Ozone and $PM_{2.5}$ Air Quality Conformity Determination

of the 2019-2045 Metropolitan Transportation Plans

and the 2018-2021 Transportation Improvement Programs

Connecticut Department of Transportation

February 2019, Revised April 2019

Table of Contents

1. **Executive Summary** 3
2. **What is Transportation Conformity?** 5
3. **Nonattainment and Maintenance Areas in Connecticut** 5
   a. **Ozone Nonattainment Areas** 5
   b. **PM2.5 Maintenance Area** 7
   c. **Carbon Monoxide Maintenance Areas** 8
   d. **PM10 Attainment Area – Limited Maintenance** 8
   e. **State of Connecticut Nonattainment/Attainment Maps** 9
4. **How Does Connecticut Demonstrate Conformity?** 11
   a. **Transportation Planning Work Program** 11
   b. **Interagency Consultation** 11
   c. **Public Consultation** 12
   d. **Scenario Years** 12
   e. **Other Planning Documents** 13
5. **Latest Planning Assumptions and Emissions Model** 13
   a. **VMT** 13
   b. **Emissions Model** 14
6. **Conformity Tests and Air Quality Emissions Results** 15
7. **Conclusions** 17
8. **Contact Information** 17
9. **Appendices** 17

1. Executive Summary

This report documents the air quality conformity analysis of the 2019-2045 Metropolitan Transportation Plans (MTPs) and the 2018-2021 Transportation Improvement Programs (TIPs), as carried out under the regulations contained in the United States Environmental Protection Agency's (EPA) final rule, published in the November 24, 1993 Federal Register, with subsequent amendments and additional federal guidance published by EPA, the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA). The process involved consultation with affected agencies such as EPA, FHWA, FTA, the Connecticut Department of Energy and Environmental Protection (CTDEEP) and the Metropolitan Planning Organizations (MPOs) within the State of Connecticut. The air quality emissions analysis is a responsibility of the Connecticut Department of Transportation (CTDOT), acting as the MPO for this task.

"Conformity" is a requirement of the Federal Clean Air Act Amendments (CAAA) Section 176(c) (42 U.S.C.7506(c)) and EPA conformity regulations (40 CFR 93 Subpart A). These regulations require that each new MTP and TIP be demonstrated to conform to the State Implementation Plan (SIP) before the MTP and TIPs are approved by the MPO or accepted by the United States Department of Transportation (USDOT). This ensures that the MTP and TIPs are consistent with air quality goals and that progress is being made towards achieving and maintaining Federal air quality standards. A conformity determination is undertaken to estimate emissions that will result from an area's transportation system. The analysis must demonstrate that those emissions are within limits outlined in state air quality implementation plans.

Under the transportation conformity regulation, the principal criteria for a determination of conformity for transportation plans and programs are:

- The TIP and MTP must pass an emissions budget test using a motor vehicle emissions budget (MVEB) that has been found to be adequate by EPA for transportation conformity purposes, or an interim emission test;
- The latest planning assumptions and emission models specified for use in conformity determinations must be employed;
- The TIP and MTP must provide for the timely implementation of transportation control measures (TCMs) specified in the applicable air quality implementation plans; and
- Interagency and public consultation.

As the federal air quality districts for ozone and PM2.5 include several counties and various planning regions, the emission analysis must be coordinated to include the TIPs and MTPs of several regions.

The CTDOT performs this coordination role. Each region submits its draft TIP and MTP to the CTDOT and the CTDOT in turn combines the TIPs and MTPs for all appropriate regions and conducts the analysis on each pollutant's impact for each air quality district in relation to the established MVEBs.

For the 2019-2045 MTP and the 2018-2021 TIPs, summer day emission estimates for ozone precursors, volatile organic compounds (VOC) and nitrogen oxides (NOx), and annual emission estimates for particulate matter 2.5 microns or smaller (PM2.5) and NOx as a precursor were developed for years 2018, 2020, 2023, 2025, 2035, and 2045 forecast years. These emission estimates were calculated using EPA's Motor Vehicle Emission Simulator (MOVES2014b).

The results of this analysis, in Tables 1 and 2 below show that the 2019-2045 MTP and the 2018-2021 TIPs mobile emissions are within the MVEBs for all forecast years per pollutant. This analysis provides a basis for a determination of conformity for the 2019-2045 MTP and the 2018-2021 TIP.

