APPENDIX B

AIR QUALITY
WRITTEN REEVALUATION/TECHNICAL REPORT

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1.0 INTRODUCTION

In April 2004, the New Hampshire Department of Transportation (NHDOT) and the Federal Highway Administration (FHWA) issued a Final Environmental Impact Statement (FEIS) proposing the widening of I-93 to four-lanes in each direction between Salem and Manchester. On June 28, 2005, FHWA issued a Record of Decision (ROD) approving the proposed alternative (hereinafter referred to as "the Project"). The Conservation Law Foundation subsequently challenged the ROD in U.S. District Court, contending that NHDOT and FHWA violated the National Environmental Policy Act, 42 U.S.C. § 4321 *et seq.* and the Federal-Aid Highway Act, 23 U.S.C. § 101 *et seq.*

A "Memorandum and Order" was issued on August 30, 2007 by the United States District Court for the District of New Hampshire on the case of the Conservation Law Foundation v. Federal Highway Administration and New Hampshire Department of Transportation (*Case No. 06-cv-45-PB and Opinion No. 2007 DNH 106;* hereinafter referred to as "the Order"). The Order directed NHDOT and FHWA to prepare

> "…an SEIS that specifically considers how the Delphi Panel's population forecasts affect Defendants' analysis of both the effectiveness of the Four Lane Alternative as a traffic congestion reduction measure and the indirect effects of the additional population predicted by those forecasts on secondary road traffic and air quality issues." [pp. 85-86]

NHDOT and FHWA are preparing a Draft Supplemental Environmental Impact Statement (DSEIS) on the Project to address the Order, specifically, and to generally supplement the Project's FEIS consistent with the guidance of FHWA Technical Advisory, entitled, "Guidance for Preparing and Processing Environmental and Section 4(f) Documents", dated October 30, 1987 (T6640.8a), relative to changes, new information, or further developments subsequent to the FEIS.

1.1 Purpose

This Written Re-evaluation/Technical Report has been prepared to: (1) identify whether or not there have been changes, new information, or further developments relevant to the Project's air quality effects subsequent to the FEIS as a result of the Order; and (2) using this identification, assess whether new or updated analyses of the Project's air quality effects are warranted.

1.2 Methodology and Approach

The following methodology and approach was used to evaluate if changes or updates to the analyses described for each respective environmental resource area analyzed in the 2004 FEIS will be required:

- Identify and describe previous analysis methods and criteria used to assess impacts;
- Describe current analysis methods, regulations and guidelines, industry standards, and criteria used to assess impact significance;
- Identify changes in analysis methods, regulations and guidelines, industry standards, and criteria used to assess impact significance;

- Reanalyze the effects of the proposed project using the Delphi Panel's population and employment projections as well as the latest New Hampshire Office of Energy and Planning (OEP) projections with respect to traffic and air quality. Update the results of the other resource categories as warranted when substantial changes to the impact assessment methods or protocols, industry standards or guidelines, and applicable federal, state, or local government regulations have been identified; and
- Include a summary of findings from these evaluations as part of a stand-alone technical report for each resource category. Each technical report includes a section that provides an overview of the previous analysis methods and criteria used to assess impacts, the results and mitigation recommended in the 2004 FEIS, as well as any changes to the analysis methods, regulations, guidelines, industry standards or criteria used to assess impact significance that have been identified with the updated results. The findings described in each technical report will be incorporated into the Draft SEIS (DSEIS). Refer to Sections 2.1, 2.2, 2.3 and 2.4 for specific details.

2.0 Air Quality

2.1 2004 Analysis Methods & Prevailing Regulations/Guidelines

2.1.1 Microscale Carbon Monoxide Analysis

The 2004 FEIS analyzed microscale CO impacts 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, the following nine (9) microscale CO analysis sites were analyzed:

1) I-93 Exit 2 southbound off-ramp at Pelham Rd (NH97) and Keewaydin Drive;
2) I-93 Exit 2 northbound off-ramp at Pelham Rd (NH97);
3) I-93 Exit 3 northbound off-ramp; at NH111;
4) Fordway and NH102;
5) Route 28A at Huse Road;
6) Route 28A at Cilley Road;
7) Route 28A at Candia Road;
8) Route 28A at Massabesic Road;
9) Along ROW south of Exit 1.

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).

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).

2.1.2 Regional Conformity

At the time of the 2004 FEIS, the towns of Salem, Windham, Derry, and Londonderry were part of the Southern New Hampshire one-hour ozone nonattainment area, which was classified as "Serious." The City of Manchester was located in the Manchester one-hour ozone nonattainment area, which was classified as "Marginal." In addition, the City of Manchester and the City of Nashua were classified as maintenance areas for CO effective January 29, 2001. Maintenance areas are established when former nonattainment areas are reclassified as attainment areas meeting the NAAQS. State Implementation Plans (SIPs) are developed for nonattainment and maintenance areas, and include emissions budgets needed to conform with the NAAQS. For ozone, emissions budgets are established for two precursor pollutants that are known to result in

ozone formation in the atmosphere- volatile organic compounds (VOCs) and nitrous oxides (NOx). For CO, emissions budgets are established only for direct CO.

The U.S. Department of Transportation (DOT) and the Environmental Protection Agency (EPA) have established conformity procedures in 40 CFR Parts 51 and 93 to ensure that transportation projects are in compliance with State Implementation Plans (SIPs) for nonattainment and maintenance areas. Transportation conformity requires that proposed transportation projects be part of a Metropolitan Planning Organization (MPO) adopted Transportation Plan (plan) and Transportation Improvement Program (TIP) for urbanized areas and that the total estimated emissions of projects in the plan and TIP should meet budgets established in the SIPs. The widening of I-93 to four lanes in each direction was included in NHDOT's "Fiscal Year 2003-2005 Conformity Determination for Transportation Improvement Programs, Transportation Plans, and Regional Emission Analysis of Transportation Projects." The conformity document included analysis of NOx and VOC emissions for the ozone nonattainment areas and CO emissions for the CO maintenance areas.[1] The conformity document was reviewed by EPA and U.S. DOT and approved by U.S. DOT in November 2002. The 2004 FEIS concluded that a regional analysis of ozone precursors and CO outside of that completed for the conformity determination was not required or necessary.

