


# Non-Modeled Area Emissions Analysis for Conformity Review

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| Transportation Planning Branch                             |  | Approved: July 6, 2010<br>Version 1 |
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## Purpose

The purpose of this procedure is to document the process for estimating air quality emissions in rural areas for which there is no travel demand model.

## Background

Transportation conformity is required by the Clean Air Act Section 176(c) (42 U.S.C. 7506(c)) to ensure that federal funding and approval are given to highway and transit projects that are consistent with ("conform to") the air quality goals established by a state air quality implementation plan (SIP). Conformity applies to transportation plans, transportation improvement programs (TIPs), and projects funded or approved by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA) in areas that do not meet or previously have not met air quality standards for pollutants such as ozone, carbon monoxide, particulate matter, or nitrogen dioxide. These areas are known as "nonattainment areas" or "maintenance areas," respectively.

A conformity determination demonstrates that the total emissions projected for a plan or program are within the emissions limits ("budgets") established by the air quality plan or State Implementation Plan (SIP). Regional emissions are estimated based on highway and transit usage according to transportation plans and TIPs. The projected emissions for the plan and TIP must not exceed the motor vehicle emissions budgets (MVEB) established by the SIP.

The "Non-Modeled Area Analysis" (NMAA) Tool is used to calculate VMT, speeds and emissions estimates for the parts of non-attainment/maintenance areas that are outside of an area's travel demand model. [Future link to Modeled Area Emissions Analysis Procedure] The process typically includes the following main steps: estimation of vehicle miles traveled (VMT) and speeds by road type for each required analysis year; preparation of speed-based emission factors for each road type and year by North Carolina Division of Air Quality (NCDAQ) personnel; and calculation of actual emissions and comparison to SIP emission budgets by NCDOT.

The original development of the overall process, methods, and data required for the NMAA Tool (formerly known as the "Rural Spreadsheet") is available in the ["Rural Conformity Spreadsheet" presentation](#). This presentation includes detailed comparisons of results of the available speed

estimation methods and rationale for the decisions made in the original Rural Spreadsheet specifications. The key options analyzed in the original specification process were (1) projection of VMT based on county-total, functional-class-specific or “hand-adjusted” methods, and (2) calculation of future speeds by the TTI, BPR or Greenshields methods. Based on subsequent experience with NMAA implementation, it has been determined that VMT projection by county total and use of the TTI method are most appropriate, so the current version of the NMAA tool is based on these options.

## ***Responsibility***

Responsibilities and related Tasks for the NMAA can be distributed in two ways. Typically, an Air Quality Specialist in the Systems Planning Group can serve as the Project Engineer and is responsible for the key technical tasks, with the support of the MPO/RPO coordinator as provider of population projection data. Due to the specialized nature of the NMAA Tool and other aspects of the conformity process, this is the preferred option. Alternatively, the MPO/RPO coordinator can serve as the Project Engineer and perform the key technical tasks, and an Air Quality Specialist can review and provide technical assistance. The following responsibilities are written to cover either these options. For each new conformity process, assignment of these roles to specific staff will be part of the preliminary establishment of roles and schedules, as described in the first Pre-Analysis Step, below.

It is the responsibility of the **Project Engineer (PE)** to:

- Ensure that this procedure is executed properly, using appropriate application of the Non-Modeled Area Analysis Tool and the most current available data sources, and in coordination with other associated efforts related to the subject area's current emission estimation and conformity demonstration process (e.g. ensuring consistency with data and assumptions used in the parallel Travel Demand Model process, and in similar analyses in any adjacent areas.)
- Track the overall Conformity Process Schedule (CPS) to ensure that the applicable tasks are accomplished.
- Work with the Reviewer and MPO/RPO Coordinator to address and resolve any issues prior to delivery of VMT and speed data to NCDAQ, and prior to inclusion of the overall analysis results in the draft conformity document.

It is the responsibility of the Air Quality Specialist to whom each Non-Modeled Area Analysis is assigned to:

- Perform quality assurance checks upon completion of the two critical “deliverables” for each county-level non-model analysis: [1] initial VMT and speed estimates, and [2] actual emission estimates and conformity budget comparisons.
- Work with the Project Engineer to address and resolve any issues prior to delivery of VMT and speed data to NCDAQ, and prior to inclusion of the overall analysis results in the draft conformity document.
- To ensure effective interagency coordination, it will be the responsibility of the Reviewer to handle all communications with, and transfer of data to and from the Division of Air

In any NMAA process, it is the responsibility of the **MPO/RPO Coordinator** to:

- Provide county and modeled-area population projections for the analysis years, and modeled area mapping, as described in Step 2 below.

