

Charting Progress to 2040 Amendment Two

AIR QUALITY CONFORMITY DETERMINATION MASSACHUSETTS DEPARTMENT OF TRANSPORTATION AND THE METROPOLITAN PLANNING ORGANIZATIONS JULY 2018

INTRODUCTION

This report documents the air quality conformity determination for the Massachusetts metropolitan planning organizations' 2016 regional transportation plans (RTPs) for the 1997 ozone National Ambient Air Quality Standards (NAAQS). It consists of the analysis of future vehicle emissions of ozone precursor pollutants.

STATEWIDE OZONE PRECURSOR ANALYSIS

Legislative Background on Ozone

The 1970 Clean Air Act defined a one-hour national ambient air quality standard (NAAQS) for ground-level ozone. The 1990 Clean Air Act Amendments further classified degrees of nonattainment of the one-hour standard based on the severity of monitored levels of the pollutant. The entire Commonwealth of Massachusetts was classified as being in serious nonattainment for the one-hour ozone standard, with a required attainment date of 1999; this was later extended first to 2003, then to 2007.

In 1997, the U.S. Environmental Protection Agency (EPA) proposed a new, eight-hour ozone NAAQS to replace the one-hour standard, effective June 15, 2005. The new standard was challenged in court, and after a lengthy legal battle, the court upheld the standard, which was finalized in June 2004. The eight-hour standard was 0.08 parts per million (ppm), averaged over eight hours and not to be exceeded more than once per year. Nonattainment areas were classified further based on the severity of eight-hour values. Massachusetts as a whole was classified as being in moderate nonattainment for the eight-hour standard, but it was separated into two nonattainment areas—Eastern Massachusetts and Western Massachusetts. Both nonattainment areas were required to reduce their emissions of volatile organic compounds (VOC) and nitrogen oxides (NO_x) to achieve attainment of the eight-hour ozone NAAQS by 2009.

In March 2008, the EPA published revisions to the eight-hour ozone NAAQS that established a level of 0.075 ppm (March 27, 2008; 73 FR 16483). After reviewing data from Massachusetts monitoring stations, the EPA sent a letter on December 16, 2011,

proposing that only Dukes County would be designated as being in nonattainment for the new proposed 0.075 ozone standard. Massachusetts concurred with these findings.

On May 21, 2012, the final rule (77 FR 30088) was published in the Federal Register, defining the 2008 NAAQS at 0.075 ppm, the standard that was promulgated in March 2008. A second rule (77 FR 30160), published on May 21, 2012, revoked the 1997 ozone NAAQS; the rule was to become effective one year after the 2008 NAAQS became effective (July 20, 2012). Also on May 21, 2012, the air quality designation areas for the 2008 NAAQS were published in the Federal Register. In this Federal Register, the only area in Massachusetts that was designated as being in nonattainment for ozone was Dukes County. All other counties were classified as unclassifiable/attainment. Therefore, the 13 Metropolitan Planning Organizations (MPOs) were not required to perform a conformity determination for ozone for their RTPs.

All of the Massachusetts MPOs and the Massachusetts Department of Transportation (MassDOT) continue to meet the requirements of air quality conformity according to the Code of Federal Regulations, and as evaluated through inter-agency consultation. Specifically, on March 6, 2015, (80 FR 12264, effective April 6, 2015) the EPA published the Final Rulemaking, "Implementation of the 2008 National Ambient Air Quality Standards (NAAQS) for Ozone: State Implementation Plan Requirements; Final Rule." This rulemaking removed transportation conformity to the 1997 Ozone NAAQS (the standard the subject of a December 23, 2014, DC Circuit Court decision). Link to Final EPA Rulemaking: <http://www.gpo.gov/fdsys/pkg/FR-2015-03-06/pdf/2015-04012.pdf>

Since the current RTPs adopted by the MPOs in August 2015 were developed, reviewed, and approved after April 6, 2015, air quality conformity determinations to the 1997 Ozone NAAQS was no longer required, as those standards and all associated area designations were permanently replaced by the 2008 NAAQS, which (with actually a stricter level of allowable ozone concentration than the 1997 standards) no longer designate Massachusetts as a nonattainment area(s) for ozone except for Dukes County as discussed above.

