



Chicago Metropolitan  
Agency for Planning



# ***Transportation Conformity Analysis for the $PM_{2.5}$ and 8-Hour Ozone National Ambient Air Quality Standards***

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***FINAL REPORT: OCTOBER 2010***



**TRANSPORTATION CONFORMITY ANALYSIS  
FOR THE PM<sub>2.5</sub> AND 8-HOUR OZONE  
NATIONAL AMBIENT AIR QUALITY STANDARDS**

*GO TO 2040*

**FFY 2010-2015 TRANSPORTATION IMPROVEMENT  
PROGRAM**

Final Report  
October, 2010

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## **1.0 GO TO 2040 AND FFY 10-15 TIP CONFORMITY**

### **1.1 Conformity Finding**

Chicago Metropolitan Agency for Planning (CMAP) staff finds that the *GO TO 2040* regional comprehensive plan and the *Federal Fiscal Year 2010-2015 Transportation Improvement Program (FFY 10-15 TIP)* conform with the 8-hour ozone standard and the annual fine particulate matter (PM<sub>2.5</sub>) standard based on the results of the conformity analysis.

This report makes the determination that the region's transportation plan and program satisfy all applicable criteria and procedures in the conformity regulations.

The *Transportation Conformity Analysis for the PM<sub>2.5</sub> and 8-Hour Ozone National Ambient Air Quality Standards* documentation was the subject of a public comment period running from June 11 through August 6, 2010. Upon close of the public comment period, the CMAP Board and MPO Policy Committee will recognize, consider and respond to all comments received.

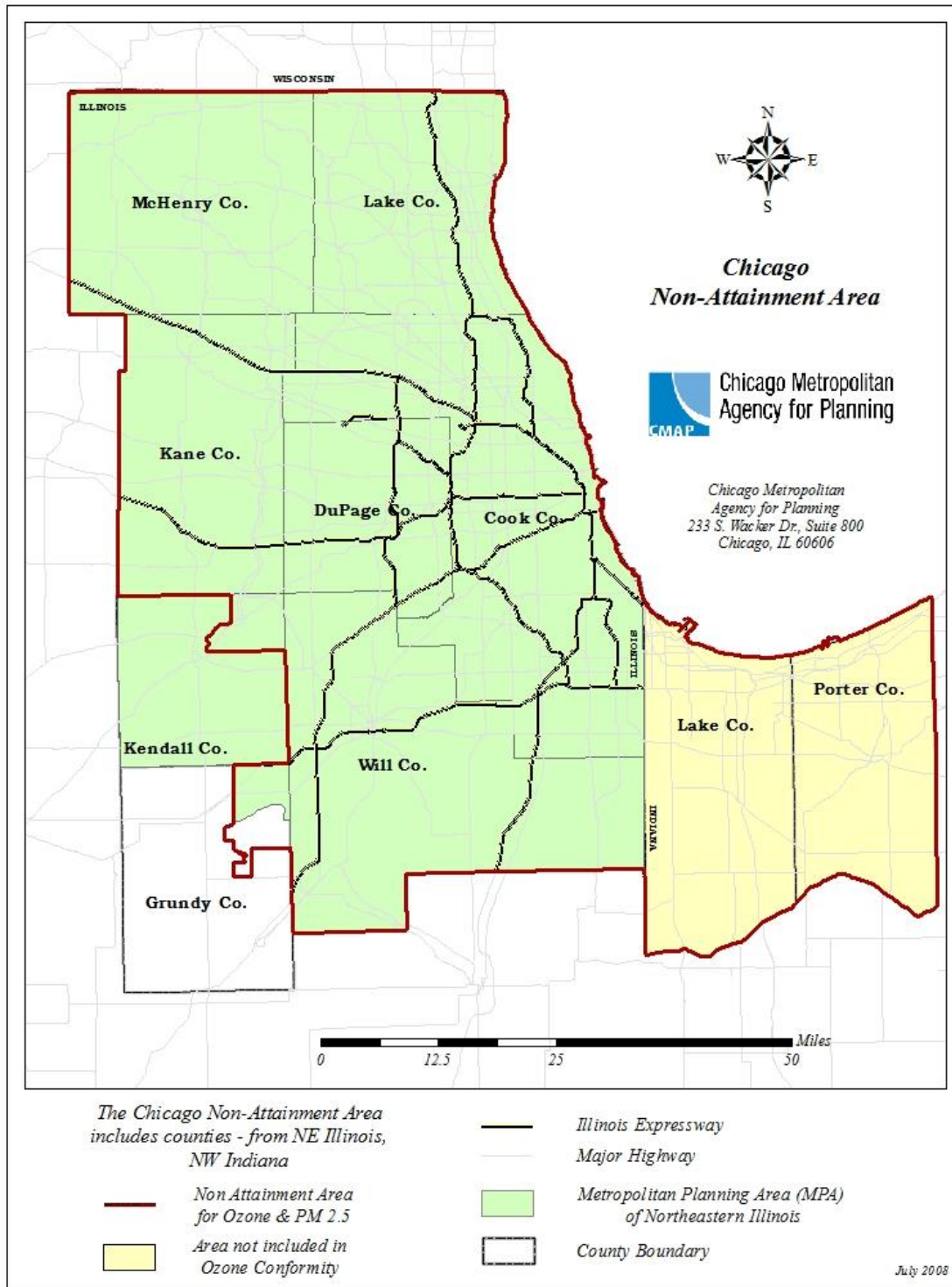
### **1.2 Overview of the Conformity Process**

