

CONSULTANT GUIDE

AIR QUALITY PROJECT-LEVEL ANALYSIS

Prepared by:

The Air Section, Environmental Division
Virginia Department of Transportation



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1) Introduction

This document provides basic information and standards for preparing an air quality analysis on a Virginia Department of Transportation (VDOT) transportation project. One objective is to enhance the development and review of the scope of work of compensation proposals by standardization. Another is to communicate key expectations regarding the comprehensiveness of the air quality work. This manual sets standards for air quality assessment work and should be consulted as a guide to avoid approval problems. The various parts of this guide conform to and improve upon the Federal Highway Administration (FHWA) Guidelines.

2) Modeling Protocol

VDOT will not accept any project level air quality analysis for carbon monoxide (CO), particulate matter (PM) or Mobile Source Air Toxics (MSATs) without first reviewing and approving in writing a modeling protocol or proposed scope of work for the project. The draft protocol to be provided to the VDOT Environmental Division Air Quality Section by the consultant must include the following details:

- 1) General modeling approach for each pollutant
- 2) Project description with project drawings, showing both the build and no-build cases.
- 3) Traffic data for all analysis years considered
- 4) Years considered in the analyses – Base year, year of peak emissions (generally the project opening year) and design year
- 5) Level of analysis for each applicable pollutant to include proposed model(s) and modeling parameters and methods (i.e. “A qualitative PM study will be conducted by comparison to another location with similar characteristics.”).

The modeling protocol should comply with all applicable guidelines and standards, including the standards outlined in 40 CFR 51 Appendix W “Guideline on Air Quality Models”; US Environmental Protection Agency (EPA) technical memorandum EPA-454/R-92-005 “Guideline for Modeling Carbon Monoxide from Roadway Intersections”; “Interim Guidance on Assessing Air Toxics in NEPA Documents”; “Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas “; and Section 5.0 Air Quality Project Level Analysis Methodology of this guidance. VDOT Environmental Division, Air Quality Section will provide approval or disapproval with comments of the modeling protocol, typically within thirty (30) days of receipt of the protocol.

3) Task and Budget Worksheet

An example scope worksheet that outlines the required sub-tasks for an air quality study is provided in Appendix 1. The consultant's scope of work must detail work

sub-tasks and cost estimates for performing the air quality work. They must be itemized and separate from all other work tasks (including those associated with noise and energy), with separate or disaggregated listings for the consultant and its subcontractors or sub-consultants (if any). All work including all deliverables remain the responsibility of the consultant contracted by VDOT.

The work proposal must reflect a thorough understanding between the consultant and VDOT concerning the job tasks, all applicable environmental requirements, methods, models and timelines. All items must be addressed separately, as the example shows, in sufficient detail to facilitate a comprehensive review of the proposal by the Department Staff.

Worksheets will be submitted to the Department which include the following: man-hour estimates detailed by sub-task and personnel who will perform the sub-task; hourly salaries for each of the personnel involved in the analyses, showing unloaded (direct), overhead, and loaded rates; itemization and details of direct cost; and timelines with definite schedule or dates for product deliverables. Include, but do not double-count, related preparation of traffic, text or reports, and plans to attend hearings. Separate itemization of the direct cost items (non-overhead items: trips, flights, lodging, meals, printing, etc.) associated with air quality is required. These itemizations (tasks, salaries, direct costs, and timelines) are pre-requisite regardless whether the payment structure is fixed billable rates, cost plus net fee, lump sum, or other. All key personnel will be identified, and substitutions will not be permitted without written agreement to that effect.

4) Air Quality Technical Report

The technical report must be a stand-alone, comprehensive documentation of the qualitative or quantitative (as appropriate) CO, PM_{2.5} and/or MSAT air analysis. It should be prepared as a support document for reference by the text of the main environmental document. For an Environmental Impact Statement (EIS) project, the report must be specifically designed for and provided as an appendix to the EIS. The technical report should address the following in approximate order:

1. Introduction – The introduction should include a brief synopsis of the project and pertinent history or information about the project.
2. Project Description – The project description should include a complete description of the project and any alternatives (including the No Build Alternative).
3. Traffic Summary – A brief summary of existing and future traffic for all analysis years must be provided. Peak ADT and percent truck traffic for the project should be noted. The source(s) for the traffic data and forecasts should be cited, and any key assumptions. If different forecasts are used for different analysis (e.g., CO versus MSATs), the forecasts should be reconciled to show reasonable agreement in peak hour and daily traffic as appropriate for the project.
4. Existing Conditions – The existing condition section should include a discussion of the meteorology/climate associated with the study area, the current or recent trends in ambient concentrations of the studied pollutants, and discussion of

current attainment status of the given air shed. Discuss as appropriate the attainment, non-attainment, and/or maintenance status (see Appendix 2) of the area (including any officially proposed or recommended classifications or changes) as well as the State Implementation Plan (SIP) status including any pertinent information on future regional trends.