Quality.

## ***Policy, Regulatory, and Legal Requirements***

The following are the principal laws and regulations related to transportation conformity.

- SAFETEA-LU, Section 6011
- Clean Air Act, Section 176 (42 USC 7506)
- Title 23 USC Sections 134 and 135
- Title 40 CFR Parts 51 and 93
- Title 23 CFR 450

See the [FHWA Conformity Regulations webpage](#) for links to these items and further information.

## ***Scheduling and Time Constraints***

The NMAA is a subset of the conformity process for the entire non-attainment area. A Conformity Process Schedule (CPS) is developed by interagency consultation at the beginning of each Conformity Determination. Although the NMAA is not mentioned explicitly in the CPS, most of the NMAA (through Step 8) is executed in parallel with the Transportation Modeling tasks outlined in the CPS, and should be completed by the date specified for the “Modeling Complete” milestone. From that point, the Emission Analysis Element of the CPS applies to both the modeled area and the non-modeled area, and typically includes specific start and end dates for that overall Element, as well as for the NCDAQ Emission Factor Review (which includes actual generation of the emission factors), and for the completion and review of the Regional Emissions Analysis.

The NMAA process includes several critical time elements, which are listed below with typical estimated times required:

**Establish NMAA Roles and Overall Time-frame / Schedule:** Upon finalization of the Conformity Process Schedule, staff roles for the NMAA will be defined, and a schedule for the NMAA work elements should be prepared. (Requires one week.)

**Pre-Analysis Preparation Items:** At least two months prior to the beginning of the CPS Emission Analysis, the Project Engineer should begin the process of requesting, collecting and processing of the Pre-Analysis Preparation Items for all counties of concern. (One month required.)

**Assemble & Review NMAA Data and Tool Results (NMAA Tasks 1 - 8):** Depending on the number of counties in the Conformity Area and complexity of the analysis (e.g. number of analysis years, pollutants of concern, required modifications to the NMAA Tool, etc.), preparation and execution of the NMAA Tool, for all non-modeled areas of counties in a given conformity area, can take from two weeks to a month.

**Request & Obtain Emission Factors from NCDAQ (Task 9):** Due to the interagency coordination required and other demands on the time of NCDAQ staff, the PE should communicate with NCDAQ regarding the need for NMAA emission factors at least one month before the VMT and Speed results will be ready. In most cases, NCDAQ will be able to turn around the emission factors in two weeks, though a shorter turnaround may be possible depending on their workload and the size/complexity of the subject analysis.

**Complete NMAA Tools, Prepare Results, Tool/Data Review (Tasks 10 & 11):** After receipt of emission factors from NCDAQ, two weeks should be allowed to complete these final tasks.

The latter two tasks would be performed in coordination with the parallel tasks for the Modeled Area Emission Analysis, so are not shown separately on the CPS schedule.

## Procedures

The NMAA Tool is county-specific, therefore, a separate NMAA Tool must be completed for each county of concern. Most conformity analyses involve multi-county non-attainment or maintenance areas, and the delineation of the modeled/non-modeled areas is completed as part of the preparation of the Consensus Plan. When working on a multi-county area, data should be requested/collected for all subject counties at the same time.

Refer to “Scheduling and Time Constraints,” above, for information on planning and coordinating the various NMAA tasks described below.

### Pre-Analysis Preparation Items –

The three tasks below are performed prior to working on a county-specific NMAA Tool, and involve planning for the NMAA, and obtaining and preparing basic data required for all counties in the analysis area.

