CHAPTER 14

AIR QUALITY POLICY AND REGULATIONS

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CHAPTER 14

AIR QUALITY POLICY AND REGULATIONS

For air quality, transportation projects that are federally funded or require federal approval are subject to the transportation conformity requirements of the federal Clean Air Act (CAA) and to evaluation under the National Environmental Policy Act of 1969 (NEPA). Transportation conformity requires two conformity determinations: regional conformity determination and project-level conformity determination in nonattainment and maintenance areas for carbon monoxide (CO), fine particulate matter defined as particulate matter less than 2.5 microns in aerodynamic diameter ($PM_{2.5}$), and respirable particulate matter defined as particulate matter less than 10 microns in aerodynamic diameter (PM_{10}). Under NEPA, air quality is one of the elements to be considered in a project impact evaluation. This chapter summarizes relevant legislation and regulations, methodology to evaluate air quality impacts from transportation projects, contents of the environmental document, and project development.

14.1 Summary of Key Legislation, Regulations, and Guidance

The following rules, regulations, and guidance documents should be used when developing a methodology for analysis of air quality affects related to transportation projects. Not all will apply to every project, and the preparer should periodically check for updates and new guidance published by the agencies listed.

- Code of Federal Regulations (CFR) Title 40, Part 93, Determining Conformity of Federal Actions to State or Federal Implementation Plans (40 CFR 93)
- District of Columbia Municipal Regulations (DCMR), Title 20 (Air Pollution Control Act of 1984)
- United States Environmental Protection Agency (USEPA), Conformity Implementation in Multi-Jurisdictional Nonattainment and Maintenance Areas for Existing and New Air Quality Standards, July 2004

- USEPA, Guideline on Air Quality Models, 1986; revised, 1993
- USEPA, Guideline for Modeling Carbon Monoxide from Roadway Intersections, 1992
- USEPA, User's Guide to CAL3QHC Version 2.0: A Modeling Methodology for Predicting Pollutant Concentrations near Roadway Intersections, 1995
- USEPA, User's Guide for MOBILE6, 2001
- USEPA, Final Rule: $PM_{2.5}$ and PM_{10} Hot Spot Analyses in Project-level Transportation Conformity Determinations for the $PM_{2.5}$ and PM_{10} National Ambient Air Quality Standards, 2006 (71 CFR 12468)
- Federal Highway Administration (FHWA), Transportation Conformity Reference Guide, March, 2006
- FHWA, Guidance for Qualitative Project Level "Hot Spot" Analysis in PM-10 Nonattainment and Maintenance Areas, September, 2001
- FHWA, A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives, 2006
- NEPA requirements for federally funded transportation projects (23 CFR 771) and the Transportation Conformity Regulations (40 CFR 93)

14.2 Agency Roles

Table 14-1 – Resource/Regulatory Agency

Agency	When Involved and Why
USEPA, Region 3	Provides concurrence of project-level hot spot air quality conformity during the review of an Environmental Impact Statement (EIS); may approve analysis methodology
Metropolitan Washington Council of Governments (MWCOG)	Resource agency for regional air quality and traffic data
FHWA	Provides guidance on transportation conformity and provides concurrence of project-level hot spot air quality conformity during the review of an EIS
District of Columbia Department of Environment (DDOE)	Regulates fugitive emissions during construction activities

14.3 Methodology for Conducting Air Quality Studies

14.3.1 Introduction

USEPA adopted the Clean Air Act (CAA) in 1970 and its amendments of 1977 and 1990. Pursuant to the 1990 CAA, the United States Department of Transportation (USDOT) cannot fund, authorize, or approve federal actions to programs or projects that do not conform to CAA requirements.

