

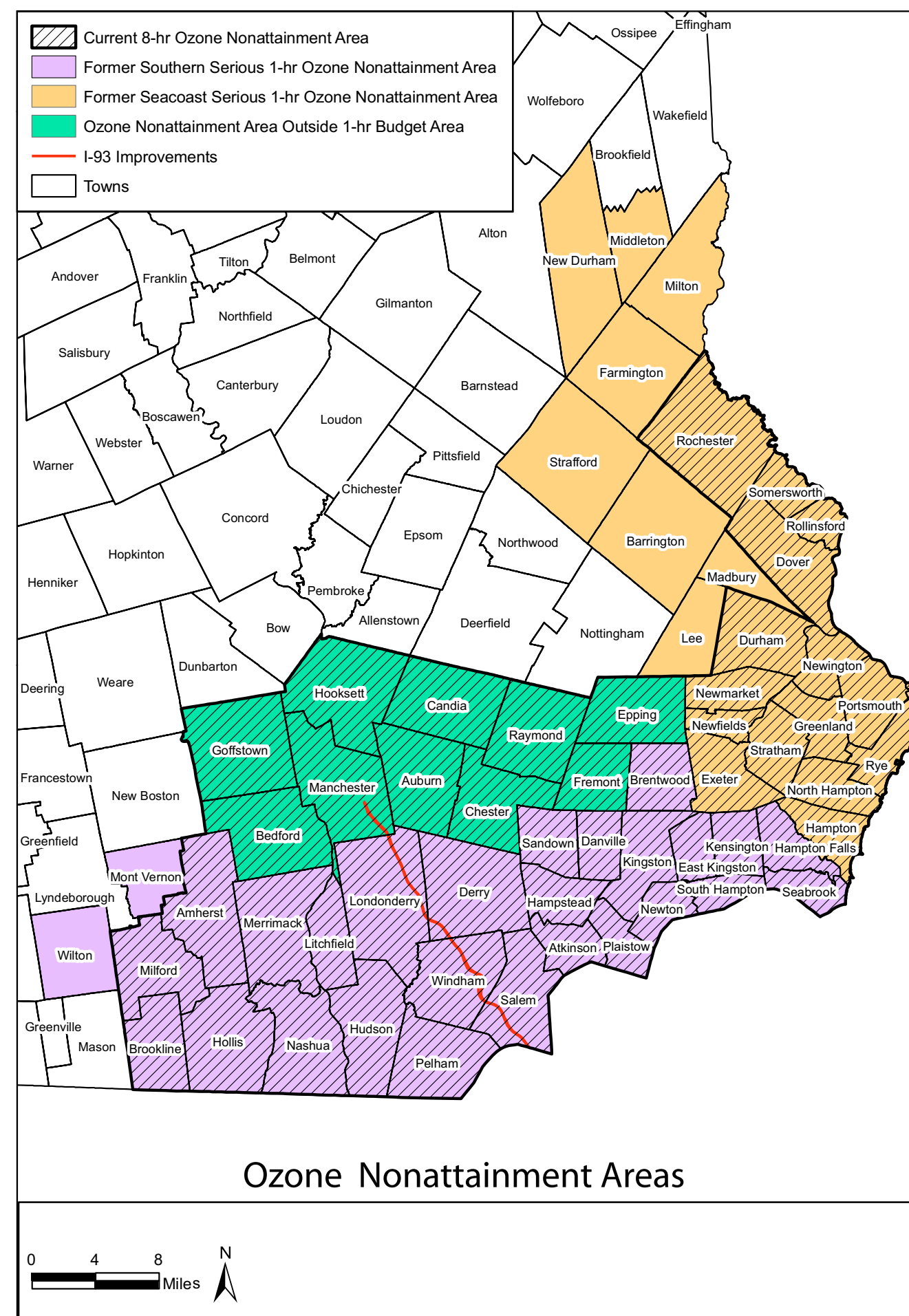
Air Quality

Regional Emissions Sensitivity Analysis

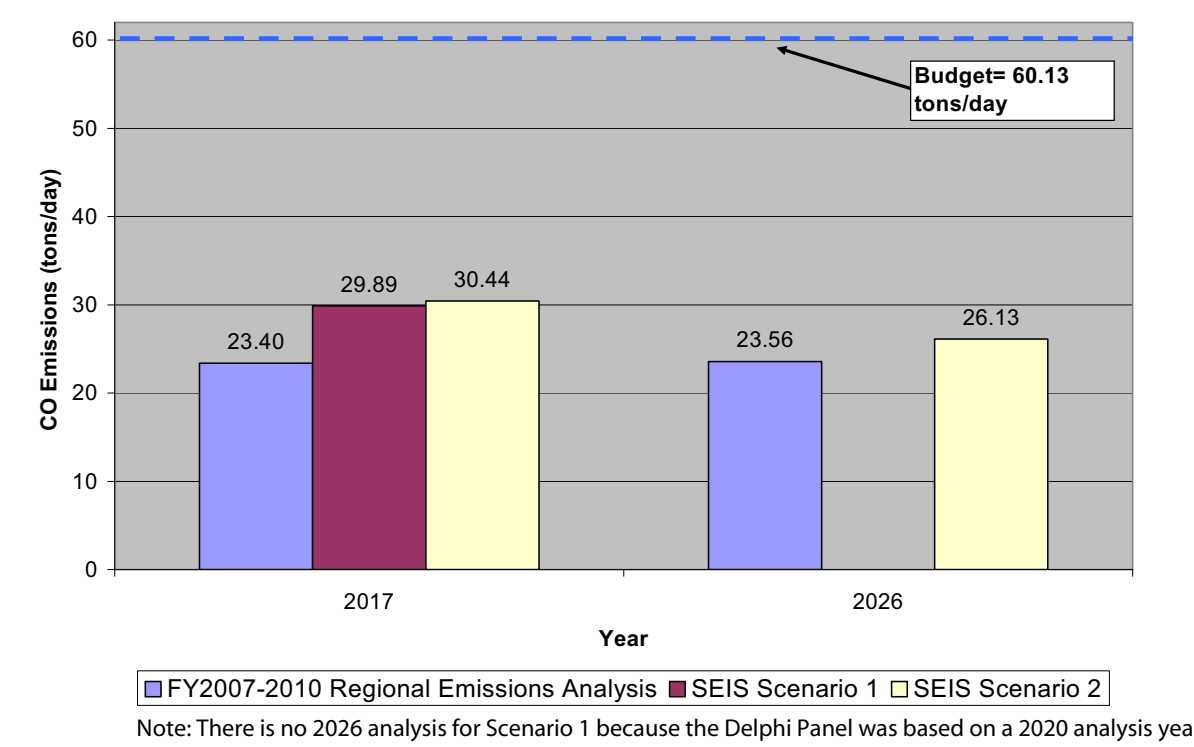
Transportation conformity is a way to ensure that federal funding and approval goes to those transportation activities that are consistent with air quality goals. Transportation conformity applies to transportation plans, transportation improvement programs (TIPs), and projects funded or approved by 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).

The purpose of the regional emissions sensitivity analysis conducted for the I-93 SEIS was to determine the effect of the Scenario 1 and Scenario 2 population and employment estimates on the results of the 2007-2026 conformity analysis. The sensitivity analysis was conducted by the individual regional planning commissions and compiled by NHDOT. The pollutants analyzed for nonattainment and maintenance areas in southern New Hampshire included carbon monoxide and the ozone precursors (volatile organic compounds and nitrogen oxide).