| Step | Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| 1    | <p><b>ESTABLISH NMAA ROLES AND OVERALL TIME-FRAME / SCHEDULE:</b></p> <p>Upon finalization of the Conformity Process Schedule, staff roles for the NMAA (who will serve as PE and who will be reviewer) will be determined by the Technical Services Group Supervisor and the respective regional planning group supervisor. Based on the framework provided by the CPS, planned dates for the commencement and completion of the following work elements should be determined by the PE, and tracked as the conformity process proceeds.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 2    | <p><b>MAKE INFORMATION REQUESTS:</b></p> <p>The PE should request, obtain, and process all Pre-Analysis Preparation data items for all counties of concern at least one month <u>prior to the beginning of the CPS Emission Analysis</u>.</p> <p><b>The PE obtains the following data from the appropriate MPO/RPO Coordinator:</b></p> <ul style="list-style-type: none"> <li>• <i>Base Year and Horizon Year Populations</i> (county total and modeled area) using the <a href="#">Population Projections spreadsheet</a> template</li> <li>• <i>Detailed map of counties of concern with modeled area outlined</i> (for determining if future TIP projects are in or out of modeled area – see “Additional Lane-Miles and Centerline Miles,” Step 6, below).</li> </ul> <p>A customized large-scale GIS-based map should be requested from the MPO/RPO Coordinator (and/or the Regional Model Team), incorporating (1) a base layer of all roads, including labels on major facilities, (2) either the model area boundary or the road network for the travel demand model, and (3) a layer incorporating all TIP projects. The available TIP Project layer should include only projects in the 10 year work program that are programmed for ROW or construction. Thus it is expected that this map will identify all funded projects that need to be entered as “Additions to the Transportation System” in the NMAA Tool. Further research under Step 6 below will confirm the relevant project list.</p> <p><b>The PE requests the latest county-total lane-mile and centerline-mile data:</b></p> <ul style="list-style-type: none"> <li>• Request and obtain latest county-total lane-mile and centerline-mile totals for each subject county, compiled by Functional Class categories, from the Reporting Group of the State Roads Management Unit, Assessments Section, (current contact: Tom Schroeder – <a href="mailto:tschroeder@ncdot.gov">tschroeder@ncdot.gov</a>, 919-212-6090). These data have historically been received in the format shown in the <a href="#">“Example</a></li> </ul> |

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|          | <p><a href="#">of Road Miles Data</a>” file.</p> <p>[NOTE: In the future, a tool will be developed to pull these data directly from ARID or the Road Characteristics file. Describe and link to it when available.]</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>3</b> | <p><b>ESTIMATE PERCENT OF COUNTY POPULATION OUTSIDE MODELED AREA:</b></p> <p>This percentage is used to estimate how much of the total county VMT should be used in the NMAA Tool, and must be developed for the base year and each analysis year. Perform the following steps for each analysis county and enter the resulting fractions in the NMAA Tool for individual counties.</p> <ul style="list-style-type: none"> <li>In the Population Projections spreadsheet, enter total population for the county and total population for each Traffic Analysis Zone (TAZ) included in the modeled area of the county for the base and projection years, in the yellow fields of the sheet. Adjust as necessary the numbers of counties, labels, etc., and interpolations for any intervening emissions analysis years required in the Consensus Plan but not included in the Modeled Area projections.</li> <li><b>POPULATION DATA CHECK:</b> Obtain corresponding county population data from <a href="#">NC Office of State Management and Budget Website</a>. Compare these “reference” figures to county totals obtained in Step 1 to determine if the data used by TPB are still current and whether there are any apparent issues for the Non-Modeled Area Analysis. If significant deviations exist between the reference data and the data used in the modeling process, the MPO/RPO Coordinator should be requested to document the process by which the model-related data were developed. However, for internal consistency, the NMAA should use the county totals that correspond to the Modeled Area TAZs.</li> </ul> <p>The Population Projection spreadsheet will calculate the populations and population fractions outside the Modeled Area for each year (to be entered on each county's NMAA Tool). In addition, the spreadsheet calculates growth rates and generates graphs for each county for review purposes. For example, the data shown in the template results in a significant reduction in non-modeled area population. Any unexpected results should be confirmed with the MPO/RPO Coordinator before proceeding with the NMAA.</p> |

### Non-Modeled Area Analysis Tasks –

Since the Non-Modeled Area Analysis is a county-level process, each of the following tasks must be performed on a separate copy of the NMAA Tool for each county in the analysis area.

Refer to the [flowchart](#) at the end of this procedure for a graphic overview of the NMAA which is described in detail below.

In addition to making the data entries noted in the Steps below, it may be necessary for the PE to alter or adapt various aspects of the spreadsheet related to base or future analysis years. Due to the unique circumstances that may be involved, techniques for handling special cases cannot be prescribed in this Procedure, but should be developed and discussed with Systems Planning Group experts in NMAA Tool application. In addition, the current tool is set-up for a total of five years of data – in the case of Consensus Plans requiring more than four future analysis years (more than five years total, including the base year), it is recommended that two separate copies of the NMAA Tool be used, instead of attempting to add additional year(s) to the template.