5. Regulatory Standards/Criteria – Summarize relevant federal and local regulations and standards concerning CO, PM_{2.5} and MSATs as they apply to the project.
6. Conformity – The section should include one or more of the following statements, as applicable, with one of the other statements depending on the type of the project.

The project is located in

- i. a non-attainment or maintenance area for carbon monoxide
- ii. a non-attainment or maintenance area for ozone
- iii. an Early Action Compact area for ozone
- iv. a non-attainment or maintenance area for fine particulate matter
- v. an attainment area for carbon monoxide, ozone and fine particulate matter

A) *Non-Exempt Projects*

1. The project is regionally significant and regional conformity requirements apply. It comes from the 20XX Transportation Plan and the Fiscal Year 20XX-20XX Transportation Improvement Program that has been found to conform to the State Implementation Plan. The project completion schedule, design concept, and scope are correctly reflected in the currently conforming transportation plan and program.
2. This project does not serve regional transportation needs and therefore is not considered to be regionally significant for conformity. Projects of this type would not normally be included in the modeling of a metropolitan area's transportation network since their effect on the regional emissions analysis is considered insignificant. This project comes from the 20XX Transportation Plan and the Fiscal Year 20XX-20XX Transportation Improvement Program that has been found to conform to the State Implementation Plan.
3. The project is {is not} considered to be regionally significant for conformity. However this project is not {properly} programmed and/or modeled in the currently conforming Plan and TIP. An amendment or administrative modification as appropriate will need to be made to the Plan and TIP to {include/revise} this project before it can proceed.

B) *Exempt Projects*

The project is one of a class of projects that is exempt from regional emission requirements under conformity, according to 40 CFR 93.126 (Table 2). This exempt category includes certain safety and "neutral" de

minimis projects whose air quality effects are not considered significant and would not be detected by the regional emissions analysis for the transportation plans and programs.

C) *Early Action Compact*

Since the designation of attainment status has been deferred, the project does not need to conform to regional conformity requirements at this time. However, if the status of the air basin should be designated as non-attainment then the project will be subject to conformity requirements in the future.

7. Operational Emissions Analysis - All federally funded highway projects and any projects located in an air quality non-attainment or maintenance area should be reviewed early in the development process to determine the appropriate level of air quality assessment. This determination should be based on the location, traffic volumes and other characteristics associated with the highway project. The project level air quality analysis may require a qualitative or quantitative (as appropriate) CO analysis, PM_{2.5} analysis and/or MSAT analysis (See Sections 5, 6 and 7). Unique projects such as a tunnel should be considered on a case-by-case basis to determine the appropriate level of air quality analysis. VDOT Environmental Division Air Quality personnel should be consulted to help determine the appropriate level of analysis for the project.
8. Construction Emission Analysis - Describe standard measures of the VDOT Road and Bridge Specifications; discuss any important impacts that may occur and any special measures beyond the Specifications proposed to minimize harm. Examine land-use features and facilities adjacent to the proposed project that may be particularly sensitive or notably impacted. Identify any locations where the degree of potential impact would be inconsistent with the specific feature or facility (i.e. ventilation or air conditioning intakes situated next to road which services tunnels or medical/health facilities, etc.).

Unless otherwise concluded, please include the following statement:

“The temporary air quality impacts from construction are not expected to be significant. Construction activities are to be performed in accordance with the Department's current "Road and Bridge Specifications". The Specifications are approved as conforming with the State Implementation Plan and require compliance with all applicable local, state, and federal regulations.”

9. Mitigation – If required, describe any mitigation measures to reduce operational or construction emissions.
10. Conclusion - Summarize the analysis and its findings relative to the impact on the applicable NAAQS levels. Summarize any construction impacts, and discuss the construction specifications and any special construction mitigation measure. Summarize the area's attainment, non-attainment or maintenance status. State

whether the project is expected to interfere with the attainment or maintenance of the applicable NAAQS.

