

NCDOT Air Quality Handbook



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**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL ANALYSIS UNIT
TRAFFIC NOISE & AIR QUALITY GROUP**

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APPENDIX

Appendix A – Air Quality Analysis Determination Flow Chart

Appendix B -- CO and PM Language Guidance Document

THE FOLLOWING SECTIONS WERE UPDATED AS PART OF THE 2020 UPDATE—1.1, 1.3.1.4, 1.3.2.2, 1.3.2.5, 1.3.2.6, 2.0, 2.2, 3.1.1, 3.1.3, 3.1.4, 3.2, 3.2.1, 3.2.2, 3.3, 4.1, 5.0, 5.2.1, 5.2.2, 5.2.3, 6.0. THE FOLLOWING PREVIOUS SECTIONS WERE MOVED TO THE SEPARATE REFERENCE DOCUMENTS —CO DOCUMENTATION, PM DOCUMENTATIONS, TECHNICAL PROCEDURES FOR CO MODELING, AND TECHNICAL PROCEDURES FOR PARTICLE POLLUTION ANALYSIS. IN ADDITION, WEBSITE REFERENCES WERE UPDATED THROUGHOUT. THIS DOCUMENT IS SUBJECT TO CHANGE AS STATE AND FEDERAL GUIDELINES ARE UPDATED.

Glossary

AADT	average annual daily traffic
CAA	Clean Air Act of 1970
CAAA	Clean Air Act Amendments of 1977/1990
CE	Categorical Exclusion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CICG	Conformity Interagency Consultation Group
CO	carbon monoxide
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency
FAST	Fixing America's Surface Transportation Act
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
FTA	Federal Transit Administration
HCS	Highway Capacity Software
I/M	Inspection/Maintenance
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
LOS	level of service
L RTP	long range transportation plan
µg/m ³	micrograms per cubic meter
m/s	meter per second
MAP-21	Moving Ahead for Progress in the 21 st Century
MOVES	Motor Vehicle Emission Simulator
MPO	metropolitan planning organization
MSAT	mobile source air toxics
MTP	Metropolitan Transportation Plan
NCDEQ/DAQ	North Carolina Department of Environment Quality Division of Air Quality
NCDOT	North Carolina Department of Transportation
NEPA	National Environmental Policy Act
NO ₂	nitrogen dioxide
O ₃	ozone
Pb	lead
PM _{2.5}	particle pollution 2.5 microns and smaller
PM ₁₀	particle pollution smaller than 10 microns but larger than 2.5 microns
ppb	parts per billion
ppm	parts per million
ROD	Record of Decision
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SEPA	North Carolina State Environmental Policy Act
SIP	state implementation plan
SO ₂	sulfur dioxide
TEA-21	Transportation Equity Act for the 21 st Century
TIP	Transportation Improvement Program
USDOT	United States Department of Transportation
vpd	vehicles per day

1 Introduction

The North Carolina Department of Transportation (NCDOT) Air Quality Handbook provides background information, guidelines, and standards for conducting project-level air quality analyses within the state of North Carolina. Any transportation project utilizing federal-aid funding or requiring Federal Highway Administration (FHWA) approval must be evaluated for its potential impacts on the natural and human environment. Air quality is one of several elements within the human environment to be considered as a part of the project's National Environmental Policy Act (NEPA) evaluation. The NEPA requirements related to project-level air quality analyses are outlined in Title 23, Part 771 of the Code of Federal Regulations (23 CFR 771).

Project-level air quality analyses will vary from one project to another, based on the following considerations:

- FHWA guidance allows for considerable flexibility in performing air quality analyses, in which the scope, content, assumptions, and level of technical detail are typically coordinated between the State Department of Transportation (NCDOT), the State Air Quality Agency [the North Carolina Department of Environmental Quality Division of Air Quality (NCDEQ/DAQ)], and local air quality agencies.
- Local conditions such as project location, topography, and meteorology influence the type and level of analysis. Large projects located in urbanized areas, as well as controversial projects, typically require detailed analyses. Detailed air quality analyses may also be required for projects located in geographical areas with unique topography or adverse meteorology.
- There are three types of environmental documentation required by NEPA: Categorical Exclusion (CE), Environmental Assessment (EA), and Environmental Impact Statement (EIS). The end result of the EA process is a summary document called a Finding of No Significant Impact (FONSI), which is issued by the lead Federal Agency. FHWA and Federal Transit Administration (FTA) regulations regarding the preparation of an EA can be found in 23 CFR 771.119. The end result of the EIS process is a summary document called a Record of Decision (ROD), which is issued by the lead Federal Agency. FHWA and FTA regulations regarding the preparation of an EIS can be found in 23 CFRs 771.123 through 771.130.