All data entry items are located on the Data Entry Sheet of the NMAA Tool, and have **YELLOW** highlight -- no other fields should be used for data entry or changed in any other way without

consultation with the Reviewer. As data items are copied into the Data Entry Sheet, the highlight will disappear, showing which items have been entered and which remain to be entered.

Each of the main sheets in the NMAA Tool has a pre-designated Print Area which displays the relevant parts of the sheet in a convenient format for printing, review and reporting purposes.

| Step | Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| 1    | <p><b>ENTER KEY NMAA PARAMETERS (Subject County, Years, Pollutants And Methods):</b></p> <ul style="list-style-type: none"> <li>Enter county, analysis years and pollutants at top of the Data Entry sheet and they will appear in all required locations. Base Year is ideally the most recent available year (typically will be last full CY if after May 15) of historic VMT data, but may actually be an earlier year if so designated in the Consensus Plan. Analysis Years are the future years in the Consensus Plan. Pollutants for which emissions estimates are desired will vary by the type of nonattainment situation involved (if ozone nonattainment, the pollutants are NOx and VOC; if particulate matter (PM) nonattainment, the pollutants are NOx and PM2.5).</li> <li>Verify choice of appropriate VMT Projection Method and Speed Calculation Method from the drop-down menus for those fields. When these methods are chosen/displayed here, the relevant methods are automatically carried out in the relevant following sheets. Based on past experience, the preferred “default” choices are projection “By County Total” and the “TTI” speed calculation methodology. In the NMAA Tool, these drop-down menus have been disabled to prevent inadvertent use of other methods. The PE should verify that the default choices are still active.</li> </ul> <p><b>NOTE:</b> Appropriate adjustments will need to be made to all relevant sheets if the number of analysis years differs from the number in the existing template.</p>                                  |
| 2    | <p><b>ENTER POPULATION AND TRANSPORTATION DATA:</b></p> <p>Enter the following data items from the sources noted:</p> <p><u>Percent of county population outside the modeled area:</u></p> <ul style="list-style-type: none"> <li>Enter the “Percent of Population Outside Modeled Area” fractions for each year from the Population Projections spreadsheet.</li> </ul> <p><u>Percent of county vehicle population subject to I&amp;M:</u></p> <ul style="list-style-type: none"> <li>Obtain from NCDAQ the percentage of the county vehicle population that is estimated to be subject to the state Inspection and Maintenance (I&amp;M) program in each of the analysis years, and enter here. (All interactions with DAQ should be through an Air Quality Specialist.</li> </ul> <p><u>Historic VMT (Units: Thousands of VMT):</u></p> <ul style="list-style-type: none"> <li>Access the current version of the NC <a href="#">Historic VMT by County workbook</a>.</li> <li>Transfer county-level VMT for the latest 10 years from Historic VMT workbook into each respective year’s line in the Data Entry sheet – for Rural, Small Urban and Urbanized classes. [Current method: From the Historic VMT sheet for each year, copy the six VMTs for each of these three classes to the yellow Historic VMT section. Note that the Historic VMT file also includes a “Urban+Small Urban” section which we do not use. Future access to VMT data via ARID will change this process.]</li> <li>Verify successful transfer by checking totals from inserted years against original</li> </ul> |