Under the authority of the CAA, USEPA has established nationwide air quality standards to protect public health and welfare with an adequate margin of safety. These federal standards, known as the National Ambient Air Quality Standards (NAAQS), represent the maximum

allowable atmospheric concentrations of pollutants and were developed for seven "criteria" pollutants:

- Ozone (O_3)
- Nitrogen Dioxide (NO_2)
- CO
- PM_{10}
- $PM_{2.5}$
- Sulfur Dioxide (SO_2)
- Lead

One of the key concepts in understanding air quality issues related to transportation projects is "attainment." Attainment, as discussed in this chapter, refers to whether USEPA has designated the study area as being in attainment of the NAAQS. If an area does not meet the standard, it is designated as a "nonattainment" area for that pollutant. Areas that were previously designated as nonattainment areas but have now met the standard—with USEPA approval of a suitable air quality plan—are called "maintenance" areas. Nonattainment areas are required to prepare implementation plans for attaining the standard for each pollutant for which there are violations of the NAAQS. As of December 2007, the Washington, D.C. area has been designated as a nonattainment area for O_3 and $PM_{2.5}$ and a maintenance area for CO. The Washington, D.C. area is in attainment for all other criteria pollutants.

In nonattainment or maintenance areas, "transportation conformity" applies if projects will be funded by FHWA, the Federal Transit Administration (FTA), or any agency that has been delegated project approval by these agencies. It also applies if projects are regionally significant, as defined at 40 CFR 93.101, and are approved by a regular recipient of federal highway or transit funds.

The basic demonstration of transportation conformity consists of showing that the project is listed in and consistent with a conforming regional transportation plan (RTP) and transportation improvement plan (TIP). In addition, a "hot spot" analysis is required if a project is located in a nonattainment or maintenance area for CO, $PM_{2.5}$, and PM_{10}. A hot spot is defined as a signalized intersection affected by the project.

In addition to the conformity requirements of criteria air pollutants, for which there are NAAQS, USEPA also regulates air toxics from mobile sources. Impacts of the six priority mobile source air toxics (MSATs)—which are benzene, formaldehyde, acetaldehyde, diesel particulate matter (DPM)/diesel exhaust organic gases, acrolein, and 1,3-butadiene—need to be evaluated.

Procedures for evaluating the air quality impacts of emissions associated with a transportation project, including emissions of criteria pollutants, MSATs, and greenhouse gases (GHGs) from project operation, are presented in the following sections. Procedures for evaluating project construction emissions are covered in a separate section and are not included here.

14.3.2 Categorical Exclusions and Exemptions

By their nature, air quality impacts are inherently negligible or nonexistent for projects processed as Categorical Exclusions (CEs). USEPA and USDOT have agreed that project-level analyses of local CO impacts may not be necessary for these projects, which are exempt from the requirement to determine air quality conformity. These

exempt projects may proceed toward implementation even in the absence of a conforming long-range transportation plan (LRTP) and TIP. However, if a metropolitan planning organization (MPO), in consultation with USEPA, FHWA, FTA, or other agencies, concludes that a project is nonexempt because it may have potentially adverse emission impacts for any reason, then an air quality analysis should be performed.

In addition to CEs, conformity regulations in 40 CFR 93.126 outline certain projects that are exempt from a conformity determination and all subsequent emission analyses. For these projects, regional and project-level conformity requirements do not apply.

14.3.3 Transportation Conformity

Because the Washington, D.C. area is a nonattainment/maintenance area for O_3, $PM_{2.5}$, and CO, projects in this area are subject to regional and project-level transportation conformity requirements, unless a project is exempt under CE or fits into one of the exempt categories listed in the transportation conformity rules.

Under these rules, all transportation plans, TIPs, and transportation projects are required to:

- Conform to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards
- Ensure that these transportation activities will not:
  - Cause or contribute to any new violation of the NAAQS
  - Increase the frequency or severity of any existing violation of the NAAQS
  - Delay timely attainment of any standard or any required interim emissions reductions

40 CFR 450 requires that an MPO be designated for each urban area of more than 50,000 people by agreement between the governor and representatives of local jurisdictions (city or county). To be in compliance with the regional transportation conformity requirements, the local MPO prepares and periodically updates an LRTP and develops a TIP for this area. This work is done in cooperation with the MWCOG, DDOT, and the National Capital Region Transportation Planning Board. The MPO LRTP covers a minimum 20-year planning horizon. Federal law requires a minimum 4-year TIP.