5) Carbon Monoxide Analysis Methodology

I. Approved Models for CO Hotspot Analysis

VDOT currently approves the use of the emission model MOBILE 6.2 and dispersion model CAL3QHC. The requirements for use of these models are outlined as follows:

MOBILE 6.2 – Vehicle registration data should be obtained from the VDOT Air Quality Section. The parameters that should generally be used for modeling CO emissions are presented below, although every effort should be made to be consistent with parameters used in regional conformity modeling where appropriate.

Parameter	Hampton Roads	Richmond	Northern VA	Other
Min/Max Temp.	32°F – 32°F	28°F – 28°F	22°F – 22°F	30°F – 30°F
Fuel Reid Vapor Pressure (RVP)	13.5	13.5	13.5	13.5
Season	2	2	2	2
Absolute Humidity	75	75	75	75
Evaluation Month	1	1	1	1

Deviation of the parameters for MOBILE 6.2 from what is presented in these guidelines must be fully documented in the modeling protocol submitted for approval to the VDOT Environmental Division Air Quality Section.

CAL3QHC: The latest version of CAL3QHC available from EPA should be used for any CO dispersion modeling analysis. The parameters that should be used for modeling CO emissions are as follows:

Description	Value
Surface Roughness Coefficient	Urban - 175 centimeters, Rural – 11 centimeters
Background CO Concentrations	See Appendix 3
Wind Speed	1 meter/second
Stability Class	Urban – D, Rural – E
Mixing Height	1000 meters

Deviation of the parameters for CAL3QHC from what is presented in these guidelines must be fully documented in the modeling protocol submitted for approval to the VDOT Environmental Division Air Quality Section.

OTHER MODELS: Other models (such as Easy Mobile Inventory Tool (EMIT) or Cal3Interface) approved by FHWA and/or EPA will be considered on a case-

by-case basis. All information pertaining to the model and modeling parameters must be included in the modeling protocol. VDOT will provide written notice of approval/disapproval for use of the model in the given project analysis.

II. Level of Analysis

An updated memorandum of understanding (MOU) was signed between VDOT and FHWA on February 27, 2009 which outlines when a quantitative or qualitative CO hot-spot analysis is required. Based on the signed memorandum, the following guidance is provided so that the appropriate level of analysis for a project can be determined:

- A. Projects that do not change (add, remove or relocate) roadway capacity or transit services do not require either qualitative or quantitative project-level air quality analyses.

- B. Projects meeting one of the following criteria require only a qualitative analysis. The qualitative analysis, represented by a uniform statement (see Attachment 2), will be included in the Categorical Exclusion or Environmental Assessment for:
 - 1. Any project that is exempt from the requirement to determine conformity under the federal transportation conformity rule,
 - 2. Any project that qualifies for a Programmatic Categorical Exclusion (PCE) according to the PCE Agreement in effect between the FHWA and VDOT,
 - 3. Any project affecting capacity for roadways without intersections or interchanges for which the build scenario design year Level of Service (LOS) is E or better (or reasonable proxy thereof) and the corresponding average daily traffic (ADT) does not exceed 59,000, or
 - 4. Any project affecting capacity for roadways with intersections and/or freeway interchanges for which the build scenario design year intersection/freeway interchange LOS is E or better (or reasonable proxy thereof) and the corresponding ADT does not exceed the following levels for the roadway being improved as part of the project or any intersecting roadway within the project area:
 - (i) 59,000, for intersections and freeway interchanges for which the minimum skew angle (defined here as the smallest angle modeled between intersecting roadways in a reasonable representation of the intersection or interchange selected for air quality analysis following applicable state and federal guidance) is 60 degrees or more,
 - (ii) 49,000, for skew angles from 45 degrees up to (but not including) 60 degrees, or
 - (iii) 39,000, for skew angles from 30 degrees up to (but not including) 45 degrees.

- C. A quantitative analysis will be required for projects meeting one or more of the following criteria:
 - 1. Any project that does not meet any of the criteria under paragraphs A or B above; or
 - 2. Any project for which an Environmental Impact Statement is prepared;

III. Methodology

A. Qualitative Analysis

If the project meets the requirements for a CO qualitative analysis, one of the following statements should be incorporated into this section:

1. Projects That Qualify as Exempt and/or for Programmatic Categorical Exclusions

The project is identified as being exempt from the requirement to determine conformity according to the federal transportation conformity rule and/or qualifies for a Programmatic Categorical Exclusion (PCE) according to the PCE Agreement in effect between the Federal Highway Administration and the Virginia Department of Transportation. Accordingly, it is concluded that the project would not significantly impact air quality and would not cause or contribute to a new violation, increase the frequency or severity of an existing violation, or delay timely attainment of any National Ambient Air Quality Standard.

