



PART IV

Air Quality Conformity

AIR QUALITY CONFORMITY STATUS

Introduction

The Commonwealth of Massachusetts is classified as serious nonattainment for ozone, and is divided into two nonattainment areas. The Eastern Massachusetts Ozone Nonattainment Area includes Barnstable, Bristol, Dukes, Essex, Middlesex, Nantucket, Norfolk, Suffolk, and Worcester counties. Berkshire, Franklin, Hampden, and Hampshire counties comprise the Western Massachusetts Ozone Nonattainment Area. With these classifications, the 1990 Clean Air Act Amendments (CAAA) required the Commonwealth to reduce its emissions of volatile organic compounds (VOCs) and nitrogen oxides (NO_x) – the two major precursors to ozone formation – to achieve attainment of the ozone standard by 1999 and beyond.

In April 2002, the cities of Lowell, Waltham, Worcester and Springfield were re-designated to attainment for carbon monoxide with EPA-approved limited maintenance plans. In April 1996, the communities of Boston, Cambridge, Chelsea, Everett, Malden, Medford, Quincy, Revere, and Somerville were classified as attainment for carbon monoxide (CO). Air quality conformity analysis must still be completed in these communities, as they have a carbon monoxide maintenance plan approved into the state implementation plan (SIP). The year 2010 carbon monoxide motor vehicle emission budget established for the Boston CO attainment area with a maintenance plan is 228.33 tons of carbon monoxide per winter day.

The CAAA also required Metropolitan Planning Organizations (MPOs) within nonattainment areas to perform conformity determinations prior to the approval of their Regional Transportation Plans (RTPs) and Transportation Improvement Programs (TIPs). The most recent prior conformity determination occurred in the summer of 2007, when the Federal Highway Administration (FHWA) – in consultation with the Environmental Protection Agency (EPA New England) and the Massachusetts Department of Environmental Protection (DEP) – confirmed that all thirteen of the RTPs for the year 2007 in Massachusetts were in conformity with the Massachusetts SIP. A brief summary of major conformity milestones in recent years is as follows (more details are provided in the 2007 RTPs and related documents).

Between 2003 and 2006, several new conformity determinations were made that were triggered by various events, including: the 2003 RTPs; a change in designation from the one-hour ozone standard to an eight-hour ozone standard; and various changes to the regional TIPs that involved re-programming transportation projects across analysis years.

In 2007, air quality analyses were conducted on behalf of all the 2007 RTPs, the purposes of which were to evaluate the RTPs' air quality impacts on the SIP. Conformity determinations were performed to ensure that all regionally significant projects were included in the RTPs. The former Executive Office of Transportation found the emission levels from the 2007 RTPs to be in conformance with the SIP. Each MPO has certified (and continues to certify) that all activities outlined in its Plan and its TIP:

- will not cause or contribute to any new violation of any standard in any area;
- will not increase the frequency or severity of any existing violation of any standard in any area; and,
- will not delay the timely attainment of any standard or any required interim emission reductions or other milestones in any area.

On April 2, 2008, EPA found that the 2008 and 2009 motor vehicle emissions budgets in the January 31, 2008 Massachusetts 8-hour ozone STIP revision were adequate for transportation conformity purposes. The submittal included 2008 and 2009 motor vehicle emission budget for the Boston-Lawrence-Worcester (Eastern Massachusetts) and Springfield (Western Massachusetts) 8-hour ozone non-attainment areas. Massachusetts submitted these budgets as part of the 8-hour ozone attainment demonstration and reasonable further progress plan for both non-attainment areas, and as a result of EPA's adequacy finding, these budgets are required to be used for this and future conformity determinations.

Conformity Test

The conformity test is to show consistency with the emissions budgets set forth in the SIP, and to contribute to reductions in CO nonattainment areas. In addition, the format of the conformity test is determined by evolving regulations. These regulations set specific requirements for different time periods depending on the timeframe of the Commonwealth's SIP submittals to EPA. These periods are defined below:

Control Strategy Period: Once a control strategy SIP has been submitted to EPA, EPA has to make a positive adequacy determination of the mobile source emission budget before such budget can be used for conformity purposes. The conformity test in this period is consistent with the mobile source emissions budget.