Since the adoption of the current RTPs in 2015, new guidance has been released by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) regarding transportation conformity requirements. The United States Court of Appeals for the DC Circuit issued a decision in the *South Coast Air Quality Management District v. EPA*, No. 15-1115 in February 2018, which struck down portions of the *2008 Ozone NAAQS SIP Requirements Rule* concerning the ozone NAAQS.

The portions of the *2008 Ozone NAAQS SIP Requirements Rule* addressed implementation requirements of the 2008 ozone NAAQS as well as the anti-backsliding requirements (ensuring that areas do not revert back to nonattainment) associated with

the revocation of the 1997 ozone NAAQS. The impact of the decision addresses two groups of ozone areas described in the decision, one of which affects Massachusetts. It affects areas that were designated as nonattainment for the 1997 ozone NAAQS at the time of revocation and are designated as attainment for the 2008 ozone NAAQS. These areas have not been required to make transportation conformity determinations for any ozone NAAQS since the 1997 ozone NAAQS were revoked by EPA in April 2016.

With this new court ruling, Massachusetts is required to perform a transportation conformity determination on any new RTP and transportation improvement program (TIP), updates, and amendments that include the addition of a project that is not exempt (also known as a regionally significant project) from transportation conformity.

In past transportation conformity determinations, it has been the policy that the TIP comes from an air quality conforming RTP. As a result of this recent court ruling and with the guidance of the FHWA and FTA, the MPOs are now required to perform a conformity determination for ozone since a conformity determination was not performed for the current RTP. MassDOT, after consultation with FHWA, FTA, EPA, and the Massachusetts Department of Environmental Protection (DEP), has determined that the MPOs would perform a conformity determination on the current RTPs, allowing each TIP to come from an air quality conforming RTP. This will allow for the approval of each MPO's 2019–2023 TIP and any other TIP amendments that may occur over the next year, prior to the adoption of the new RTPs in May 2019.

Legislative Background on Carbon Monoxide

Although this document reports on statewide ozone precursor emissions, reporting on another criteria pollutant, carbon monoxide (CO) is still federally required for some MPOs in Massachusetts. The cities of Boston, Cambridge, Chelsea, Everett, Malden, Medford, Quincy, Revere, and Somerville within the Boston Region MPO were classified as being in attainment for CO emissions with a carbon monoxide maintenance plan approved as part of the State Implementation Plan (SIP). A conformity analysis for carbon monoxide was done as part of the current RTP in 2015. However as of April 1, 2016, the 20-year maintenance period for this carbon monoxide maintenance area expired and transportation conformity is no longer required for this pollutant in these communities. This ruling is documented in a letter from the EPA dated May 12, 2016.

The Lowell, Waltham, Worcester and Springfield carbon monoxide areas are classified as attainment with a limited maintenance plan in place. No regional air quality analysis is required in limited maintenance plan areas as emissions may be treated as essentially not constraining for the length of the maintenance period because it is unreasonable to expect that such areas will experience so much growth in that period that a violation of the carbon monoxide NAAQS would result. Therefore, in areas with approved limited maintenance plans, Federal actions requiring conformity

determinations under the transportation conformity rule are considered to satisfy the “budget test.” All other transportation conformity requirements under 40 CFR 93.109(b) continue to apply in limited maintenance areas, including project-level conformity determinations based on carbon monoxide hot spot analyses under 40 CFR 93.116. The latest conformity determinations for Lowell, Waltham, Worcester and Springfield may be found in the respective MPO’s 2019–2023 TIPs.

AIR QUALITY ANALYSIS CRITERIA

The air quality analysis was prepared using the following criteria:

- The horizon years for the travel-demand model analysis are established as 2012 (base year), 2020, 2030, and 2040.
- Projections for future population, employment, and households were developed jointly by MassDOT, the Metropolitan Area Planning Council, and the Donahue Institute of the University of Massachusetts. This was a cooperative and iterative process conducted throughout 2014 and into 2015, with input and comments from each MPO in the Commonwealth.
- Demographic projections were incorporated into the statewide travel demand model, along with updated travel characteristics, obtained through the 2010–2011 Massachusetts Travel Survey and the U.S. Census.
- The transit service assumptions for the MBTA were included in this analysis and were based on MBTA service in the spring of 2012. Travel-demand model calibration was performed using the Ridership and Service Statistics, MBTA Blue Book.
- Factors used for calculating emissions changes were determined using the EPA’s latest emissions model, Motor Vehicle Emissions Simulator (MOVES) 2014. Inputs used for 2012 through 2040 were received from the DEP and include information about programs that were submitted to the EPA as the strategy for the Commonwealth to attain ambient air quality standards.
- The Federal Highway Administration’s Highway Performance Monitoring System (HPMS) is used to track daily vehicle-miles of travel (VMT). For each MPO region, adjustment factors that compare the 2012 HPMS VMT to the 2012 base year VMT estimated by the travel demand models transportation model VMT were developed. The adjustment factors were then applied to all modeled VOC and NOx emissions for the years 2020 through 2040 to ensure consistency with EPA-accepted procedures.