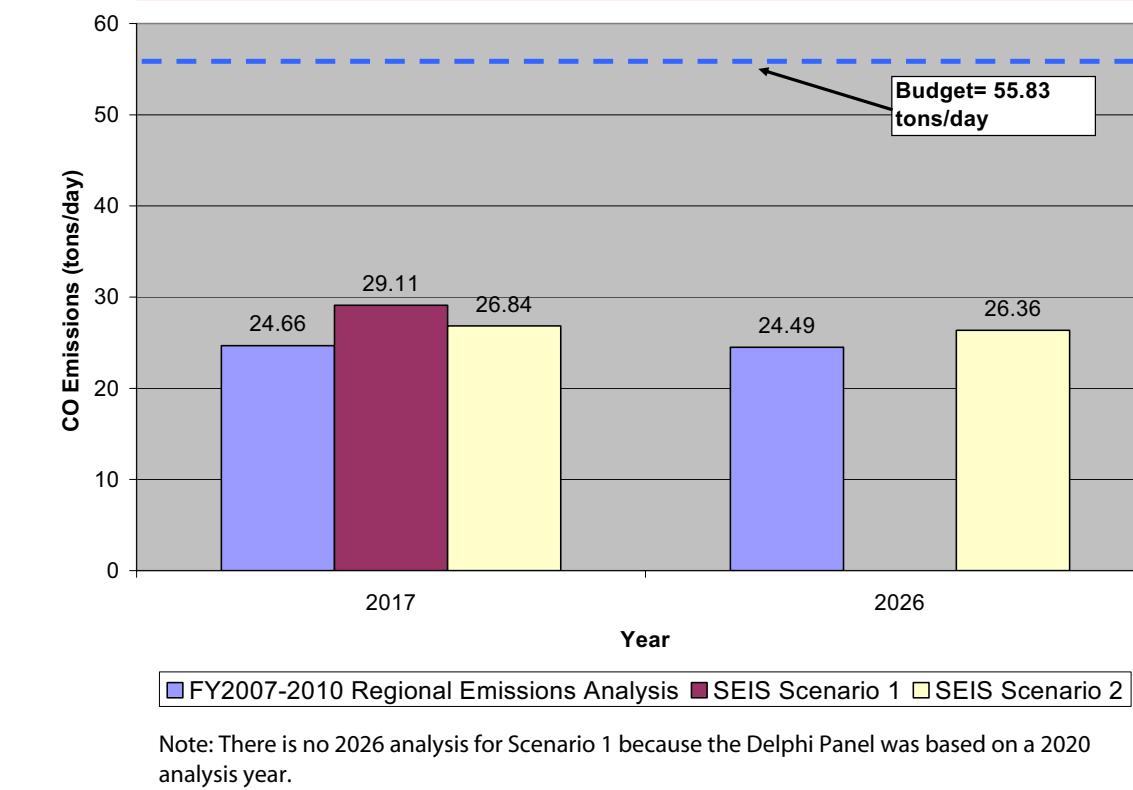
The results of the regional emissions sensitivity analysis show that the Scenario 1 and Scenario 2 Build condition population and employment estimates would not alter the conclusions of the previous regional emissions conformity analyses—emissions would continue to be well below the applicable emissions budgets.