Pursuant to the CAA Amendments of 1990, MPOs in areas designated by USEPA as nonattainment or maintenance of any of the NAAQS are required to demonstrate that LRTPs and TIPs conform to the state implementation plan (SIP). The MPO, FHWA, and FTA must make a finding of conformity for MPO LRTPs and TIPs in coordination with USEPA.

All projects subject to the transportation conformity rule must also have a project-level conformity determination unless they fit into one of the exempt categories listed in the conformity rule at 40 CFR 93.126 and 40 CFR 93.128. Procedures for the project level (hot spot) analysis are described in the following sections.

14.3.4 Procedures for Hot Spot Analysis

The following criteria are required to demonstrate project-level conformity:

- The project is listed in a conforming RTP and regional TIP.
- The design concept and scope that were in place at the time of the conformity finding are maintained through implementation.
- The project design concept and scope must be defined sufficiently to determine emissions at the time of the conformity determination.
- The project must not cause a new local violation of the federal standards for CO, PM_{10}, or $PM_{2.5}$ or exacerbate an existing violation of the federal standards for CO, PM_{10}, or $PM_{2.5}$.
- Project-level conformity for the final criteria listed above is demonstrated by performing hot spot analyses in areas designated as nonattainment or maintenance areas for CO, PM_{10}, and $PM_{2.5}$.

As of 2008, hot spot analyses for CO and $PM_{2.5}$ are required for projects in the Washington, D.C. area. Currently, the area is in attainment for PM_{10}, so a hot spot analysis of PM_{10} is not required. The methodology for the CO and PM_{10}/$PM_{2.5}$ air quality analysis for Environmental Assessments (EAs) and EISs should be confirmed, and if necessary, refined, in consultation with FHWA, MPO, and USEPA during the agency scoping and early coordination process.

Although the Washington, D.C. area is designated as nonattainment for O_3, O_3 impacts are regional in nature and cannot be ascribed to any single project. Projects included in the LRTP and TIP have been included in a regional conformity analysis and require no further analysis at the project level.

PM_{10} and $PM_{2.5}$ Hot Spot Analysis

On March 10, 2006, USEPA issued amendments to the transportation conformity rule to address localized impacts of particulate matter emissions: $PM_{2.5}$ and PM_{10} Hot Spot Analyses in Project-level Transportation Conformity Determinations for the New $PM_{2.5}$ and Existing PM_{10} National Ambient Air Quality Standards (71 CFR 12468). This amendment requires the assessment of localized air quality impacts in $PM_{2.5}$ and PM_{10} nonattainment and maintenance areas for projects of air quality concern.

USEPA has specified in 40 CFR 93.123(b)(1) of the final rule that projects of air quality concern are certain highway and transit projects that involve significant levels of diesel-fueled vehicle traffic, or any other project that is identified in the $PM_{2.5}$ or PM_{10} SIP as a localized air quality concern.

Because USEPA has not released modeling guidance on how to perform quantitative PM_{10}/$PM_{2.5}$ hot spot analysis, such analysis is not currently required (40 CFR 93.123(b)(4)). Any future requirements for quantitative analysis will not take effect until USEPA releases modeling guidance and announces in the Federal Register that these requirements are in effect. Where quantitative analysis methods are not required, the demonstration may be based on a qualitative consideration of local factors, as described in 40 CFR 93.123(b)(2), and follow the latest USEPA guidance.

CO Hot Spot Analysis

The analysis for project-level local CO impacts begins by implementing a screening analysis. If the project fails the screening analysis, then a full air quality modeling analysis is required. The procedures for the CO screening analysis and quantitative analysis are described in the following sections.

Screening Analysis 40 CFR 90.123 states that for projects whose traffic volumes are at level of service (LOS) D, E, or F or those that will change to these categories due to project-related traffic increases, the air quality screening analysis must be based on a quantitative approach and data. This is accomplished by using applicable air quality models, databases, and other requirements specified in 40 CFR 51, Appendix W (Guidelines on Air Quality Models).