2.2 Results from 2004 FEIS

2.2.1 Microscale Carbon Monoxide Analysis

The CO microscale analysis 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. The 2004 FEIS predicted maximum 1-hour and 8-hour CO concentrations are presented in the Table 2-1 and Table 2-2.

2.2.2 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.

[1] The regional emissions analyses were conducted using EPA's MOBILE5B emission model.

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.

Table 2-1
Predicted Maximum 1 Hour CO Concentrations (Parts Per Million)[1]

Receptor No. and Location[2,]		1997 Existing	2010 No-Build	2010 4-Lane Build	2020 No-Build	2020 4-Lane Build
Fordway Extension and NH 102						
1	80 West Broadway	4.8	3.7	3.7	3.9	3.9
2	55 West Broadway	8.3	4.9	4.8	4.8	4.7
3	49 West Broadway	6.8	4.3	4.2	4.2	4.2
4	78 West Broadway	4.8	3.7	3.7	3.8	3.9
I-93 Exit 3 Northbound Ramp and NH 111						
5	Open Space Southwest Quadrant	9.4	7.0	7.1	8.0	8.1
6	123/125 Indian Rock Road	10.1	7.4	7.8	8.0	8.3
7	Open Space/Country Corner Store	10.2	7.5	7.7	8.0	8.4
I-93 Exit 2 Southbound Ramp, Pelham Road, and Keewaydin Drive						
8	25 Pelham Road	10.5	7.8	6.6	8.0	7.3
9	Open Space Northwest Quadrant	9.0	6.9	6.6	7.5	7.2
10	Open Space Southeast Quadrant	10.1	7.3	9.3	9.1	9.7
11	Open Space Northeast Quadrant	8.3	6.3	6.1	7.2	6.7
I-93 Exit 2 Northbound Ramp and Pelham Road						
12	Open Space Northwest Quadrant	10.3	7.6	6.7	8.1	7.3
13	Open Space Southwest Quadrant	10.6	8.4	6.9	8.9	7.6
14	Open Space Southeast Quadrant	10.0	7.5	6.6	8.2	7.1
15	Open Space Northeast Quadrant	10.7	8.0	6.9	8.9	8.0
I-93 Right-of-Way						
16	Open Space	4.2	3.7	3.7	3.9	3.7
Route 28A at Huse Road						
17	Southwest Corner (Dentist Office)	11.5	8.4	8.4	8.6	8.6
18	East (Easter Seal Society)	12.0	9.0	8.9	10.2	10.4
19	Northwest Corner (7 Mammoth Road)	10.0	7.7	7.7	8.1	8.2
Route 28A at Cilley Road						
20	East (Robert School)	10.5	8.0	8.1	8.5	8.9
21	Northwest Corner (Convenience Store)	12.0	8.9	8.9	9.5	9.5
22	Southwest Corner	11.8	8.9	8.9	9.2	9.2
Route 28A at Candia Road						
23	Southwest Quadrant (Stills Power Equipment)	10.0	8.3	8.3	8.7	9.0
24	Southeast Quadrant (181 Mammoth Road)	11.6	8.8	8.8	10.1	10.5
25	Northeast Quadrant (193 Mammoth Road)	12.0	9.1	9.1	9.9	10.2
26	Northwest Quadrant (Hess)	10.9	8.6	8.7	9.7	9.9
Route 28A at Massabesic Road						
27	Southeast Quadrant (203 Mammoth Road)	10.2	8.4	8.4	9.1	9.3
28	Northeast Quadrant	9.3	7.8	7.8	8.3	8.7
29	Northwest Quadrant	10.6	8.9	8.9	10.3	10.6
30	Southwest Quadrant (Hess)	11.1	9.1	9.1	9.8	10.0

Source: Vanasse Hangen Brustlin, Inc., 2004

1. The concentrations are expressed in parts per million (ppm) and include a 1-hour background concentration of 2.0 ppm. The 1-hour NAAQS for CO is 35 ppm.
2. The air quality study assumes that if these intersections meet the NAAQS, then all other intersections, regardless of alternative, which will have lower volumes and better levels of service, can be assumed to also meet the NAAQS.

See Figures 2-1 for locations.

Table 2-2
Predicted Maximum 8 Hour CO Concentrations (Parts Per Million)[1]

Receptor No. and Location[2,]		1997 Existing	2010 No-Build	2010 4-Lane Build	2020 No-Build	2020 4-Lane Build
Fordway Extension and NH 102						
1	80 West Broadway	4.0	3.2	3.2	3.3	3.3
2	55 West Broadway	6.4	4.0	4.0	4.0	3.9
3	49 West Broadway	5.4	3.6	3.5	3.5	3.5
4	78 West Broadway	4.0	3.2	3.2	3.3	3.3
I-93 Exit 3 Northbound Ramp and NH 111						
5	Open Space Southwest Quadrant	7.2	5.5	5.6	6.2	6.3
6	123/125 Indian Rock Road	7.7	5.8	6.1	6.2	6.4
7	Open Space/Country Corner Store	7.7	5.9	6.0	6.2	6.5
I-93 Exit 2 Southbound Ramp, Pelham Road, and Keewaydin Drive						
8	25 Pelham Road	8.0	6.1	5.2	6.2	5.7
9	Open Space Northwest Quadrant	6.9	5.4	5.2	5.9	5.6
10	Open Space Southeast Quadrant	7.7	5.7	7.1	7.0	7.4
11	Open Space Northeast Quadrant	6.4	5.0	4.9	5.6	5.3
I-93 Exit 2 Northbound Ramp and Pelham Road						
12	Open Space Northwest Quadrant	7.8	5.9	5.3	6.3	5.7
13	Open Space Southwest Quadrant	8.0	6.5	5.4	6.8	5.9
14	Open Space Southeast Quadrant	7.6	5.9	5.2	6.3	5.6
15	Open Space Northeast Quadrant	8.1	6.2	5.4	6.8	6.2
I-93 Right-of-Way						
16	Open Space	3.5	3.2	3.2	3.3	3.2
Route 28A at Huse Road						
17	Southwest Corner (Dentist Office)	8.1	5.9	5.9	6.0	6.0
18	East (Easter Seal Society)	8.4	6.3	6.2	7.1	7.3
19	Northwest Corner (7 Mammoth Road)	7.0	5.4	5.4	5.7	5.7
Route 28A at Cilley Road						
20	East (Robert School)	7.4	5.6	5.7	6.0	6.2
21	Northwest Corner (Convenience Store)	8.4	6.2	6.2	6.7	6.7
22	Southwest Corner	8.3	6.2	6.2	6.4	6.4
Route 28A at Candia Road						
23	Southwest Quadrant (Stills Power Equipment)	7.0	5.8	5.8	6.1	6.3
24	Southeast Quadrant (181 Mammoth Road)	8.1	6.2	6.2	7.1	7.4
25	Northeast Quadrant (193 Mammoth Road)	8.4	6.4	6.4	6.9	7.1
26	Northwest Quadrant (Hess)	7.6	6.0	6.1	6.8	6.9
Route 28A at Massabesic Road						
27	Southeast Quadrant (203 Mammoth Road)	7.1	5.9	5.9	6.4	6.5
28	Northeast Quadrant	6.5	5.5	5.5	5.8	6.1
29	Northwest Quadrant	7.4	6.2	6.2	7.2	7.4
30	Southwest Quadrant (Hess)	7.8	6.4	6.4	6.9	7.0