2. Traffic Volume, Skew Angle, and Level of Service

The project does not include or directly affect any roadway whose design year average daily traffic volume, skew angle or level of service would exceed the threshold criteria specified in the Agreement between the Federal Highway Administration and the Virginia Department of Transportation for streamlining the project-level air quality analysis process for carbon monoxide. Modeling using “worst-case” parameters has been conducted for these thresholds and it has been determined that projects, such as this one, for which the thresholds would not be exceeded would not significantly impact air quality and would not cause or contribute to a new violation, increase the frequency or severity of an existing violation, or delay timely attainment of the National Ambient Air Quality Standards for carbon monoxide.

B. Quantitative Hot Spot Analysis

If the project requires a quantitative CO hotspot analysis, it must include a micro-scale air dispersion analysis following a protocol approved by VDOT Environmental Division Air Quality Section and using one of the approved models outlined above, or a model approved by VDOT Environmental

Division Air Quality Section. The air quality analysis must be fully documented in a stand alone technical report that follows the guidance outlined in this section. Document the modeling methodology and results from the micro-scale air dispersion modeling analysis. The documentation should include the parameters used in the modeling, receptor locations (including maps and/or pictures), emission factors, meteorological parameters, traffic data, and any assumptions used in the modeling. The CO maxima site selection/intersections selection process should be described and documented. Background concentrations used should be documented. The traffic data source should be cited and projection techniques used to project the traffic should be documented. The results should be presented in an easy-to-read table.

Micro-Scale Air Dispersion Analysis

The quantitative analysis should be conducted using the default parameters outlined above. In addition, the following guidance should be followed while conducting the micro-scale air dispersion analysis:

1. Site Selection – For a project that includes intersections, the three (3) intersections with the lowest LOS should be selected for the analysis. Selecting the lowest LOS intersections will ensure that the highest air quality impacts are modeled for the project. For a project that does not include intersections, reasonable CO maxima sites should be selected based on the details of the proposed plans, vehicle emission source strength factors, traffic, land use and the relative proximity of right of way boundaries to the road. Locations of special interest such as 4(f) parks, recreation or refuge areas, and 106 historic areas should also be determined, if any. The number of potential "final" analysis sites should be reduced down to those having the highest CO levels, with the possible exception of the 4(f) and 106 sites.
2. Receptor Location – The placement of receptors should follow the guidance outlined in EPA-454/R-92-005 “Guideline for Modeling Carbon Monoxide from Roadway Intersections”. All receptors should be placed at minimum three (3) meters from the edge of the roadway and at a height of 1.8 meters. Reasonable receptor locations include the following:
 - i. Sidewalks to which the general public have access
 - ii. Vacant lots near an intersection
 - iii. Parking lots including their entrances and exits
 - iv. Property lines of all residences, hospitals, rest homes, schools, playgrounds, and the entrances and air intakes to all other buildings.
3. Averaging Period – The dispersion analysis should be conducted using a sixty (60) minute averaging period for the analysis. The eight (8) hour averaging period concentration should be derived by applying a persistence factor of 0.7 to the one (1) hour impact concentration. The

persistence factor of 0.7 is based on the guidance in the *Guidelines for Modeling Carbon Monoxide from Roadway Intersections*, by EPA, November 1992. If the derived eight (8) hour impact concentration is unrealistically high then a refined analysis can be conducted to determine the impact.

4. Traffic - One-hour traffic volumes, average operating speeds, percent hot-start, percent cold-start, and percent hot stabilized operation should conform to conditions for the peak one-hour with the highest traffic on adjacent roads. If a refined analysis of the eight-hour period is required then traffic volumes, average operating speeds, percent hot-start, percent cold-start, and percent hot stabilized operation should conform to conditions for the consecutive eight one-hour periods with the highest traffic volume.
5. Modeled Years – The project should be modeled for the base, peak emission and design years of the project and all of the alternatives (including the No-Build Alternative).
6. Meteorology - "Worst-case" assumptions for meteorology should include a 1 m/sec wind speed and a wind direction resulting in the highest CO concentration at each site. The worst case wind direction should be modeled by varying the wind direction in CAL3QHC by 5 degree increments. Stability "D" generally should be used for one-hour estimates. On projects situated in rural low density land-use areas, however, stability "E" should be used for a peak one hour. Stability "E" conditions do not prevail over peak eight-hour traffic periods even in rural situations. Therefore, when conducting a refined eight (8) hour analysis, use stability "D".

