5.0 AIR QUALITY

5.1 Introduction

This chapter provides a summary of the detailed information in Appendix B: Air Quality Written Reevaluation/Technical Report.

5.1.1 National Ambient Air Quality Standards

The Clean Air Act and its amendments led to the creation of National Ambient Air Quality Standards (NAAQS) by U.S. Environmental Protection Agency (EPA) for six criteria air pollutants: carbon monoxide, sulfur dioxide, ozone, particulate matter, nitrogen dioxide, and lead. The NAAQS are set at levels designed to protect public health. Areas that meet the NAAQS are classified as attainment areas. Areas that do not meet the NAAQS are classified as nonattainment areas for that pollutant. State Implementation Plans (SIPs) are designed to bring nonattainment areas into compliance with the NAAQS. Former nonattainment areas currently meeting the NAAQS are designated maintenance areas.

The counties surrounding the I-93 project corridor are attainment areas for sulfur dioxide, particulate matter (PM_{10} and $PM_{2.5}$), nitrogen dioxide and lead. Southern New Hampshire contains a single nonattainment area for the 1997 8-hour ozone NAAQS which encompasses portions of Hillsborough, Rockingham, Merrimack, and Strafford counties. There are two carbon monoxide maintenance areas in southern New Hampshire, the City of Manchester and the City of Nashua.

<u>Carbon Monoxide</u>

Carbon monoxide (CO) is a colorless and odorless gas that results from the incomplete combustion of gasoline and other fossil fuels. Approximately 80 percent of CO emissions are from motor vehicles. Because CO disperses quickly, concentrations can vary greatly over relatively short distances. Elevated concentrations are usually limited to locations near crowded intersections and along congested roadways.

<u>Ozone</u>

Ozone is also a colorless gas and is a major constituent of photochemical smog at the earth's surface. The precursors in the formation of ozone are volatile organic compounds (VOCs) and nitrogen oxide (NOx). In the presence of sunlight, ozone is formed through a series of chemical reactions that take place in the atmosphere. Because the reactions occur as the pollutants are diffusing downwind, elevated ozone levels are often found many miles from sources of the precursor pollutants.

Transportation Conformity

Transportation conformity is a way to ensure that federal funding and approval goes to those transportation activities that are consistent with air quality goals. Transportation conformity applies to transportation plans, transportation improvement programs (TIPs), and projects funded or approved by Federal Highway Administration (FHWA) or Federal Transit Administration (FTA) in nonattainment and maintenance areas. 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), and that transportation control measures (TCMs) are implemented in a timely fashion.

For projects in metropolitan areas, conformity is demonstrated by showing that the project is included in conforming Metropolitan Planning Organization (MPO) plans/TIPs and that the applicable hot-spot analysis requirements have been met. Hot spot analysis involves comparing localized CO, PM_{10}, and $PM_{2.5}$ concentrations to the NAAQS (e.g. around congested intersections). For the I-93 project, hot-spot analysis requirements for CO apply in the Manchester CO maintenance area. Section 5.3.3 explains the methodology for the microscale (or hot spot) CO analysis used to demonstrate that the project will not cause a new violation of the NAAQS or worsen existing violations. Hot spot analysis requirements for PM_{10}, and $PM_{2.5}$ do not apply because southern New Hampshire is an attainment area for these pollutants.

At the time of this study, the most recently approved conformity determinations for New Hampshire were made in the “FY2007-2010 Conformity Determinations for Transportation Improvement Programs, Transportation Plans, and Regional Emissions Analysis of Transportation Projects in New Hampshire’s Nonattainment Areas” (NHDOT, 2007). NHDOT prepared the FY2007-2010 conformity analysis document based on the regional emissions analyses conducted by the regional planning commissions in southern New Hampshire. The regional emissions analyses covered the years 2007 to 2026 and took into account the traffic effects of widening I-93 to four-lanes in each direction from Salem to Manchester, as well as most other major transportation projects included in MPO plans and TIPs.[1] The FY2007-2010 conformity analysis did not directly take into account the potential induced growth estimated by the Delphi Panel Blended Average Allocation, however it did take into account future population and employment levels anticipated by each regional planning commission. Therefore, as described in Section 5.3.4, a regional emissions sensitivity analysis was conducted as part of the DSEIS to determine the effect of the Scenario 1 and Scenario 2 population and employment estimates on the results of the FY2007-2010 conformity analysis.

Subsequent to the preparation of the regional emissions sensitivity analysis based on the 2007-2026 conformity analyses, conformity analyses for 2009-2035 have been completed by the Nashua Regional Planning Commission, the Southern New Hampshire Planning Commission, the Rockingham Planning Commission, and the Strafford Regional Planning Commission. NHDOT has summarized the 2009-2035 conformity analyses conducted by the MPOs in the

[1] The transportation conformity regulations require the regional emissions analysis to include federal transportation projects and all regionally significant transportation projects, regardless of their funding source (40 CFR §93.122(a)(1)). The regulations also define certain types projects as exempt from regional emissions analysis (40 CFR § 93.127 and 40 CFR §93.126).

document "Summary of Transportation Conformity Determinations in New Hampshire: 2009-2035" (NHDOT, 2008). As with the previous conformity analysis, the 2009-2035 analysis includes the widening of I-93 to four-lanes in each direction from Salem to Manchester. The 2009-2035 analysis incorporates a number of changes since the previous analysis, including the use of new motor vehicle emissions budgets for the Boston-Manchester-Portsmouth (Southeast), New Hampshire 8-hour ozone nonattainment area approved by EPA effective August 12, 2008. The 2009-2035 analysis shows that all future year emissions in nonattainment and maintenance areas will be well below their respective emissions budgets. Given that the future emissions are well under the budgets and the very small effect of the DSEIS population and employment levels on regional emissions indicated by the 2007-2026 regional emissions sensitivity analysis, it was not necessary to conduct an additional sensitivity analysis on the 2009-2035 conformity analysis.

5.1.2 Mobile Source Air Toxics

In addition to the criteria air pollutants for which there are NAAQS, EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes or diesel locomotives), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries). The entire list of air toxics currently identified by the Clean Air Act includes 188 air toxics, also known as hazardous air pollutants. The EPA has identified a group of 21 of these pollutants as Mobile Source Air Toxics (MSATs), which are set forth in an USEPA final rule; *Control of Emissions of Hazardous Air Pollutants from Mobile Sources, 66 Fed. Reg. 17235* (March 29, 2001). MSATs are compounds emitted from highway vehicles and non-road equipment (e.g., volatile organic compounds, nonvolatile organics, diesel particulate matter/diesel exhaust gases, or metals). Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

From the group of 21 MSATs, EPA has identified six "priority MSATs". These six include: benzene, formaldehyde, acetaldehyde, diesel particulate matter/diesel exhaust organic gases, acrolein, and 1,3-butadiene. EPA has issued two regulations to reduce MSAT emissions, Controlling Emissions of Hazardous Air Pollutants from Mobile Sources 66 Fed. Reg. 17229 (March 29, 2001) and Control of Hazardous Air Pollutants from Mobile Sources 72 Fed. Reg. 8427 (February 26, 2007). Among other measures, these regulations established fuel based standards (e.g. standards for the maximum allowable benzene content in gasoline) and emissions standards for passenger vehicles when operating at cold temperatures. MSAT emissions are also projected to decrease due to other mobile source regulations, such as the reformulated gasoline (RFG) program, the National Low Emission Vehicle (NLEV) standards, Tier 2 motor vehicle emission standards, and gasoline sulfur control requirements, proposed heavy duty engine and vehicle standards and on-going highway diesel fuel sulfur control requirements. At the national level, EPA expects a 65 percent reduction in MSAT emissions from on-road mobile sources between 1999 and 2020, despite a 57 percent increase in vehicle miles traveled (VMT) over this same time period (EPA, 2007).

5.1.3 Greenhouse Gas Emissions and Climate Change

Greenhouse gases are trace gases that trap heat in the earth's atmosphere. Some greenhouse gases occur naturally and are emitted into the atmosphere through natural processes and human activities. Naturally occurring greenhouse gases include water vapor, carbon dioxide, methane, nitrous oxide, and ozone. Other greenhouse gases such as chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs) are created and emitted solely through human activities. Certain human activities can also add to the levels of most of the naturally occurring gases. The principal greenhouse gases that enter the atmosphere because of human activities are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated gases.

As a sector, transportation is a significant source of greenhouse gases. In 1998, transportation sources accounted for approximately one quarter of the total greenhouse gas emissions in the U.S. Transportation contributes to global warming through the burning of gasoline and diesel fuel. Any process that burns fossil fuels, such as gasoline and diesel fuel, releases CO_2 into the air. CO_2 from fossil fuel combustion is responsible for almost all greenhouse gas emissions from mobile sources, which include both transportation sources and non-transportation equipment, such as agricultural and construction equipment. CH_4 and N_2O emissions also result from fuel combustion, while HFC emissions are associated with motor vehicle air conditioners.