Maintenance Period is the period of time beginning when the Commonwealth submits and EPA approves a request for redesignation to an attainment area, and lasting for 20 years. The conformity test in this period is consistent with the mobile source emissions budget.

Horizon years for regional model analyses have been established following 40 CFR 93.106(a) of the Federal Conformity Regulations. The years for which the regional transportation models were run for emission estimates are shown below:

- 2007: Milestone Year – This year is now being used by the statewide travel demand model as the new base year for calculation of emission reductions of VOCs and NOx.
- 2017 - Milestone Year and Analysis Year: This year is used to show conformity with the 2009 emission budgets for ozone precursors in Eastern and Western Massachusetts.
- 2020 - Analysis Year
- 2030 - Horizon Year – last forecast year of regional transportation plans

Changes in Project Design since the Last Conformity Determination Analysis

The Commonwealth requires that any change in project design from the previous conformity determination for the region is identified. Changes that have occurred since the last conformity determination in 2009 are as follows:

- The modeled base year has changed from 2000 to 2007.
- A new analysis year has been included in the conformity determination. An air quality analysis has been completed for 2017. This complies with the conformity guidelines for no more than ten years between analysis years (2007 base to 2017 analysis year).
- Emission factors have been developed for 2017 using Mobile 6.2 with inputs approved by DEP and EPA.
- New HPMS adjustment factors have been developed for the new 2007 base year.

As stated in EPA guidance, all areas of serious ozone and carbon monoxide nonattainment must use FHWA's Performance Monitoring System (HPMS) to track daily vehicle-miles of travel (VMT) prior to attainment to ensure that the state is in line with commitments made in reaching attainment of the ambient air quality standards by the required attainment dates. MassDOT provided HPMS information to DEP. DEP used this information in setting mobile-source budgets for VOC, NOx, and CO in all SIP revisions prior to 1997. DEP has since revised its VOC and NOx budgets using transportation-demand model runs. However, the models must still be compared to HPMS data since HPMS remains the accepted tracking procedure as outlined in the regulations.

The conformity regulations require that all model-based VMT be compared with the HPMS VMT to ensure that the region is in line with VMT and emission projections made by DEP. An adjustment factor that compares the 2007 HPMS VMT to the 2007 transportation model VMT has been developed. This adjustment factor is then applied to all modeled VOC and NOx emissions for the years 2017 through 2030 to ensure consistency with EPA-accepted procedures.

$$\frac{\text{2007 HPMS VMT}}{\text{2007 Modeled VMT}} = \text{Adjustment factor for VOC and NOx}$$

HPMS adjustment factors, calculated on a regional basis, are applied to the model output of future scenarios, and they change as base-year models are updated or improved, or as HPMS data is revised or updated. The latest factors are as follows:

REGION	2007 HPMS VMT (miles)	Travel Demand Model VMT (miles)	HPMS/Model Conversion Factor
Cape Cod	6,918,000	4,861,037	1.423
Central Massachusetts	14,668,000	14,755,472	0.994
Martha's Vineyard	268,000	259,927	1.031
Merrimack Valley	9,420,000	8,997,480	1.047
Boston	61,187,000	73,783,915	0.829
Montachusett	5,051,000	5,126,618	0.985
Nantucket	154,000	72,893	2.113
Northern Middlesex	6,570,000	7,489,431	0.877
Old Colony	6,932,000	6,889,967	1.006
Southeastern Massachusetts	14,816,000	14,271,095	1.038

Eastern MA	125,984,000	136,507,834	0.923
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REGION	2007 HPMS VMT (miles)	Travel Demand Model VMT (miles)	HPMS/Model Conversion Factor
Berkshire	5,186,000	3,050,904	1.700
Franklin	3,553,000	2,097,856	1.694
Pioneer Valley	15,282,000	13,128,032	1.164