To perform the screening analysis, the LOS using the appropriate traffic model (such as CORSIM) of all signalized intersections affected by the project will be calculated. All intersections that are found to be at LOS A, B, or C for the No Action Alternative and build alternatives are considered to be insignificant in terms of impact to air quality, and no further analysis is required. For those intersections found to be at LOS D, E, or F, further quantitative analysis is required. For projects with more than five or six intersections at LOS D or worse, three or four intersections that have the worst LOS and highest vehicle volumes are usually sufficient for the detailed hot spot modeling.

Quantitative Analysis

The quantitative analysis requires the use of applicable air quality models. The model required to calculate vehicle emission factors is currently MOBILE 6.2. As with all modeling, the latest approved regulatory version should be verified. The model required to identify the impacts at the localized hot spot is CAL3QHC. Other information needed to provide the required input to CAL3QHC includes the traffic model output files. The steps to conduct the quantitative analysis are as follows:

1. Model the vehicle emission factors using the latest approved regulatory version of the MOBILE model (currently, MOBILE 6.2). Inputs should be consistent with those area-specific values used by the MPO for regional modeling.
2. Prepare the output of the appropriate traffic model (such as CORSIM) to be used as input to CAL3QHC.
3. Model the CO 1-hour concentrations at the affected signalized intersections.
4. Add the projected background CO concentrations to the modeled results from Step 3.
5. Compare the resultant 1-hour concentration with the NAAQS 1-hour standard of 35 parts per million (ppm).
6. Convert the resultant 1-hour concentration to an 8-hour concentration. The standard conversion factor is 0.7.
7. Compare the resultant 8-hour concentration with the NAAQS 8-hour standard of 9 ppm.
8. Compare the No Action Alternative concentrations with the build concentrations.

The intersections that do not exceed the NAAQS in the future year have demonstrated project-level conformity, and no further analysis is needed. Any intersection in the build alternative that exceeds the NAAQS for the future year should be compared with the No Action Alternative. If the build alternative does not create a new violation or increase the severity or number of violations predicted by the No Action Alternative, then project-level conformity has been demonstrated and no further analysis is required.

Mitigating measures must be applied to intersections that create a new violation or increase the severity or number of

existing ones. These measures may include reconfiguring the intersection, optimizing traffic signalization, or performing other engineering and operational measures.

With the mitigating measures in place, the quantitative analysis should be rerun to determine if project-level conformity requirements have been met. This process should be repeated until there are no new violations or increases in the severity or number of existing violations.

14.3.5 MSAT Analysis

The CAA identifies 188 air toxics, also known as hazardous air pollutants. USEPA has assessed this expansive list of toxics and identified a group of 21 as MSATs, which are set forth in an USEPA final rule, Control of Emissions of Hazardous Air Pollutants from Mobile Sources (66 CFR 17235). Of these, USEPA identified six as priority MSATs.

- Benzene
- Formaldehyde
- Acetaldehyde
- DPM/diesel exhaust organic gases
- Acrolein
- 1,3-butadiene

Currently, there are no established criteria for determining when MSAT emissions should be considered a significant issue in the NEPA context. For the purpose of the air quality evaluation under NEPA, FHWA has developed a tiered approach for analyzing MSATs. Depending on a project's specific circumstances and potential MSAT impacts, a project may be subject to one of the 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

Discussions and evaluations of the MSAT impacts should follow the latest FHWA or USEPA guidance.

14.3.6 Greenhouse Gases

Greenhouse gases (GHGs) include carbon dioxide, methane, O_3, water vapor, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Carbon dioxide is the most abundant GHG. It is increasingly becoming accepted that increased concentrations of GHGs in the earth's atmosphere are linked to global climate change, such as rising surface temperatures, melting icebergs and snowpack, rising sea levels, and the increasing frequency and magnitude of severe weather conditions.