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|  | <p>totals.</p> <ul style="list-style-type: none"> <li>Inspect results in VMT Projection sheet – are resulting graphs by road type reasonable?</li> </ul> <p><u>Lane-miles and centerline-miles:</u></p> <p>[As noted under Pre-Analysis Items, in the future access to these data will be arranged to eliminate reliance on the SRM unit.]</p> <ul style="list-style-type: none"> <li>For this analysis, from the standard output previously requested from the State Road Management/Assessments/Reporting Group, use “Adjusted Centerline Miles,” which are (“Unfiltered” [all Universe records] minus “Directional Centerline Miles”).</li> <li>Enter lane-miles and centerline-miles for the base year in the appropriate cells in the Data Entry sheet of the Tool. NOTE: As received, these outputs do NOT include any road types which have no mileage in the subject county, so transfer to the NMAA Data Entry sheet must be done with care.</li> </ul> <p><u>Additions to the transportation system in future years - lane miles &amp; centerline miles:</u></p> <ul style="list-style-type: none"> <li>Use detailed map of analysis area obtained in Step 1 as basic reference for confirmation of project references with respect to modeled area boundaries.</li> <li>Download current TIP listing for subject county from DOT Website (reference below). [NOTE: After the 10-year Work Program is in place, it is expected that the following process should converted to be based on those project listings rather than the TIP.]</li> <li>Prepare <a href="#">TIP Information table</a> including all the required items for all projects scheduled for completion of construction in the TIP timeframe which are in the non-modeled area. <ul style="list-style-type: none"> <li>Locate all Urban and Rural road projects for the subject county using the <a href="#">Search utility for the current STIP</a>. Select the county name and enter “U” or “R” in the “TIP Number” box to produce a list of all projects in that county with that designation. (Note: “U” is necessary because there may be urban projects in communities outside the Modeled Area.)</li> <li>Obtain basic description of these projects and their scheduled funding by searching each project number in the <a href="#">TIP Funding Table</a>. The only projects (or sections of projects) that will be included in the NMAA Tool include those which are (1) confirmed to lie outside the Modeled Area, (2) listed with “new location” or “widen to multi-lanes,” and (3) scheduled to be completed and open to traffic in the current seven-year TIP cycle. Projects with Future Year construction which do not involve new lanes or which lie entirely in the modeled area should be eliminated from consideration and documented in files. If a project crosses the Modeled Area boundary, only the mileage/laneage outside the Modeled Area should be estimated and included. In such cases, or to confirm other details, a TIP Detail map showing exact location and detailed mileage of a project can be obtained by clicking on the Project Number in TIP Search listing.</li> </ul> <p>If the above project descriptions are not adequate to determine the relevant mileage and lanes, additional project details can be obtained from the <a href="#">public hearing maps</a>.</p> <p>If there has been no Public Hearing for a project, additional project details can be obtained from the relevant Highway Division Office.</p> </li> </ul> |
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|          | <ul style="list-style-type: none"> <li>○ Obtain Functional Classification of current and planned projects from the <a href="#">North Carolina Functional Classification maps</a>. (It may be necessary to use any of the above sources and professional judgment to assign a classification to a project that has yet to appear on the classification maps.) [NOTE: In the future these data will be available on line through the spatial data viewer.]</li> <li>○ Determine mileage and lanes for each non-modeled area project by referring to sources above. If a portion of a project is within the modeled area, determine the mileage of non-modeled area portion using Modeled Area Map, Roads by Functional Classification maps and Division Maps (with links to projects). Calculate lane miles by multiplying the project length by the total number of travel lanes. Centerline miles are equivalent to the project length.</li> <li>○ The entries for each analysis year in the “Additions to the Transportation System” (lane miles and centerline miles) tables should include the combined mileages for all projects completed between the previous and current analysis years. These totals are not cumulative, so the total new mileage in all years for any given road type should be the same as the total on the TIP Information Table.</li> </ul> <p>(QA Check: Many of these entries will be zero in any given analysis year, and in almost all cases the new mileages will be much smaller than the base year mileage. Unless new-location projects are added to the system, centerline miles will always be zero.)</p> |
| <b>3</b> | <p><b>INTERIM RESULTS AND COMPUTATIONS</b> <i>(NO ENTRY OR ACTION REQUIRED):</i></p> <p>When the data from Steps 1 and 2 are entered into the Data Entry sheet, the following sheets automatically process the inputs and return estimated VMT and speed by road type and year to the top of the Results sheet. This section provides basic information on the data and processes involved in each sheet.</p> <p><b>VMT PROJECTION SHEET</b> – this worksheet provides year-specific tables summarizing essential transportation system data by road type, for the non-modeled area, including:</p> <p><b>Non-Modeled Area VMT</b> – from VMT Projection sheet</p> <p><b>Non-Modeled Area Lane-Miles</b> – calculated as follows:</p> <ul style="list-style-type: none"> <li>○ For base year: Ratio-estimated for non-modeled area from county-total Lane-Miles and non-modeled area population fraction (both from Data Entry sheet)</li> <li>○ For projection years: Previous year county-total Lane-Miles plus any new additional Lane-miles from “Additions to the Transportation System” for the projection year of concern</li> </ul> <p><b>Non-Modeled Area Centerline Miles</b> – calculated same as Lane-Miles</p> <p><b>AADT</b> – Calculated by VMT/Centerline Miles</p> <p><b>Lanes</b> – Calculated by Lane-Miles/Centerline Miles</p> <p><b>Hourly Capacity</b> – Calculated by Lanes x Hourly Capacity per lane (from Data Entry sheet)</p>                                                                                                                                                                                      |