INCLUSION OF REGIONALLY SIGNIFICANT TRANSPORTATION PROJECTS

Only “regionally significant” projects are included in the travel-demand modeling. Regionally significant projects are defined as follows:

A transportation project (other than an exempt project) that is on a facility that serves regional transportation needs (such as access to and from the area outside of the MPO

region; major activity centers in the region; major planned developments, such as new retail malls and sport complexes; and transportation terminals (as well as most terminals themselves) and would be included in the modeling of a metropolitan area's transportation network, including at a minimum all principal arterial highways and all fixed-guideway transit facilities that offer an alternative to regional highway travel.

The following table lists the regionally significant projects proposed in the RTPs:

Regionally Significant Projects Included in the Travel-Demand Model, 2020–2040

Analysis Year	Community	Project Description
2020	Bedford and Billerica	Middlesex Turnpike improvements, from Crosby Drive North to Manning Road, Phase 3
2020	Newton and Needham	Reconstruction of Highland Avenue, Needham Street and Charles River Bridge, from Webster Street to Route 9
2020	Weymouth and Abington	Reconstruction and widening on Route 18 (Main Street) from Highland Place to Route 139
2020	Woburn	Reconstruction of Montvale Avenue, from I-93 Interchange to Central Street
2020	Woburn	Bridge replacement, New Boston Street over MBTA
2030	Boston	Reconstruction of Rutherford Avenue, from City Square to Sullivan Square
2030	Framingham	Intersection improvements at Route 126 and Route 135/MBTA and CSX Railroad
2030	Lexington	Route 4/225 (Bedford Street) and Hartwell Avenue
2030	Natick	Bridge replacement, Route 27 (North Main St.) over Route 9 (Worcester St.) and interchange improvements
2030	Somerville	McGrath Boulevard project
2040	Barnstable	Hyannis Access improvements
2030	Westborough	Route 9 improvements
2030	Oxford	Route 20 capacity improvement
2030	Millbury	Turnpike/Route 146 intersection improvement
2030	Worcester	I-290 bridge expansion
2030	North Andover	Route 114 reconstruction
2030	Athol	Route 2 Interchange at South Athol Road
2040	Philipston to Athol	Route 2 expansion
2040	Westford	Route 110 widening
2040	Tewksbury, Andover	Lowell Junction Interchange
2020	Wilbraham	Boston Road reconstruction
2020	Hadley	Route 9 Phase 1
2030	Hadley	Route 9 Phase 2
2030	Hadley	Route 9 Phase 3
2030	Middleborough	Routes 44/28/18 Rotary
2040	Taunton	Routes 24 and 140 improvements
2040	Fall River	Route 79 Boulevard

Emissions Inventory Assumptions

This air quality analysis was conducted relative to the SIP mobile-source ozone emission projections that were approved in March 2008 for the revoked 1997 eight-hour NAAQS for VOC and NO_x. The VOC mobile-source emission budget for 2009 for the Eastern Massachusetts Ozone Nonattainment Area was set at 63.50 tons per summer day and at 10.73 tons per summer day for the Western Massachusetts Ozone Nonattainment Area. The NO_x mobile-source emission budget for 2009 for the Eastern Massachusetts Ozone Nonattainment Area was set at 174.96 tons per summer day and at 27.73 tons per summer day for the Western Massachusetts Ozone Nonattainment Area.

The Massachusetts Department of Transportation, Office of Transportation Planning (MassDOT's Office of Transportation Planning) estimated the results for the Eastern and Western Massachusetts Ozone Nonattainment Areas using the statewide travel-demand model set, based on the latest planning assumptions (as outlined in this document).