1.1 Purpose of the Handbook

This Handbook is intended to assist NCDOT and its consultants in the completion of project-level air quality analyses to satisfy state and federal air quality requirements for transportation improvement projects. The Handbook includes:

- A process to analyze air quality impacts on transportation improvement projects
- Background information and citations to relevant state and federal rules, regulations, and guidance documents
- Guidance on scoping the appropriate level of project-level air quality analysis

- A screening process to identify projects that may be of air quality concern and a process to determine the need for air quality modeling during the NEPA process
- Technical guidance and procedures for assessing Mobile Source Air Toxics (MSAT) at the project-level
- Guidance on documenting regional conformity analysis for NEPA documentation

1.2 Policy Statement

This Handbook incorporates all pertinent issues relating to air quality analysis at the project-level in North Carolina. The Handbook will be updated on an as-needed basis.

It is NCDOT's policy to assess the air quality impacts of transportation improvement projects and to give consideration to the incorporation of appropriate avoidance and mitigation strategies into preliminary engineering designs and construction for projects which have potential air quality impacts.

These new guidelines are in compliance with 23 CFR 771, and also reflect recent procedures regarding conformity as published in Title 40, Parts 51 and 93 of the Code of Federal Regulations (40 CFR 51 & 93). It is NCDOT's policy to follow regulations and guidance issued by the United States Environmental Protection Agency (EPA), FHWA, and NCDEQ/DAQ.

The Handbook is applicable to both state-funded and federally-funded transportation projects. Guidance provided herein should be referenced during the project scoping and analysis phases of the transportation development process.

1.3 Legal Justification

The procedures and processes described in this Handbook conform to the legal documentation listed in the following sections.

1.3.1 Federal and State Acts, Laws, and Regulation

Below is a summary of the relevant state and federal regulations pertaining to air quality analysis for transportation improvement projects.

1.3.1.1 The Clean Air Act and Amendments

The Clean Air Act (CAA) was enacted in 1970 and established National Ambient Air Quality Standards (NAAQS). Amended in 1977 and again in 1990, the Clean Air Act (CAA) includes strategies to achieve and maintain the NAAQS, to reduce air pollutant and pollutant precursor emissions from mobile sources, and to provide enforcement sanctions for not achieving and maintaining the NAAQS.

Reference: <http://www.epa.gov/oar/caa>

1.3.1.2 Federal Transportation Legislation

The Moving Ahead for Progress in the 21st Century Act (MAP-21) was signed into law July 6, 2012, and builds upon the groundwork established by prior legislative actions relating to surface transportation, namely the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), the Transportation Equity Act for the 21st



Century (TEA-21), and the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). In addition to providing guaranteed funding for highways, this legislation provides a link between transportation and environmental goals by providing funding flexibility and strengthening the role of metropolitan planning organizations (MPOs) in transportation planning and programming. MAP-21 refines the programmatic framework for investments needed to maintain and grow the nation's transportation infrastructure. MAP-21 addresses the challenges facing the nation's transportation system challenges such as improving safety, reducing intermodal connectivity, and protecting the environment – as well as laying the groundwork for addressing future challenges.

Building upon and expanding the principles of MAP-21, the Fixing America's Surface Transportation (FAST) Act was signed into law December 4, 2015. The FAST Act increases transportation funding by 11 percent over five years. The law also makes changes and reforms to many Federal transportation programs, including streamlining the approval processes for new transportation projects, providing new safety tools, and establishing new programs to advance critical freight projects.

Reference: <http://www.fhwa.dot.gov/map21/>; <https://www.transportation.gov/fastact>

1.3.1.3 National Environmental Policy Act (NEPA)

The National Environmental Policy Act of 1969 (NEPA) is the basic national charter for the protection of the environment. It establishes environmental policy, provides an interdisciplinary framework to prevent undue environmental damage, and contains procedures to ensure that decision-makers consider environmental factors. The NEPA process evaluates alternative courses of action based on the dual purpose of environmental protection and transportation improvement goals. The range of alternatives analyzed encompasses a variety of factors including social, economic, and environmental effects.

For any proposed project or activity that fall under NEPA, an Environmental Assessment (EA) or an Environmental Impact Statement (EIS) must be prepared. Generally, an environmental assessment is prepared for a proposed project or activity which is not anticipated to include significant environmental impacts. If the environmental document does not satisfy a Finding of No Significant Impact (FONSI), then an EIS must be prepared. Thus, if it is known prior to document preparation that a project will have significant impacts, an EIS can be prepared initially. For more information on NEPA documents see link below.