Federal legislation and action by USEPA is expected soon. In the case of Massachusetts v. Environmental Protection Agency, 127 S. Ct. 1438 (2007), the United States Supreme Court ruled that GHGs qualify as air pollutants under the CAA. The Supreme Court held that, unless the USEPA concludes that GHGs are not causing climate change, USEPA must regulate GHGs from automobiles. USEPA has not developed a mandatory regulatory program for GHGs, although it is actively engaged in a voluntary program.

Currently there is no approved policy or guidance to assist in evaluating the significance of a specific project at the project or cumulative level. To address the issue of GHG emissions

and their implications for global warming, a qualitative discussion of the GHG emissions associated with the project should be included in the air quality analysis. The qualitative discussion of GHG emissions should include both direct and indirect impacts and follow the USEPA guidance when it becomes available.

14.4 Format and Contents of Documentation

The discussion of the affected environment in the environmental document should summarize the current air quality conditions and regulatory background. In particular, the section should describe:

Current Air Quality Conditions. Include a description of the existing climate and meteorological conditions of the project area, summarize pollutant monitoring data, and quantify the current air quality levels and attainment designation. Provide a regulatory background on the regional emission inventory, TIP/SIP, and transportation and general conformity.

The discussion of environmental consequences should summarize the air quality methodology, environmental impacts, and conformity determination. In particular, the section should describe:

Analysis Methodology. Include a summary of the methodology developed during the agency consultation, scoping, and early coordination meetings and used to evaluate air quality impacts and project-level conformity. The methodology discussion should encompass the screening analysis, air quality models, and construction emissions (if these are analyzed as part of the air quality analysis).

Environmental Impacts. Include a summary of the regional and localized impacts of the proposed project on air quality as determined from the screening and modeling results. Describe significance (or nonsignificance) of the air quality impacts of the project with respect to regional air quality levels. For intersections that violate NAAQS under a build scenario and exceed the impacts of the No Action scenario, mitigation measures should be described and analyzed in the air quality models.

Conformity Determination. Include a summary of transportation and general conformity, if applicable.