In contrast with trends in other air emissions, greenhouse gas emissions from transportation continue to rise, in large part because travel growth has outpaced improvements in vehicle energy efficiency. Transportation sector emissions have grown at an average rate of about 2.0 percent annually since 1990. The sector's emissions have grown considerably faster than those of other sectors, which averaged about 0.8 percent annually during the same period (U.S. DOT Center for Climate Change and Environmental Forecasting, 2008).

To date, no national standards have been established regarding greenhouse gases, nor has EPA established criteria or thresholds for greenhouse gas emissions. On April 2, 2007, the Supreme Court issued a decision in *Massachusetts et al. v. Environmental Protection Agency et al.* 549 U.S. 497 (2007) that the EPA does have authority under the Clean Air Act to establish motor vehicle emissions standards for CO_2 emissions. In response to the Court's decision, EPA issued a proposed endangerment and cause or contribute finding for six greenhouse gases under Section 202(a) of the Clean Air Act on April 17, 2009. The proposed endangerment finding states that current and projected greenhouse gas concentrations in the atmosphere threaten the public health and welfare. The proposed cause or contribute finding states that certain greenhouse gas emissions from motor vehicles contribute to the atmospheric concentrations of greenhouse gases and to climate change. EPA's proposed findings are the first steps towards the potential regulation of greenhouse gas emissions under the Clean Air Act. However, the proposed findings do not have any direct implications on requirements for developing transportation projects at this time.

In December 2007, New Hampshire established a Climate Change Policy Task Force and charged the task force with developing a Climate Change Action Plan that establishes climate change goals and recommends meaningful steps to meet those goals, based on Executive Order

Number 2007-3. The New Hampshire Department of Environmental Services (NHDES) is designated as the lead agency for the task force. The "2009 New Hampshire Climate Action Plan: A Plan for New Hampshire's Energy, Environmental and Economic Development Future" was published in March 2009 (NHDES, 2009). The plan recommends a long-term goal of reducing greenhouse gas emissions by 80 percent below 1990 levels by 2050 and a mid-term goal of reducing greenhouse gas emissions 20 percent below 1990 by 2025. The plan contains 67 recommended actions for individuals, businesses and government organized around the following 10 overarching strategies:

1. Maximize energy efficiency in buildings.
2. Increase renewable and low-CO2-emitting sources of energy in a long-term sustainable manner.
3. Support regional and national actions to reduce greenhouse gas emissions.
4. Reduce vehicle emissions through state actions.
5. Encourage appropriate land use patterns that enable fewer vehicle-miles traveled.
6. Reduce vehicle-miles traveled through an integrated multimodal transportation system.
7. Protect natural resources (land, water, wildlife) to maintain the amount of carbon fixed or sequestered.
8. Lead by example in government operations.
9. Plan for how to address existing and potential climate change impacts.
10. Develop an integrated education, outreach and workforce training program.

5.2 Summary of 2004 FEIS Analysis and Record of Decision Commitments

5.2.1 Microscale Carbon Monoxide Analysis

The 2004 FEIS analyzed microscale CO concentrations for existing conditions (1997), the estimated year of completion (2010), and the design (2020) years for the No-Build and Build Alternatives using the EPA emission model (MOBILE5B) and dispersion model (CAL3QHC) computer models. Based on the study area roadway configurations, land use, and traffic patterns, and the level of service associated with the intersections, nine (9) microscale CO analysis sites were analyzed. The predicted CO pollutant concentration levels for the No Build and Build conditions were compared to the National Ambient Air Quality Standards (NAAQS) for carbon monoxide (CO) (1-hour and 8-hour concentration thresholds of 35 parts per million (ppm) and 9 ppm; respectively). The results presented in the 2004 FEIS showed that future No Build and Build concentrations would be below the NAAQS at all of the receptor locations.

Four of the analysis sites (Route 28A at Huse Road, Cilley Road, Candia Road, and Massabesic Road) were located in the City of Manchester, a maintenance area for CO. These sites were used to meet CO hot spot analysis requirements under the transportation conformity regulations (40 CFR 93.116 and 40 CFR 93.123).

5.2.2 Transportation Conformity

The 2004 FEIS concluded that the 2005 Selected Alternative was in compliance with the 1990 Clean Air Act Amendments and the New Hampshire SIP. The results of the microscale analysis demonstrated that the 2005 Selected Alternative would not create CO violations in locations where violations currently do not exist and that all modeled CO concentrations would be below the NAAQS. The 2005 Selected Alternative also satisfied the regional transportation conformity requirements for ozone and CO because it was evaluated as part of NHDOT's "Fiscal Year 2003-2005 Conformity Determination for Transportation Improvement Programs, Transportation Plans, and Regional Emission Analysis of Transportation Projects" which was reviewed by EPA and found to conform by U.S. DOT, as documented in the conformity determination dated November 2002.

5.2.3 Record of Decision Commitments/Mitigation

The Record of Decision made the following commitments with respect to air quality:

- Air quality will continue to be addressed for the project through the regional transportation conformity analyses conducted by the MPOs and NHDOT. The project is, and will continue to be, included in conforming TIPs, and MPO plans.
- Mitigation measures for controlling fugitive dust emissions during construction will include wetting and stabilization of all work areas, cleaning paved roadways, and scheduling construction to minimize the amount and duration of exposed earth.
- NHDOT will require that contractors involved with the reconstruction of I-93 include air pollution control devices on heavy diesel construction equipment in accordance with applicable State and Federal laws at the time of construction. The merits and practicality of more stringent or voluntary specification measures will be considered during the final design process and in consultation with the contracting community at large.

5.3 Methodology

5.3.1 Updated Traffic Data

All of the quantitative air quality analyses conducted for this DSEIS were conducted using updated traffic data generated to explicitly account for the additional travel generated by induced population and employment growth. The microscale carbon monoxide analysis was based on DSEIS traffic data for Scenario 1 and Scenario 2. The methodology used to generate the DSEIS traffic data with the New Hampshire Statewide Model is explained in Chapter 4: Traffic. For the regional emissions sensitivity analysis, traffic data was generated from local MPO transportation models using the Scenario 1 and Scenario 2 population and employment estimates as inputs.

5.3.2 Updated Emissions Model

The EPA approved emissions model used in the 2004 FEIS was MOBILE5B. The air quality analyses conducted for this DSEIS utilize an updated version of the EPA approved emissions model, MOBILE6.2.

5.3.3 Microscale Carbon Monoxide Analysis

The 2004 FEIS CO microscale analysis was conducted for nine sites, including four located within the Manchester CO maintenance area in order to meet transportation conformity hot-spot analysis requirements. The updated microscale analysis includes the nine analysis sites from the 2004 FEIS and three additional analysis sites along secondary roadways to meet the requirements of the court order (See Figure 5-1). The three additional sites were selected based on a screening process that used the DSEIS updated traffic analysis results to identify the intersections with the largest change (increase or decrease) in traffic volumes between the No Build and Build conditions. The screening analysis considered traffic data from Scenario 1 and Scenario 2 in identifying the additional analysis locations. Large traffic volume changes as a result of the 2005 Selected Alternative are indicative of potential microscale air quality impacts warranting detailed analysis. The following secondary road analysis sites were selected based on the results of the screening assessment of traffic volume changes:

- I-93 Exit 3 Southbound on ramp at NH 111
- NH 28 at Rockingham Park Boulevard
- NH 128 at NH 102

At each microscale receptor location, maximum 1-hour and 8-hour CO concentrations for the existing, No Build, and Build conditions were calculated. The air pollutant dispersion model CAL3QHC was used to simulate mathematically how traffic, emissions, meteorology, and geometry combine to affect pollutant concentrations. CAL3QHC predicted CO levels were then added to background levels to obtain the predicted total ambient concentrations at analyzed receptor locations for comparison with the NAAQS. Based on 2005-2007 New Hampshire monitoring data, the background concentration used in the 1-hr analysis was 4.5 ppm and the background concentration used in the 8-hr analysis was 2.2 ppm. The 2004 FEIS used a background concentration of 2.0 ppm for both the 1-hour and 8-hour analysis.

5.3.4 Regional Emissions Sensitivity Analysis

A sensitivity analysis was conducted to determine the effect of the Scenario 1 and Scenario 2 population and employment levels on the FY2007-2010 conformity analyses for CO and ozone nonattainment and maintenance areas in southern New Hampshire. The sensitivity analysis was proposed in response to the court order requirement that the DSEIS address the potential air quality effects of induced growth. The analysis methodology was agreed upon through coordination between FHWA, NHDOT, Nashua Regional Planning Commission (NRPC), Southern New Hampshire Planning Commission (SNHPC), and the Rockingham Planning Commission (RPC).