Reference: <http://www.epa.gov/compliance/nepa/epacompliance/>

An air quality analysis is not required for Categorical Exclusions. For EAs and EISs prepared under NEPA, a project level air quality analysis is required.

The project-level air quality analysis required during North Carolina's NEPA process will vary considerably in content and in level of detail from one project to another based on its size, geographic location, and anticipated impacts. The project-level air quality analysis, which primarily addresses localized emissions of carbon monoxide, is performed to ensure violations of the NAAQS will not occur as a result of the proposed project. Ozone is considered to be a regional pollutant and is evaluated as part of the regional conformity analyses during the project planning phases. Particle pollution and Mobile Source Air Toxics are addressed at

varying levels of detail depending on the nature of the project and the regional attainment status for these pollutants.

1.3.1.4 NORTH CAROLINA STATE ENVIRONMENTAL POLICY ACT (SEPA)

The North Carolina (or State) Environmental Policy Act of 1971 (SEPA) requires state agencies to review and report the environmental effects of all activities that involve an action by a state agency, an expenditure of public monies or private use of public land and have a potential negative environmental effect upon natural resources, public health and safety, natural beauty, or historical or cultural elements of the state. If a report has been prepared for NEPA, and submitted for review through the State Clearinghouse process, then additional filing under SEPA is not required.

For any proposed project or activity that fall under SEPA, an Environmental Assessment (EA) or an Environmental Impact Statement (EIS) must be prepared. Generally, an environmental assessment is prepared for a proposed project or activity which is not anticipated to include significant environmental impacts. If the environmental document does not satisfy a Finding of No Significant Impact (FONSI), then an EIS must be prepared. Thus, if it is known prior to document preparation that a project will have significant impacts, an EIS can be prepared initially. For more information on SEPA documents see link below.

Reference: <https://deq.nc.gov/permits-regulations/sepa/general-information>

An air quality analysis is not required for State Minimum Criteria Determination Checklists. For EAs and EISs prepared under SEPA, a project level air quality analysis is required.

1.3.2 Criteria Pollutants

The EPA Office of Air Quality Planning Standards has established primary (to protect public health) and secondary (to protect public welfare) NAAQS for seven pollutants, referred to as the criteria air pollutants. The pollutants are ozone (O₃), nitrogen dioxide (NO₂), particulate pollution (PM_{2.5} and PM₁₀), sulfur dioxide (SO₂), carbon monoxide (CO), and lead (Pb). The standards are provided in **TABLE 1**.

1.3.2.1 Carbon Monoxide

Carbon monoxide is a colorless, odorless gas that is formed when carbon in fuel is not burned completely. It is a component of motor vehicle exhaust, which contributes approximately 56 percent of all carbon emissions nationally. State and federal guidance suggests using CO predictions as the primary indicator for vehicular-induced pollution. CO is sensitive to variations in temperature; emissions are twice as high in winter months as compared to summer months. CO is also sensitive to vehicle speed; emissions decrease with an increase in speed (up to 50 mph), and then increase again at higher speeds. Idling and low speeds (less than 15 mph) can produce the highest CO levels. Recent trends in air quality indicate CO levels have dramatically improved. The decline in CO concentrations is primarily due to stricter controls on automobile exhaust resulting in cleaner cars. This drop is remarkable because it is occurring while the nation's population is growing rapidly yielding more traffic and urban sprawl.

1.3.2.2 Lead

Lead is a metal found naturally in the environment. The major sources of lead emissions were historically motor vehicles. However, due to a phase-out of leaded gasoline beginning in the 1970s, metal processing is currently the major source of lead emissions. Lead is not a pollutant of concern for on-road transportation projects.

1.3.2.3 Nitrogen Dioxide

Nitrogen oxides are a group of highly reactive gases. One of these gases, nitrogen dioxide, along with particles in the air, is often seen as a reddish-brown layer over urban areas. The primary source of nitrogen oxides are motor vehicles, electric utilities, and industrial, commercial, and residential sources that burn fuel. Motor vehicles emit approximately 49 percent of the nation's level of nitrogen oxides. Nitrogen dioxide (along with other oxides of nitrogen) is considered an ozone precursor and is evaluated as part of the regional conformity requirements during the project planning phases. Therefore, nitrogen dioxide is not considered in project-level analyses.