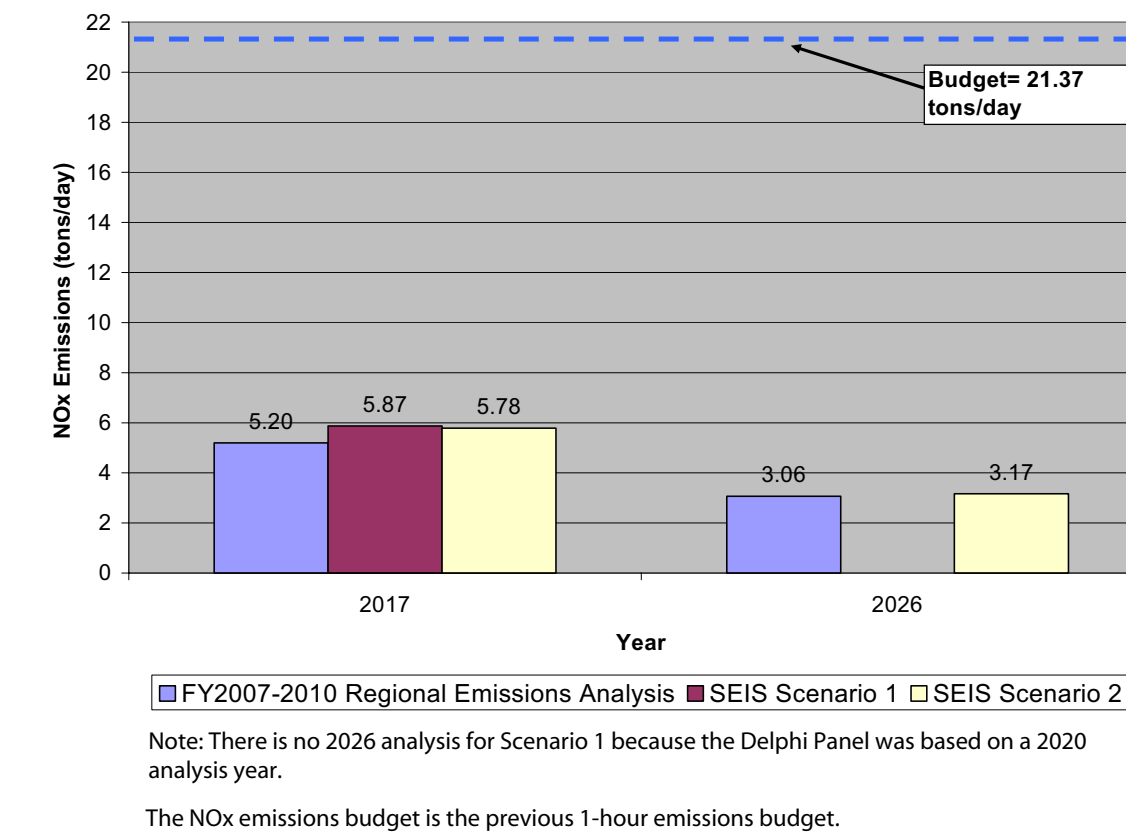
Nashua CO Sensitivity Analysis, 2017 and 2026



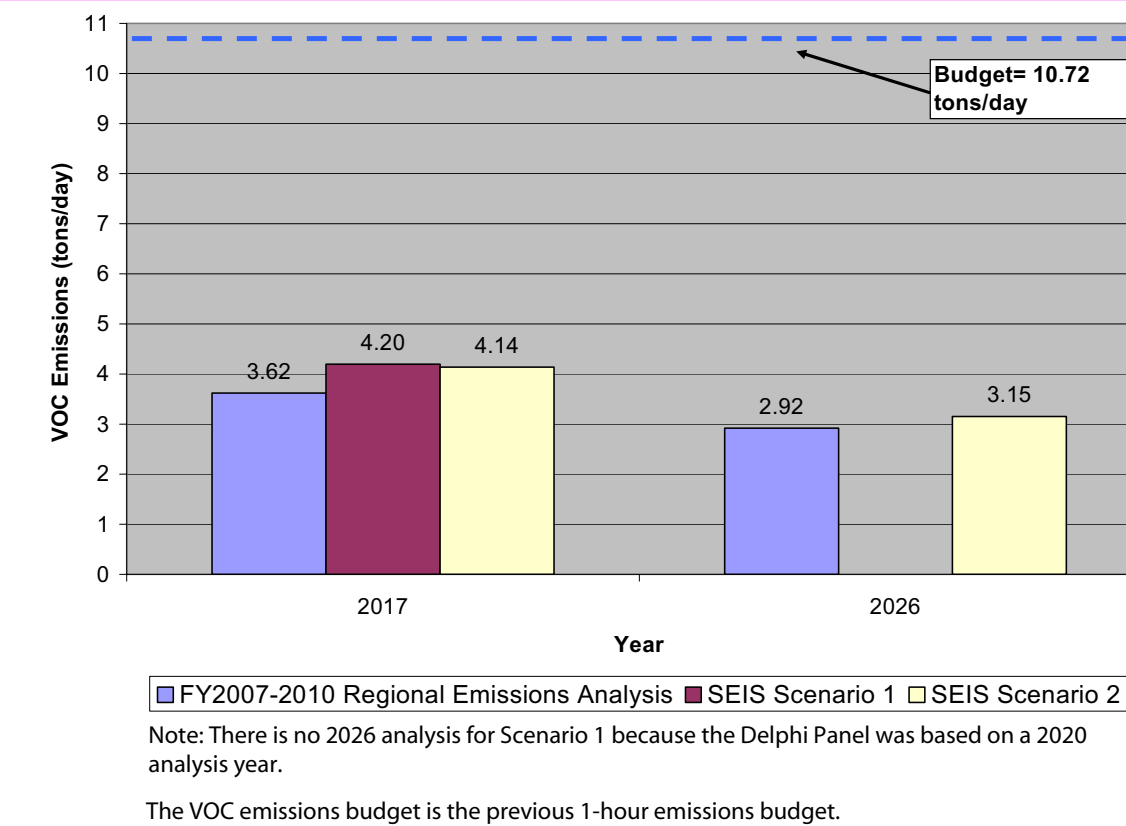
Manchester CO Sensitivity Analysis, 2017 and 2026