Source: Vanasse Hangen Brustlin, Inc., 2004

1. The concentrations are expressed in parts per million (ppm) and include an 8-hour background concentration of 2.0 ppm. The 8-hour NAAQS for CO is 9 ppm.
2. The air quality study assumes that if these intersections meet the NAAQS, then all other intersections, regardless of alternative, which will have lower volumes and better levels of service, can be assumed to also meet the NAAQS.

See Figures 2-1 for locations.

2.4 2008 Update Evaluations

2.4.1 Changes in Regulations/Guidelines

National Ambient Air Quality Standards

Particulate Matter
On October 17, 2006, EPA issued a final rule lowering the NAAQS for particulate matter with diameter less than 2.5 micrometer ($PM_{2.5}$) which became effective on December 18, 2006. Specifically, the 24-hour standard for $PM_{2.5}$ was lowered to 35 micrograms per cubic meter ($\mu g/m^3$) from the previous standard of 65 $\mu g/m^3$. As a result, new designations of attainment status were made nationwide by EPA on December 22, 2008. The entire State of New Hampshire is designated an attainment area for the revised 24-hour standard for $PM_{2.5}$.

On March 10, 2006 EPA published a final rulemaking on PM_{10} and $PM_{2.5}$ hotspot analysis where it concluded that quantitative hotspot modeling for particulate matter is not appropriate at the present time given the limitations in technical tools.

Ozone
On April 15, 2004, EPA made final nonattainment designations for the 8-hour ozone NAAQS. A single moderate ozone nonattainment area was designated in New Hampshire (Boston-Manchester-Portsmouth (SE, NH), encompassing portions of Hillsborough, Merrimack, Rockingham, and Strafford counties. On June 15, 2004, EPA issued the final rule to implement the 8-hour Ozone NAAQS Phase I. On November 9, 2005 EPA issued the final rule to implement the 8-hour Ozone NAAQS Phase II.

On June 15, 2005 the 1-hour ozone NAAQS was revoked for most areas of the country, including the three 1-hour ozone nonattainment areas in New Hampshire: Boston-Lawrence-Worcester (E. MA), MA-NH (Southern Serious); Portsmouth-Dover-Rochester, NH (Seacoast Serious); and Manchester, NH (Manchester Marginal).

On March 27, 2008, EPA issued a final rule lowering the 8-hour NAAQS for ozone from 0.08 ppm to 0.075 ppm, effective May 27, 2008. States must make recommendations to EPA no later than March 2009 for areas to be designated attainment, nonattainment and unclassifiable under the new standard. At this time, it is expected that New Hampshire will recommend an area at least as large as the current 8-hour ozone nonattainment area under the revised standard. However, these recommendations will have no immediate effect on this project since designations are not expected until March 2010 and transportation conformity will not apply to the revised standard until one year after the effective date of those designations which will be approximately June 2011.

On May 28, 2008 NHDES submitted to EPA a motor vehicle emission budget for the Boston-Manchester-Portsmouth (Southeast) 8-hour ozone nonattainment area. On July 28, 2008, EPA issued a notice in the Federal Register that it has found New Hampshire's 2009 motor vehicle emissions budgets adequate for transportation conformity purposes. The budgets are 15.31 tons per summer day for VOC and 28.53 tons per summer day for NOx, and became effective on

August 12, 2008. The new budgets will be used in the preparation of future transportation conformity analyses.

Mobile Source Air Toxics

The FHWA issued interim guidance on the analysis of Mobile Source Air Toxics (MSATs) in NEPA documents on February 3, 2006. The FHWA Interim Guidance provides a three-level analytical approach for assessing MSATs as follows:

1. Level 1: No analysis for exempt projects or projects with no meaningful potential MSAT effects;
2. Level 2: Qualitative analysis for projects with low potential MSAT effects; and
3. Level 3: Quantitative analysis for projects with higher potential MSAT effects.

The criteria for a roadway project to be considered for Level 3 analysis are as follows:

- Create new or add substantial capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to be in the range of 140,000 to 150,000, or greater, by the design year;

And also

- Be proposed to be located in proximity to populated areas or in rural areas, in proximity to concentrations of vulnerable populations (i.e., schools, nursing homes, hospitals).

MOBILE Emission Model

The MOBILE5B emission model used in the 2004 FEIS microscale CO analysis and the regional emissions analysis for the metropolitan plan and TIP conformity determination for CO and ozone has been replaced with an updated version, MOBILE6.2.

New Hampshire Greenhouse Gas Policy

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-CO_2-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.

2.4.2 2008 Update Analysis Methods

Microscale Carbon Monoxide Analysis

As with the 2004 FEIS, CO concentrations were estimated for the update analysis in accordance with the 1992 EPA document entitled, "Guidelines for Modeling Carbon Monoxide from Roadway Intersections" (EPA-454/R-92-005); and the User's Guide for the CAL3QHC dispersion model, Version 2.0: "A Modeling Methodology for Calculating Pollutant Concentrations near Roadway Intersections." 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.