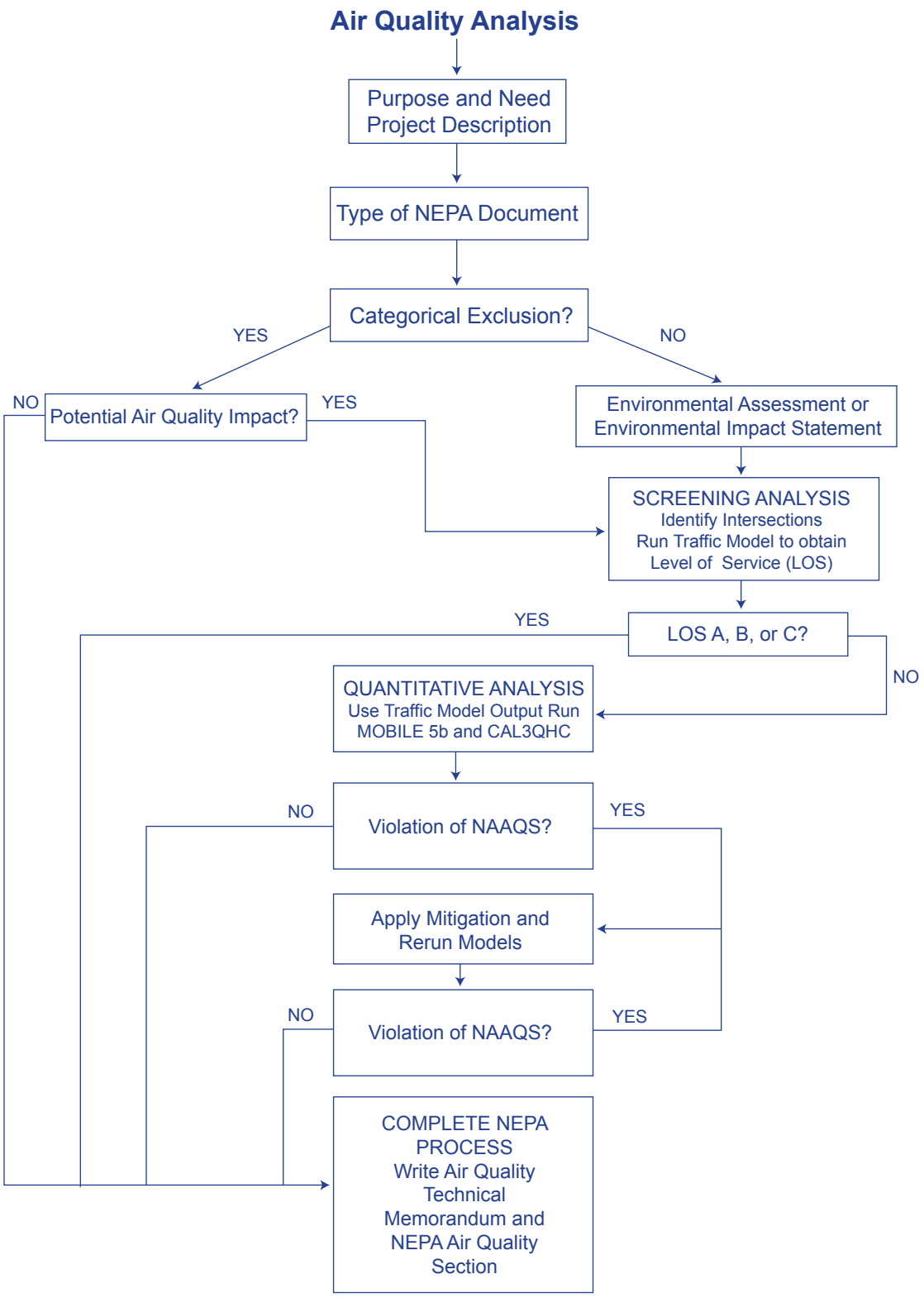
Cumulative and Indirect Impacts. Include a summary of the cumulative and indirect air quality impacts from other proposed or existing projects in the project area.

Appendices. Include any correspondence with regulatory agencies, including the results of the consultation process on the air quality analysis methodology, the assessment of current conditions, and projected pollutant background concentrations. Provide the MOBILE 6 modeling input and output data, summary of the LOS calculations, summary of the traffic modeling output data, and the CAL3QHC modeling input and output data.

14.5 Project Development Process Guidance

The air quality analysis process is presented in Figure 14-1. The diagram presents the steps taken to evaluate the potential air quality impacts of a transportation project. The two most important pieces to begin the evaluation are the project description and type of NEPA document. However, regardless of the type of NEPA document being prepared, an air quality technical memorandum and air quality section for the NEPA document should be prepared. The air quality section should present the impact evaluation based on the conclusions drawn by following the steps in Figure 14-1.

Figure 14-1 – Air Quality Analysis Process Diagram



14.6 Continuation through Design and Construction

Construction-related emissions should be considered during the design and construction phases. Each site that is potentially affected by construction-related activities should be considered separately. If warranted, standard mitigation measures, such as fugitive dust suppression through watering, should be evaluated and implemented if necessary. If mitigation measures are committed to in the NEPA documentation, then plans for verifying and documenting their implementation need to be developed and executed.

14.7 Additional Information

Federal Highway Administration—Environmental Guidebook (Air Quality)
http://environment.fhwa.dot.gov/guidebook/results.asp?selSub=83

MWCOG, Air Quality Key Documents
http://www.mwcog.org/environment/air/documents.asp

National Capital Region Transportation Planning Board, Draft 2007 Financially Constrained Long-Range Transportation Plan (CLRP), 2007
http://www.mwcog.org/clrp/projects/tip/fy0813.asp

National Capital Region Transportation Planning Board, FY 2008-2013 Transportation Improvement Program, December 2007.
http://www.mwcog.org/clrp/projects/tip/fy0813.asp