6) Particulate Matter Hot Spot Analysis Methodology

I. Approved Models for PM Analysis

Currently, there is no federally approved method for conducting quantitative PM analyses. The Consultant Guide will be updated once federal guidance concerning quantitative PM hotspot analyses is issued.

II. Level of Analysis

Federal guidance concerning qualitative PM_{2.5} hotspot analyses was issued March 29, 2006, superseding prior guidance (See Appendix 3). A decision regarding the appropriate level of analysis can be made based on that guidance, which is outlined below.

For projects within non-attainment or maintenance areas for PM_{2.5}, qualitative analyses are required for “projects of air quality concern” that meet one or more of the following criteria:

1. A new or expanded highway project that serves a significant volume of or will result in a significant increase in diesel vehicles, such as facilities

with greater than 125,000 annual average daily traffic (AADT) and 8% or more of such AADT is diesel truck traffic.

2. A project that creates a new, or expands or improves accessibility to an existing bus or rail terminal or transfer point that will have a significant number of diesel vehicles congregating at that location, or that is defined as regionally significant.
3. A project that affects intersections that are at LOS D, E or F with a significant number of diesel vehicles, or that will change to LOS D, E or F because of increased traffic volumes from a significant number of diesel vehicles related to the project.
4. A project otherwise considered a project of “air quality concern” as outlined in 40 CFR 93.123 (b)(1)(i),(ii),(iii) or (iv).

III. Methodology

A. Exempt Projects

The project is one of a class of projects that is exempt from regional emission requirements under conformity, according to 40 CFR 93.126 (Table 2). This exempt category includes certain safety and "neutral" de minimis projects whose air quality effects are not considered significant and would not be detected by the regional emissions analysis for the transportation plans and programs.

B. Projects that are NOT of air quality concern

If the project does not meet the requirements of a project of air quality concern, the report must discuss the reasons for that determination and include the following statement:

“Clean Air Act and 40 CFR 93.116 requirements for PM_{2.5} were met without a hot-spot analysis, since such projects have been found to not be of air quality concern under 40 CFR 93.123(b)(1).”

C. Qualitative PM_{2.5} Analysis

As of April 5, 2006, projects of air quality concern require a qualitative analysis if the National Environmental Protection Act (NEPA) document has not been completed, or if the NEPA document has been completed but federal approval is still required. Read the guidance (referenced in Appendix 3) for further information. The qualitative analysis should be completed according to the basic guidelines provided below. The hot-spot analysis should include sufficient documentation to justify the conclusion that a proposed project

meets conformity hot-spot analysis requirements in 40 CFR 93.116 and 93.123.

There are two recommended methods for conducting a qualitative PM_{2.5} analysis:

1. Comparison to another location with similar characteristics

This method is a simple approach for demonstrating that a new project will meet statutory conformity requirements. It involves reviewing existing highway or transit facilities that were constructed in the past and built in locations similar to the proposed project and, whenever possible, near an air quality monitor (a “surrogate”) to allow a comparison of PM_{2.5} air quality concentrations.

2. Air quality studies for the proposed project location

Air quality information from many sources may be available for the proposed project’s location. PM_{2.5} non-attainment areas may use, as appropriate, any preliminary data or modeling from a PM_{2.5} SIP under development. The SIP contains specific information on the air quality conditions of a given nonattainment or maintenance area. Such information may include monitoring data and modeling data for past or future years at or near a project’s location. Even if a state has not yet begun work on its PM_{2.5} SIP, the air agency would be able to supply data from air quality monitors that may be useful in a given hot-spot analysis. In some cases, the state or local air agency or a university may also have performed an air quality study near the location of a proposed project. In addition, other scientific studies may be appropriate to understand the potential air quality impact from certain projects.¹

The hot-spot analysis should include a summary of the method and data that were used, such as:

1. A description of the method chosen to conduct the hot-spot analysis;
2. A description of the type of PM_{2.5} emissions from the proposed project that are considered in the qualitative hot-spot analysis;
3. A description of the changes in certain factors that will result from the project for future scenarios, including changes in the surrounding environment that will affect PM_{2.5} air quality, changes in traffic and emissions trends;
4. A description of the analysis year(s) that is examined;
5. A discussion of any mitigation measures that will be implemented and their expected effects; and

¹ EPA will be providing a summary of scientific studies that have been completed on the potential impacts of transportation projects. See EPA’s website for further information: <http://epa.gov/otaq/transp/conform/>.