1.3.2.4 Ozone

Ozone (i.e., a gaseous component of ground-level photochemical smog) results from a chemical reaction between volatile organic compounds and oxides of nitrogen in the presence of sunlight. Also, the concentration and dispersion of ozone are significantly affected by an area's meteorology and topography. Because it is primarily an area-wide pollutant, it is typically assessed in system-level planning as part of the air quality State Implementation Plan (SIP) development and conformity process. Through the Transportation Improvement Program (TIP)/SIP evaluation process, this pollutant is evaluated on a regional level, but is not evaluated at the project-level. **Currently, there are three different 8-hour ozone standards in effect – the 1997, 2008, and 2015 standards. These standards and their impacts within North Carolina are discussed later in this handbook.**

1.3.2.5 Particle Pollution

Particle pollution is a term used to describe particles in the air including dust, dirt, soot, smoke, and liquid droplets. Sources that directly emit particle pollution include motor vehicles, construction activities, and unpaved roads. Sources of particles that form in the air from chemical processes involving sunlight and water vapor include fuel combustion in motor vehicles, at power plants, and in industrial processes. Particle pollution is of increased interest because diesel vehicles emit significant levels of the pollutant and diesel particulate has been identified as a probable carcinogen by the EPA.

PM₁₀ is used as a measure of "coarse" particulate, in which the particles are 10 microns or less in size. Coarse particles of this size are typically formed by earth-based materials such as brake or tire wear. PM_{2.5} is used as a measure of "fine" particulate, in which the particles are 2.5 microns or less in size. Fine particles of this size are typically formed as a product of combustion. There are three counties (Catawba, Davidson, and Guilford) that were identified as maintenance in North Carolina for the 1997 PM_{2.5} standard. The 1997 Primary Annual PM- 2.5 NAAQS (level of 15 µg/m³) has been revoked in attainment and maintenance areas for the NAAQS, effective October 24, 2016. Therefore, no hot spot analysis is required in North Carolina for PM_{2.5}.

1.3.2.6 Sulfur Dioxide

The largest source of sulfur dioxide is from burning fossil fuels by power plants. On-road motor vehicles are not considered to be a significant source of sulfur dioxide. Sulfur dioxide is not a pollutant of concern for project-level analyses.

TABLE 1. NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Primary/Secondary	Averaging Time	Level
Carbon Monoxide (CO)	Primary	8-hour	9 ppm
		1-hour	35 ppm
Lead (Pb)	Primary and secondary	Rolling 3-month average	0.15 µg/m ³ ⁽¹⁾
Nitrogen Dioxide (NO ₂)	Primary	1-hour	100 ppb
	Primary and secondary	Annual	53 ppb ⁽²⁾
Ozone (O ₃)	Primary and secondary	8-hour	0.070 ppm ⁽³⁾
Particle Pollution (PM _{2.5})	Primary	Annual	12 µg/m ³
	Secondary	Annual	15 µg/m ³
	Primary and secondary	24-hour	35 µg/m ³
Particle Pollution (PM ₁₀)	Primary and secondary	24-hour	150 µg/m ³
Sulfur Dioxides (SO ₂)	Primary	1-hour	75 ppb ⁽⁴⁾
	Secondary	3-hour	0.5 ppm

- 1) In areas, designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m³ as a calendar quarter average) also remain in effect.
- 2) The official level of the annual NO₂ standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.
- 3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O₃ standards additionally remain in effect in some areas. Revocation of the previous (2008) O₃ standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.
- 4) The previous SO₂ standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous SO₂ standards or is not meeting the requirements of a SIP call under the previous SO₂ standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.

Source: <https://www.epa.gov/criteria-air-pollutants/naaqs-table>

2 Regional Conformity Documentation

In addition to evaluating projects at the micro-scale level, transportation improvement projects must be also be considered at the macro-scale level when located in areas designated by the EPA as “nonattainment” or “maintenance.” Regional “conformity” analyses are conducted to ensure that total emissions associated with transportation plans and programs are within regional emission budgets identified in SIPs. SIPs are agreements between EPA and state air quality agencies, developed to demonstrate how the state will comply with the CAA. It ensures that emissions associated with transportation activities do not worsen air quality or interfere with the attainment of EPA standards for pollutants of concern. Conformity is a way to ensure that federal funding and approval are only given to those transportation activities that are consistent with air quality goals for a given region, as identified in the SIP.

NCDOT currently has several nonattainment and maintenance areas for O₃. These areas (with current or historic monitored levels above the NAAQS) are required to undergo regional macro-scale modeling to ensure yearly emission budgets are met. Ultimately, programmed (funded) projects located within nonattainment or maintenance areas must come from an approved Metropolitan Transportation Plan (MTP) and TIP that has been determined to be consistent (and conforming) with the emission budgets identified in the SIP.