Table 1: Ozone Conformity - NOx and VOC Emissions Budget Test Results

Year	Ozone Area	Tons per day					
		Series 31G		Budgets		Difference	
		VOC	NOx	VOC	NOx	VOC	NOx
2018	CT Portion of NY-NJ-CT Area	16.61	23.74	17.6	24.6	- 0.99	- 0.86
	Greater CT Area	14.96	21.18	15.9	22.2	- 0.94	- 1.02
2020	Greater CT Area	13.54	17.84	15.9	22.2	- 2.36	- 4.36
2023	CT Portion of NY-NJ-CT Area	13.06	15.70	17.6	24.6	- 4.54	- 8.90
2025	CT Portion of NY-NJ-CT Area	12.39	13.94	17.6	24.6	- 5.21	-10.66
	Greater CT Area	11.18	12.53	15.9	22.2	- 4.72	- 9.67
2035	CT Portion of NY-NJ-CT Area	7.27	8.45	17.6	24.6	-10.33	-16.15
	Greater CT Area	6.49	7.53	15.9	22.2	- 9.41	-14.67
2045	CT Portion of NY-NJ-CT Area	6.41	7.85	17.6	24.6	-11.19	-16.75
	Greater CT Area	5.76	7.01	15.9	22.2	-10.14	-15.19

Table 2: PM2.5 Conformity - Direct PM2.5 and NOx Emission Budget Test Results

Year	PM2.5 Area	Tons per year					
		Series 31G		Budgets		Difference	
		Direct $PM_{2.5}$	NOx	Direct $PM_{2.5}$	NOx	Direct $PM_{2.5}$	NOx
2018	CT Portion of NY-NJ-CT Area	318.1	7,837.5	575.8	12,791.8	-257.7	-4,954.3
2025	CT Portion of NY-NJ-CT Area	221.6	4,707.9	516.0	9,728.1	-294.4	-5,020.2
2035	CT Portion of NY-NJ-CT Area	169.2	2,987.4	516.0	9,728.1	-346.8	-6,740.7
2045	CT Portion of NY-NJ-CT Area	152.4	2,803.5	516.0	9,728.1	-363.6	-6,924.6

2. What is Transportation Conformity?

Transportation conformity is a planning process required by the CAA Section 176(c), which establishes the framework for improving air quality to protect public health and the environment. The goal of transportation conformity is to ensure that FHWA and FTA funding and approvals are given to highway and public transportation activities that are consistent with air quality goals.

The CAA requires that metropolitan transportation plans, TIPs, and Federal projects conform to the purpose of the SIP. Conformity to a SIP means that such activities will not cause or contribute to any new violations of the National Ambient Air Quality Standards (NAAQS); increase the frequency or severity of NAAQS violations; or delay timely attainment of the NAAQS or any required interim milestone. Conformity requirements apply in areas that either do not meet or previously have not met air quality standards for ozone, carbon monoxide, particulate matter, or nitrogen dioxide. These areas are known as "nonattainment areas" or "maintenance areas", respectively.

Connecticut contains nonattainment areas for ozone (O3) and maintenance areas for carbon monoxide (CO) and PM2.5.

For MTP and TIP conformity, the determination shows that the total emissions from on-road travel on an area's transportation system are consistent with the MVEBs and goals for air quality found in the state's SIP. A conformity determination demonstrates that implementation of the MTP or TIP will not cause any new violations of the air quality standard, increase the frequency or severity of violations of the standard, or delay timely attainment of the standard or any interim milestone.

This document was developed by the CTDOT to demonstrate that the MTP, comply with the MVEBs for the nonattainment and maintenance areas that fall within the state's planning boundary. In accordance with EPA regulation 40 CFR 93 Subpart A, this conformity determination is being issued in response to the adoption of new MTPs.

In addition, the conformity determination demonstrates compliance with the congestion management process in transportation management areas (23 CFR §450.322), development and content of the MTP (23 CFR §450.324), and fiscal constraints for MTPs and TIPs (40 CFR §93.108-119).

3. Nonattainment and Maintenance Areas in Connecticut

a. Ozone Nonattainment Areas

Ozone is an extremely reactive, colorless gas comprised of three atoms of oxygen. Ozone exists naturally in a layer of the earth's upper atmosphere known as the stratosphere, where it shields the earth from the sun's harmful ultraviolet rays. However, ozone found close to the earth's surface, called ground-level ozone, is a component of smog and a harmful pollutant. Ground-level ozone is produced by a complex chemical reaction between VOCs and NOx in the presence of sunlight.

Mobile source NOx emissions form when nitrogen and oxygen atoms chemically react inside the high pressure and temperature conditions in an engine. VOC emissions are a product of partial fuel combustion, fuel evaporation and refueling losses caused by spillage and vapor leakage.

Exposure to ozone has been linked to a number of respiratory health effects, including significant decreases in lung function, inflammation of airways, and increased symptoms such as cough and pain when breathing deeply. High concentrations of ozone can also contribute to reductions in agricultural crop production and forest yields, as well as increased susceptibility of plants to disease, pests and other environmental stresses

such as harsh weather. This pollutant alone contributes to the majority of unhealthy air quality days in Connecticut, as measured by the Air Quality Index (AQI).