Western MA	24,021,000	18,276,792	1.314
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State Total	150,005,000	154,784,626	0.969
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The milestone and analysis year transportation model networks are composed of projects proposed in this 2011-2014 TIP. Projects in these networks consist of all in-place “regionally significant” projects that can reasonably be expected to be completed by a given analysis/horizon year with consideration of available funding commitments. This project group would include, but not be limited to, regionally significant projects where at least one of the following steps has occurred within the past three years:

- Comes from the first year of a previously conforming TIP,
- Completed the NEPA process, or
- Currently under construction or are undergoing right-of-way acquisition

Based on these definitions – for the following three regions – there are no regionally significant projects included in each referenced 2007 regional transportation plan for the corresponding 2011-2014 regional transportation improvement program, and there have been no changes in project design since the last conformity determination:

- Martha’s Vineyard Commission* (Eastern Massachusetts)
- Nantucket Planning and Economic Development Commission* (Eastern Massachusetts)
- Franklin Regional Council of Governments* (Western Massachusetts)

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

A complete listing of future regionally significant projects for the entire Eastern (Table AQ-1) and Western (Table AQ-2) Massachusetts Ozone Non-Attainment Area follows:

**Table AQ-1
Regionally Significant Projects Included in the Regional Transportation Models for the Eastern
Massachusetts Ozone Non-Attainment Area**

Analysis Year	Community	Project Description – Boston Region
2017	Bedford	Middlesex Turnpike Improvements Phase 3 – widening Plank St. to Manning
2017	Boston	East Boston Haul Road/Chelsea Truck Route (new grade separated roadway)
2017*	Boston	Fairmount Line Improvements, including new stations
2017*	Boston	Russia Wharf Ferry Terminal
2017	Boston Logan Airport	Consolidated Rental Car Facility (Boston Logan Airport)
2017	Canton	I-95 (NB)/Dedham Street Ramp/Dedham Street Corridor (new ramp with widening on Dedham St. from I-95 to University Ave.)
2017	Concord, Lincoln	Route 2/Crosby’s Corner (grade separation)
2017	Hanover	Route 53 Final Phase (widening to 4 lanes between Rt 3 and Rt 123)
2017	Hudson	Route 85 (capacity improvements from Marlborough TL to Rt 62)
2017	Marshfield	Route 139 Widening (to 4 lanes between School St. and Furnace St.)
2017	Quincy	Quincy Center Concourse, Phase 2 (new roadway: Parking Way to Hancock)
2017	Revere	Wonderland Parking Garage
2017	Salem	Bridge Street (widening to 4 lanes between Flint and Washington St.)
2017*	Regionwide	1000 Additional Park and Ride Spaces