CO regional and project-level conformity requirements in North Carolina (Durham, Forsyth, Mecklenburg, and Wake counties) have ended. According to 40 CFR 93.102(b)(3), a transportation conformity determination applies to maintenance areas through the last year of a maintenance area’s approved CAA section 175A(b) maintenance plan, unless the applicable implementation plan specifies that the provisions of this subpart shall apply for more than 20 years. Durham, Forsyth, Mecklenburg, and Wake counties met their 20-year maintenance period requirement on September 18, 2015. Therefore, regional and project-level transportation conformity requirements no longer apply to CO in North Carolina. As such, project-level CO hot-spot analyses using MOVES2014 and CAL3QHC emission and dispersion models are no longer required in North Carolina as part of the NEPA/SEPA process, unless they are deemed necessary to respond to public or agency comments. For guidance on how to conduct a micro scale CO analysis, Appendix B of this Handbook.

MPOs are responsible for the initial conformity determinations in metropolitan areas, while NCDOT takes responsibility for conformity in rural regions that are not governed by an MPO. During the regional conformity analysis, projects are grouped by horizon years and modeled to determine if the MTP conforms to the purpose of the SIP. All federally funded and non-federally funded regionally significant projects must be included in the regional emissions analysis conducted for the region.

The United States Department of Transportation (USDOT) along with EPA, NCDEQ/DAQ and NCDOT consultation, must approve all region-specific conformity determinations performed by local planning organizations or NCDOT. It is the role of the project-level air quality analyst to verify and document that all regionally significant projects being evaluated at the project-level are part of a conforming MTP and TIP that has been approved by both the metropolitan planning organization and FHWA.

2.1 Legal Requirements

In order to satisfy federal requirements, every transportation project is required to be evaluated regarding regional air quality concerns. The Clean Air Act Amendments (CAAA) of 1990 mandate improvements to the nation's air quality. The final conformity regulations promulgated by the US EPA in 1997, as part of 40 CFR 93 (as amended), require transportation plans and programs to conform to the SIP. The final conformity rule requires that transportation plans in nonattainment areas are consistent with the most recent estimates of mobile source emissions; provide for the expeditious implementation of transportation control measures in the applicable implementation plan; and contribute to annual emission reductions for criteria pollutants in nonattainment areas.

2.2 EPA Classification of Attainment Status

Based on the proposed project's location, the analyst must identify the latest EPA attainment status for the area or region in which the project is located. If the county is designated as being in attainment for all pollutants of concern, the NEPA document should state the area is in attainment for transportation-related pollutants and indicate that conformity does not apply. If a project is located in a nonattainment or maintenance area and is federally-funded or considered to be regionally significant, the project must be considered as part of a conforming MTP/TIP. This finding (and relevant approval dates) should be included in the NEPA document. Additional information is available in "Air Quality Guidelines for Environmental Documents" published by FHWA's North Carolina Division. EPA provides up-to-date mapping to identify attainment designations for all criteria pollutants at the following web site:

Reference: <https://www.epa.gov/green-book>

2.2.1 Required Conformity Information in NEPA Documents

It is important to verify that the project description (size and scope of the project) is consistent with the project description in the MTP/TIP to ensure that the project is accurately reflected in the regional conformity determination. In the event that the project description has changed and differs from the project description in the MTP/TIP evaluation, it is recommended that NCDOT be notified as soon as possible to ensure the current project specifications can be included and reevaluated in the conformity determination, if necessary.

The following information is required in all NEPA documents to satisfy the conformity requirements as outlined by the CAAA of 1990 and all subsequent amendments.

- Attainment status of the project area
- Nonattainment status by pollutant, if applicable
- Name and title of the current MTP/TIP
- Date of MPO/NCDOT adoption of the MTP/TIP
- Date of FHWA approval of MTP/TIP

3 Reporting Requirements for Project-Level Air Quality Analyses

3.1 NEPA Documentation for Pollutants of Concern

The following sections present the relevant discussions that should be included in the NEPA document where applicable for each of the pollutants of concern associated with transportation improvement projects. Sample documentation is provided below on a per-pollutant basis.

3.1.1 CO Documentation

Regional and project-level transportation conformity requirements no longer apply to CO in North Carolina. As such, project-level CO hot-spot analyses using MOVES2014 and CAL3QHC emission and dispersion models are no longer required in North Carolina as part of the NEPA/SEPA process, unless they are deemed necessary to respond to public or agency comments. For additional information on CO analysis and documentation, see Appendix B of this Handbook.

3.1.2 Particle Pollution Documentation

Regional and project-level transportation conformity requirements no longer apply to PM in North Carolina. As such, project-level PM analyses using MOVES2014 are no longer required in North Carolina as part of the NEPA/SEPA process, unless they are deemed necessary to respond to public or agency comments. For additional information on PM analysis and documentation, see Appendix B of this Handbook.