EPA revised the ozone NAAQS in 2008 and again in 2015. The 2008 ozone NAAQS was established at 75 ppb and the 2015 ozone NAAQS revised the standard to 70 ppb. States and portions of states are then subsequently classified as attainment (meeting the standard) or one of the following classifications of nonattainment: marginal, moderate, serious, severe and extreme. The classifications indicate the severity of the exceedance are defined in rules that proceed a newly promulgated NAAQS. Connecticut is nonattainment for both standards and as such must contend with the subsequent nonattainment requirements for both standards. More specifically, under the 2008 standard Connecticut's two nonattainment areas were originally designated as marginal and have subsequently been reclassified as moderate. Under the 2015 standard the southwest portion of the state, known as the New York-Northern New Jersey-Long Island (NY-NJ-CT) ozone nonattainment area, is designated as moderate and the rest of the state, known as the Greater Connecticut ozone non-attainment area, is designated as marginal.[1]

Under the 2008 standard, the Connecticut ozone nonattainment areas were subsequently reclassified to moderate. EPA determined that 11 of the original marginal areas did not attain the 2008 ozone standards by the July 20, 2015 attainment date and that they must be reclassified as moderate. Both the Greater Connecticut and the Connecticut portion of the NY-NJ-CT nonattainment areas were two of the eleven areas.[2] The "bump- up" designation to moderate was effective on June 3, 2016.

In this action, the EPA also established a due date of January 1, 2017, by which states with newly reclassified moderate areas must submit SIP revisions to address moderate nonattainment area requirements for those areas. The reclassified areas must attain the 2008 ozone standards by the July 20, 2018 moderate attainment deadline. Neither of Connecticut's nonattainment areas measured compliance by the deadline. As such, on November 14, 2018, EPA proposed to reclassify both areas as serious under the 2008 standard. However, this action is not yet final. Therefore, Connecticut remains moderate under the 2008 standard.

On March 20, 2017, EPA notified CTDEEP that EPA had determined the 2017 MVEBs for the Greater Connecticut ozone nonattainment area, submitted as a SIP revision by CTDEEP to EPA on January 17, 2017, to be adequate for transportation conformity purposes. On May 31, 2017, EPA published its adequacy finding in the Federal Register (82 FR 24859) and the MVEBs became effective on June 15, 2017 for transportation conformity purposes.

On June 4, 2018, EPA published a final rule that designated new nonattainment areas for the 2015 Ozone NAAQS (83 FR 25776). These designations were effective on August 3, 2018. Therefore, conformity of transportation plans and TIPs for the 2015 Ozone NAAQS must be demonstrated by August 3, 2019. This analysis demonstrates conformity to the new 2015 Ozone NAAQS for both Connecticut non-attainment areas.

On October 1, 2018, EPA published a final rule approving certain SIP revisions relating to the 2008 8-hour Ozone NAAQS (83 FR 49297), including approval of the MVEB as shown in Table 3.

[1] 83 FR 25776
[2] 81 FR 26697

Table 3: Approved Motor Vehicle Emissions Budgets - Ozone

Year	Area	VOC (tons/summer day)	NOx (tons/summer day)
2017	Connecticut portion of the New York-Northern New Jersey-Long Island, NY-NJ-CT Ozone Area	17.6	24.6
2017	Greater Connecticut Ozone Area	15.9	22.2

CTDEEP will be required to address the MVEBs again in the attainment demonstration for the 2015 ozone NAAQS. The attainment demonstration for the 2015 ozone NAAQS is due August 3, 2021.

Additionally, MVEBs will need to be addressed for the 2008 ozone NAAQS should the EPA finalize the reclassification proposed on November 14, 2018. Deadlines for this reclassification will be set upon the effective date of the final rule.

b. PM2.5 Maintenance Area

Fine particulate matter, also called PM2.5, is a mixture of microscopic solids and liquid droplets suspended in air, where the size of the particles is equal to or less than 2.5 micrometers (about one-thirtieth the diameter of a human hair). Fine particles can be emitted directly (such as smoke from a fire, or as a component of automobile exhaust) or be formed indirectly in the air from power plant, industrial and mobile source emissions of gases such as sulfur dioxide and nitrogen oxides.

The health effects associated with exposure to fine particles are serious. Scientific studies have shown significant associations between elevated fine particle levels and premature death. Effects associated with fine particle exposure include aggravation of respiratory and cardiovascular disease (as indicated by increased hospital admissions, emergency room visits, absences from school or work, and restricted activity days), lung disease, decreased lung function, asthma attacks, and certain cardiovascular problems such as heart attacks and cardiac arrhythmia. While fine particles are unhealthy for anyone to breathe, people with heart or lung disease, asthmatics, older adults, and children are especially at risk.