2017	Somerville	Assembly Square Orange Line Station
2017	Somerville	Assembly Square Roadways (new and reconfigured)
2017*	Somerville, Cambridge	Green Line Extension from Lechmere Station to College Avenue
2017	Weymouth, Hingham, Rockland	South Weymouth Naval Air Station Access Improvements
2017	Weymouth	Route 18 Improvements (widening between Rt 3 and Rt 139)
2017	Woburn	Montvale Avenue (widening between Central St. to east of Washington St.)
2020	Boston	Sullivan Square Improvements
2020	Braintree	Braintree Split - I-93/Route 3 Interchange
2020	Somerville, Medford	Green Line Extension from College Ave. to Mystic Valley Parkway (Route 16)
2020	Wilmington	Tri-Town Interchange (new "Lowell Junction" interchange on I-93 between Route 125 and Dascomb Rd.)
2020	Woburn	New Boston Street Bridge (reestablish connection over MBTA Lowell line)
2030	Boston	Rutherford Avenue (new 4 lane bypass road)
2030	Canton	I-95/I-93 Interchange (new direct connect ramps)
2030	Framingham	Route 126/135 Grade Separation
2030	Malden, Revere, Saugus	Route 1 (widening from 4 to 6 lanes between Copeland Circle and Rt. 99)
2030	Newton, Needham	Needham Street/Highland Avenue (includes widening Charles River Bridge)
2030	Reading, Woburn, Stoneham	I-93/I-95 Interchange (new direct connect ramps)
TBD*	Boston	Red Line/Blue Line Connector – Design Only
Analysis Year	Community	Project Description - Cape Cod Region
2020	Barnstable	Barnstable Airport Access
2020	Barnstable	Yarmouth Rd. /Rt 28 (widening to 4 lanes) with Hyannis Rotary improvements
2030	Bourne	Bourne Rotary Long-Term Improvements
2030	Bourne, Sandwich	Bourne-Sandwich Parkway (widening to 4 lanes)
Analysis Year	Community	Project Description - Central Massachusetts Region
2020	Charlton, Oxford	Route 20 Widening
2020	Auburn, Shrewsbury, Worcester	Route 20 Widening – selected locations
2020	Worcester	I-290 / Vernon St. / Kelley Square (new interchange and square realignment)
2030	Millbury, Sutton	Route 146 Improvements – add frontage roads to create limited access roadway between a new interchange (at Boston Rd.) and existing I-90 interchange
Analysis Year	Community	Project Description – Martha’s Vineyard Region
n/a	n/a	None
Analysis Year	Community	Project Description – Merrimack Valley Region
2017	Amesbury	Route 110 from I-495 to I-95 (widen from 2 lanes to 4)
2017	Georgetown	Georgetown Industrial Park Access Road from Route 133
2017	Lawrence	I-495 over Merrimack River (widening and add new ramps)
2020	Andover	Burt Road extension – improve access to Route 125
2020	Andover	Tri-Town Interchange (new "Lowell Junction" interchange on I-93 between Route 125 and Dascomb Rd.) and I-93 widening to 4 lanes in each direction from new interchange/current "lane drop" area to I-495.
2020	Lawrence	Route 114 (widening from I-495 to Waverly Road)
2020	Methuen	Route 110/113 (Methuen Rotary – new interchange ramps at I-93)
2020	Newburyport, Amesbury	I-95 over Merrimack River (Whittier Bridge widening from 6 to 8 lanes)
2030	Andover, Methuen	I-93 – widening to 4 travel lanes in each direction from I-495 to NH line
2030	Newburyport	Hale Street Industrial Park access from I-95
Analysis Year	Community	Project Description – Montachusett Region
2017	Fitchburg	New Wachusett Commuter Rail Station
2020	Athol	New Interchange on Route 2 at South Athol Road
2020	Fitchburg, Leominster, Sterling	Routes 12 and 13 (various improvements to on and off ramps)
Analysis Year	Community	Project Description – Nantucket Region
n/a	n/a	None

Analysis Year	Community	Project Description – Northern Middlesex Region
2017	Billerica	Middlesex Turnpike Improvements Phase 3 – widening Plank St. to Manning
2020	Tewksbury	Tri-Town Interchange (new “Lowell Junction” interchange on I-93 between Route 125 and Dascomb Rd.)
Analysis Year	Community	Project Description – Old Colony Region
2020	Abington	Route 18 - Widening to 4 Lanes from Route 139 to Highland Place
2020	Brockton	Route 123 - Widen from Route 24 to Linwood Street
2030	Bridgewater	Route 24 - Add Northbound Slip Ramp from Route 104 WB to Route 24 NB
2030	Brockton	Main Street, Warren Avenue, Spring Street, West Elm Street, Belmont Street - Reestablish Two-Way Circulation
2030	Kingston, Plymouth	Route 3 - Widening from 4 to 6 Lanes between Hingham and Rt 44
2030	Plymouth	Route 25 - Add New Interchange Before Exit 1 and connect to Bourne Road
2030	Plymouth	Route 3 - Add NB Off-ramp to Plimouth Plantation Hwy. and SB On/off Ramp to Camelot Dr.
2030	Plymouth	Route 3 - Add Northbound on-Ramp at Long Pond Road (Exit 5)
2030	West Bridgewater	Route 106 - Widening from 2 to 4 Lanes between Route 24 and Route 28
Analysis Year	Community	Project Description – Southeastern Massachusetts Region
2017	Fall River, Somerset	New Brightman Street Bridge - capacity improvements to 4 lane divided facility
2020	Dartmouth	Route 6 (Faunce Corner Rd) / I-195 Interchange - Bridge Widening to 5 Lanes
2020	Freetown	Route 24 - New Interchange (Exit 8 ½)
2020	Mansfield	Route 140 / I-495 New Southbound On-Ramp
2020	Middleborough	Route 44 - Widening from Rt 24 to Rt 58 and Remove Middleboro Rotary
2030	Fall River	Route 79/Davol Street (interchange improvements and new traffic circulation)
2030	New Bedford	Kings Highway - Corridor Widening
2030	Taunton	Route 24 / 140 - Interchange Reconstruction
2030	Taunton, Raynham	Route 24 - Widening from Route 140 to I-495