Ozone Analysis Results

MassDOT's Office of Transportation Planning conducted an air quality conformity analysis for the Commonwealth's 13 MPO's 2016 RTPs. The purpose of the conformity test is to show consistency with the emissions budgets set forth in the SIP. Additional specific information regarding the analysis and modeling methods, latest planning assumptions, and consultation procedures are detailed in each MPO's 2016 RTP (and appendices).

The test used in this analysis was to show that the RTPs are consistent with the emission budgets set for the revoked 1997 eight-hour ozone NAAQS as described above. The results are shown in the tables below. They include emissions from regionally significant projects as represented in the statewide travel-demand model and off-model emissions from commuter rail, commuter boat, and buses:

The emissions from the following MPOs have been combined to show conformity with the SIP for the Eastern Massachusetts Ozone Nonattainment Area:

- Cape Cod MPO
- Central Massachusetts MPO
- Merrimack Valley MPO
- Boston Region MPO
- Montachusett Region MPO
- Northern Middlesex MPO
- Old Colony MPO

- Southeastern Region MPO
- Martha's Vineyard Commission*
- Nantucket Planning and Economic Development Commission*

*These regions do not contain any official urbanized areas, but are considered to be MPOs for planning purposes.

**VOC Emissions Estimates,
Eastern Massachusetts Ozone Nonattainment Area
(Emissions in TPSD)**

Year	VOC Action Emissions	VOC Budget	Difference (Action–Budget)
2012	30.56	N/A	N/A
2020	6.68	63.50	(56.82)
2030	5.68	63.50	(57.82)
2040	4.69	63.50	(58.81)

N/A = Not applicable. TPSD = Tons per summer day. VOC = Volatile organic compounds.

**NOx Emissions Estimates,
Eastern Massachusetts Ozone Nonattainment Area
(Emissions in TPSD)**

Year	NOx Action Emissions	NOx Budget	Difference (Action–Budget)
2012	116.97	N/A	N/A
2020	27.24	174.96	(147.72)
2030	20.63	174.96	(154.33)
2040	14.02	174.96	(160.94)

N/A = Not applicable. NOx = Volatile organic compounds. TPSD = Tons per summer day.

The emissions from the following MPOs have been combined to show conformity with the SIP for the Western Massachusetts Nonattainment Area:

- Berkshire Region MPO
- Franklin Regional Council of Governments*
- Pioneer Valley MPO

*This region does not contain any official urbanized areas, but is considered to be an MPO for planning purposes.

**VOC Emissions Estimates—Western Massachusetts
Ozone Nonattainment Area, 2012–2040
(Emissions in TPSD)**

Year	VOC Action Emissions	VOC Budget	Difference (Action–Budget)
2012	3.61	N/A	N/A
2020	1.08	10.73	(9.65)
2030	1.02	10.73	(9.71)
2040	0.96	10.73	(9.77)

N/A = Not applicable. TPSD = Tons per summer day. VOC = Volatile organic compounds.

**NOx Emissions Estimates—Western Massachusetts
Ozone Nonattainment Area, 2012–2040
(Emissions in TPSD)**

Year	NOx Action Emissions	NOx Budget	Difference (Action–Budget)
2012	13.10	N/A	N/A
2020	5.03	27.73	(22.70)
2030	3.97	27.73	(23.76)
2040	2.92	27.73	(24.81)

N/A = Not applicable. NOx = Volatile organic compounds. TPSD = Tons per summer day.

Based on the preceding results, MassDOT Planning has found that the combined emission levels from transportation projects contained in the 2016 Regional Transportation Plans and 2019–2023 Transportation Improvement Programs—for both former ozone nonattainment areas in Massachusetts—demonstrate conformity with the SIP, the Clean Air Act, and the EPA conformity regulations (40 CFR part 51).

Through the interagency air quality consultation process (involving U.S. Department of Transportation, EPA, DEP, MassDOT, and the MPOs) the latest EPA rulemakings, and the referenced legislative background and legal issues, currently applicable ozone standards, area designations, and requirements were all reviewed.

The ozone analysis outlined in this section demonstrates that the implementation of the 2016 RTPs and 2019–2023 TIPs meet the “budget test,” and therefore satisfy the air quality ozone and carbon monoxide conformity criteria, and are consistent with the air quality goals in the Massachusetts SIP.