In December of 2004, EPA signed the final rulemaking notice to designate attainment and nonattainment areas with respect to the PM2.5 NAAQS, becoming effective April 5, 2005. In Connecticut, Fairfield and New Haven Counties were included in the New York-Northern New Jersey-Long Island, NY-NJ-CT PM2.5 nonattainment area. On June 20, 2007, PM2.5 budgets were found to be adequate for the early progress SIP. CTDEEP submitted a re-designation request and maintenance plan for the Connecticut portion of the NY-NJ-CT area on June 22, 2012. The plan demonstrated that Connecticut's air quality met both the 1997 annual and the 2006 24-hour PM2.5 NAAQS due to a combination of national, regional and local control measures implemented to reduce emissions and presented a maintenance plan that ensures continued attainment through the year 2025. The end of the maintenance period was established as 2025, consistent with the CAA section 175A (a) requirement that the plan provide for maintenance of the NAAQS for at least 10 years after EPA formally approves the re-designation request.

EPA subsequently determined that the 2017 and 2025 MVEBs in the maintenance plan were adequate for transportation conformity purposes and effective as of February 20, 2013. On September 24, 2013, EPA published its approval of the PM2.5 re-designation request, establishing October 24, 2013 as the effective

date of re-designation to attainment/maintenance for Connecticut's portion of the NY-NJ-CT area for both the 1997 annual and 24-hours PM2.5 NAAQS. Table 4 summarizes Connecticut's current PM2.5 MVEBs.

Table 4: Approved Motor Vehicle Emissions Budgets – PM2.5

Year	Area	Direct $PM_{2.5}$ (tons/year)	NOx (tons/year)
2017	Connecticut portion of the New York-Northern New Jersey-Long Island, NY-NJ-CT $PM_{2.5}$ Area	575.8	12,791.8
2025	Connecticut portion of the New York-Northern New Jersey-Long Island, NY-NJ-CT $PM_{2.5}$ Area	516.0	9,728.1

c. Carbon Monoxide Maintenance Areas

Carbon monoxide is produced by the incomplete burning of carbon in fuels, including gasoline. High concentrations of CO occur along roadsides in heavy traffic, particularly at major intersections and in enclosed areas such as garages and poorly ventilated tunnels. Peak concentrations occur during the colder months of the year when CO vehicular emissions are greater and meteorological inversion conditions occur more frequently, trapping pollutants near the ground.

There were formerly three CO nonattainment areas in the state. These were the Southwestern portion of the state, the New Haven-Meriden-Waterbury area, and the Hartford-New Britain-Middletown area. The remainder of the state was in attainment for CO. Attainment was demonstrated in each of the nonattainment areas and, subsequently, they were designated as full maintenance areas. On September 13, 2004, EPA approved a CTDEEP submittal for a SIP revision for re-designation of these areas to limited maintenance plan status, thus eliminating the need for budget testing. Effective January 2, 2016, the Hartford-New Britain-Middletown area was in full attainment status. The New Haven-Meriden-Waterbury area completed the maintenance period effective December 4, 2018 while the Southwestern Connecticut area will be effective May 10, 2020. In the future, "hot-spot" carbon monoxide analyses will be performed to satisfy "project level" conformity determinations.

d. PM10 Attainment Area – Limited Maintenance

EPA previously designated the City of New Haven as nonattainment with respect to the NAAQS for particulate matter with a nominal diameter of ten microns or less (PM10). The PM10 nonattainment status in New Haven was a local problem stemming from activities of several businesses located in the Stiles Street section of the city. Numerous violations in the late 1980's and early 1990's of Section 22a-174-18 (Fugitive Dust) of CTDEEP regulations in that section of the city led to a nonattainment designation (CTDEEP, 1994: Narrative Connecticut Department of Energy and Environmental Protection, State Implementation Plan Revision, For PM10, March 1994). Corrective actions were subsequently identified in the SIP and implemented, with no violations of the PM10 NAAQS since the mid-1990s.

On October 13, 2005, EPA published in the Federal Register (70 FR 59690), approval of a request by CTDEEP for a limited maintenance plan and re-designation of the New Haven nonattainment area to attainment for the PM10 NAAQS. This direct final rule became effective on December 12, 2005.

All construction activities undertaken in the City of New Haven are required to be performed in compliance with Section 22a-174-18 (Control of Particulate "Emissions") of the CTDEEP regulations. All reasonable

available control measures must be implemented during construction to mitigate particulate matter emissions, including wind-blown fugitive dust, mud and dirt carry out, and re-entrained fugitive emission from mobile equipment.