The FY2007-2010 regional emissions analyses are for the years 2017 and 2026 to coincide with the SIP years for emissions budgets under the Clean Air Act. The DSEIS future analysis years are 2020 (Scenario 1 and 2) and 2030 (Scenario 2 only). For the sensitivity analysis, 2020 Build population and employment data were used in the 2017 analysis and the 2030 Build population and employment data were used in the 2026 analysis. This is a conservative approach as the

2020 population and employment projections are greater than projected for 2017 and the population and employment projections for 2030 are greater than projected for 2026.

NRPC, SNHPC, and RPC each utilized the DSEIS Build population and employment levels for Scenario 1 and Scenario 2 as inputs in their regional transportation models. The resulting estimates of CO, VOC and NOx emissions for each Scenario and analysis year were provided to NHDOT for processing in order to generate results comparable to the FY2007-2010 conformity analysis. Appendix B: Air Quality Written Reevaluation/Technical Report provides the sensitivity analysis modeling results reported by NRPC, SNHPC, and RPC.

For CO, the geographic units of analysis were Manchester and Nashua, the two CO maintenance areas in New Hampshire. For VOCs and NOx, the geographic units of analysis were the former Southern Serious and Seacoast Serious 1-hour ozone nonattainment areas, and areas outside the Seacoast and Southern areas, but within the boundaries of the 8-hour ozone nonattainment area (See Figure 5-2). Since a SIP for the 8-hour ozone had not been approved or the motor vehicle emissions budgets found adequate by EPA at the time of the FY2007-2010 conformity analysis, NHDOT used the 1-hour mobile source emission budgets to demonstrate conformity for the Southern Serious and Seacoast Serious nonattainment areas. For the towns outside of the Southern and Seacoast nonattainment areas, but within the boundaries of the 8-hr nonattainment area, there was no approved emissions budget. For this area (includes Auburn, Bedford, Candia, Chester, Epping, Freemont, Goffstown, Hooksett, Manchester, and Raymond), conformity was demonstrated by showing that Build emissions would be less than 2002 baseline emissions and less than No Build emissions.

5.3.5 Mobile Source Air Toxics Analysis

A MSAT mesoscale analysis was conducted for the six priority MSATs: (1) benzene; (2) formaldehyde; (3) acetaldehyde; (4) diesel particulate matter/diesel exhaust organic gases; (5) acrolein; and (6) 1,3-butadiene. In accordance with the FHWA interim guidance on the analysis of MSATs in NEPA documents issued on February 3, 2006, a Level 3 quantitative analysis was performed. Traffic volumes on certain segments of I-93 have been projected to be at or near the 140,000 to 150,000 annual average daily traffic (AADT) thresholds for a Level 3 analysis. The analysis used the New Hampshire Statewide Model to identify those roadway links that had a 5 percent or greater change in the traffic volume between the No-Build and Build conditions, for Scenario 1 and Scenario 2, as recommended by FHWA. The emissions analyses were performed using MOBILE6.2 on the vehicle miles traveled (VMT) for these identified roadways links.

5.3.6 Tolling Sensitivity Analysis

The tolling sensitivity analysis framework is explained in Chapter 1: Introduction. For air quality, the tolling sensitivity analysis involved microscale carbon monoxide analysis and MSAT analysis for the Build with Toll condition for Scenario 2 (2020 and 2030).

The microscale carbon monoxide analysis utilized the same methodology as explained in Section 5.3.3. The traffic analysis for the Build with Toll condition included 18 intersections in the Exit 1 to Exit 3 area where diversions of traffic from I-93 to secondary roads were expected. Two intersections out of the 18 intersections were selected for the microscale carbon monoxide analysis. The intersections selected had the highest increase in traffic volumes under the Build with Toll condition in comparison to the Build without Toll condition. The two analysis sites are the intersection of the I-93 Exit 3 southbound ramp and NH 111 and the intersection of the I-93 Exit 2 southbound ramp and Pelham Road. Microscale analyses were not conducted for all 12 sites included in the DSEIS Scenario 1 and Scenario 2 No Build and Build analyses because the purpose of the tolling sensitivity analysis was to consider the potential impacts of tolling in the locations where these impacts would be the most likely. Based on the traffic analysis results which generally show traffic volume and congestion reductions in the I-93 corridor as a result of the toll, microscale analysis of additional sites was not warranted.

A quantitative MSAT analysis was conducted for the Build with Toll condition using the same methodology as described in Section 5.3.5. The MSAT analysis compares the change in emissions between the Build with Toll and Build without Toll conditions.

Regional emissions analyses for CO and ozone precursors were not conducted as part of the tolling sensitivity analysis. The purpose of the regional emissions sensitivity analysis included in the DSEIS was to determine the effect of Scenario 1 and Scenario 2 population and employment levels on the FY2007-2010 conformity analyses (see Section 5.3.4). It would be premature to conduct a similar sensitivity analysis for the Build with Toll condition because of the preliminary nature of the tolling proposal (e.g. Expression of Interest letter) and the fact that tolling on I -93 is not included in the long-range transportation plans for the region. If required, a regional emissions analysis would be conducted at the appropriate time prior to the approval of the proposed tolling, in accordance with transportation conformity requirements.

5.3.7 Greenhouse Gas Analysis

It is not useful or informative at this point to consider greenhouse gas emissions as part of the I-93 DSEIS. Climate change is inherently a global issue. The sources of greenhouse gas emissions that scientists believe are causing the current change in climate are from all over the world, and climate change does not easily lend itself to an analysis at a local level. Further, nothing in National Environmental Policy Act (NEPA) law explicitly requires an analysis of greenhouse gases at the project level and no national standards have been established. The 2009 New Hampshire Climate Change Action Plan contains recommended actions for reducing greenhouse gas emissions; it does not regulate greenhouse gas emissions or require greenhouse gas analysis of specific projects.

It is also not useful or informative to make greenhouse gas emission comparisons among the DSEIS analysis scenarios. Relative to the global scope of the problem of climate change, any difference in greenhouse gas emissions between Scenario 1 and Scenario 2 are not likely to be significant. The magnitude of the changes in climate caused by these scenarios and any corresponding impacts on environmental resources would be too small to measure, as current analytical tools are not sophisticated enough to accurately reflect such minute differences. Attributing any environmental consequence to the differences in emissions between Scenario 1 and Scenario 2 or assessing how each contributes to impacts occurring around the world is not possible in a meaningful way. As a result, the comparison of greenhouse gas emissions resulting from each analysis scenario will not provide information that will be helpful to the public or relevant to project decision-making.

Greenhouse gases are quantitatively and qualitatively different from other motor vehicle emissions, and their magnitude and breadth appear to require a different approach to address their potential climate impacts. First, pollutant emissions are of concern, and thus regulated, in individual metropolitan or smaller areas. The climate impacts of CO_2 emissions, on the other hand, are global in nature. From a NEPA perspective, it is analytically problematic to conduct a project level cumulative effects analysis of greenhouse gas emissions on a global-scale problem. Secondly, criteria pollutant emissions last in the atmosphere for perhaps months; CO_2 emissions remain in the atmosphere far longer - over 100 years - and therefore require a much more sustained, intergenerational effort. Finally, due to the interactions between elements of the transportation system as a whole, project-level emissions analyses would be less informative than ones conducted at regional, state, or national levels. Because of these concerns, Federal Highway Administration (FHWA) concludes that CO_2 emissions cannot be usefully evaluated in the same way as other vehicle emissions are addressed.

The NEPA process is meant to concentrate on the analyses of issues that can be truly meaningful to the consideration of project alternatives, rather than simply "amassing" data. In the absence of a regional or national framework for considering the implications of a project-level greenhouse gas analysis, such an analysis would not inform project decision-making, while adding to the administrative burden.

5.4 Existing Conditions

CO concentrations at the 12 microscale analysis locations for 2005 are reported in Table 5-1. The existing estimated concentrations are all below the NAAQS.

