that people are exposed at a specific location and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (Special

Report 16, <https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects>). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA states that concerning diesel engine exhaust, “[t]he absence of adequate data to develop a sufficiently confident dose-response relationship from the epidemiologic studies has prevented the estimation of inhalation carcinogenic risk (<https://www.epa.gov/iris>).”

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine an “acceptable” level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA’s approach to addressing risk in its two-step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable (https://www.fhwa.dot.gov/ENVIRONMENT/air_quality/air_toxics/policy_and_guidance/msat/fhwa_nepa_msat_appendix_c_2023.pdf).

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision-makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, which are better suited for quantitative analysis.

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