Analysis Sites

The updated analysis includes the nine analysis sites from the 2004 FEIS and three additional analysis sites along secondary roadways. The three additional sites were selected based on a screening process that used the SEIS 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:

- Intersection of NH 97 and NH 28.
- NH 28 at Rockingham Park Boulevard
- NH 128 at NH 102

Analysis Scenarios

The existing conditions year for the update analysis was changed from 1997 to 2005. The air quality analysis used traffic data generated for the following demographic scenarios:

- Scenario 1: Delphi Panel's Blended Average Allocations (PBAA) of population and employment, 2020, No Build and Build. There is no Scenario 1 analysis for the year 2030 because the Delphi panel's work was focused on an analysis year of 2020.

- Scenario 2: New Hampshire Office of Energy and Planning (OEP) population forecasts, 2020 and 2030, No Build and Build.

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 SEIS to address air quality effects on secondary roads (the regional emissions analyses cover the entire network in each region). 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).

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). The 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 SEIS 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 SEIS Build population and employment levels for Scenario 1 and Scenario 2 as input 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 A 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 2-2). Since a SIP for the 8-hour ozone nonattainment area had not been approved or the motor vehicle emissions budgets found adequate by EPA at the time of the FY2007-2010 conformity analysis, New Hampshire 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.

For VOC and NOx emissions in the Southern and Seacoast nonattainment areas, the sensitivity analysis employed the adjustment factors described in the FY2007-2010 conformity analysis. The adjustment factors are used to make the transportation model outputs comparable to 2002 baseline emissions inventories and budgets developed using Highway Performance Monitoring System (HPMS) data.

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 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.

Mobile Source Air Toxics Analysis

The SEIS 2008 update evaluations included a mesoscale analysis to evaluate the MSAT emission changes 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. 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 under FHWA's interim guidance. 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.

Tolling Sensitivity Analysis

The tolling sensitivity analysis framework is explained in DSEIS 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 above. . 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 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 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 above. 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. 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.

$PM_{2.5}$ Analysis

New Hampshire is an attainment area for PM $_{2.5}$. Based on a review of the most recent 3-year State monitoring data, the 24-hour $PM_{2.5}$ levels within the study area (i.e. Hillsborough and Rockingham counties in New Hampshire), and the neighboring Essex County in Massachusetts have been consistently well below the revised 24-hour $PM_{2.5}$ standard. It is unlikely that a project in an attainment area would result in air quality impacts. Attainment areas are not subject to the conformity requirements under 40 CFR Part 93. Therefore, a project level conformity analysis under the $PM_{2.5}$ standard is not required. In addition, quantitative hotspot modeling for particulate matter was not included in the SEIS update because it would be inconsistent with the March 10, 2006 EPA rulemaking stating that this type of analysis is not appropriate at this time given the limitations of the available technical tools.

Greenhouse Gas Emissions and Climate Change

It is not useful or informative at this point to consider greenhouse gas emissions as part of the I-93 SEIS. 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 NEPA law explicitly requires an analysis of greenhouse gases at the project level, no national standards have been established, and New Hampshire's Climate Change Action Plan has not yet been fully developed.

It is also not useful or informative to make greenhouse gas emission comparisons among the SEIS 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, FHWA concludes that we cannot usefully evaluate CO_2 emissions in the same way that we address other vehicle emissions.

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 GHG analysis, such an analysis would not inform project decision-making, while adding administrative burden.

2.4.3 Changes in the Existing Conditions

The existing conditions analysis year for the SEIS is 2005. CO concentrations at the 12 microscale analysis locations for 2005 are reported along with future No Build and Build concentrations in the tables presented in Section 2.4.4, below. The existing estimated concentrations are all below the NAAQS.

2.4.3 Changes in the Future No Build and Build Conditions

Microscale Carbon Monoxide Analysis

The results of the microscale air quality analysis show that the concentrations estimated for all scenarios and alternatives analyzed were below the NAAQS. The predicted maximum 1-hour and 8-hour concentrations are presented in Tables 2-3 and 2-4, respectively. 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 the tables mentioned above, none of the increases in CO concentrations are enough to exceed the NAAQS. The total concentration results are not directly comparable to the 2004 FEIS results because different emissions models were used and the 2004 FEIS used lower background values, particularly for the 1-hr analysis. The 2004 FEIS used a background concentration of 2.0 ppm for the 1-hr analysis, while the update analysis uses a background concentration of 4.5 ppm (based on 2005-2007 monitoring data).

Table 2-3
Predicted Maximum 1-Hour CO Concentrations (Parts Per Million)[1]

Analysis Site No. and Location[2]		2005	2020	2020	2020	2020	2030	2030
			Scenario 1	Scenario 1	Scenario 2	Scenario 2	Scenario 2	Scenario 2
		Existing	No-Build	Build	No-Build	Build	No-Build	Build
1	Fordway Extension and NH 102	6.80	5.70	5.80	5.60	5.50	5.50	5.50
2	I-93 Exit 3 Northbound Ramp and NH 111	9.00	6.90	7.00	6.80	6.90	7.20	7.10
3	I-93 Exit 3 Southbound Ramp and NH 111	7.40	6.20	7.40	6.10	7.10	6.20	7.50
4	I-93 Exit 2 Southbound Ramp and Pelham Road	9.60	8.60	9.80	7.10	7.10	7.40	8.40
5	I-93 Exit 2 Northbound Ramp and Pelham Road	10.10	8.20	11.30	7.60	9.70	7.20	10.70
6	I-93 Right-of-Way near Mass Border	7.40	6.30	6.70	6.20	6.30	6.20	6.60
7	Route 28A at Huse Road	7.40	5.60	6.30	5.80	5.90	5.90	5.90
8	Route 28A at Cilley Road	7.80	5.70	6.20	5.70	5.90	5.80	5.90
9	Route 28A at Candia Road	8.10	5.90	6.50	6.00	6.20	5.90	6.30
10	Route 28A at Massabesic Road	8.20	5.80	6.10	5.90	6.30	5.90	6.60
11	NH Route 28 Rockingham Park Boulevard	8.60	7.60	7.60	7.20	7.10	7.20	7.00
12	NH Route 128 and NH 102	7.70	6.00	6.00	5.90	5.90	5.90	5.80

1. The concentrations are expressed in parts per million (ppm) and include a background concentration of 4.5 ppm (New Hampshire State 2005 ~ 2007 monitoring data). The 1-hour NAAQS for CO is 35 ppm.
2. The concentrations at worst-case receptor are presented. The air quality study assumes that if these intersections meet the NAAQS, then all other intersections, regardless of alternative, which will have lower volumes and better levels of service, can be assumed to also meet the NAAQS.