3.1.3 MSAT Documentation

FHWA has identified suggested prototype language referenced online (Appendix A, B and C of FHWA's Interim Guidance), available at https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/.

3.1.4 Conformity Documentation

The following statements (or something similar) should appear under a conformity heading in NEPA documents. Typically, the conformity section should appear as the last section of the air quality analysis documentation and should include the following information:

- Brief description of conformity
- Date final rule was issued
- Documentation of final rule (40 CFR 93)

The following statements must also appear under the conformity section of the air quality analysis.

The final conformity rule requires that transportation plans and programs in nonattainment areas:

Are consistent with the most-recent estimates of mobile source emissions

Provide for the expeditious implementation of transportation control measures in the applicable implementation plan

Contribute to annual emissions reductions in nonattainment areas

3.2 Project-Level Air Quality Report Content

The level of analysis required is dependent upon several factors – the involvement of federal funds, the level of NEPA documentation required, and other pollutant-specific requirements. To assist in determining the required level of analysis, see the Project Level Air Quality Analysis Determination Flow Chart in Appendix A of Handbook.

3.2.1 Categorical Exclusion

Categorical Exclusion (CE) documents in North Carolina are divided up into three types—Type 1, Type 2, and Type 3. To determine the level of NEPA documentation, review the Documentation Requirements and Approval Procedures for Federal-Aid Projects Classified as Categorical Exclusions Programmatic Agreement between FHWA and NCDOT. The level of Air Quality documentation for a CE is dependent on its type.

For all Type 1 and Type 2 Categorical Exclusion level NEPA documents, no air quality analysis or air quality discussion is required.

For Type 3 Categorical Exclusion level NEPA documents, an air quality analysis is not required. Although no air quality analysis is required, standard conformity language specific to NAAQS should be included in the Type 3 checklist if the project is located in a nonattainment or maintenance area for Ozone. For projects within an attainment area, no air quality discussion is required.

For projects located in nonattainment or maintenance areas for 2008 ozone (O₃) or 1997 ozone (O₃), indicate this on the Type 3 checklist and consult the Traffic Noise and Air Quality Group for the current standard conformity language for insertion into Type 3 documentation.

3.2.2 Federal (NEPA) or State (SEPA) Environmental Assessments and Environmental Impact Statements

For Environmental Assessments (EAs) and Environmental Impact Statements (EIS) prepared in compliance with NEPA or SEPA, an air quality report should be prepared as a self-sufficient, standalone, comprehensive document. The air quality assessment results and all relevant information should be summarized in the body of the document. The air quality summary in the NEPA or SEPA document should reference the standalone air quality report. In order to develop a consistent reporting style, NCDOT has developed the following guidelines when preparing an air quality report:

- Introduction – The introduction should include a brief synopsis of the project and pertinent history / information about the project area.

- Methodology – The methodology should include a complete description of the project and any alternatives (including the no build alternative). This section should also include a discussion on the air quality modeling approach, computer programs used, pertinent guidance, and any assumptions used for the assessment. Discussion on attainment status and the general air quality of the study area should also be included.
- EPA National Ambient Air Quality Standards (NAAQS)- This section should include a discussion of the Federal Clean Air Act of 1970 which established the NAAQS. It should also include the table found at <https://www.epa.gov/criteria-air-pollutants/naaqs-table>.
- Attainment Status – The conformity documentation section should include a brief synopsis of the Final Conformity regulations and subsequent regulations. Eight-hour ozone, CO, and PM_{2.5} attainment status for where the project is located should be discussed. Additionally, if the project is located in a nonattainment or maintenance area, conformity requirements apply. Documentation should include the date FHWA makes its conformity determination on the MTP/TIP. Consult the Traffic Noise and Air Quality Group, who keeps a running list of the most current conformity determination dates for the nonattainment and maintenance areas.
- Mobile Source Air Toxics (MSAT) – The MSAT analysis section should include a discussion on emissions relative to mobile transportation sources.
- Construction Air Quality – Air quality impacts resulting from roadway construction activities are typically not a concern when contractors utilize appropriate control measures. In North Carolina, contractors shall perform all construction activities with adequate control measures in place, e.g. watering exposed surfaces, covering or maintaining free board space on haul trucks, limiting vehicle speeds on unpaved roads, and minimizing equipment idling time. The following statement should be included in the report: “The temporary air quality impacts from construction are not expected to be significant.”
- Summary – A brief conclusion section is recommended to summarize the results of the air quality assessment.