6. A conclusion for how the proposed project meets 40 CFR 93.116 and 93.123 conformity requirements for the PM_{2.5} air quality standards.

7) Mobile Source Air Toxics Analysis Methodology

I. Approved Models for MSAT Analysis

Currently there is no federally approved model to perform a quantitative MSAT hot-spot analysis. Contact FHWA if a quantitative analysis is needed.

II. Level of Analysis

On February 3, 2006, FHWA issued interim guidance concerning Mobile Source Air Toxics (see Appendix 3 for reference). This guidance can be used to determine the level of analysis based on the following criteria:

- A. No analysis is required for a project that meets one or more of the following criteria:
 1. Any project qualifying as a categorical exclusion under 23 CFR 771.117(c);
 2. Any project exempt under the Clean Air Act (CAA) conformity rule under 40CFR 93.126; or
 3. Any other project with no meaningful impacts on traffic volumes or vehicle mix.
- B. A quantitative analysis is required for projects that meet the following criteria:
 1. Any project that creates or significantly alters a major intermodal freight facility that has the potential to concentrate high levels of diesel particulate matter in a single location; or
 2. Any project that creates new or adds 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 150,000², or greater, by the design year;

AND ALSO

3. is proposed to be located in proximity to populated areas or in rural areas, in proximity to concentrations of vulnerable populations (i.e., schools, nursing homes, hospitals).

² Using EPA's MOBILE6.2 emissions model, FHWA technical staff determined that this range of AADT would be roughly equivalent to the CAA definition of a major Hazardous Air Pollutant (HAP) source, i.e. 25 tons per year (tpy) for all HAPs or 10 tpy for any single HAP. Significant variations in conditions such as congestion or vehicle mix could warrant a different range for AADT; if this range does not seem appropriate for your project please consult with the contacts from the Office of Planning, Environment and Realty identified in this memorandum.

- C. A qualitative analysis is required for projects that exceed the requirements set forth in Part A of this section, but do not meet the requirements set forth in Part B.

III. Methodology

A. Exempt Projects

If the project is determined to be exempt from MSAT analysis, the report must discuss the reasoning for this determination and include the following statement:

This project will not result in any meaningful changes in traffic volumes, vehicle mix, location of the existing facility, or any other factor that would cause an increase in emissions impacts relative to the no-build alternative. As such, FHWA has determined that this project will generate minimal air quality impacts for Clean Air Act criteria pollutants and has not been linked with any special MSAT concerns. Consequently, this effort is exempt from analysis for MSATs.

Moreover, EPA regulations for vehicle engines and fuels will cause overall MSATs to decline significantly over the next 20 years. Even after accounting for a 64 percent increase in vehicle-miles-traveled (VMT), FHWA predicts MSATs will decline in the range of 57 percent to 87 percent, from 2000 to 2020, based on regulations now in effect, even with a projected 64 percent increase in VMT. This will both reduce the background level of MSATs as well as the possibility of even minor MSAT emissions from this project.

B. Qualitative MSAT Analysis

If the project meets the requirements for a qualitative MSAT analysis, please refer to the guidance referenced in Appendix 3 for the appropriate language.

C. Quantitative MSAT Analysis

If the project appears to need a quantitative analysis, contact Michael Koontz or Pamela Stephenson in the Office of Planning, Environment, and Realty in FHWA for assistance in developing a specific approach for assessing impacts. This approach would include a quantitative analysis that would attempt to measure the level of emissions for the six priority MSATs 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. Once a method for conducting a quantitative MSAT analysis has been determined, submit a supplemental modeling protocol to VDOT Air Quality Section for approval, following the basic guidelines outlined in Section 3 of this document. VDOT will approve or disapprove the modeling protocol within 30 (thirty) days.

8) Incorporation into Environmental Documents

In environmental document texts (CE, EA and EIS), provide summary paragraphs pertaining to the air quality findings that suit the context of the various environmental document sections. These should use the summary from the appropriate multi-alternative or selected alternative technical report, and refer readers to the technical report for additional detail. For 4(f) or 106 documentation, however, discussion should refer to any 4(f) or 106 sites that were modeled, or were represented by other sites in the CO analyses. Assure that the appropriate agencies (Virginia Department of Environmental Quality or VDEQ, EPA and any others) are considered for solicitation of comments and are present on any distribution list. For EIS work, identify the personnel that performed the air quality work. Assure that responses are provided to review comments received from the public and review agencies.