Table 2-4
Predicted Maximum 8-Hour CO Concentrations (Parts Per Million)[1]

Analysis Site No. and Location[2]		2005	2020	2020	2020	2020	2030	2030
			Scenario 1	Scenario 1	Scenario 2	Scenario 2	Scenario 2	Scenario 2
		Existing	No-Build	Build	No-Build	Build	No-Build	Build
1	Fordway Extension and NH 102	3.81	3.04	3.11	2.97	2.90	2.90	2.90
2	I-93 Exit 3 Northbound Ramp and NH 111	5.35	3.88	3.95	3.81	3.88	4.09	4.02
3	I-93 Exit 3 Southbound Ramp and NH 111	4.23	3.39	4.23	3.32	4.02	3.39	4.30
4	I-93 Exit 2 Southbound Ramp and Pelham Road	5.77	5.07	5.91	4.02	4.02	4.23	4.93
5	I-93 Exit 2 Northbound Ramp and Pelham Road	6.12	4.79	6.96	4.37	5.84	4.09	6.54
6	I-93 Right-of-Way near Mass Border	4.23	3.46	3.74	3.39	3.46	3.39	3.67
7	Route 28A at Huse Road	4.23	2.97	3.46	3.11	3.18	3.18	3.18
8	Route 28A at Cilley Road	4.51	3.04	3.39	3.04	3.18	3.11	3.18
9	Route 28A at Candia Road	4.72	3.18	3.60	3.25	3.39	3.18	3.46
10	Route 28A at Massabesic Road	4.79	3.11	3.32	3.18	3.46	3.18	3.67
11	NH Route 28 Rockingham Park Boulevard	5.07	4.37	4.37	4.09	4.02	4.09	3.95
12	NH Route 128 and NH 102	4.44	3.25	3.25	3.18	3.18	3.18	3.11

1. The concentrations are expressed in parts per million (ppm) and include a background concentration of 2.2 ppm (New Hampshire State 2005 ~ 2007 monitoring data). The 8-hour NAAQS for CO is 9 ppm.
2. The concentrations at worst-case receptor are presented. The air quality study assumes that if these intersections meet the NAAQS, then all other intersections, regardless of alternative, which will have lower volumes and better levels of service, can be assumed to also meet the NAAQS.

Regional Emissions Sensitivity Analysis

Carbon Monoxide

Tables 2-5 and 2-6 provide the CO sensitivity analysis results for Manchester for 2017 and 2026, respectively. The results show that even if the population and employment numbers from the SEIS Scenarios were used in the conformity analysis, the Manchester maintenance area would still demonstrate conformity because total CO emissions would be well under the CO emissions budget. In Scenario 1, emissions would be about 4.45 tons per day or 18 percent higher than the FY2007-2010 conformity analysis. For Scenario 2, emissions would be about 7 to 8 percent higher than the FY2007-2010 conformity analysis in 2017 and 2026. As with the FY2007-2010 conformity analysis, a very small (less than 0.5 ton) decrease in emissions between 2017 and 2026 is predicted under Scenario 2. The Manchester emissions estimates for Scenario 1 include the effects of the induced population and employment allocated to Manchester by the Delphi PBAA. For Scenario 2, the emissions estimates include the accessibility based estimates of induced population and employment growth in Manchester under the 2005 Selected Alternative.

Tables 2-7 and 2-8 provide the CO sensitivity analysis results for Nashua for 2017 and 2026, respectively. The results show that even if the population and employment numbers from the SEIS Scenarios were used in the conformity analysis, the Nashua maintenance area would still demonstrate conformity because total CO emissions would be well under the CO emissions budget. For Scenario 1 and 2, 2017 emissions would be up to 7 tons/day or 30 percent higher than the previous conformity analysis. For Scenario 2 in 2026, emissions would be up to 11 percent higher than the conformity analysis. While the FY2007-2010 conformity analysis predicted almost no change in CO emissions between 2017 and 2026 (23.40 to 23.56 tons per day), the Scenario 2 population and employment forecasts result in a decrease, from 30.44 tons/day in 2017 to 26.13 tons/day in 2026. Nashua is not included in the Delphi panel study area, but Delphi PBAA allocations to other towns could have some effect on traffic in Nashua in Scenario 1. While Nashua itself is expected to experience a less than one percent Build-No Build increase in population and employment in Scenario 2, some adjacent communities would have larger increases (e.g. Litchfield, Hudson and Merrimack). Nevertheless, the emissions and VMT results suggest a substantial difference between the population and employment inputs used in the FY2007-2010 conformity analysis, and the inputs used in the SEIS scenarios (particularly for 2017) that is not explained by the indirect effects of the 2005 Selected Alternative.

Table 2-5
Manchester
CO Sensitivity Analysis, 2017

	CO Emissions (Tons/Day)	Budget (Tons/Day)	SEIS Compared to FY 2007-2010 Conformity Analysis	
			Absolute Difference	Percent Difference
FY2007-2010 Conformity Analysis	24.66	55.83	-	-
SEIS Scenario 1 (Delphi) Build	29.11	55.83	4.45	18.06%
SEIS Scenario 2 (OEP) Build	26.84	55.83	2.18	8.86%

Note: Emissions rounded to nearest hundredth, percent difference based on unrounded values.