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|          | <p><b>Estimated Speed</b> – taken from Speed Estimation Model Results Summary, based on estimation method selected at top of sheet</p> <p><b>Speed Estimation Model Results Summary</b> – results from the three speed estimation methods, by year and road type</p> <p><b>SPEED ESTIMATION METHODS SHEETS</b> – For typical applications, the TTI speed estimation method is selected by default on the Data Entry Sheet. (All three available methods [TTI, BPR and Greenshields] are documented in detail in the “Rural Conformity Spreadsheet” presentation - see Resources and Tools).</p> <p><b>VMT PROJECTION SHEET</b> – This worksheet provides projected VMT by Functional Classification for each of the future analysis years. All values required for this estimation process are entered on Data Entry sheet.</p> <p>The historic VMT for the most recent ten years are multiplied by the percent of county’s population not in the modeled area (both on Data Entry sheet) to estimate VMT for the non-modeled area, in top part of this sheet. For a typical analysis, the percentage for the base year used in the Modeled Area Analysis is used for estimating non-modeled area VMT for all historic years; this may be adjusted if modeled/non-modeled population percentages for historic years are available.</p> <p>The spreadsheet can perform projections by three different methods: by functional class, by county totals, or by hand-adjustment. The standard method is by county totals, and the NMAA Tool uses this method. In this method, the annual county totals from the historic data are forecast into the future analysis years and then allocated to facility types using the facility type distribution from the base year. Projecting by county totals avoids a number of issues that come up when attempting to project by road type (e.g. shifts of VMT from one road type to another due to periodic reclassification of roads in the county).</p> <p>The results are located in the “Projected VMT” part of the sheet, and are transferred to the Transportation System Data sheet (for use in calculating AADT and speeds), from which they are further transferred to the Results sheet for emission calculations, and summary of overall results.</p> <p>Graphs are provided to allow visualization of the results, for QA purposes.</p> |
| <b>3</b> | <p><b>PERFORM QA CHECK/REVIEW:</b></p> <p>Upon completion of all data entry and review of the results (including the QA checks provided on the above sheets), the PE should forward each NMAA to the designated Reviewer. Any issues should be addressed prior to proceeding to the next step.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>4</b> | <p><b>REQUEST EMISSION FACTORS AND I/M FRACTION DATA FROM NCDAQ:</b></p> <p>Due to the interagency coordination required and other demands on the time of relevant NCDAQ staff, the Air Quality Specialist should communicate with NCDAQ regarding the need for NMAA emission factors at least a month before the VMT and Speed results will be ready, to verify NCDAQ staff availability and identify any other issues or data needs. Fleet-wide composite average emission factors for the pollutants of concern and the percent of vehicles subject to I/M must be obtained from NCDAQ and entered in the Emission Factors section. Emission factors are required for each of the rural and urban road types based on the average speeds estimated for the road types, for vehicles subject to and not subject to I/M, and for</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