Table 5-1
2005 Existing Conditions
Predicted Maximum 1-Hour and 8-Hour CO Concentrations (Parts Per Million)

Site Number	Site Name	1-Hour CO Concentration[1]	8-Hour CO Concentration[2]
1	Fordway Extension and NH 102	6.80	3.81
2	I-93 Exit 3 Northbound Ramp and NH 111	9.00	5.35
3	I-93 Exit 3 Southbound Ramp and NH 111	7.40	4.23
4	I-93 Exit 2 Southbound Ramp and Pelham Road	9.60	5.77
5	I-93 Exit 2 Northbound Ramp and Pelham Road	10.10	6.12
6	I-93 Right-of-Way near Mass Border	7.40	4.23
7*	Route 28A at Huse Road	7.40	4.23
8*	Route 28A at Cilley Road	7.80	4.51
9*	Route 28A at Candia Road	8.10	4.72
10*	Route 28A at Massabesic Road	8.20	4.79
11	NH Route 28 and Rockingham Park Boulevard	8.60	5.07
12	NH Route 128 and NH 102	7.70	4.44

1. The 1-hour CO NAAQS is 35 ppm. The reported concentrations include a background concentration of 4.5 ppm (2005 ~ 2007 monitoring data).
2. The 8-hour CO NAAQS is 9 ppm. The reported concentrations include a background concentration of 2.2 ppm (2005 ~ 2007 monitoring data).

* Site located in Manchester CO maintenance area.

5.5 Impacts

5.5.1 Scenario 1 (Delphi Panel Blended Average Allocation)

<u>Microscale Carbon Monoxide Analysis</u>

The results of the microscale air quality analysis show that the concentrations estimated for all locations analyzed were below the NAAQS. The predicted maximum 1-hour and 8-hour concentrations for 2020 are presented in the Table 5-2. For the analysis locations in Manchester (a maintenance area for CO), the results demonstrate that the 2005 Selected Alternative would not create new violations of NAAQS, or worsen existing violations. Therefore, it complies with the transportation conformity regulations for CO hotspot analysis.

For both the 1-hr and 8-hr analyses, the results show locations with small increases in CO concentrations as a result of the 2005 Selected Alternative, and other locations with relatively no change in CO concentrations. However, as shown in Table 5-2, none of the increases in CO concentrations are enough to exceed the NAAQS.

Table 5-2
Scenario 1 (2020 Delphi Panel Blended Average Allocation)
Predicted Maximum 1-Hour and 8-Hour CO Concentrations (Parts Per Million)

Site Number	Site Name	1-Hour CO Concentrations[1]		8-Hour CO Concentrations[2]	
		No Build	Build	No Build	Build
1	Fordway Extension and NH 102	5.70	5.80	3.04	3.11
2	I-93 Exit 3 Northbound Ramp and NH 111	6.90	7.00	3.88	3.95
3	I-93 Exit 3 Southbound Ramp and NH 111	6.20	7.40	3.39	4.23
4	I-93 Exit 2 Southbound Ramp and Pelham Road	8.60	9.80	5.07	5.91
5	I-93 Exit 2 Northbound Ramp and Pelham Road	8.20	11.30	4.79	6.96
6	I-93 Right-of-Way near Mass Border	6.30	6.70	3.46	3.74
7*	Route 28A at Huse Road	5.60	6.30	2.97	3.46
8*	Route 28A at Cilley Road	5.70	6.20	3.04	3.39
9*	Route 28A at Candia Road	5.90	6.50	3.18	3.60
10*	Route 28A at Massabesic Road	5.80	6.10	3.11	3.32
11	NH Route 28 and Rockingham Park Boulevard	7.60	7.60	4.37	4.37
12	NH Route 128 and NH 102	6.00	6.00	3.25	3.25

1. The 1-hour CO NAAQS is 35 ppm. The reported concentrations include a background concentration of 4.5 ppm (2005 ~ 2007 monitoring data).
2. The 8-hour CO NAAQS is 9 ppm. The reported concentrations include a background concentration of 2.2 ppm (2005 ~ 2007 monitoring data).

* Site located in Manchester CO maintenance area.

Regional Emissions Sensitivity Analysis

This section summarizes the results of the regional emissions sensitivity analysis for Scenario 1. Detailed results tables and supporting documentation are provided in Appendix B: Air Quality Written Re-evaluation/Technical Report. Note that a widened I-93 (four-lanes in each direction) is included in both the FY2007-2010 conformity analysis and the sensitivity analysis conducted for this DSEIS. Therefore, the differences between the results of the FY2007-2010 conformity analysis and the sensitivity analysis are attributable to differences in the magnitude and distribution of future population and employment.

Carbon Monoxide
The results of the CO sensitivity analysis results for Manchester and Nashua show that total CO emissions for Scenario 1 would be well under the CO emissions budgets. In Manchester, emissions under Scenario 1 would be about 4.45 tons per day higher than the total emissions of 24.6 tons per day predicted by the FY2007-2010 conformity analysis, an 18 percent increase. The CO emissions budget for Manchester is 55.83 tons per day. In Nashua, emissions under Scenario 1 would be about 6.49 tons per day higher than the total emissions of 23.40 tons per day predicted by the FY2007-2010 conformity analysis, a 28 percent increase. The CO emissions budget for Nashua is 60.13 tons per day. Figures 5-3 and 5-4 summarize the results of the CO sensitivity analysis for Manchester and Nashua, respectively.

Ozone

The results of the VOC and NOx sensitivity analyses for the Southern Serious and Seacoast Serious nonattainment areas show that total VOC and NOx emissions for Scenario 1 would be well under their respective emissions budgets.

In the Southern Serious nonattainment area, VOC emissions under Scenario 1 would be 0.58 tons per day higher than the total emissions of 3.62 tons per day predicted by the FY2007-2010 conformity analysis, a 16 percent increase. The VOC emissions budget for the Southern Serious nonattainment area is 10.72 tons per day. NOx emissions would be 0.68 tons per day higher than the total emissions of 5.20 tons per day predicted by the FY2007-2010 conformity analysis, a 13 percent increase. The NOx emissions budget for the Southern Serious nonattainment area is 21.37 tons per day. The emissions estimates for the Southern Serious nonattainment area in Scenario 1 include the induced growth added to the towns of Londonderry, Derry, Windham, Pelham, Salem, Sandown, Atkinson, and Danville by the Delphi PBAA. Figures 5-5 and 5-6 summarize the results of the Southern Serious nonattainment area sensitivity analysis for VOC and NOx, respectively.

The former Seacoast Serious nonattainment area does not include any of the towns in the Delphi panel study area (Scenario 1). The sensitivity analysis results for this area show that emissions would differ by less than one percent under Scenario 1 compared to the FY2007-2010 conformity analysis. As shown in Figure 5-2, the former Seacoast Serious nonattainment area is a substantial distance from the I-93 corridor. The detailed emissions estimates for the former Seacoast Serious nonattainment area are provided in Appendix B: Air Quality Written Reevaluation/Technical Report.

For the nonattainment area outside of the Southern and Seacoast budget areas, but within the 8-hr nonattainment area, the sensitivity analysis results show that total emissions would be less than the 2002 baseline emissions, which were 8.21 tons/day for VOCs and 14.82 tons/day for NOx. Under Scenario 1, emissions would be less than one percent higher than the FY2007-2010 conformity analysis for 2017. The detailed emissions estimates for the nonattainment area outside of the Southern and Seacoast budget areas are provided in Appendix B: Air Quality Written Reevaluation/Technical Report.

<u>Mobile Source Air Toxics Analysis</u>

Table 5-3 shows that mesoscale MSAT emissions are estimated to decrease between 2005 existing conditions and 2020 No Build conditions under Scenario 1. These reductions reflect the effects of phased increases in fuel content and engine operation standards (e.g. new standards that reduce MSAT emissions). As a result of project related reductions in congested operating conditions, additional emission reductions over the No Build condition would occur with the 2005 Selected Alternative in Scenario 1, however, the effect is very small in comparison to fuel and engine standard-related reductions expected under the No Build.

Table 5-3
Scenario 1
Mobile Source Air Toxic Emissions

Pollutant	Change in Emissions between 2005 Existing Conditions and 2020 No Build (lbs per day)	Change in Emissions between 2020 No Build and 2020 Build (lbs per day)
1,3 Butadiene	-632.60	-4.34
Formaldehyde	-1,381.05	-12.61
Acetaldehyde	-509.76	-3.96
Acrolein	-70.01	-0.61
Benzene	-5,226.47	-29.19
MTBE	-120.48	-4.00

5.5.2 Scenario 2 (Current State Projections)

Microscale Carbon Monoxide Analysis

The results of the microscale air quality analysis show that the concentrations estimated for all locations analyzed were below the NAAQS. The predicted maximum 1-hour and 8-hour concentrations for 2020 and 2030 are presented in the Tables 5-4 and Table 5-5. For the analysis locations in Manchester (a maintenance area for CO), the results demonstrate that the 2005 Selected Alternative would not create new violations of NAAQS, or worsen existing violations. Therefore, it complies with the transportation conformity regulations for CO hotspot analysis.

For both the 1-hr and 8-hr analyses, the results show locations with small increases in CO concentrations as a result of the 2005 Selected Alternative, and other locations with other locations with relatively no change in CO concentrations. However, as shown in the tables mentioned above, none of the increases in CO concentrations are enough to exceed the NAAQS.