3.3 Technical File Requirements and Content

The submission of the air quality report should be accompanied by the following information as report appendices for review:

- Traffic data used in analysis (if applicable)
- Conformity documentation
- And only if PM or CO modeling was performed, include the following:
 - Project mapping showing receptors
 - Emission factor and dispersion model software input and output files

4 Initial Project-Level Scoping and Determining the Appropriate Level of Air Quality Analyses

4.1 Appropriate Level of Analysis

The appropriate level of analysis for documenting potential air quality impacts for transportation improvement projects is determined based on the magnitude and scope of the proposed project; the overall efficiency of existing and proposed signalized intersections; the presence of sensitive receptors; and existing air quality conditions. The appropriate level of air quality analysis may vary from a brief qualitative (narrative) discussion to a detailed modeling analysis. To assist in determining the required level of analysis, please see Project Level Air Quality Analysis Determination Flow Chart in Appendix A of the Handbook.

4.2 Project-Level Scoping

This scoping process has been developed to determine the appropriate level of air quality analysis for transportation improvement projects in North Carolina. The goal is to identify highway projects which, based on their type, configuration, projected traffic volume, congestion, and location, are not considered to be projects of air quality concern. These projects are to be assessed qualitatively and do not require any detailed air quality analysis. Projects that exceed the thresholds are to be assessed quantitatively through detailed atmospheric dispersion modeling.

5 Technical Procedures for MSAT Analyses

To assist in determining the required level analysis please see FHWA Updated Interim Guidance on Mobile Source Air Toxics. MSAT discussion and analysis only applies to EA and EIS level documents.

If a NEPA document is being prepared (EA or EIS), a qualitative analysis should be completed consistent with Section 3.2.2 of this Handbook. If the future AADT is 140,000 or more, a more rigorous analysis may be needed, and FHWA should be consulted for additional guidance.

If a SEPA document is being prepared, a qualitative analysis should be completed consistent with Section 3.2.2 of this Handbook; however, if the future AADT is 140,000 or more, the Traffic Noise and Air Quality Group should be consulted for additional guidance

5.1 Background

The Clean Air Act identified 188 air toxics referred to as hazardous air pollutants. The EPA has assessed this list of toxics and identified a group of 21 as Mobile Source Air Toxics. The EPA also identified a subset of this list that is now considered as the seven priority MSAT. These are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While these MSAT are considered the priority transportation toxics, the EPA has indicated that the lists are subject to change in future rulings.

Relative to project-level analysis, the tools and techniques for assessing project-specific health impacts from MSAT are limited. These limitations restrict NCDOT's and FHWA's ability to evaluate how MSAT health risks should factor into project-level decision-making under NEPA. It is anticipated that the EPA will provide further clarification and analytical tools for assessing MSAT on a project-level in the future.

FHWA recognizes that air toxics continue to be an area of concern on transportation projects during the NEPA process. As such, FHWA has issued the *Updated Interim Guidance on Air Toxic Analysis in NEPA Documents* (October 2016) to provide guidance on how MSAT should be addressed in NEPA documents for highway projects. This interim guidance and an expanded discussion of MSAT can be referenced on the FHWA's website:

https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/index.cfm

5.2 MSAT Analytical Procedures

There are currently no established criteria for determining the scope of MSAT emissions analyses. Therefore, a range of options should be considered when addressing this issue in NEPA documentation. FHWA has developed a tiered approach for analyzing MSAT in NEPA documents. Depending on the specific project circumstances, FHWA has identified three levels of analysis:

- No analysis for projects with no potential for meaningful MSAT effects
- Qualitative analysis for projects with low potential MSAT effects
- Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects

5.2.1 Projects with No Meaningful Potential MSAT Effects or Exempt Projects

Three types of projects included in this category are:

- Projects qualifying as a categorical exclusion under 23 CFR 771.117
- Projects exempt under the Clean Air Act conformity rule under 40 CFR 93.126
- Other projects with no meaningful impacts on traffic volumes or vehicle mix

For projects that are categorically excluded under 23 CFR 771.117, or are exempt from conformity requirements under the Clean Air Act pursuant to 40 CFR 93.126, no analysis or discussion of MSAT is necessary. Documentation sufficient to demonstrate that the project qualifies as a categorical exclusion and/or exempt project will suffice. For other projects with no or negligible traffic impacts, regardless of the class of NEPA environmental document, no MSAT analysis is recommended. However, the project record should document in the EA or EIS the basis for the determination of no meaningful potential impacts with a brief description of the factors considered. Example language, which must be modified to correspond with local and project-specific circumstances, is provided in the appendix of the Interim Guidance.