Based on air quality monitoring data gathered between 1988 and 1990, the northeastern Illinois area was designated as a "severe" nonattainment area for the 1-hour national ambient air quality standard (NAAQS) for ozone by the United States Environmental Protection Agency (US EPA) on November 6, 1991 (56 FR 56694). The northeastern Illinois ozone nonattainment area included the counties of Cook, DuPage, Kane, Lake, McHenry and Will, the townships of Aux Sable and Goose Lake in Grundy County and Oswego Township in Kendall County. The Indiana counties of Lake and Porter were also included in the nonattainment area.

On April 15, 2004, US EPA issued final designations of areas not attaining or meeting the 8-hour NAAQS for ozone promulgated in 1997 under the Clean Air Act (69 FR 23898). The same area of northeastern Illinois and northwestern Indiana was designated as a moderate nonattainment area under this standard.

Based on air quality monitoring data gathered between 2001 and 2003, the northeastern Illinois area was designated as a "moderate" nonattainment area for the annual PM<sub>2.5</sub> NAAQS by the US EPA on April 5, 2005 (70 FR 944). The northeastern Illinois PM<sub>2.5</sub> nonattainment area includes the counties of Cook, DuPage, Kane, Lake, McHenry and Will, the townships of Aux Sable and Goose Lake in Grundy County and Oswego Township in Kendall County. The Indiana counties of Lake and Porter are also included in the nonattainment area.

Exhibit 1 shows the nonattainment area designated by US EPA for ozone and PM<sub>2.5</sub>.



**Exhibit 1: Northeastern Illinois Non-Attainment Area for Ozone and PM<sub>2.5</sub>**

The transportation conformity provisions of the Clean Air Act Amendments of 1990 require that the Metropolitan Planning Organization (MPO) for northeastern Illinois, make a determination that the region's transportation plan, program and projects conform to applicable State Implementation Plans (SIPs) and that emissions, taken as a whole from the plan, program and projects will not negatively impact the region's ability to meet the NAAQS deadlines. Conformity to a SIP means that the region's transportation plan and program: 1) will not cause any new violations of the NAAQS; 2) will not cause any worsening of existing violations; and 3) will not delay efforts to attain the NAAQS in a timely manner. This demonstration is conducted by comparing motor vehicle emissions estimates developed from implementation of *GO TO 2040* and the *FFY 10–15 TIP* for specific analysis years to the motor vehicle emissions budgets contained in the applicable SIP.

Although transportation plans and metropolitan TIPs do not need to be approved by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA), they must approve conformity determinations for the Plan and TIP. In addition, the region's TIP needs to be amended into the Statewide TIP (STIP), which amendment must be approved by FHWA and FTA.

The purpose of this report is to document the process and findings developed as part of the transportation conformity analysis of *GO TO 2040* and the *FFY 10–15 TIP* for northeastern Illinois.

### **1.3 Summary of 8-Hour Ozone Conformity Process**

The Illinois Environmental Protection Agency (IEPA) submitted a redesignation request and maintenance SIP for the 1997 8-hour ozone standard to US EPA on March 18, 2009. Effective May 26, 2010, US EPA found that the motor vehicle emissions budgets contained in this submission are adequate for conformity purposes. Thus, this conformity analysis will evaluate emissions in the region against these budgets.

### **1.4 Summary of PM<sub>2.5</sub> Conformity Process**

Since a SIP budget for the annual PM<sub>2.5</sub> standard has not been developed, CMAP continues to use the interim process for conformity to that standard. In this case, the regulations (40 CFR 93.109(i)(2) and 40 CFR 93.119(e)(2)) permit a region to demonstrate conformity either through a “baseline” test, or a “build/no-build” test. In the baseline test, the emissions in the analysis years are compared to a baseline year. To demonstrate conformity, the analysis year emissions must be less than or equal to the baseline emissions.

In the build/no-build test, emissions in the analysis years are compared by estimating emissions under the assumption that all projects in the plan and TIP are built (the “build” scenario) and comparing the result to estimated emissions assuming that none of the projects in the plan and TIP are built (the “no-build” scenario). Again, the estimated

emissions under the build scenario must be less than or equal to the estimated emissions under the no-build scenario.

In consultation with federal and state agencies and the Northwestern Indiana Regional Planning Commission (NIRPC), CMAP has determined that the baseline test is the most appropriate for the region.