Table 2-6
Manchester
CO Sensitivity Analysis, 2026

	CO Emissions (Tons/Day)	Budget (Tons/Day)	SEIS Compared to FY 2007-2010 Conformity Analysis	
			Absolute Difference	Percent Difference
FY2007-2010 Conformity Analysis	24.49	55.83	-	-
SEIS Scenario 2 (OEP) Build	26.36	55.83	1.87	7.63%

Note: Emissions rounded to nearest hundredth, percent difference based on unrounded values

Table 2-7
Nashua
CO Sensitivity Analysis, 2017

	CO Emissions (Tons/Day)	Budget	SEIS Compared to FY 2007-2010 Conformity Analysis	
			Absolute Difference	Percent Difference
FY2007-2010 Conformity Analysis	23.40	60.13	-	-
SEIS Scenario 1 (Delphi) Build	29.89	60.13	6.49	27.72%
SEIS Scenario 2 (OEP) Build	30.44	60.13	7.04	30.08%

Note: Emissions rounded to nearest hundredth, percent difference based on unrounded values.

Table 2-8
Nashua
CO Sensitivity Analysis, 2026

	CO Emissions (Tons/Day)	Budget	SEIS Compared to FY 2007-2010 Conformity Analysis	
			Absolute Difference	Percent Difference
FY2007-2010 Conformity Analysis	23.56	60.13	-	-
SEIS Scenario 2 (OEP) Build	26.13	60.13	2.57	10.92%

Note: Emissions rounded to nearest hundredth, percent difference based on unrounded values

Ozone

Tables 2-9 and 2-10 compare the SEIS population and employment scenarios to the FY2007-2010 conformity analysis for the former Southern Serious nonattainment area. As the nonattainment area is made up of municipalities from three regional planning commissions, the total emissions for the area is the sum of the contributing portion of each regional planning commission. For both 2017 and 2026, the estimated VOC and NOx emissions are well under their respective emissions budgets under Scenario 1 and Scenario 2. In 2017, VOC emissions are about 16 percent higher than the FY2007-2010 conformity analysis under Scenario 1, and 14 percent higher under Scenario 2. NOx emissions are about 13 percent higher than the FY2007-2010 conformity analysis under Scenario 1 in 2017, and 11 percent higher under Scenario 2. The

difference between Scenario 2 and the FY2007-2010 conformity analysis emissions decreases in the 2026 analysis year to eight percent for VOC and three percent for NOx (See Table 2-10). The sensitivity analysis 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. For Scenario 2 the emissions estimates include the accessibility based estimates of induced population and employment growth in I-93 corridor towns such as Derry, Londonderry, Windham, and Salem. The emissions results are not surprising given the increased population and employment growth expected in parts of the Southern Serious nonattainment area with the 2005 Selected Alternative.

Tables 2-11 and 2-12 compare the SEIS population and employment scenarios to the FY2007-2010 conformity analysis for the former Seacoast Serious nonattainment area. The Seacoast Serious nonattainment area is located within the modeling area of a single regional planning commission, the Rockingham Planning Commission. For both 2017 and 2026, the estimated VOC and NOx emissions are well under their respective emissions budgets under Scenario 1 and Scenario 2. The results show that the difference between the FY2007-2010 conformity analysis and the SEIS scenarios is two percent or less. This result indicates that there is very little difference between the population and employment inputs used in the FY2007-2010 conformity analysis and the SEIS scenarios for this region. The former Seacoast Serious nonattainment area does not include any of the towns in the Delphi panel study area (Scenario 1). The Scenario 2 accessibility analysis showed that the 2005 Selected Alternative would have very little effect on this area (increases or decreases in population and employment of less than one percent compared to the No Build) (See Indirect Effects Report Figures 3-2 and 3-3).

Table 2-9
Southern Serious (Boston-Lawrence-Worcester NH) Nonattainment Area
Ozone Precursor Sensitivity Analysis, 2017

		NRPC Portion	SNHPC Portion	RPC Portion	Total	Adjusted Total*	Budget	SEIS Compared to FY 2007-2010 Conformity Analysis	
								Absolute Difference	Percent Difference
FY2007-2010 Conformity Analysis	VOC (tons/day)	1.75	0.69	1.51	3.95	3.62	10.72	-	-
	NOx (tons/day)	2.31	0.96	2.02	5.29	5.20	21.37	-	-
SEIS Scenario 1 (Delphi) Build	VOC (tons/day)	2.27	0.73	1.57	4.58	4.20	10.72	0.58	15.96%
	NOx (tons/day)	2.88	1.01	2.09	5.98	5.87	21.37	0.68	13.06%
SEIS Scenario 2 (OEP) Build	VOC (tons/day)	2.32	0.64	1.56	4.52	4.14	10.72	0.52	14.38%
	NOx (tons/day)	2.92	0.90	2.07	5.89	5.78	21.37	0.59	11.34%

*Accounts for HPMS adjustment factors of 0.92 for VOC and 0.98 for NOx.
Note: Emissions rounded to nearest hundredth, percent difference based on unrounded values.

Table 2-10
Southern Serious (Boston-Lawrence-Worcester MA-NH) Nonattainment Area
Ozone Precursor Sensitivity Analysis, 2026

		NRPC Portion	SNHPC Portion	RPC Portion	Total	Adjusted Total*	Budget	SEIS Compared to FY 2007-2010 Conformity Analysis	
								Absolute Difference	Percent Difference
FY2007-2010 Conformity Analysis	VOC (tons/day)	1.46	0.56	1.17	3.19	2.92	10.72	-	-
	NOx (tons/day)	1.47	0.55	1.10	3.12	3.06	21.37	-	-
SEIS Scenario 2 (OEP) Build	VOC (tons/day)	1.74	0.50	1.20	3.44	3.15	10.72	0.23	7.86%
	NOx (tons/day)	1.61	0.49	1.12	3.23	3.17	21.37	0.10	3.38%

*Accounts for HPMS adjustment factors of 0.92 for VOC and 0.98 for NOx.
Note: Emissions rounded to nearest hundredth, percent difference based on unrounded values.