Note: * = Listed as SIP Commitment (State Implementation Plan)

The transportation air quality conformity analyses prepared for the 2011 – 2014 Regional Transportation Improvement Programs (and collectively, this State TIP) also serve to demonstrate transportation air quality conformity Regional Transportation Plans in Massachusetts. All regionally significant transportation projects in the FFY 2011 – 2014 transportation improvement programs are contained in the 2007 transportation plans (with any amendments). Furthermore, all regionally significant projects in the 2014 to 2030 timeframe of all the transportation plans are modeled in the FFY 2011 – 2014 Transportation Improvement Programs’ transportation air quality conformity analyses.

**Table AQ-2
Regionally Significant Projects Included in the Regional Transportation Models for the
Western Massachusetts Ozone Non-Attainment Area**

Analysis Year	Community	Project Description – Pioneer Valley Region
2017	Chicopee	Memorial Drive signal coordination.
2017	Chicopee	Traffic coordination and improvements along Broadway.
2017	Hadley	Route 9 signal coordination.
2017	Holyoke, W. Springfield	Route 5 signal coordination.
2017	Northampton	Road widening on Damon Road from Rte 9 to King St.
2017	Westfield	Route 10/202 Great River Bridge - two bridges acting as one-way pairs.
2017	Westfield	Route 20 signal coordination.
2020	Agawam	Route 57 Fly-over Ramp.

2020	E. Longmeadow	Improvements to the East Longmeadow Rotary.
2020	Northampton	Improvements to I-91 Exit 19 to construct a full interchange.
2020	Springfield	New slip ramp from I-291 to East Columbus Avenue.
2020	West Springfield	Improve the Union Street Railroad Underpass. Construct a truck bypass road.
2030	Agawam	Improvement to Route 5 access ramps for truck routing.
2030	Agawam	Route 57 Phase II new limited access highway from Route 187 to Southwick Line.
2030	Agawam, Longmeadow, Springfield	Improve the South End Bridge, pedestrian connections to Agawam/Springfield Riverwalks, fix existing lane reduction problem on I-91 between Exits 1-3.
2030	Chicopee, Holyoke	Route 116 Bridge Improvements (possible widening).
2030	Ludlow, Springfield	Route 21 bridge reconstruction (possible to be widened as well).
Analysis Year	Community	Project Description -- Berkshire Region
2017	Great Barrington	Main St. intersection improvements, signalization upgrades and add turning lanes
2020	Pittsfield	Safety and capacity improvements on East St. between Elm St. and Merrill Road
2020	Pittsfield	Intersection widening, turning lane improvements First/Tyler & Tyler/Stoddard Ave
2020	Pittsfield	Construct connector street from W. Housatonic St. to West St. near CSX yard
2030	Great Barrington	Realign & widen State Rd., including new bridge to replace the current Brown bridge
2030	Lanesboro/Cheshire	Construct passing lanes on Route 8 between Mall Road and truck weighing station
2030	Stockbridge - MassPike	Construct full interchange at Exit 1 with mitigation on impacted area roadways
2030	Great Barrington	Realign & widen State Rd., including new bridge to replace the current Brown bridge
Analysis Year	Community	Project Description - Franklin Region
n/a	n/a	none