Unlike the conformity process for ozone, the entire PM<sub>2.5</sub> nonattainment area, including both regional planning agencies, must demonstrate conformity for the federal agencies to accept the determination. This results from the fact that there are not yet adequate budgets for PM<sub>2.5</sub>.

Pursuant to final rules published May 6, 2005 (40 CFR 93.102(b)(2)(iv) and (v) and 93.119(f)(9) and (10)), PM<sub>2.5</sub> nonattainment areas are required to perform a regional emissions analysis for direct PM<sub>2.5</sub> motor vehicle emissions and for NO<sub>x</sub> as a PM<sub>2.5</sub> precursor unless the head of the state air agency and the US EPA Regional Administrator make a finding that NO<sub>x</sub> is not a significant contributor to the PM<sub>2.5</sub> air quality problem in a given area. Such a finding has not been made for northeastern Illinois, so this conformity analysis includes NO<sub>x</sub> as well as direct PM<sub>2.5</sub> emissions.

Regional emissions analyses under the annual PM<sub>2.5</sub> standard are not required for VOC, SO<sub>x</sub> or ammonia before an adequate or approved SIP budget for such precursors is established, unless the head of the state air agency or US EPA Regional Administrator makes a finding that on-road emissions of any of these precursors is a significant contributor. Since such a finding of significance has not been made for the northeastern Illinois nonattainment area, these precursors have not been analyzed for this conformity determination.

The region was required to demonstrate conformity for the annual PM<sub>2.5</sub> standard by April 5, 2006. The Policy Committee made a finding of conformity on October 13, 2005. NIRPC made a finding of conformity on December 8, 2005. The U.S. Department of Transportation (USDOT) approved the combined conformity determination on February 15, 2006. Subsequent conformity findings in conjunction with TIP amendments have also been approved, most recently on March 12, 2010.

## **2.0 FEDERAL ACCEPTANCE OF THE PLAN AND TIP**

The most recent federal review of the conformity determination of the plan and TIP occurred on March 12, 2010. the USDOT, through FHWA Illinois Division and the FTA Region V, found that the conformity analysis of the *2030 Regional Transportation Plan (2030 RTP)* and *FY 2007 - 2012 Transportation Improvement Program*, performed by CMAP as the MPO, met the applicable criteria of 40 CFR 93, and accepted the *TIP*.

The USDOT acceptance letter is provided as Exhibit 1.



Illinois Division

3250 Executive Park Dr.  
Springfield, IL 62703  
(217) 492-4640  
www.fhwa.dot.gov/ildiv/index.htm

March 12, 2010

In Reply Refer To:  
HPER-IL

Mr. Charles Ingersoll  
Acting Director of Planning and Programming  
Illinois Department of Transportation  
2300 South Dirksen Parkway  
Springfield, IL 62764

Attention: Mr. Keith Sherman  
Bureau of Urban Program Planning

Subject: Transportation Improvement Program Amendment  
Chicago Metropolitan Area

Dear Mr. Ingersoll:

We approve the amendment and accept the administrative modification to the FY 2007-2012 Chicago Metropolitan Agency for Planning (CMAP) Transportation Improvement Program and the FY 2009-2012 Statewide Transportation Improvement Program (STIP) as submitted with your letter dated March 8, 2010. Please note this approval action does not include the American and Reinvestment Recovery Act 2 projects that were conditionally approved by the CMAP transportation committee, pending additional legislative action. This action has been taken after consultation with the Federal Transit Administration.

We can now consider project authorization requests related to this STIP amendment. Requests must be submitted according to our letter to the Illinois Department of Transportation, "Transportation Planning Support for Obligation for Federal-aid Highway Project Funds" dated December 29, 1995.

Sincerely,

John M. Donovan  
Transportation Planning Specialist

For: Norman R. Stoner, P.E.  
Division Administrator

Enclosures



**Exhibit 1: Most recent USDOT letter accepting the 2030 RTP and the FY 2007 - 2012 TIP**

## 3.0 CONSULTATION

Interagency consultation is required under the transportation conformity rule, as described in 40 CFR 93.105. In the northeastern Illinois region, these procedures are addressed through the consultation process described below and through the work of CMAP's committees, subcommittees, task forces and working groups as described in the region's [Public Participation Plan](#).

In the northeastern Illinois region, consultation involving the MPO, IEPA, the Illinois Department of Transportation (IDOT), the Regional Transportation Authority (RTA), FHWA, FTA and US EPA facilitates the local, regional and state decision-making process by providing a forum for all affected federal, state, regional and local agencies to discuss and resolve important issues. Decisions made through this interagency consultation process guide the MPO in making the conformity determination.

### 3.1 Consultation Process

The consultation process facilitates the regional planning process in several ways. First, consultation assures early and proactive participation by the US EPA, FTA, and FHWA in the plan and TIP development process. Second, consultation serves as a forum for interagency communication and understanding to prevent or resolve potential obstacles in the conformity process. Finally, the expertise of the federal agency representatives is relied upon for assistance in interpreting air quality regulations, as well as transportation plan and TIP requirements.