9) Record Keeping

Copies of the air quality reports and portions of environmental texts must be provided to VDOT in an agreed electronic format for preliminary review and file reference. Copies of all CO, PM_{2.5} (and/or PM₁₀) and MSAT input and output data (MOBILE, CAL3QHC, etc.) also must be forwarded to the VDOT Environmental Division for confirmation and retention in the Division's Project Files. The Consultant is also required to maintain his own copies of the plans, traffic, air quality reports and documentation in accordance with the contract.

Any questions or comments about the guidance provide in this document can be directed to VDOT Environmental Division Air Quality Section personnel. Current Environmental Division Air Quality Section contacts for questions about Air Quality Project Level Analysis are:

Jim Ponticello
Air Quality Program Manager
Email: Jim.Ponticello@vdot.virginia.gov
Direct Line: (804) 371-6769

Chris Voigt
Air Quality Engineer Senior
Email: Christopher.Voigt@vdot.virginia.gov
Direct Line: (804) 371-6764

Dan Grinnell
Air Quality Engineer
Email: Daniel.Grinnell@vdot.virginia.gov
Direct Line: (804) 371-7865

Mailing Address:

VDOT Environmental Division; Air Quality Section
1401 E. Broad St., Hospital Building
Richmond, VA. 23219
Fax: (804) 786-7401

Appendix 1- Example Worksheets

Example Worksheets for Consultant Proposals

(See Section 2)

I) AIR QUALITY SUB-TASKS & PERSONNEL HOURS

DETAILED SUB-TASK	PLANNER	MANAGER	SPECIALIST	TECH	TYPIST
1. Plan & traffic review, CO sites selection, and 1 & 8hr CO analysis					
1A. Site Selection (reasonable CO maxima sites)					
1B Detailed Analyses (CAL3QHC/Mobile6.2)					
2. CO Backgrounds (usually use default estimates)					
Existing					
Future					
3. Construction Impacts					
4. Evaluate Results					
5. Prepare Tech. Report					
6. Prepare Draft &/or Final Document Texts					
7. Rev./Public Hearing Comment Responses					
8. Management/Work Coordination, etc.					
9. Total Hours					
10. Salaried Costs (Hrs x Hourly rate)					
11. Total Salaried Cost for Air					

II) SALARY HOURLY RATES

Position/Title	Hourly Rates (Unloaded rates, overhead factors, and loaded rates)	Name of Person
Manager (Key personnel)		
Air Planner (Key personnel)		
Air Specialist (Key Personnel)		
Technician		
Typist		

III). DIRECT COSTS

Also list, detail and total the direct cost items and expenses to be charged with respect to the air quality work. Itemize information and costs for travel events (transportation modes, meals & lodging including number of persons and number and type of occasions such as site visits, project meetings and hearing(s)). Also itemize expenses for telephone or fax, special computer/software needs, and printing and mailing (reproduction and distribution of quantities and sizes of documents). Also itemize and detail any work involving sub-contract consultants. Note all items purchased for the project using state funds are the property of the state and as such are project deliverables unless otherwise specified in the contract governing the project.

IV) TIMELINES & SCHEDULES

Identify a specific schedule or definite dates for completion of key work tasks. For example:

- 1) Draft Stage Reviews:
The consultant ensures that VDOT will receive preliminary draft technical air quality reports for review by mm/dd/yyyy. VDOT will receive preliminary copies of the draft environmental document sections for review by mm/dd/yyyy.
- 2) Draft Stage Signature copies:
All air reports and related documents for the draft document stage will be readied by the consultant and received by VDOT on or before mm/dd/yyyy.
- 3) Final Stage Reviews:
The consultant ensures that VDOT will receive preliminary final technical air quality reports for review by mm/dd/yyyy. VDOT will receive preliminary copies of the final environmental document sections for review by mm/dd/yyyy.
- 4) Final Stage Signature copies
All air reports and related documents for the final document stage will readied by the consultant and received by VDOT on or before mm/dd/yyyy.

Appendix 2 - Non-Attainment and Maintenance Areas

Virginia Non-attainment and Maintenance Areas as of May 2009

Non-attainment Area - An area that exceeds the Environmental Protection Agency's national ambient air quality standard (NAAQS) for a critical pollutant including ozone, carbon monoxide, particulate matter, sulfur dioxide, nitrogen dioxide or lead.

Maintenance Area – An area that previously exceeded the EPA's NAAQS for a critical pollutant that must continue to implement procedures to assure continued air quality improvements.