Table 2-11
Seacoast Serious (Portsmouth-Dover-Rochester, NH) Nonattainment Area
Ozone Precursor Sensitivity Analysis, 2017

		Total	Adjusted Total*	Budget	SEIS Compared to FY 2007-2010 Conformity Analysis	
					Absolute Difference	Percent Difference
FY2007-2010 Conformity Analysis	VOC (tons/day)	2.96	2.59	6.97	-	-
	NOx (tons/day)	4.00	3.53	13.68	-	-
SEIS Scenario 1 (Delphi) Build	VOC (tons/day)	2.95	2.58	6.97	-0.01	-0.40%
	NOx (tons/day)	4.04	3.57	13.68	0.04	0.99%
SEIS Scenario 2 (OEP) Build	VOC (tons/day)	2.95	2.58	6.97	-0.01	-0.24%
	NOx (tons/day)	4.04	3.57	13.68	0.04	1.08%

*Accounts for HPMS adjustment factors of 0.88 for VOC and 0.8825 for NOx.
Note: Emissions rounded to nearest hundredth, percent difference based on unrounded values.

Table 2-12
Seacoast Serious (Portsmouth-Dover-Rochester, NH) Nonattainment Area
Ozone Precursor Sensitivity Analysis, 2026

		Total	Adjusted Total*	Budget	SEIS Compared to FY 2007-2010 Conformity Analysis	
					Absolute Difference	Percent Difference
FY2007-2010 Conformity Analysis	VOC (tons/day)	2.27	1.99	6.97		
	NOx (tons/day)	2.15	1.90	13.68		
SEIS Scenario 2 (OEP) Build	VOC (tons/day)	2.22	1.95	6.97	-0.04	-2.07%
	NOx (tons/day)	2.17	1.92	13.68	0.02	1.07%

*Accounts for HPMS adjustment factors of 0.88 for VOC and 0.8825 for NOx
Note: Emissions rounded to nearest hundredth, percent difference based on unrounded values.

Tables 2-13 and 2-14 compare the SEIS population and employment scenarios to the FY2007-2010 conformity analysis for the nonattainment area outside of the Southern and Seacoast budget areas, but within the 8-hr nonattainment area. The 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. Under Scenario 2, emissions would be approximately eight percent lower than the FY2007-2010 conformity analysis. The Scenario 1 results are somewhat unexpected given that this area includes the towns of Bedford, Goffstown, Manchester, Hooksett, Auburn, Candia, Chester and Raymond that were allocated additional population and employment by the Delphi PBAA. Several of these towns were also allocated additional population and employment under the Build Condition in Scenario 2; however the decrease in emissions in Scenario 2 could be attributed to the overall decrease in the population growth rates in this area under current OEP projections in comparison to earlier projections.

Table 2-13
Nonattainment Area Outside 1-hr Budget Areas
Ozone Precursor Sensitivity Analysis, 2017

		SNHPC Portion	RPC Portion	Total	SEIS Compared to FY 2007-2010 Conformity Analysis	
					Absolute Difference	Percent Difference
FY2007-2010 Conformity Analysis	VOC (tons/day)	2.18	0.30	2.48	-	-
	NOx (tons/day)	2.89	0.41	3.30	-	-
SEIS Scenario 1 (Delphi) Build	VOC (tons/day)	2.31	0.18	2.49	0.01	0.46%
	NOx (tons/day)	3.06	0.25	3.31	0.01	0.37%
SEIS Scenario 2 (OEP) Build	VOC (tons/day)	2.10	0.17	2.28	-0.20	-8.26%
	NOx (tons/day)	2.78	0.25	3.03	-0.27	-8.09%

Note: Emissions rounded to nearest hundredth, percent difference based on unrounded values.

Table 2-14
Nonattainment Area Outside 1-hr Budget Areas
Ozone Precursor Sensitivity Analysis, 2026

		SNHPC Portion	RPC Portion	Total	SEIS Compared to FY 2007-2010 Conformity Analysis	
					Absolute Difference	Percent Difference
FY2007-2010 Conformity Analysis	VOC (tons/day)	1.73	0.24	1.97	-	-
	NOx (tons/day)	1.65	0.23	1.88	-	-
SEIS Scenario 2 (OEP) Build	VOC (tons/day)	1.64	0.14	1.77	-0.20	-9.96%
	NOx (tons/day)	1.56	0.14	1.69	-0.19	-9.94%

Note: Emissions rounded to nearest hundredth, percent difference based on unrounded values

Transportation Conformity

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 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.

Mobile Source Air Toxics Analysis

Table 2-15 shows that mesoscale MSAT emissions are estimated to decrease between 2005 existing conditions and 2020 No Build conditions for Scenario 1 and Scenario 2. These reductions reflect the effects of phased increases in fuel content and engine operation standards.

Table 2-16 shows the difference between No Build and Build conditions in 2020. 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 and Scenario 2. The Scenario 2 emission reductions are generally larger than the Scenario 1 reductions, however the effect for either Scenario 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, see Table 2-17.

Table 2-15
Mobile Source Air Toxics Emissions
Change Between 2020 No Build and 2005 Existing Conditions

Pollutant	Scenario 1 (lbs/day change compared to Existing)	Scenario 2 (lbs/day change compared to Existing)
1,3 Butadiene	-632.60	-642.69
Formaldehyde	-1,381.05	-1,407.56
Acetaldehyde	-509.76	-518.89
Acrolein	-70.01	-71.17
Benzene	-5,226.47	-5,309.10
MTBE	-120.48	-123.66

+ / - : Emission Increase / Decrease, No Build versus Existing

Table 2-16
Mobile Source Air Toxics Emissions
Changes Between 2020 Build and No Build Conditions, Scenario 1 and Scenario 2

Pollutant	Scenario 1 Build (lbs/day change compared to No-Build)	Scenario 2 Build (lbs/day change compared to No-Build)
1,3 Butadiene	-4.34	-1.05
Formaldehyde	-12.61	-3.98
Acetaldehyde	-3.96	-1.01
Acrolein	-0.61	-0.23
Benzene	-29.19	-2.71
MTBE	-4.00	-2.97

+ / - : Emission Increase / Decrease, Build versus No-Build

Table 2-17
Mobile Source Air Toxics Emissions
Changes Between Scenario 2 2030 Build and 2020 Build Conditions

Pollutant	(lbs/day change between 2030 and 2020 Conditions)
1,3 Butadiene	-10.23
Formaldehyde	-16.23
Acetaldehyde	-6.92
Acrolein	-0.96
Benzene	-105.99
MTBE	-3.96

+ / - : Emission Increase / Decrease, 2030 Build versus 2020 Build

Tolling Sensitivity Analysis

Tables 2-18 and 2-19 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 2-18
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 2-19
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 2-20 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 2-15).