Acceptable means of communication for the purpose of consultation include telephone, fax, e-mail, person-to-person communication and arranged meetings. The consultation team has found that having all parties present at meetings greatly facilitates interagency coordination and assures mutual understanding of issues and determinations. Therefore, CMAP relies heavily upon scheduled consultation meetings with federal agency representatives and other members of the consultation team.

Conformity consultation responsibility for FHWA and FTA has evolved since the creation of the Chicago metropolitan office of USDOT in January of 1997. The term "consultation team" describes the consultation group comprised of representatives of USDOT, US EPA, IEPA, IDOT, RTA and CMAP. In addition to the standing members of the consultation team, representatives of local transportation implementing agencies and other stakeholders are invited to attend as needed.

The consultation process in northeastern Illinois consists of two levels, or "tiers". Tier 1 participants include federal representatives from headquarters offices in Washington, D.C. Tier 2 participants include federal representatives from US EPA's Region V office and USDOT representatives from the Chicago Metro Office, IEPA, IDOT, RTA and CMAP. The Tier 1 consultation team is convened in the event the Tier 2 team is unable to resolve a particular issue.

The consultation process used during the development of *GO TO 2040* and the *FFY 10–15 TIP* and this conformity analysis consisted solely of Tier 2 meetings.

The consultation team meets at the CMAP office on an as-needed basis. Every attempt is made to schedule meetings so that all representatives can attend, but the meetings are held whether or not all members are present. No decision is put into effect until the concurrence of all parties involved in the consultation process is achieved.

To provide a reference for discussion items and issue resolution, CMAP staff prepares meeting summaries following the completion of each scheduled consultation meeting. These summaries are reviewed for accuracy and approved by the consultation team at a subsequent meeting. Following resolution of an issue, staff typically provides a verbal update to pertinent CMAP committees to assist committee members in their decision-making processes.

### **3.2 Summary of Formal Consultation Meetings**

Minutes of consultation meetings are available on the CMAP web site, [http://www.cmap.illinois.gov/tier\\_2/default.aspx](http://www.cmap.illinois.gov/tier_2/default.aspx).



## 4.0 PUBLIC PARTICIPATION

### 4.1 Public Participation Process Overview

Federal legislation and the metropolitan transportation planning regulations require MPOs to have an enhanced public participation process. Citizen interest in transportation planning has continued to grow as CMAP has taken actions to increase public awareness of the transportation decision-making process.

CMAP uses a variety of methods to achieve greater public participation. Among these are extensive use of all types of media to explain the planning process, face-to-face meetings with citizens' groups, and easy-to-understand publications that are distributed via mail, email and on the CMAP web site. The underlying premise of the public participation process is that more citizens will participate in the planning process if they understand the factors that influence transportation decisions.

The [\*Public Participation Plan\*](#), adopted by the CMAP Board in June, 2007 and the MPO Policy Committee in June, 2007, establishes the mechanisms by which CMAP reaches out to its many stakeholders and the public.

The CMAP web site, [www.cmap.illinois.gov](http://www.cmap.illinois.gov), includes a range of information about CMAP, its planning partners, MPO activities and opportunities for citizens to learn and participate in transportation decisions. Meetings of all CMAP committees, task forces and other groups, as well as notes from past meetings are regularly posted on the site. The Web site also includes links to many other transportation resources. The *GO TO 2040* materials and the *TIP* are accessible through the site. A Spanish version of the Web site is also available.

Additionally, all implementing agencies have citizen participation mechanisms that allow public input throughout the transportation planning process.

### 4.2 Special Outreach Efforts for *GO TO 2040*

In addition to traditional outreach efforts, *GO TO 2040* has incorporated numerous extensive and innovative efforts to involve the public, including

- special visioning tools to allow members of the public to see the impacts of their choices
- hand-held voting tools to allow groups to quickly come to consensus on issues of importance to them
- online tools and kiosks to reach individuals at their convenience.

These efforts are documented at the [GO TO 2040 public participation web page](#).

### 4.3 Specific Outreach Efforts for the *Transportation Conformity Analysis for the PM<sub>2.5</sub> and 8-Hour Ozone National Ambient Air Quality Standards for GO TO 2040 and FFY 2010–2015 TIP*

A formal public comment period for the draft *Transportation Conformity Analysis for the PM<sub>2.5</sub> and 8-Hour Ozone National Ambient Air Quality Standards* was held from June 11 to August 6, 2010. Comments were accepted via fax, the U.S. Mail and via email.

To notify the public of the comment period an advertisement was placed in the *Chicago Tribune*. In addition, CMAP's extensive email list received a blast, and notices were sent through the Executive Director's weekly email, CMAP's Twitter account, and posted on its Facebook page.

[Public meetings](#) were held at different locations across the region, at which time comments were made in person.

### 4.4 Public Comments

Two comments were received during the public comment period:

- "In Section 3.1 Consultation Process, I think the discussion of the Tier 2 participants should include the state and local partners and not just the federal representatives. Thus the sentence could read 'Tier 2 participants include federal representatives from US EPA's Region V office and USDOT representatives from the Chicago Metro Office and the IEPA, IDOT, RTA and CMAP.'"