As with limited maintenance plans for other pollutants, emissions budgets are considered to satisfy transportation conformity's "budget test". However, future "project level" conformity determination may require "hot spot" PM10 analyses for new transportation projects with significant diesel traffic in accordance with EPA's Final Rule for "PM2.5 and PM10 Hot-Spot Analyses in Project-level Transportation Conformity Rule PM2.5 and PM10 Amendments; Final Rule (75 FR 4260, March 24, 2010) which became effective on April 23, 2010.

e. State of Connecticut Nonattainment/Attainment Maps

Figure 1: Connecticut Ozone Nonattainment Areas

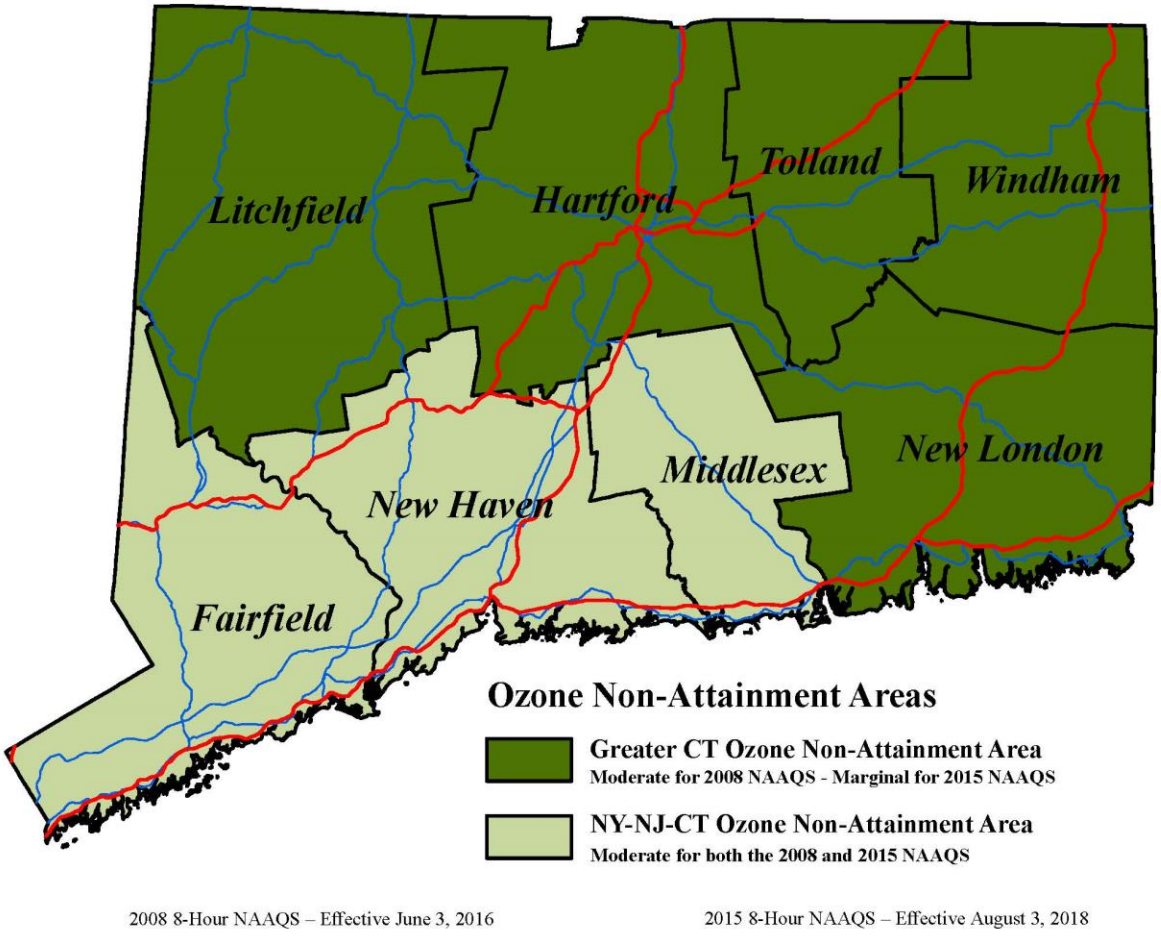


Figure 2: Connecticut PM2.5 Attainment/Maintenance Area

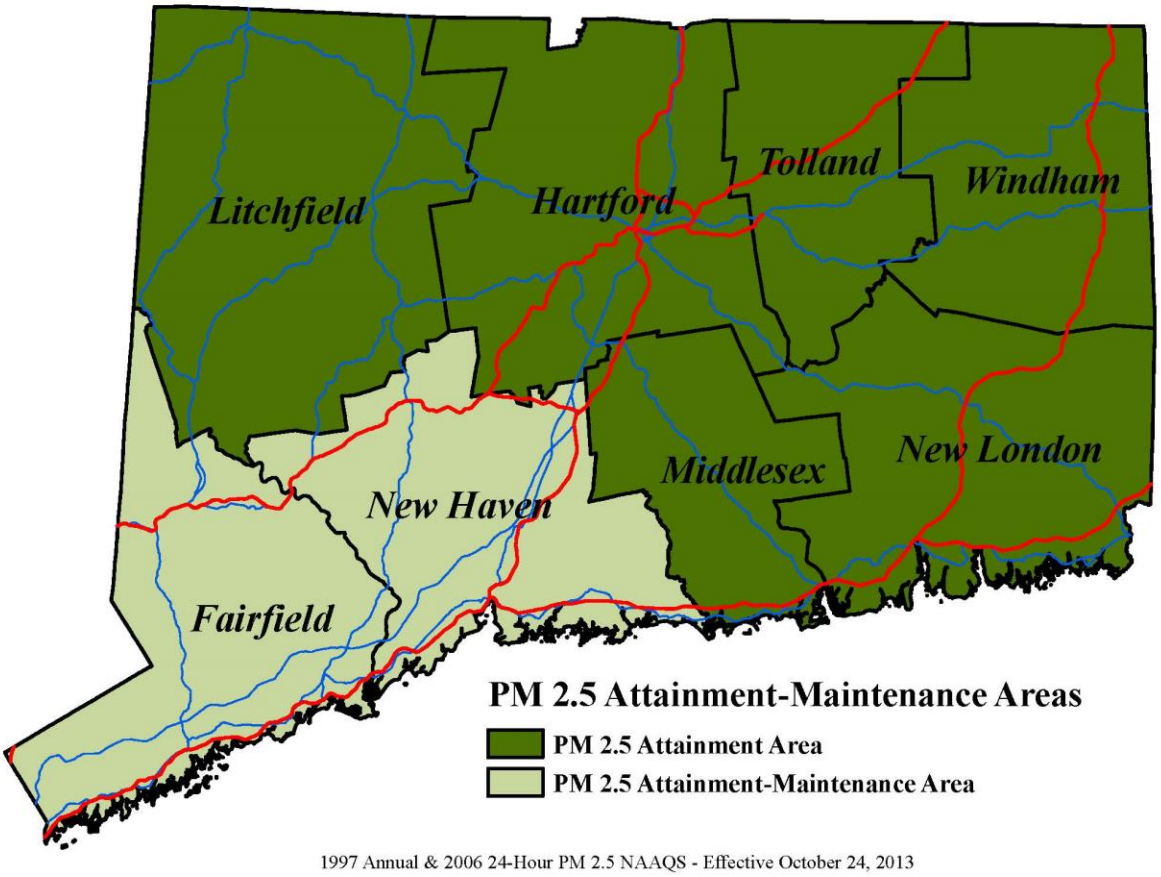
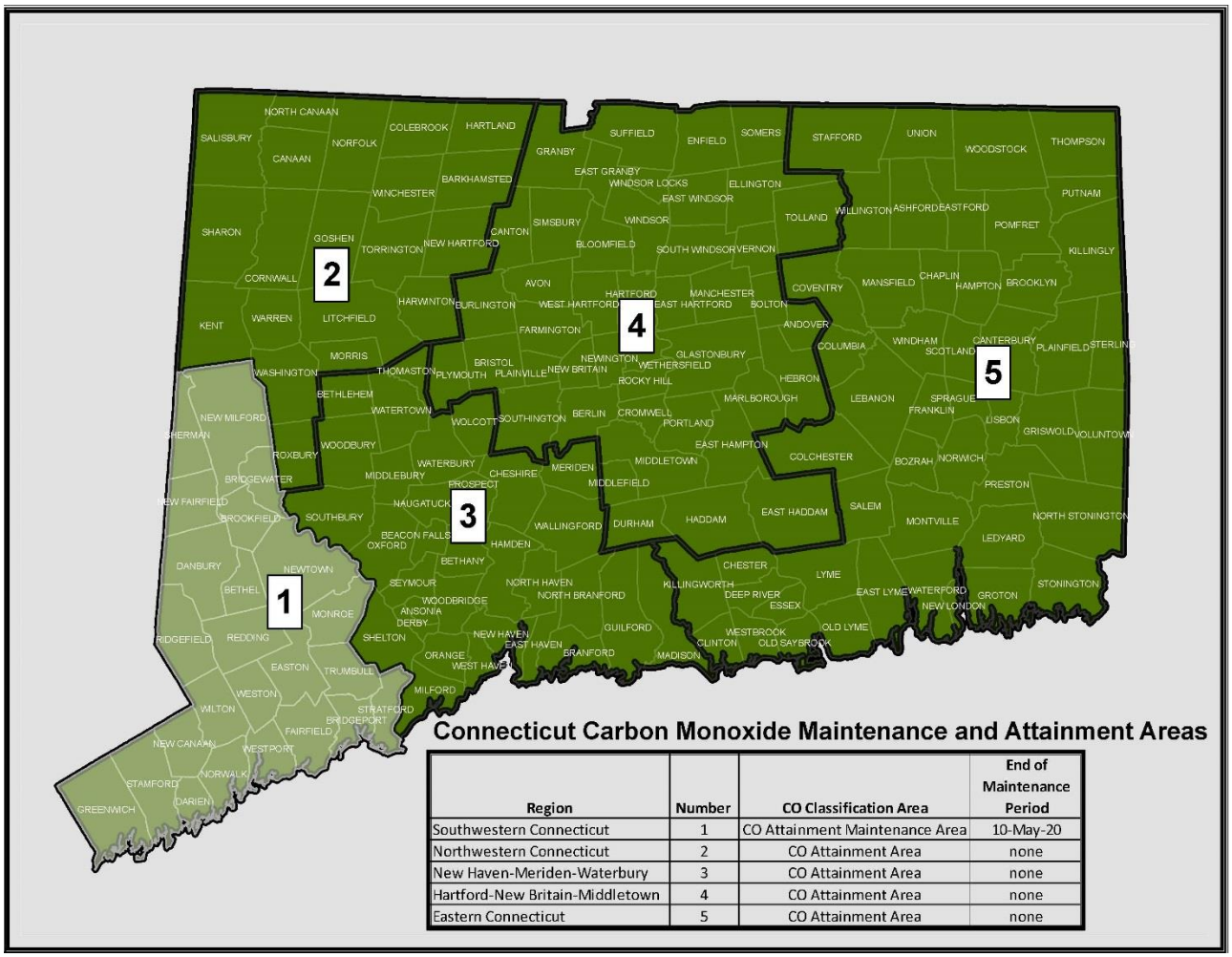