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|          | <p>the designated base year and each analysis year.</p> <p>Tables of VMT and speeds for all road types and years for an entire Non-Modeled Analysis Area should be extracted from each county's Results sheet, and submitted to NCDAQ with a letter or e-mail requesting review and generation of emission factors for the counties in question. This should be coordinated with the parallel task for the Modeled Area. An estimated time of completion of emission factor runs should also be agreed upon in conversation with DAQ personnel. Proposed "Percent of Vehicles Subject to I/M" figures should also be forwarded to NCDAQ for confirmation. (The latter data are either obtained originally from DAQ, or developed from NCDMV Accident Data [See possible <a href="#">Future Procedure</a> and link to it.]</p> <p>NOTE: This step should be performed only when the analyses are complete for the entire subject conformity area. All interactions with DAQ should be through an Air Quality Specialist.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>5</b> | <p><b>COMPLETE EMISSION ESTIMATION:</b></p> <p>Upon receipt of I/M fractions and completed emission factor files from NCDAQ, enter the percent of vehicles subject to I&amp;M on the Data Entry sheet, and copy the DAQ Composite Emission Factors to the left-hand side of each year's section of the Emission Factors sheet. These data are used to calculate the Weighted Annual Emission Factors on the right side of that sheet.</p> <p>The Results sheet uses the speed-based emission factors (with and without I&amp;M) for each road type and the estimated fraction of vehicles in the county subject to I&amp;M (both from Data Entry), combined with the estimated VMT by road type (from Transportation System Data), to generate road-type-specific and total emissions estimates for each analysis year. The formula for this calculation is shown on the Notes sheet.</p> <ul style="list-style-type: none"> <li>• <b>SPECIAL CASE</b> –In the case of a PM2.5 conformity analysis, there will be four sets of quarterly emission factors. In this case, the separate <a href="#">Template for Quarterly Emission Factors</a> should be used for generation of the Weighted Annual Emission Factors from the DAQ quarterly emission factors, and the resulting annual factors brought back into each Results sheet.</li> </ul> <p>Final results from the Results sheet should be forwarded to the Reviewer. When approved, the results should be forwarded to the preparer of the Conformity document.</p> |
| <b>6</b> | <p><b>REVIEW OF NMAA TOOL AND DATA:</b></p> <p>Upon completion of a Non-Modeled Area Analysis, the process and data used should be reviewed and any issues, exceptions or modifications to the NMAA Tool should be assessed for applicability to future analyses. If necessary, the Tool or other relevant templates and this Procedure should be updated to reflect needed changes or improvements.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## ***Warnings and Precautions***

**NMAA Data Entry** - All data entry items are located on the Data Entry Sheet of the NMAA Tool, and have **YELLOW** highlight -- no other fields should be used for data entry or changed in any other way without consultation with the a Non-Modeled Area Analysis expert.

**Project Lists** - The projects listed for addition to the non-modeled area should be verified with relevant regional planning group personnel.

**VMT by County and Functional Class** – must be up-to-date and accurate.

**Schedule Coordination** – The NMAA must be completed at the same time as or prior to the modeled area analysis.

**County-level NMAA** – Each county must be entered on a separate NMAA tool.

## ***Resources and Tools***

- [Non-Modeled Area Analysis Tool](#)
- [Population Projections spreadsheet](#)
- [“Historic VMT” by County workbook](#)
- [TIP Information table](#)
- [Template for Quarterly Emission Factors](#)
- [“Rural Conformity Spreadsheet” presentation](#)
- [FHWA Conformity Regulations webpage](#)
- [Example of Road Miles Data](#)

## ***Contacts***

- For suggestions to change this procedure contact: Elena Talanker, (919) 733-4705 x35
- For questions about performing this procedure contact: Mark G. Smith, (919) 715-5482 x383

## ***Glossary***

For a complete listing of terms, definitions and acronyms, go to the [Master Glossary](#).

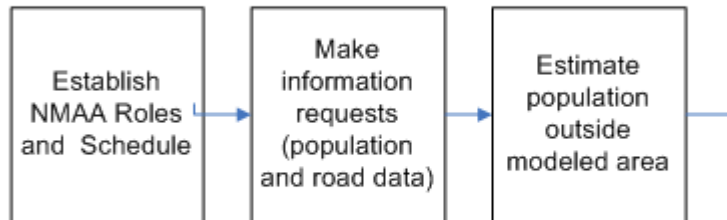
## ***User Access***

Restricted NCDOT, FHWA, MPO, RPO, Consultants, etc.

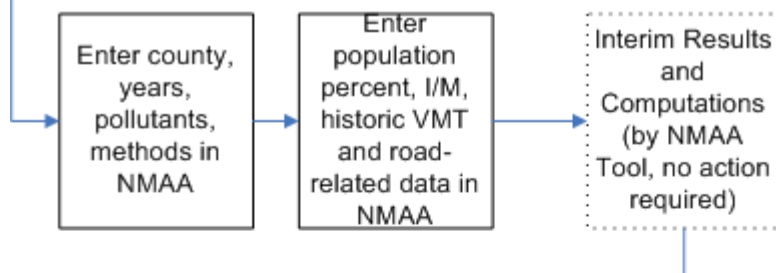
## Flowchart

### Non-Modeled Area Analysis Overview

#### Pre-Analysis Preparation Items



#### NMAA Tool Data Entry



#### Post-processing Steps