The suggested language was added to the section.

- "Although not required to be included since the proposed budgets have not been finalized or determined adequate, the plan could acknowledge under Section 10.2 PM<sub>2.5</sub> Conformity Results, that the Illinois EPA is in the process of finalizing a Maintenance Plan for the PM<sub>2.5</sub> NAAQS which includes motor vehicle emissions budgets for the direct PM<sub>2.5</sub> and NO<sub>x</sub> emissions for the years 2008 and 2025. The proposed budget numbers, listed below could also be included in a matrix similar to Table 5 along with the Table 5 plan year emissions estimates. A conclusion could then be included that the GOTO 2040 Plan meets not only the motor vehicle emissions estimates currently in force, but the more stringent levels in the draft Chicago PM<sub>2.5</sub> Maintenance Plan State Implementation Plan (SIP) currently proposed. I think that the incorporation of this more up-to-date recent air quality planning information would be advantageous since the SIP will likely be finalized and submitted to the US EPA by the time the MPO Policy Board acts to adopt the GO TO 2040 plan and the current PM<sub>2.5</sub> conformity test figures, albeit legal, are 8 years old."

This issue was discussed at the Tier 2 consultation meeting on August 19, 2010. Although the draft budgets have not been included in Section 10 at the advice of the

consultation team, some discussion was added addressing the pending SIP submission and the region's expectation of being able to meet the draft budgets.

## 5.0 PROCEDURES FOR DETERMINING REGIONAL TRANSPORTATION DEMAND

The procedures for determining regional transportation demand are subject to requirements set out in the conformity regulations, at 40 CFR 93.122(b).

The report, [Travel Model Documentation](#), documents the modeling process used for this conformity analysis. This material demonstrates the inherent behavioral connections between regional land use, demographics and transportation infrastructure and policy input to the quantification of travel demand levels and patterns and the subsequent measurement of transportation system performance, which the models contain.

The following is a description of how CMAP’s demand model meets the specific criteria from the regulations:

<u>Paragraph</u>	<u>Requirement</u>	<u>How the Requirement is Satisfied</u>
(b) (1) (i)	Network-based travel models must be validated against observed counts (peak and off-peak, if possible) for a base year that is not more than 10 years prior to the date of the conformity determination. Model forecasts must be analyzed for reasonableness and compared to historical trends and other factors, and the results must be documented.	The models were validated against the most recent ground counts as documented in the <a href="#">Travel Model Documentation</a>
(b) (1) (ii)	Land use, population, employment, and other network-based travel model assumptions must be documented and based on the best available information.	The socioeconomic forecasts used are based on the best available information including census data and a sound methodology as documented in the <i>GO TO 2040</i> documentation.
(b) (1) (iii)	Scenarios of land development and use must be consistent with the future transportation system alternatives for which emissions are being estimated. The distribution of employment and residences for different transportation options must be reasonable.	The analysis uses forecasts of population, employment and land use developed by CMAP. The transportation simulation model has been structured with a feedback mechanism. Analysis and scenario testing were performed on land use/transportation interactions during the development of <i>GO TO 2040</i> .
(b) (1) (iv)	A capacity-sensitive assignment methodology must be used, and emissions estimates must be based on a methodology which differentiates between peak and off-peak link volumes and speeds and uses speeds based on final assigned volumes.	Separate capacity restraint assignments are produced to estimate vehicle miles and travel speeds for eight time periods during the day. Results of the separate period assignments are accumulated into daily volumes and tabulated by vehicle mile by speed range as required for the emission calculations.
(b) (1) (v)	Zone-to-zone travel impedances used to distribute trips between origin and destination pairs must be in reasonable agreement with the travel times that are	The modeling process includes three iterations through the steps of distribution, mode split and assignment. The final highway distribution and assignment is based on the times from the third

	estimated from final assigned traffic volumes. Where use of transit currently is anticipated to be a significant factor in satisfying transportation demand, these times should also be used for modeling mode splits.	iteration. In the iteration process, the highway and transit times for each step are the same for distribution, mode split and assignment.
(b) (1) (vi)	Network-based travel models must be reasonably sensitive to changes in the time(s), cost(s), and other factors affecting travel choices.	The binary logit mode-choice model contains the full range of pricing (or cost) variables in the individual utility equation expressions for both auto and transit. These cost variables include destination zone parking cost, rail station parking cost, automobile operating cost (cents per mile), tolls, and transit fare. The intervening opportunities trip distribution model utilizes a composite impedance measure, also known as the LogSum variable as a measure of zonal accessibility. The LogSum variable includes travel time and cost associated with both highway and transit travel. In addition the transit path selection uses the transit fares as one of the key parameters in selecting the transit path. The use of transit fares in path building is very important in a region that has transit options including commuter rail, rapid transit, express bus and local bus.