Figure 3: Connecticut Carbon Monoxide Maintenance and Attainment Areas



Region	Number	CO Classification Area	End of Maintenance Period
Southwestern Connecticut	1	CO Attainment Maintenance Area	10-May-20
Northwestern Connecticut	2	CO Attainment Area	none
New Haven-Meriden-Waterbury	3	CO Attainment Area	none
Hartford-New Britain-Middletown	4	CO Attainment Area	none
Eastern Connecticut	5	CO Attainment Area	none

4. How Does Connecticut Demonstrate Conformity?

a. Transportation Planning Work Program

CTDOT's FY 2019-2020 Transportation Planning Work Program contains a description of all planning efforts, including those related to air quality, to be sponsored or undertaken with federal assistance during FY 2019 and 2020. Included with this program are several tasks directly related to CTDOT's responsibilities under Connecticut's air quality SIP. Additional functions, such as those supporting the preparation of project level conformity analysis, are funded under project related tasks. This work program is available at CTDOT for review.

b. Interagency Consultation

The conformity rule requires that Federal, State, and local transportation and air quality agencies establish formal procedures to ensure interagency coordination on critical issues. Interagency consultation is a collaborative process between organizations on key elements of the transportation and air quality planning and provides a forum for effective state and local planning and decision-making.

Key organizations included in the interagency consultation are FHWA, FTA, EPA, CTDOT, CTDEEP and the MPOs.

Some goals of interagency consultation are to:

- Ensure all agencies meet regularly and share information;
- Identify key issues early in the process;
- Enable well-coordinated schedules for TIP/MTP conformity determinations and SIP development; and
- Allow collaborative decision on methodologies, assumptions and conformity test selections.

A list of attendees and call-in participants of the Interagency Consultation Meeting is included in Appendix C along with a copy of the minutes from the meeting.

c. Public Consultation

The transportation conformity process must also include public consultation on the emissions analysis and conformity determination. This includes posting of relevant documentation and analysis on a "clearinghouse" webpage maintained through the interagency consultation process. All MPOs in the affected nonattainment or maintenance areas must provide thirty-day public comment periods and address any comments received. For this transportation conformity determination, all Connecticut MPOs will hold a thirty-day public comment period. If any public comments were received, they will be attached and can be found in Appendix E.

d. Scenario Years

The "Action Scenario" is the future transportation system that will result from full implementation of the MTP.