Air Quality Conformity Analysis

Specific information regarding the analysis methods, latest planning assumptions, and consultation procedures are all detailed in the 2007 RTPs. The emissions from the following MPOs have been combined to show conformity with the SIP for the Eastern Massachusetts Nonattainment Area:

- Cape Cod MPO
- Central Massachusetts MPO
- Merrimack Valley MPO
- Boston MPO
- Montachusett Region MPO
- Northern Middlesex MPO
- Old Colony MPO
- Southeastern Region MPO
- Martha's Vineyard Commission*
- Nantucket Planning and Economic Development Commission*

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

* These regions do not contain any urbanized areas, but are treated as MPOs for planning purposes.

Using the latest planning assumptions, MassDOT's Office of Transportation Planning estimated the emissions for VOC and NOx from all MPOs through a combination of the statewide and selected regional travel demand models (and with assistance from MPO staff). The VOC mobile source emission budget for

2009 (and beyond) for the Eastern Massachusetts Nonattainment Area has been set at 63.50 tons per summer day (TPSD) and the 2009 (and beyond) mobile source emission budget for NOx is 174.96 TPSD (Tables AQ-3 and AQ-4). For the Western Massachusetts Nonattainment Area (Tables AQ-5 and AQ-6), the 2009 (and beyond) VOC mobile source emission budget has been set at 10.73 TPSD, while the 2009 (and beyond) mobile source emission budget for NOx is 27.73 TPSD. As shown in the tables, the results of the air quality analyses demonstrate that the VOC and NOx emissions from all action scenarios are less than the VOC and NOx emissions budgets for both non-attainment areas.

TABLE AQ-3
VOC Emissions Estimates for the Eastern Massachusetts Ozone Nonattainment Area
(all emissions in tons per summer day)

Year	Eastern MA Action Emissions	Budget	Difference (Action – Budget)
2007	86.558	n/a	n/a
2017	41.389	63.50	-22.111
2020	34.293	63.50	-29.207
2030	32.157	63.50	-31.343

TABLE AQ-4
NOx Emissions Estimates for the Eastern Massachusetts Ozone Nonattainment Area
(all emissions in tons per summer day)

Year	Eastern MA Action Emissions	Budget	Difference (Action – Budget)
2007	234.850	n/a	n/a
2017	66.418	174.96	-108.542
2020	50.694	174.96	-124.266
2030	34.259	174.96	-140.701

TABLE AQ-5
VOC Emissions Estimates for the Western Massachusetts Ozone Nonattainment Area
(all emissions in tons per summer day)

Year	Western MA Action Emissions	Budget	Difference (Action – Budget)
2007	14.798	n/a	n/a
2017	6.512	10.73	-4.218
2020	6.051	10.73	-4.679
2030	5.532	10.73	-5.198

TABLE AQ-6
NOx Emissions Estimates for the Western Massachusetts Ozone Nonattainment Area
(all emissions in tons per summer day)

Year	Western MA Action Emissions	Budget	Difference (Action – Budget)
2007	41.612	n/a	n/a
2017	10.440	27.73	-17.290
2020	7.784	27.73	-19.946
2030	5.011	27.73	-22.719

In summary, each Eastern Massachusetts MPO and each Western Massachusetts MPO has found that the emission levels from its FY 2011-2014 TIP, in combination with the emission levels from the other MPOs in its nonattainment area, demonstrate conformity with the SIP as required.

All the regional TIPs are derived from regional transportation plans that meet the conformity requirements. The applicable MPO conformity determinations have been prepared in accordance with EPA's and Massachusetts' final conformity regulations. These conformity determinations show that the 2011-2014 Statewide TIP – as a product of all the regional TIPs – has been prepared following all the guidelines and requirements of these rules during this time period.

Therefore, the implementation of the FFY 2011-2014 Statewide Transportation Improvement Program is consistent with the air quality goals, and in conformity with, the Massachusetts State Implementation Plan.