### 5.1 Travel Demand for Ozone Conformity

Since the ozone NAAQS is based on daily measurements, the VMT estimates for conformity analysis are daily values. Furthermore, since the highest ozone concentrations are monitored during the summer, the VMT estimates are adjusted to be daily VMT for a summer weekday. The travel demand model runs produce weekday averages over the year, so the VMT results of the model runs are adjusted by increasing the model averages to summer weekday averages, based on analysis of traffic monitoring data by IDOT. The adjusted VMT values are then applied to the emission rates produced by the MOBILE model runs. The adjustment factors are:

Facility	Multiplier
arterial	1.0700
expressway	0.9969
local	1.0700
ramp	1.0700

**Table 1: Daily ADT conversion factors**

## 5.2 Travel Demand for PM<sub>2.5</sub> Conformity

In contrast to ozone, the annual PM<sub>2.5</sub> NAAQS to which the northeastern Illinois region must demonstrate conformity is based on annual measurements, so the VMT estimates must be annual values. To convert weekday average VMT model output to monthly VMT, traffic monitoring data were obtained from IDOT. The data give the ratio of average weekday traffic to weekly traffic. In addition, the IDOT data supply the ratio of each month to annual traffic. To obtain monthly VMT estimates, the weekday to average (7-day) factor is multiplied by the month-to-year ratio. The following table gives the monthly ADT factors:

<b>Month</b>	<b>Freeway Monthly ADT (% of AADT)</b>	<b>Non-Freeway Monthly ADT (% of AADT)</b>
January	87%	86%
February	95%	87%
March	96%	89%
April	97%	96%
May	96%	99%
June	98%	101%
July	95%	95%
August	98%	97%
September	95%	97%
October	94%	95%
November	94%	94%
December	90%	95%

**Table 2: Monthly ADT conversion factors**

## 6.0 LATEST PLANNING ASSUMPTIONS

### 6.1 Socioeconomic Forecasts

A major input to any transportation demand modeling process is the socioeconomic data used to develop the number and types of trips to be assigned to the transportation system. There are three components to this data: the geographic or spatial component; the socioeconomic variables used to describe or characterize these areas; and the base and forecast years which define the time horizons for the analysis.

CMAP has systematically forecast 2040 population, employment and economic activity from the land use and transportation strategies found in the *GO TO 2040* Preferred Scenario. The CMAP travel demand models are then used to estimate travel behavior, congestion and emissions resulting from these forecasts. Population and employment estimates for interim conformity years are interpolated and tested against transportation improvements expected to be implemented at the time. A description of the method used to prepare the forecasts and data summaries are included as the [Socioeconomic Validation and Forecasting Primer](#).

### 6.2 Transit Operating Policies

The [Regional Transportation Authority Operating Budget, Financial Plan and Capital Programs](#), which are updated annually, serve as the basis for considering the impact of transit operating policies on travel demand model estimates. These documents include projections over the near term of key transit operating policies including fare, service and ridership levels.

Since the most recent conformity determination was adopted, in March 2010, transit operating policies (including fares and service levels) and assumed transit ridership have not changed.

### 6.3 Transit Fares and Highway Costs in the Conformity Analysis

The transportation model used in the conformity analysis requires information on the cost of transportation by each mode. Of particular importance are the relative costs of transportation versus all other costs, and the relative costs of the transit and auto modes to each other. Auto costs used in the model are based on the cost to own and operate an automobile, parking costs and charges for tollway facilities. Transit costs include information on the base fares, transfers and access costs.

It was assumed the relative costs of the two transportation modes (highway and transit) would be the same in the future years as that which existed in the base year. This treatment of future costs for the transit mode and for the bridge and road toll component of the auto operating cost is consistent with observed trends.

## **6.4 Transportation Control Measures**

Transportation control measures were used in development of SIPs related to the 1-hour ozone standard, including the 15% ROP SIP (1993), Control Strategy SIP (1995), 1996 ROP SIP, 9% Control Strategy SIP (1998) and 9% ROP Control Strategy SIP (1999). All the TCMs adopted for these SIPs were implemented by 1999.

The ozone maintenance SIP submission, which has the budgets found adequate for conformity, assumes no transportation control measures. Thus no such measures are identified here.



## 7.0 EMISSION BUDGETS AND MOBILE MODEL SETTINGS

### 7.1 Ozone Conformity

Mobile source emissions budgets for ozone precursors – VOC and NO<sub>x</sub> – were developed by IEPA as part of the 8-hour ozone maintenance SIP. These budgets were found adequate effective May 26, 2010 (75 FR 26225).

IEPA and CMAP worked closely during the development of the VOC and NO<sub>x</sub> emission budgets to determine the appropriate MOBILE model settings. This conformity demonstration uses the same applicable settings in MOBILE runs as were used in developing the SIP budgets. A full discussion of the settings and input files is provided in the [Travel Model Documentation](#).

### 7.2 PM<sub>2.5</sub> Conformity

Since a SIP has not been developed for the annual PM<sub>2.5</sub> standard, the interim process for demonstrating conformity to the standard is a baseline test, in which the emissions in the analysis years are compared to a baseline year – 2002 in this case. The use of this test was decided through the consultation process.