Table 2-20
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

2.4.4 Mitigation

As no new adverse air quality impacts were identified by the update analysis, no new air quality mitigation is necessary or proposed. The air quality commitments from the 2004 FEIS and Record of Decision (Section 2.3) remain valid.

2.5 Conclusion

The SEIS air quality analyses show that the 2005 Selected Alternative would not contribute to any exceedences of the NAAQS for CO under all of the SEIS 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 SEIS 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.

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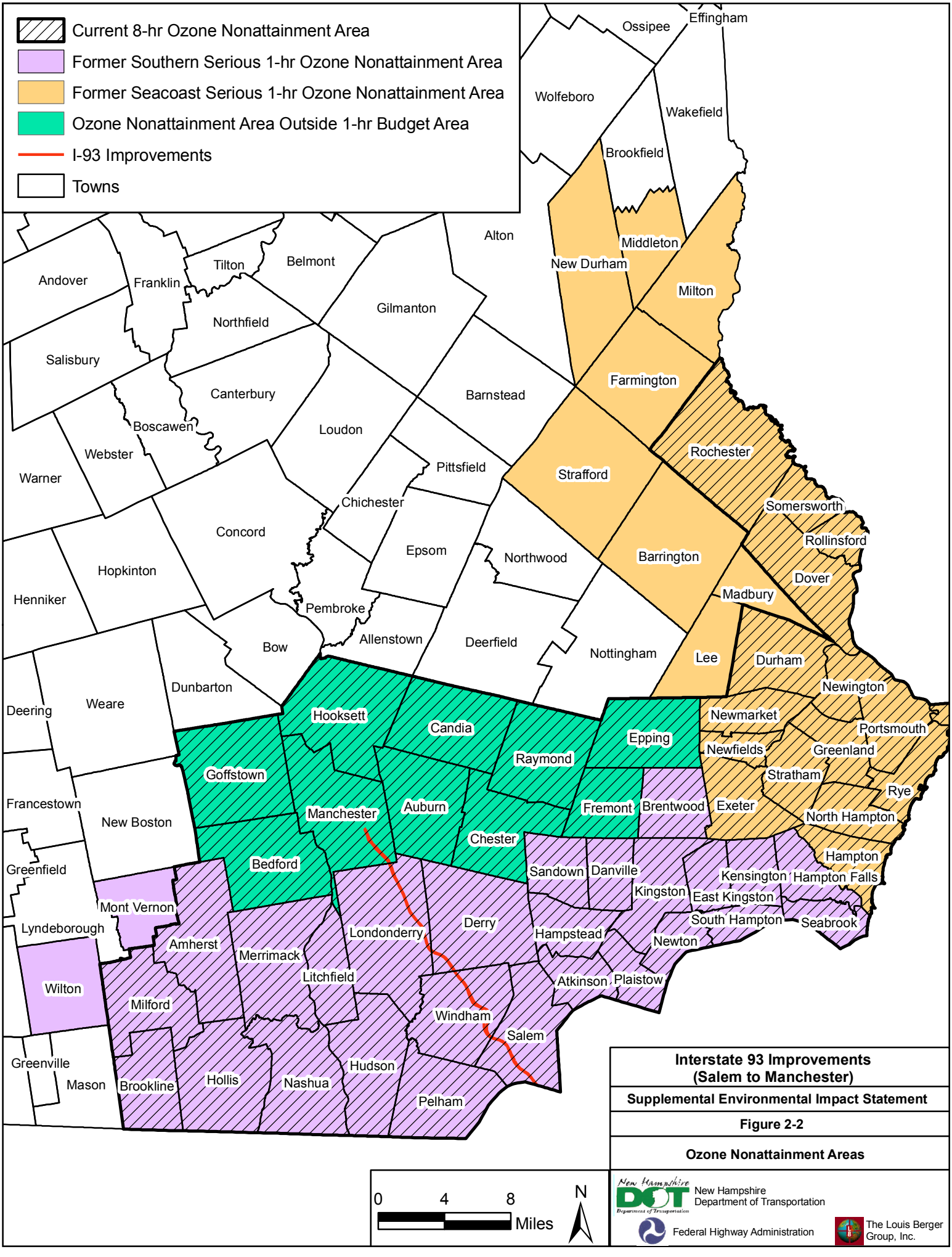
Current 8-hr Ozone Nonattainment Area
Former Southern Serious 1-hr Ozone Nonattainment Area
Former Seacoast Serious 1-hr Ozone Nonattainment Area
Ozone Nonattainment Area Outside 1-hr Budget Area
I-93 Improvements
Towns
Ossipee
Effingham
Wolfeboro
Wakefield
Brookfield
Alton
Middleton
New Durham
Milton
Andover
Franklin
Tilton
Belmont
Gilmanton
Northfield
Salisbury
Canterbury
Barnstead
Farmington
Boscawen
Loudon
Webster
Warner
Pittsfield
Strafford
Rochester
Chichester
Somersworth
Concord
Epsom
Northwood
Barrington
Rollinsford
Dover
Hopkinton
Henniker
Pembroke
Madbury
Bow
Allenstown
Deerfield
Nottingham
Lee
Durham
Dunbarton
Newington
Deering
Weare
Hooksett
Candia
Epping
Newmarket
Portsmouth
Raymond
Newfields
Greenland
Goffstown
Stratham
Rye
Francestown
New Boston
Manchester
Auburn
Fremont
Brentwood
Exeter
North Hampton
Chester
Hampton
Greenfield
Bedford
Sandown
Danville
Kensington
Hampton Falls
Kingston
East Kingston
Mont Vernon
Lyndeborough
Londonderry
Derry
South Hampton
Seabrook
Amherst
Hampstead
Newton
Merrimack
Litchfield
Atkinson
Plaistow
Wilton
Milford
Windham
Salem
Greenville
Mason
Brookline
Hollis
Nashua
Hudson
Pelham
0
4
8
Miles
N
Interstate 93 Improvements
(Salem to Manchester)
Supplemental Environmental Impact Statement
Figure 2-2
Ozone Nonattainment Areas
New Hampshire Department of Transportation
Federal Highway Administration
The Louis Berger Group, Inc.