Table 5-4
Scenario 2, 2020
Predicted Maximum 1-Hour and 8-Hour CO Concentrations (Parts Per Million)

Site Number	Site Name	1-Hour CO Concentrations[1]		8-Hour CO Concentrations[2]	
		No Build	Build	No Build	Build
1	Fordway Extension and NH 102	5.60	5.50	2.97	2.90
2	I-93 Exit 3 Northbound Ramp and NH 111	6.80	6.90	3.81	3.88
3	I-93 Exit 3 Southbound Ramp and NH 111	6.10	7.10	3.32	4.02
4	I-93 Exit 2 Southbound Ramp and Pelham Road	7.10	7.10	4.02	4.02
5	I-93 Exit 2 Northbound Ramp and Pelham Road	7.60	9.70	4.37	5.84
6	I-93 Right-of-Way near Mass Border	6.20	6.30	3.39	3.46
7*	Route 28A at Huse Road	5.80	5.90	3.11	3.18
8*	Route 28A at Cilley Road	5.70	5.90	3.04	3.18
9*	Route 28A at Candia Road	6.00	6.20	3.25	3.39
10*	Route 28A at Massabesic Road	5.90	6.30	3.18	3.46
11	NH Route 28 and Rockingham Park Boulevard	7.20	7.10	4.09	4.02
12	NH Route 128 and NH 102	5.90	5.90	3.18	3.18

1. The 1-hour CO NAAQS is 35 ppm. The reported concentrations include a background concentration of 4.5 ppm (2005 ~ 2007 monitoring data).
2. The 8-hour CO NAAQS is 9 ppm. The reported concentrations include a background concentration of 2.2 ppm (2005 ~ 2007 monitoring data).

* Site located in Manchester CO maintenance area.

Table 5-5
Scenario 2, 2030
Predicted Maximum 1-Hour and 8-Hour CO Concentrations (Parts Per Million)

Site Number	Site Name	1-Hour CO Concentrations[1]		8-Hour CO Concentrations[2]	
		No Build	Build	No Build	Build
1	Fordway Extension and NH 102	5.50	5.50	2.90	2.90
2	I-93 Exit 3 Northbound Ramp and NH 111	7.20	7.10	4.09	4.02
3	I-93 Exit 3 Southbound Ramp and NH 111	6.20	7.50	3.39	4.30
4	I-93 Exit 2 Southbound Ramp and Pelham Road	7.40	8.40	4.23	4.93
5	I-93 Exit 2 Northbound Ramp and Pelham Road	7.20	10.70	4.09	6.54
6	I-93 Right-of-Way near Mass Border	6.20	6.60	3.39	3.67
7*	Route 28A at Huse Road	5.90	5.90	3.18	3.18
8*	Route 28A at Cilley Road	5.80	5.90	3.11	3.18
9*	Route 28A at Candia Road	5.90	6.30	3.18	3.46
10*	Route 28A at Massabesic Road	5.90	6.60	3.18	3.67
11	NH Route 28 and Rockingham Park Boulevard	7.20	7.00	4.09	3.95
12	NH Route 128 and NH 102	5.90	5.80	3.18	3.11

1. The 1-hour CO NAAQS is 35 ppm. The reported concentrations include a background concentration of 4.5 ppm (2005 ~ 2007 monitoring data).
2. The 8-hour CO NAAQS is 9 ppm. The reported concentrations include a background concentration of 2.2 ppm (2005 ~ 2007 monitoring data).

* Site located in Manchester CO maintenance area.

Regional Emissions Sensitivity Analysis

This section summarizes the results of the regional emissions sensitivity analysis for Scenario 2. Detailed results tables and supporting documentation are provided in Appendix B: Air Quality Written Re-evaluation/Technical Report. Note that a widened I-93 is included in both the FY2007-2010 conformity analysis and the sensitivity analysis conducted for this DSEIS. Therefore, the differences between the results of the FY2007-2010 conformity analysis and the sensitivity analysis are attributable to differences in the magnitude and distribution of future population and employment.

Carbon Monoxide
The results of the CO sensitivity analysis results for Manchester and Nashua show that total CO emissions for Scenario 2 would be well under the CO emissions budgets. In Manchester, emissions under Scenario 2 would be about 2.18 tons per day higher than the total emissions of 24.66 tons per day predicted by the FY2007-2010 conformity analysis in 2017 (a 9 percent increase), and 1.87 tons per day higher than the total emissions of 24.49 tons per day predicted by the FY2007-2010 conformity analysis in 2026 (a 8 percent increase). The CO emissions budget for Manchester is 55.83 tons per day. In Nashua, emissions under Scenario 2 would be about 7.04 tons per day higher than the total emissions of 23.40 tons per day predicted by the FY2007-2010 conformity analysis in 2017 (a 30 percent increase) and 2.57 tons per day higher than the total emissions of 23.56 tons per day predicted by the FY2007-2010 conformity analysis in 2026 (a 11 percent increase). The CO emissions budget for Nashua is 60.13 tons per day. Figures 5-3 and 5-4 summarize the results of the CO sensitivity analysis for Manchester and Nashua, respectively.

Ozone
The results of the VOC and NOx sensitivity analysis for the Southern Serious and Seacoast Serious nonattainment areas show that total VOC and NOx emissions for Scenario 2 would be well under their respective emissions budgets.

In the Southern Serious nonattainment area in 2017, VOC emissions under Scenario 2 would be 0.52 tons per day higher than the total emissions of 3.62 tons per day predicted by the FY2007-2010 conformity analysis (a 14 percent increase). The VOC emissions budget for the Southern Serious nonattainment area is 10.72 tons per day. NOx emissions in 2017 would be 0.59 tons per day higher than the total emissions of 5.20 tons per day predicted by the FY2007-2010 conformity analysis (a 11 percent increase). The NOx emissions budget for the Southern Serious nonattainment area is 21.37 tons per day. By 2026 the difference between the Scenario 2 emissions estimates and the FY2007-2010 conformity analysis would decrease to 8 percent for VOC and 3 percent for NOx. The sensitivity analysis emissions estimates for the Southern Serious nonattainment area include the accessibility based estimates of induced population and employment growth in I-93 corridor towns such as Derry, Londonderry, Windham, and Salem. Figures 5-5 and 5-6 summarize the results of the Southern Serious nonattainment area sensitivity analysis for VOC and NOx, respectively.

The Scenario 2 accessibility analysis showed that the 2005 Selected Alternative would have very little effect on the Seacoast Serious nonattainment area (increases or decreases in population and employment of less than one percent compared to the No Build). The sensitivity analysis results for this area show that emissions would differ by two percent or less under Scenario 2 compared to the FY2007-2010 conformity analysis. As shown in Figure 5-2, the former Seacoast Serious nonattainment area is a substantial distance from the I-93 corridor. The detailed emissions estimates for the former Seacoast Serious nonattainment area are provided in Appendix B: Air Quality Written Reevaluation/Technical Report.

For the nonattainment area outside of the Southern and Seacoast budget areas, but within the 8-hr nonattainment area, the sensitivity analysis results show that total emissions would be less than the 2002 baseline emissions, which were 8.21 tons/day for VOCs and 14.82 tons/day for NOx. Under Scenario 2, emissions would be approximately eight percent lower than the FY2007-2010 conformity analysis for both 2017 and 2026. The detailed emissions estimates for the nonattainment area outside of the Southern and Seacoast budget areas are provided in Appendix B: Air Quality Written Reevaluation/Technical Report.

<u>Mobile Source Air Toxics Analysis</u>

Table 5-6 shows that mesoscale MSAT emissions are estimated to decrease between 2005 existing conditions and 2020 No Build conditions under Scenario 2. These reductions reflect the effects of phased increases in fuel content and engine operation standards (e.g. new standards that reduce MSAT emissions). As a result of project related reductions in congested operating conditions, additional emission reductions over the No Build condition would occur with the 2005 Selected Alternative in Scenario 2. However, the effect is very small in comparison to fuel and engine standard-related reductions expected under the No Build. Mesoscale MSAT emissions would continue to decrease between 2020 and 2030 under 2005 Selected Alternative in Scenario 2.

Table 5-6
Scenario 2 (2020 and 2030 Current State Projections)
Mobile Source Air Toxic Emissions

Pollutant	Change in Emissions between 2005 Existing Conditions and 2020 No Build (lbs per day)	Change in Emissions between 2020 No Build and 2020 Build (lbs per day)	Change in Emissions between 2020 Build and 2030 Build (lbs per day)
1,3 Butadiene	-642.69	-1.05	-10.23
Formaldehyde	-1,407.56	-3.98	-16.23
Acetaldehyde	-518.89	-1.01	-6.92
Acrolein	-71.17	-0.23	-0.96
Benzene	-5,309.10	-2.71	-105.99
MTBE	-123.66	-2.97	-3.96

5.5.3 Tolling Sensitivity Analysis

Tables 5-7 and 5-8 present the results of the microscale carbon monoxide analysis comparing the Build with Toll condition to the Build without Toll condition. The results show that the concentrations estimated for all locations analyzed are below the NAAQS in the Build with Toll condition.