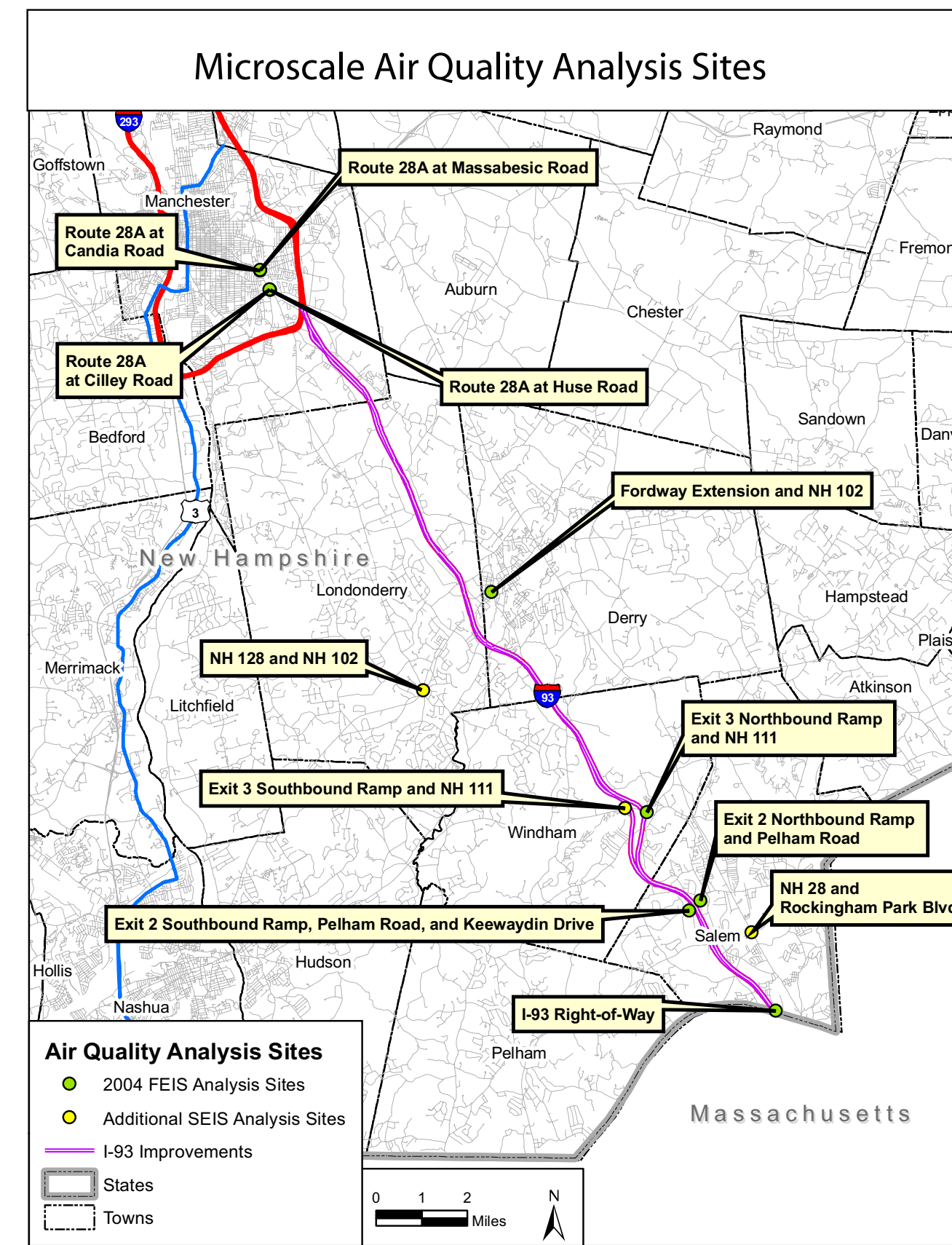
Southern Serious (Boston-Lawrence-Worcester NH) Nonattainment Area NOx Sensitivity Analysis, 2017 and 2026