5.2.2 Projects with Low Potential MSAT Effects

The types of projects included in this category are those that serve to improve operations of highway, transit, or freight without adding substantial new capacity or without creating a facility that is likely to meaningfully increase MSAT emissions. This category covers a broad range of projects. Most highway projects that need an MSAT assessment will fall into this category. Examples of these types of projects are minor widening projects, new interchanges, replacing a signalized intersection on a surface street, or projects where the design year traffic is projected to be less than 140,000 to 150,000 AADT.

For these projects, a qualitative assessment of emissions projections should be conducted. This qualitative assessment would compare, in narrative form, the expected effect of the project on traffic volumes, vehicle mix, or routing of traffic and the associated changes in MSAT for the project alternatives, including no build, based on VMT, vehicle mix, and speed. It would also discuss national trend data projecting substantial overall reductions in emissions due to stricter engine and fuel regulations issued by EPA. Because the emission effects of these projects typically are low, no appreciable difference in overall MSAT emissions among the various alternatives is expected.

The Interim Guidance appendix includes example language for a qualitative assessment, with specific examples for four types of projects: (1) a minor widening project; (2) a new interchange connecting an existing roadway with a new roadway; (3) a new interchange connecting new roadways; and (4) minor improvements or expansions to intermodal centers or other projects that affect truck traffic. The information provided in the FHWA Interim Guidance appendix should be modified to reflect the local and project-specific situation.

In addition to the qualitative assessment, a NEPA document for this category of projects must include a discussion of information that is incomplete or unavailable for a project specific assessment of MSAT impacts, in compliance with the Council on Environmental Quality (CEQ) regulations (40 CFR 1502.22(b)). This discussion should explain how current scientific techniques, tools, and data are not sufficient to accurately



estimate human health impacts that could result from a transportation project in a way that would be useful to decision-makers. Also in compliance with 40 CFR 150.22(b), it should contain information regarding the health impacts of MSAT. The FHWA Interim Guidance appendix contains more information.

5.2.3 Projects with Higher Potential MSAT Effects

This category includes projects that have the potential for meaningful differences in MSAT emissions among project alternatives. A limited number of projects are expected to meet this two-pronged test. To fall into this category, a project should:

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of diesel particulate matter in a single location, involving a significant number of diesel vehicles for new projects or accommodating with a significant increase in the number of diesel vehicles for expansion projects, or
- Create new capacity or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to be in the range of 140,000 to 150,000 or greater by the design year, and
- Proposed to be located in proximity to populated areas

Once a quantitative analysis is deemed necessary for a project, the air quality analyst should coordinate with NCDOT to establish the analysis methodology and parameters. Interagency consultation with NCDOT, NCDEQ, and FHWA will be necessary to ensure compliance with national best practices and procedures. Projects falling within this category should be more rigorously assessed for impacts. If a project falls within this category, the air quality analyst should contact NCDOT and the Office of Natural Environment and the Office of Project Development and Environmental Review in FHWA Headquarters for assistance in developing a specific approach for assessing impacts.

This approach would include a quantitative analysis to forecast local-specific emission trends of the priority MSAT for each alternative, to use as a basis of comparison. This analysis also may address the potential for cumulative impacts, where appropriate, based on local conditions. How and when cumulative impacts should be considered would be addressed as part of the assistance outlined above. The NEPA document for this project should also include relevant language on unavailable information provided in the appendix of the FHWA Interim Guidance.

Should a quantitative analysis be deemed necessary, air quality modeling should be done using EPA's MOVES software which replaced the previous model, MOBILE6.2, for estimating on-road mobile source emissions. MOVES2014b, the latest version of the software, can be used to estimate air pollution emissions from cars, trucks, motorcycles, and buses. MOVES2014 is approved for use in official state implementation plan (SIP) submissions to EPA and for transportation conformity analyses. It can also be used to estimate the benefits from a range of mobile source control strategies, for more general analyses of national or local emissions trends, and for policy evaluation. MOVES2014 is EPA's best available tool for quantifying criteria pollutant and precursor emissions, as well as for other emissions analyses of the transportation sector. MOVES2014 is EPA's approved motor vehicle emission factor model for estimating MSATs and other pollutants and precursors from cars, trucks, motorcycles, and buses by state and local agencies outside of California.

MOVES2014 is updated by the EPA when needed, and therefore the Air Quality analyst must consult the EPA website prior to modeling for projects to ensure any updates have been downloaded.

If the analysis for a project in this category indicates meaningful differences in levels of MSAT emissions among alternatives, mitigation options should be identified and considered. See appendix of the FHWA Interim Guidance for information on mitigation strategies.

In the case of a project that does not fall within any of the types of projects listed, but may have the potential to substantially increase future MSAT emissions, consult the Traffic Noise and Air Quality Group.

6 Contact Information

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