Table 5-7
Tolling Sensitivity Analysis, 2020
Predicted Maximum 1-Hour and 8-Hour CO Concentrations (Parts Per Million)

Site Number	Site Name	1-Hour CO Concentrations[1]		8-Hour CO Concentrations[2]	
		Build without Toll	Build with Toll	Build without Toll	Build with Toll
3	I-93 Exit 3 Southbound Ramp and NH 111	7.1	6.3	4.02	3.46
4	I-93 Exit 2 Southbound Ramp and Pelham Road	7.1	8.0	4.02	4.65

1. The 1-hour CO NAAQS is 35 ppm. The reported concentrations include a background concentration of 4.5 ppm (2005 ~ 2007 monitoring data).
2. The 8-hour CO NAAQS is 9 ppm. The reported concentrations include a background concentration of 2.2 ppm (2005 ~ 2007 monitoring data).

Table 5-8
Tolling Sensitivity Analysis, 2030
Predicted Maximum 1-Hour and 8-Hour CO Concentrations (Parts Per Million)

Site Number	Site Name	1-Hour CO Concentrations[1]		8-Hour CO Concentrations[2]	
		Build without Toll	Build with Toll	Build without Toll	Build with Toll
3	I-93 Exit 3 Southbound Ramp and NH 111	7.5	6.6	4.30	3.67
4	I-93 Exit 2 Southbound Ramp and Pelham Road	8.4	8.3	4.93	4.86

1. The 1-hour CO NAAQS is 35 ppm. The reported concentrations include a background concentration of 4.5 ppm (2005 ~ 2007 monitoring data).
2. The 8-hour CO NAAQS is 9 ppm. The reported concentrations include a background concentration of 2.2 ppm (2005 ~ 2007 monitoring data).

Table 5-9 provides the results of the MSAT analysis comparing the Build with Toll and Build without Toll conditions. The toll results in regional reductions in VMT, which in turn leads to reduced MSAT emissions in the Build with Toll condition in both 2020 and 2030. The MSAT emissions reductions are very small in comparison to reductions expected between 2005 and 2020 under the No Build condition (see Table 5-6).

Table 5-9
Tolling Sensitivity Analysis
Mobile Source Air Toxic Emissions, 2020 and 2030

Pollutant	Change in Emissions between Build without Toll and Build with Toll Conditions (lbs/day)	
	2020	2030
1,3 Butadiene	-1.42	-1.28
Formaldehyde	-3.71	-3.43
Acetaldehyde	-1.28	-1.17
Acrolein	-0.16	-0.15
Benzene	-11.51	-10.30
MTBE	-0.37	-0.37

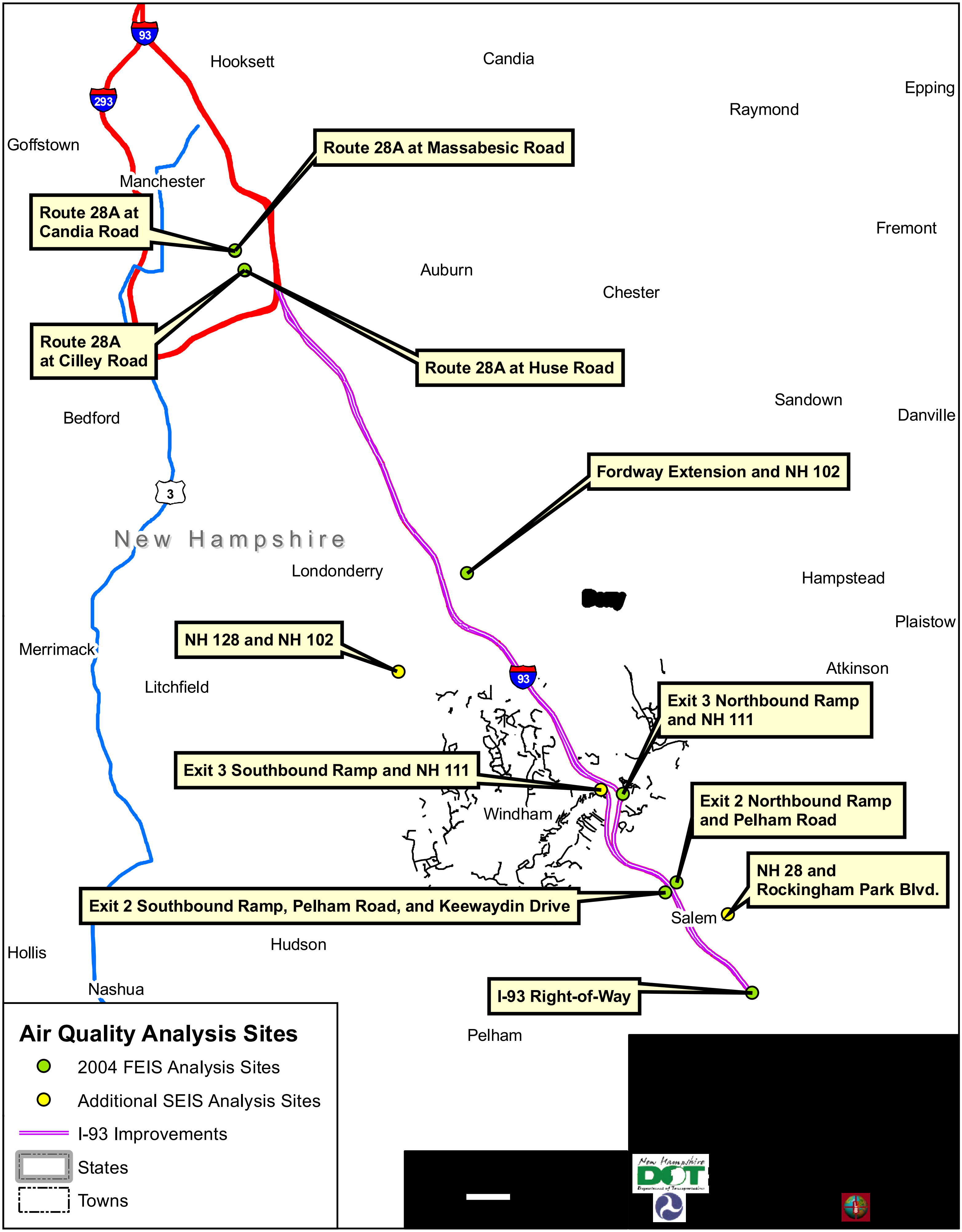
5.6 Mitigation

As no new adverse air quality impacts were identified by the DSEIS air quality analyses, no new air quality mitigation measures are necessary or proposed. The air quality commitments from the 2004 FEIS and Record of Decision (Section 5.2.3) remain valid.

5.7 Conclusions

The DSEIS air quality analyses show that the 2005 Selected Alternative would not contribute to any exceedences of the NAAQS for CO under all of the DSEIS population and employment scenarios, including at three new analysis locations along the secondary road network. The 2005 Selected Alternative is in compliance with 40 CFR Part 93, the Clean Air Act Amendments and the New Hampshire SIP. The 2005 Selected Alternative is included in the currently conforming MPO plans and TIPs per 40 CFR 93.115. The regional emissions sensitivity analysis shows that the various DSEIS population and employment scenarios would not alter the conclusions of the FY2007-2010 regional emissions conformity analyses—emissions would continue to be well below the applicable CO, VOC and NOx budgets. Finally, the MSAT analysis shows that MSAT emissions will decrease in the future under the No Build condition and decrease even further with the implementation of the 2005 Selected Alternative.

The tolling sensitivity analysis for air quality demonstrates that the proposed tolling would not result in exceedences of the NAAQS for CO at congested intersections in the I-93 corridor. In addition, the regional effects of the toll on traffic patterns would reduce MSAT emissions.