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



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



Microscale Carbon Monoxide Analysis

A criteria pollutant regulated under the Clean Air Act, carbon monoxide (CO) is a colorless and odorless gas that results from the incomplete combustion of gasoline and other fossil fuels. Elevated concentrations are usually limited to locations near congested roadways and intersections.

A total of 12 intersection sites were selected for analysis based on the results of the SEIS traffic analysis. The analysis was conducted using the latest official EPA approved emissions model (MOBILE6.2). The air pollutant dispersion model CAL3QHC was used to simulate mathematically how traffic, emissions, meteorology, and geometry combine to affect pollutant concentrations.

The analysis results for Scenario 1 and Scenario 2 show that the I-93 widening project would not cause any exceedances of the health based National Ambient Air Quality Standards.

CO Concentration Levels

Scenario 1 (2020 Delphi Panel Blended Average Allocation)					Scenario 2, 2030						
Predicted Maximum 1-Hour and 8-Hour CO Concentrations (Parts Per Million)					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		Site Number	Site Name	1-Hour CO Concentrations ¹		8-Hour CO Concentrations ²	
		No Build	Build	No Build	Build			No Build	Build		
1	Fordway Extension and NH 102	5.70	5.80	3.04	3.11	1	Fordway Extension and NH 102	5.50	5.50	2.90	2.90
2	I-93 Exit 3 Northbound Ramp and NH 111	6.90	7.00	3.88	3.95	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	7.40	3.39	4.23	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	8.60	9.80	5.07	5.91	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	8.20	11.30	4.79	6.96	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	6.30	6.70	3.46	3.74	6	I-93 Right-of-Way near Mass Border	6.20	6.60	3.39	3.67
7*	Route 28A at Huse Road	5.60	6.30	2.97	3.46	7*	Route 28A at Huse Road	5.90	5.90	3.18	3.18
8*	Route 28A at Cilley Road	5.70	6.20	3.04	3.39	8*	Route 28A at Cilley Road	5.80	5.90	3.11	3.18
9*	Route 28A at Candia Road	5.90	6.50	3.18	3.60	9*	Route 28A at Candia Road	5.90	6.30	3.18	3.46
10*	Route 28A at Massabesic Road	5.80	6.10	3.11	3.32	10*	Route 28A at Massabesic Road	5.90	6.60	3.18	3.67
11	NH Route 28 and Rockingham Park Boulevard	7.60	7.60	4.37	4.37	11	NH Route 28 and Rockingham Park Boulevard	7.20	7.00	4.09	3.95
12	NH Route 128 and NH 102	6.00	6.00	3.25	3.25	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.

Mobile Source Air Toxics Analysis

Mobile Source Air Toxics (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. EPA has identified six "priority MSATs." These six include: benzene, formaldehyde, acetaldehyde, diesel particulate matter/diesel exhaust organic gases, acrolein, and 1,3-butadiene. Current regulations on MSAT emissions involve fuel based standards, such as limits on the maximum benzene content in gasoline.

A quantitative MSAT analysis was conducted for the SEIS using MOBILE6.2 emission factors and vehicle activity data from the traffic modeling. MSAT emissions are expected to decrease substantially in the future in the No Build condition as a result of fuel content and engine operation standards. Emissions are expected to decrease even further with the completion of the project.

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