The below air quality jurisdictions can be found on the following Virginia legislative websites:

<http://www.townhall.state.va.us/Utils/DisplayContent.cfm?fileName=E%3A%5Ctownhall%5Cdoctoot%5C102%5C20%5C1556%5C2816%5CText%5FDEQ%5F2816%5Fv2%2Epdf>

Northern Virginia 8-Hour Ozone Nonattainment Area (moderate – Effective June 15, 2004)

Northern Virginia Fine Particulate Matter Nonattainment Area (Effective April 5, 2005):

Arlington County	Alexandria City
Fairfax County	Fairfax City
Loudoun County	Fall Church City
Prince William County	Manassas City
Manassas Park City	

Richmond 8-Hour Ozone Maintenance Area (Effective June 18, 2007):

Charles City County	Colonial Heights City
Chesterfield County	Hopewell City
Hanover County	Henrico County
Petersburg	Prince George
Richmond City	

Hampton Roads 8-Hour Ozone Maintenance Area (Effective June 1, 2007):

Chesapeake City	Poquoson City
Hampton City	Portsmouth City
Isle of Wright	Norfolk City
James City County	Suffolk City
Gloucester County	Virginia Beach City
Newport News City	Williamsburg City
York County	

Fredericksburg 8-Hour Ozone Maintenance Area (Effective January 23, 2006)

City of Fredericksburg	Spotsylvania
Stafford County	

Shenandoah National Park 8-Hour Ozone Maintenance Area (Effective February 2, 2006):

Madison County (Partial)	Page County (Partial)
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NOVA Carbon Monoxide Maintenance Area:

Arlington County	City of Alexandria
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Appendix 3 – Background Carbon Monoxide (CO) Values

July 11, 2008

MEMORANDUM

TO: Jim Ponticello, Air Quality Program Manager

FROM: Christ Voigt, Air Quality Engineer, Sr.

SUBJECT: Background Carbon Monoxide (CO) Values

Background concentrations of carbon monoxide (CO) are tabulated below for application in project-level air quality (hot-spot) analyses. The background concentrations are based on monitoring data provided by the Virginia Department of Environmental Quality (VDEQ) for the most recent three year period for which data are available, 2005 through 2007.

With one exception, the highest second maximum value reported within this three year period was selected for each region, consistent with the form of the standard (i.e., not to be exceeded more than once per year) and with US Environmental Protection Agency Region 3 staff guidance on this point. The exception was for Roanoke, for which VDEQ advised that “*the higher numbers for the 2007 data for Roanoke may be an exception, and should not be used to characterize typical background urban CO levels*” (See the attached email). Data for 2005 and 2006 were applied for Roanoke instead. Data for a Fairfax County monitoring site were selected to represent a maximum for rural areas, based also on a VDEQ recommendation.

Region	One-Hour	Eight-Hour
<i>Urban Areas</i>		
NOVA	2.9	2.3
Richmond	3.0	2.0
Hampton Roads	3.6	2.5
Roanoke	3.0	2.2
<i>Max. of urbanized areas</i>	3.6	2.5
<i>Rural Areas</i>	1.7	1.5

Projects located outside but near one of the urban areas listed could use its background concentrations as representative or, to be conservative, the maxima of the urbanized area values.

Appendix 4 – Reference Documents and Further Information

Discussion paper on the appropriate level of air quality analysis (April 1985).
<http://environment.fhwa.dot.gov/guidebook/vol1/doc1r.pdf>

Guidance for preparing and processing environmental and Section 4(f) documents (October 1987).
<http://environment.fhwa.dot.gov/guidebook/vol2/doc7i.pdf>

Discussion of the different standards and concerns that apply to highway tunnels (March 1989).
<http://environment.fhwa.dot.gov/guidebook/vol1/doc1q.pdf>

National Ambient Air Quality Standards.
<http://www.epa.gov/air/criteria.html>

CAL3QHC Air Dispersion Model.
http://www.epa.gov/scram001/dispersion_prefrec.htm#cal3qhc

Interim Guidance on Assessing Air Toxics in NEPA Documents (February 2006).
<http://www.fhwa.dot.gov/environment/airtoxic/020306guidmem.htm>

Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas (March 2006).
<http://www.epa.gov/fedrgstr/EPA-AIR/2006/March/Day-10/a2178.htm>

Guidelines for Modeling Carbon Monoxide from Roadway Intersections, Report No. EPA-454/R-92-005, Nov. 1992