93
293
3
Hooksett
Candia
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New Hampshire
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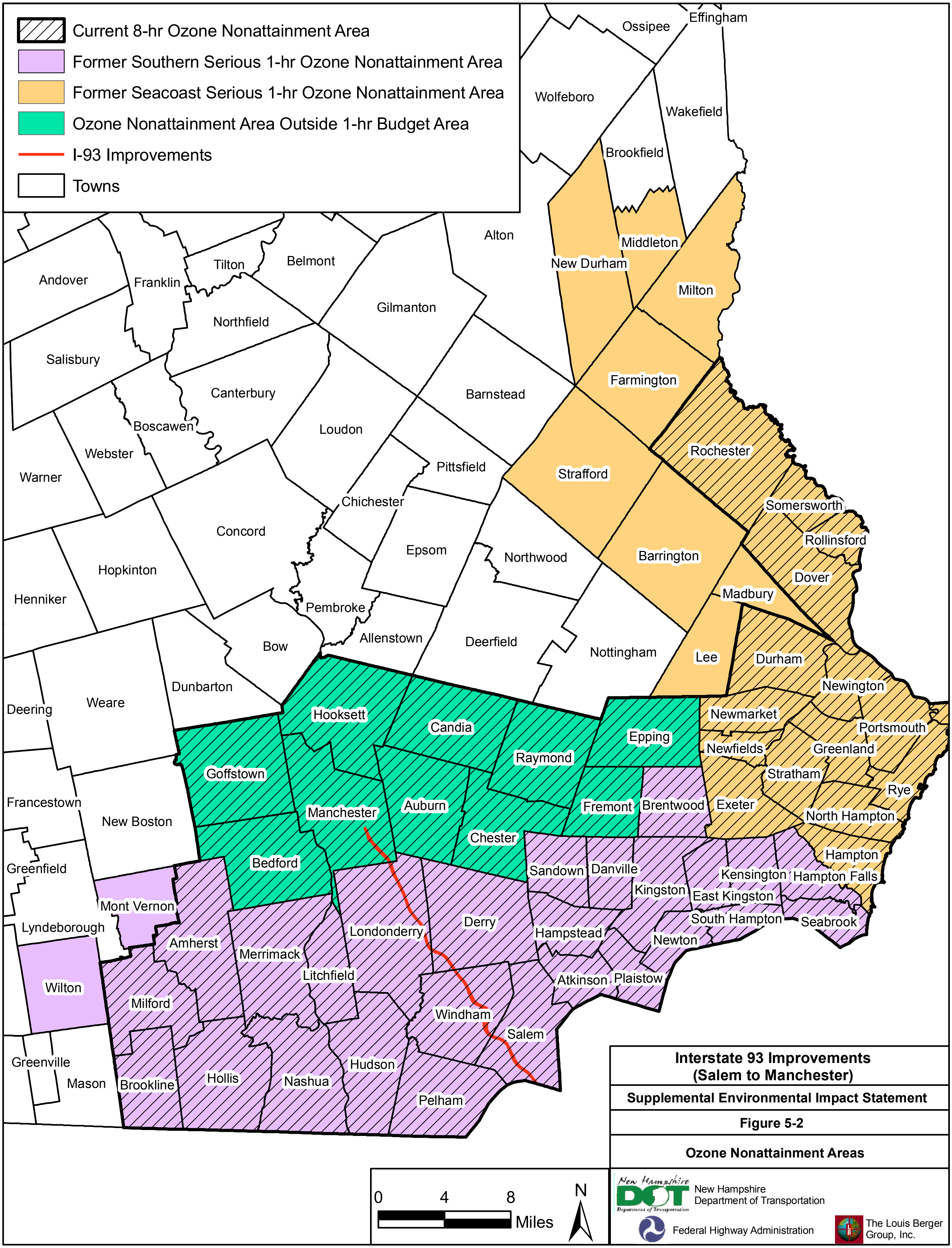
Merrimack
Litchfield
Atkinson
Windham
Salem
Hollis
Hudson
Nashua
Pelham
Route 28A at Massabesic Road
Route 28A at Candia Road
Route 28A at Cilley Road
Route 28A at Huse Road
Fordway Extension and NH 102
NH 128 and NH 102
Exit 3 Northbound Ramp and NH 111
Exit 3 Southbound Ramp and NH 111
Exit 2 Northbound Ramp and Pelham Road
NH 28 and Rockingham Park Blvd.
Exit 2 Southbound Ramp, Pelham Road, and Keewaydin Drive
I-93 Right-of-Way
Air Quality Analysis Sites
2004 FEIS Analysis Sites
Additional SEIS Analysis Sites
I-93 Improvements
States
Towns
[redacted]
New Hampshire DOT



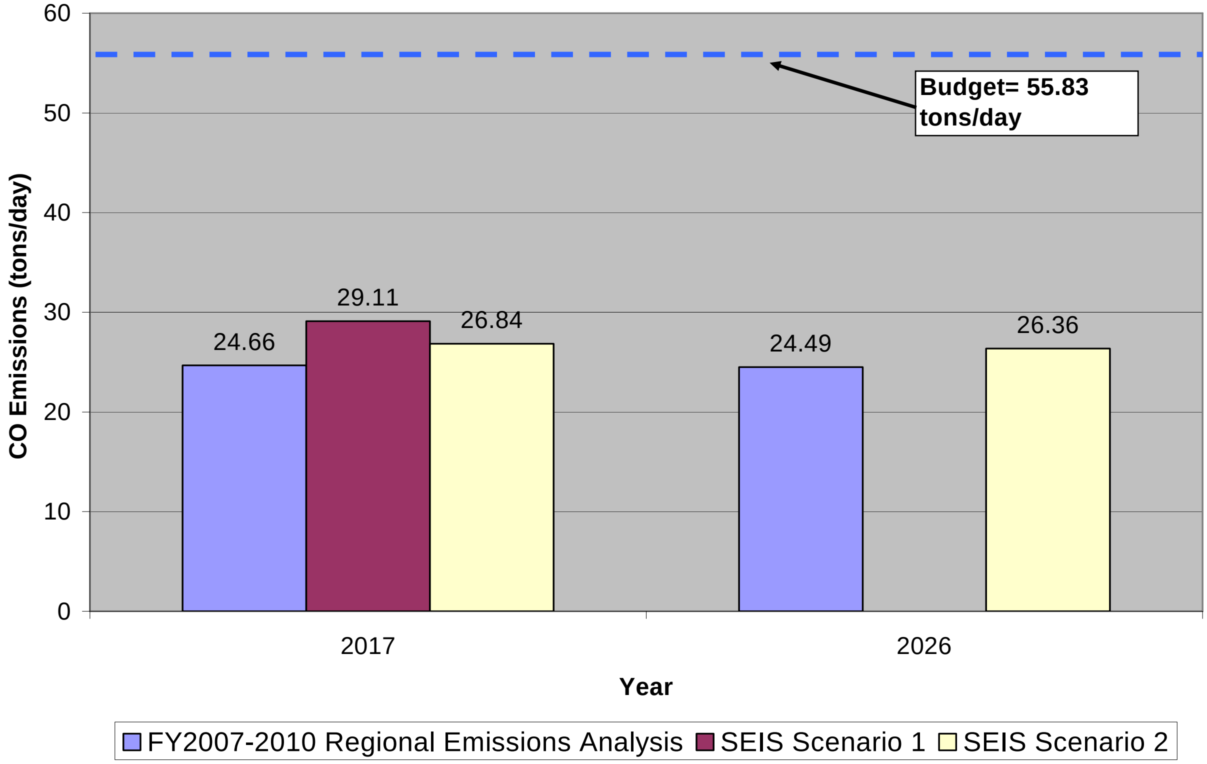
Interstate 93 Improvements (Salem to Manchester)