IEPA developed the 2002 emissions inventory, using MOBILE settings appropriate to reflect the conditions during the baseline year. This conformity analysis uses the same applicable settings in the MOBILE runs.

The northeastern Illinois region is in nonattainment of the annual PM<sub>2.5</sub> standard, so the emissions inventory must reflect annual emissions totals. To accomplish this, an emission rate appropriate to each month was developed, and the rate was multiplied by VMT for the month. Monthly emissions were then added to obtain the annual emissions.

For direct PM<sub>2.5</sub> emissions, the emission rates are not sensitive to temperature, humidity, or inspection/maintenance programs. Following the practice used by IEPA and outlined in section 2.2.2 of *Technical Guidance on the Use of MOBILE6.2 for Emission Inventory Preparation*, the calendar year and month were set to obtain the closest possible fleet composition. Thus, January through March 2016 used the year 2016 and month 1; April – September 2016 used the year 2016 and the month 7; and October – December 2016 used the year 2017 and the month 1. Similar settings were used for the other analysis years, so that each year's emission rates were developed using three MOBILE runs.

For NO<sub>x</sub> emissions, the emission rates are sensitive to temperature, humidity, and inspection/maintenance programs. Thus, each year's emission rates were developed using 24 MOBILE runs – one for each month for vehicles subject to I/M, and one for each month for vehicles not subject to I/M.

A more complete description of the MOBILE runs and full listings for these runs are given in the [Travel Model Documentation](#)

## **8.0 OFF-NETWORK CALCULATIONS**

Although the four-step modeling process is continually being improved in terms of the capability to estimate the effects of non-traditional transportation improvements, there is still the need to examine projects whose impacts are outside the transportation demand estimation modeling process. For example, signal interconnect projects for the FY 96-00 TIP conformity analysis were evaluated using off-network techniques. However, their effects were included within the models when the FY 01-06 TIP was subjected to a conformity analysis. Types of project that may be evaluated using off-network methods include bicycle and pedestrian projects, expansion of vanpool programs and isolated intersection improvements.

Although the final estimate of regional emissions does not include credit for off-network calculations, the identification and understanding of these projects is necessary to complete the picture of surface transportation's impact on air quality.

### **8.1 Project Evaluation Methods**

Many of the projects that are not currently incorporated explicitly in the travel demand model have been programmed using CMAQ funds. These funds are programmed by CMAP on the basis of the project's demonstrated air quality benefits. A benefit evaluation method has been developed for each type of project. The methods are structured so that, if appropriate, a project's benefits can be incorporated in the appropriate SIP by the IEPA as a TCM, or used in conformity determinations. A few methods of major project types are discussed below.

#### **8.1.1 Bicycle and Pedestrian Projects**

Bicycle and pedestrian projects are evaluated using a method that examines the population and employment of the corridor in which the proposed facility is located. Using relationships developed from Census data, bike usage for work trips is estimated for the facility. An estimate of non-work trips diverted from single occupant vehicles is also generated using rates developed from the CATS 1990 Home Interview Survey. Using appropriate city/suburban trip lengths and VOC and NO<sub>x</sub> emission rates, estimates of the reductions are calculated.

#### **8.1.2 Intersection Improvements**

Intersection improvement projects are evaluated by modeling the intersection under build and no-build scenarios using traffic engineering simulation software. The simulations estimate average speed on the facility using the current ADT. VOC and NO<sub>x</sub> emission rates are calculated for the northeastern Illinois fleet at a range of possible speeds using the MOBILE model. Using the build and no-build speeds along with the length of the facility and the emission rates, VOC and NO<sub>x</sub> emissions are then calculated for each scenario. The difference between the two estimates is attributed to the improvement. With these projects the estimate of the speed improvement is gradually lowered so that the facility operates at the pre-improvement speed at the end of the project's life.

## 8.2 Benefit Summary

The focus of the CMAQ program in northeastern Illinois has been to identify, select and program projects that will have the greatest benefit in terms of improving air quality in the region. The project selection method examines the criteria of cost per ton of emission reductions, and trips or vehicle miles of travel eliminated.

CMAQ has an innovative demonstration program. The Committee has solicited and programmed non-traditional transportation projects that have the potential for providing significant reductions in vehicular emissions. Each project is being monitored closely with the anticipation that future investments of that type will be made if the project is successful.

Another important facet of the CMAQ program is that CMAQ fund recipients are required to certify that their project can be included as a TCM in an appropriate SIP. This action enhances the probability that the CMAQ program will indeed produce the anticipated results. The potential designation of CMAQ-funded projects as TCMs further supports the region's commitment to air quality objectives and evidence that these projects have emission reduction benefits.

Table 6 indicates the approximate level of VOC emission reductions from off-network projects that may have been expected since the beginning of the CMAQ program. Benefits from these projects or other projects not represented within the traditional network-based conformity analysis are not included in the final budget test.

Year	Daily VOC Reduction (kg)
1992	451.13
1993	1,141.24
1994	40,310.57*
1995	6,901.73
1996	894.69
1997	1,471.55
1998	107.68
1999	3,430.24
2000	2,879.05
2001	725.40
2002	567.01
2003	536.23
2004	3,351.42*
2005	25,540.96*
2006	2,584.08*
2007	719.64
2008	701.82
2009	221.10
2010	780.10

**Table 3: CMAQ Program VOC Emission Reductions**

\*Includes benefits from IEPA's Inspection & Maintenance Program.

## 9.0 MODELED PROJECTS

Projects included in *GO TO 2040* and the *FFY 2010 – 2015 TIP* transportation demand estimation modeling process are listed on the CMAP web site. Major capital projects included in *GO TO 2040* are discussed in detail in the [chapter on these projects](#) in the *GO TO 2040* write-up; TIP projects are listed on the CMAP [TIP web page](#).

## 10. RESULTS OF THE CONFORMITY ANALYSIS

### 10.1 Ozone Conformity Results

The VOC and NO<sub>x</sub> emissions estimates for each of the scenario years are shown in Table 4. Credits for projects that have air quality benefits but are not represented within the transportation networks are not included.

Emission reductions from the National Energy Policy Act Credit and Clean Fuel Fleet Program have not been claimed.

As shown in the table, the emission results from the conformity analysis for the analysis years show that the VOC and NO<sub>x</sub> emissions are lower than the applicable SIP budgets, and conformity for the 8-hour ozone standard is demonstrated.

Year	Volatile Organic Compounds		Nitrogen Oxides	
	Emissions	SIP Budget	Emissions	SIP Budget
2016	68.03	133.78	113.55	284.65
2020	58.50	73.68	76.78	88.17
2030	57.89	73.68	52.00	88.17
2040	62.12	73.68	52.09	88.17

**Table 4: VOC and NO<sub>x</sub> Emissions in Tons per Summer Day for Ozone Conformity**

### 10.2 PM<sub>2.5</sub> Conformity Results

The direct PM<sub>2.5</sub> and NO<sub>x</sub> emissions estimates for each of the scenario years are shown in Table 5. Credits for projects that have air quality benefits but are not represented within the transportation networks are not included.

The emission results from the conformity analysis for the analysis years show that the direct PM<sub>2.5</sub> and NO<sub>x</sub> emissions from motor vehicles are lower than the 2002 emissions, and conformity for the annual PM<sub>2.5</sub> standard is demonstrated.

IEPA is in the process of finalizing a Maintenance Plan for the PM<sub>2.5</sub> NAAQS which includes motor vehicle emissions budgets for the direct PM<sub>2.5</sub> and NO<sub>x</sub> emissions for the years 2008 and 2025. Although these draft budgets have not been formally submitted to US EPA and hence have not been found adequate, CMAP staff has conducted preliminary analyses that indicate the region will be able to conform to the budgets when they are found adequate.

Year	Northeastern Illinois		Northwestern Indiana		Nonattainment area total	
	Direct PM <sub>2.5</sub>	NOx	Direct PM <sub>2.5</sub>	NOx	Direct PM <sub>2.5</sub>	NOx
2002	3,070.78	167,630.81	562.64	30,397.97	3,633.42	198,028.78
2016	1,110.19	42,230.54	158.90	8,442.66	1,269.09	50,673.20
2020	1,008.72	28,841.04	114.32	3,004.68	1,123.04	31,845.72
2030	990.33	20,093.84	116.46	2,065.23	1,106.79	22,159.07
2040	1,029.20	20,257.31	129.31	2,195.38	1,158.51	22,452.69

**Table 5: Direct PM<sub>2.5</sub> and NOx Emissions in Tons per Year for PM<sub>2.5</sub> Conformity**

### 10.3 Conclusion

The conformity analysis conducted by CMAP concludes that *GO TO 2040* and the *FFY 10-15 TIP* meet all applicable requirements for conformity for the 8-hour ozone standard and the annual PM<sub>2.5</sub> standard; *GO TO 2040* and the *FFY 10-15 TIP* are recommended for approval by USDOT.

Prior to development of separate PM<sub>2.5</sub> SIP budgets for northeastern Illinois and northwestern Indiana, federal agencies are anticipated to combine the conformity analysis results for the two regions into a joint analysis result for the entire nonattainment area. The conclusions of this analysis, that *GO TO 2040* and the *FFY 10-15 TIP* meet all applicable requirements for conformity for the 8-hour ozone standard and the annual PM<sub>2.5</sub> standard, are unaffected by this combination.

The *Transportation Conformity Analysis for the PM<sub>2.5</sub> and 8-Hour Ozone National Ambient Air Quality Standards* was the subject of a public comment period running from June 11 through August 6, 2010. This report and the accompanying appendices make the determination that the region’s transportation plan and program satisfy all applicable criteria and procedures in the conformity regulations and comply with all applicable implementation plan conformity requirements.









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