Supplemental Environmental Impact Statement

Figure 5-2

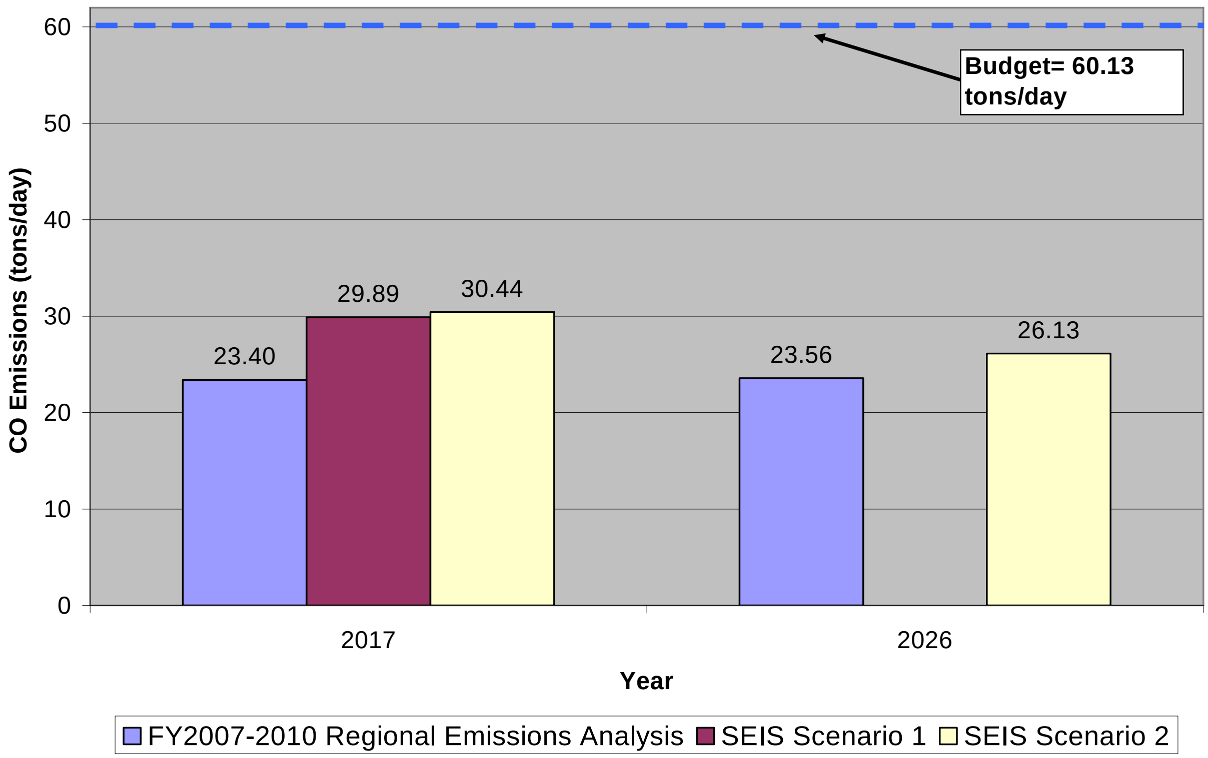
Ozone Nonattainment Areas

Figure 5-3
Manchester CO Sensitivity Analysis, 2017 and 2026



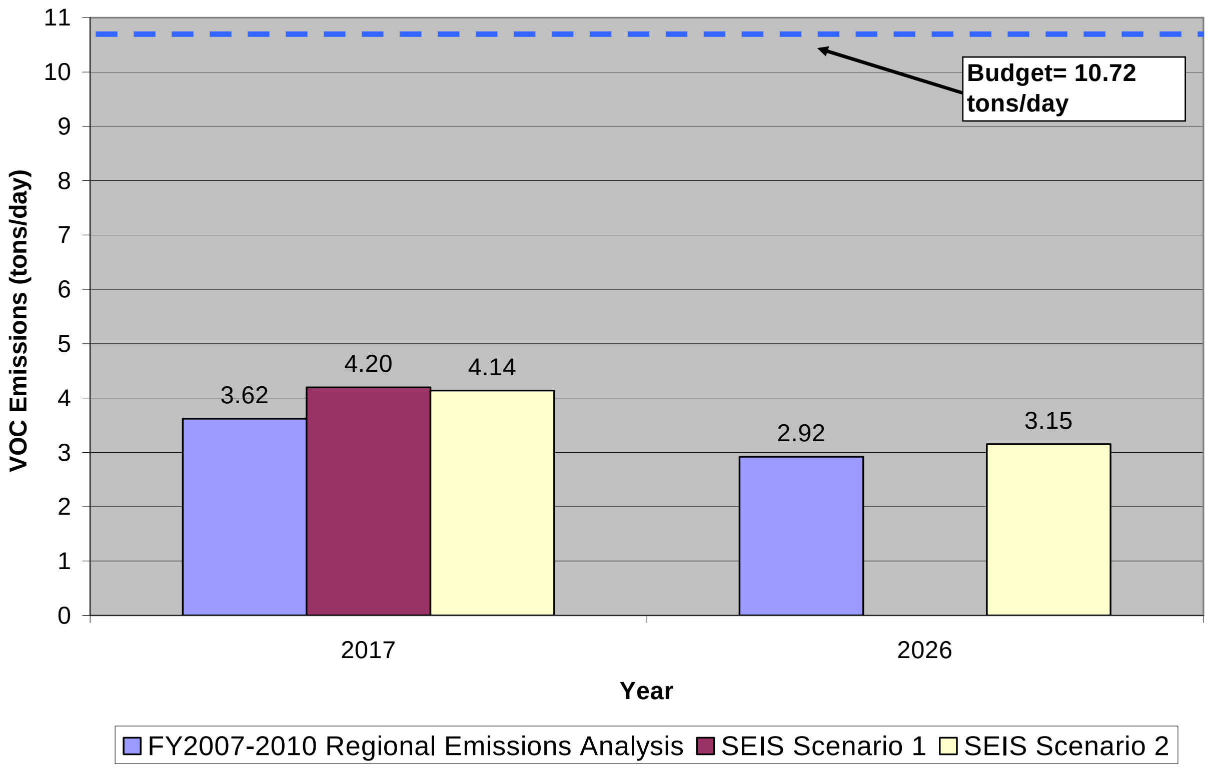
Note: There is no 2026 analysis for Scenario 1 because the Delphi Panel was based on a 2020 analysis year.

Figure 5-4
Nashua CO Sensitivity Analysis, 2017 and 2026



Note: There is no 2026 analysis for Scenario 1 because the Delphi Panel was based on a 2020 analysis year.

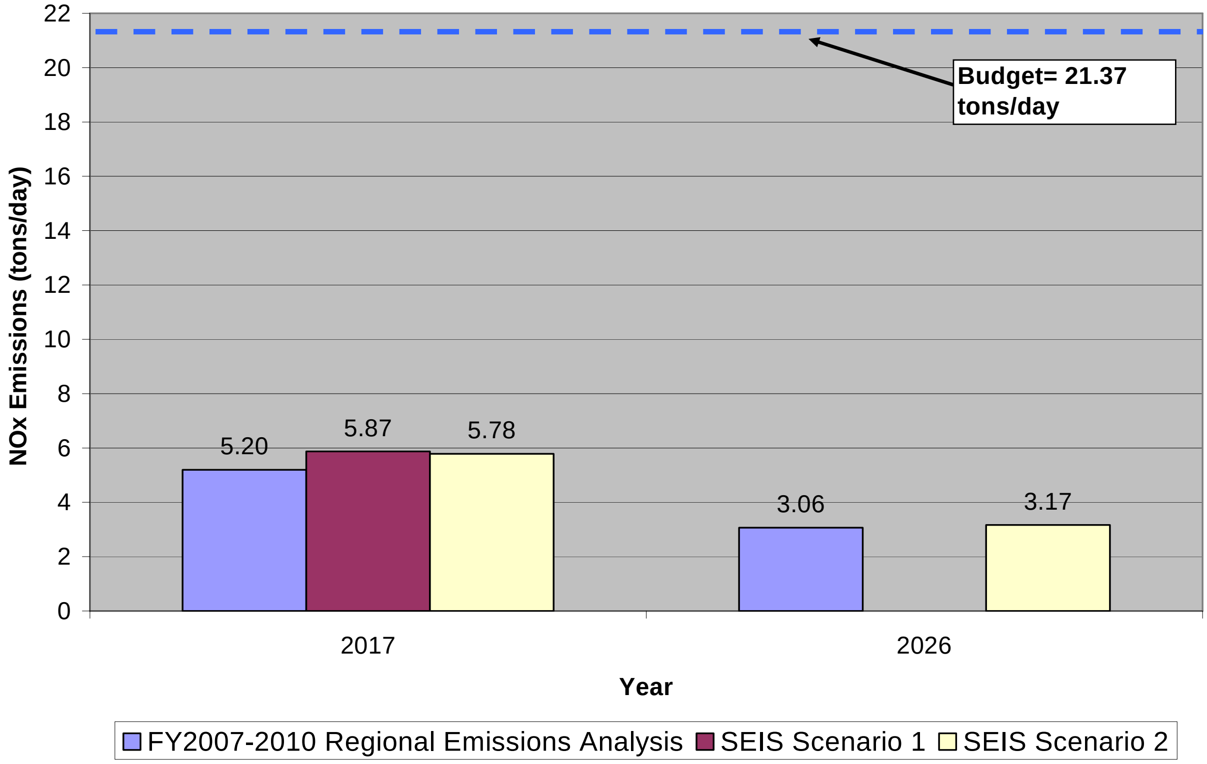
Figure 5-5
Southern Serious (Boston-Lawrence-Worcester NH) Nonattainment Area
VOC Sensitivity Analysis, 2017 and 2026



Notes: There is no 2026 analysis for Scenario 1 because the Delphi Panel was based on a 2020 analysis year.

The VOC emissions budget is the previous 1-hour emissions budget.

Figure 5-6
Southern Serious (Boston-Lawrence-Worcester NH) Nonattainment Area
NOx Sensitivity Analysis, 2017 and 2026



Note: There is no 2026 analysis for Scenario 1 because the Delphi Panel was based on a 2020 analysis year.

The NOx emissions budget is the previous 1-hour emissions budget.