VOC/NOx emission analysis was conducted for ozone season summer day conditions for the following years:

- 2018 (Attainment year and near term analysis year)
- 2020 (Attainment year for the Greater CT Marginal nonattainment area under the 2015 Ozone NAAQS)[3]
- 2023 (Attainment year for the CT portion of NY-NJ-CT Moderate nonattainment area under the 2015 Ozone NAAQS)[3]
- 2025 (Interim modeling year)
- 2035 (Interim modeling year)
- 2045 (Metropolitan Transportation Plan horizon year)

PM2.5 emission analysis was conducted for the following years but for annual average conditions:

- 2018 (Attainment year and near term analysis year)
- 2025 (Interim modeling year)
- 2035 (Interim modeling year)
- 2045 (Metropolitan Transportation Plan horizon year)

[3] Per March 20, 2019 email from Ariel Garcia, Senior SIP Coordinator, Air Quality Unit, EPA Region 1. "The reason being is that going-forward EPA will rely on the definition of "Attainment Year" to refer to the year containing the last fully completed ozone season preceding the attainment date…"

e. Other Planning Documents

The enaction of Section 81 of Connecticut Public Act 13-277 repealed Section 13b-15 of the Connecticut General Statutes, no longer mandating a biennial Master Transportation Plan effective July 1, 2013. The Department's Capital Plan has been expanded to include much of the project information that was formerly included in the Master Transportation Plan. In addition, the Existing Systems document, the Statewide Long Range Transportation Plan and "Let's GO CT!" contain other information that was included in various Master Transportation Plans.

5. Latest Planning Assumptions and Emissions Model

a. VMT

Vehicle miles of travel (VMT) estimates were developed from CTDOT's statewide network-based travel demand model, Series 31G. The 2018 travel model network, to the extent practical, represents all state highways and major connecting non-state streets and roads, as well as the rail, local bus, and express bus systems that currently exist. Future highway networks for 2020, 2025, 2028, 2030, 2035 and 2045 and transit networks for 2020, 2025, 2030, and 2045 were built by adding MTP projects (programmed for opening after 2018) to the 2018 network year. These networks were used to run travel demand models and conduct emissions analyses for the years 2018, 2020, 2023, 2025, 2035, and 2045. Projects for each model analysis year for which network changes were required are listed in Appendix B.

It should be noted that MTP projects, which have negligible impact on trip distribution and/or highway capacity, have not been incorporated into the network. These include, but are not limited to, geometric improvements of existing interchanges, short sections of climbing lanes, intersection improvements, transit projects dealing with equipment for existing facilities and vehicles, and transit operating assistance. Other projects that reduce the number of vehicle trips, VMT or both may not be included. Such projects include ridesharing and telecommuting programs, bicycling facilities, clean fuel vehicle programs or other possible actions. These types of considerations, while not explicitly accounted for in the travel demand model, will continue to reduce the emissions levels in the regions. Essentially, those projects that do not impact the travel demand forecasts are not included in the networks and/or analysis.

The network-based travel model used for this analysis is the model that CTDOT utilizes for transportation planning, programming and design requirements. This travel demand model uses demographic and land use assumptions based on the 2011-2015 American Community Survey 5-Year Estimates population and Connecticut Department of Labor 2015 employment estimates. Population and employment projections for the years 2020, 2030, 2040 and 2050 were developed by the Connecticut Department of Transportation, Travel Demand and Air Quality Modeling Unit.

The model uses a constrained equilibrium approach to allocate trips among links. The model was calibrated using 2015 ground counts and 2015 Highway Performance Monitoring System (HPMS) Vehicle Miles of Travel data.

In addition, the Employer Commute Options (ECO) Program has been made available to all employers and is incorporated in the travel demand model. It is felt that this process is an effective means of achieving Connecticut's clean air targets. Funding of this effort under the Congestion Mitigation and Air Quality Improvement (CMAQ) program is included in the TIP for FY 2018-2021. It is estimated that this program, if fully successful, could reduce VMT and mobile source emissions by 2% in Southwest Connecticut.

Peak hour directional traffic volumes were estimated as a percentage of the Average Daily Traffic (ADT) on a link-by-link basis. Based on automatic traffic recorder data, 9.0 percent, 8.5 percent, 8.0 percent and 7.5 percent of the ADT occurs during the four highest hours of the day. A 55:45 directional split was assumed. Hourly volumes were then converted to Service Flow Levels (SFL) and Volume to Capacity (V/C) ratios calculated as follows:

$$SFL = DHV / PHF * N$$

$$VC = SFL / C$$

where: DHV = Directional Hourly Volume
PHF = Peak Hour Factor = 0.9
N = Number of lanes
C = Capacity of lane

Peak period speeds were estimated from the 2000 Highway Capacity Manual based on the design speed, facility class, area type and calculated V/C ratio. On the expressway system, Connecticut- based free flow speed data was available. This data was deemed more appropriate and superseded the capacity manual speed values. The expressway free flow speeds were updated in 2005.

For the off-peak hours, traffic volume is not the controlling factor for vehicle speed. Off-peak link speeds were based on the Highway Capacity Manual free flow speeds as a function of facility class and area type. As before, Connecticut-based speed data was substituted for expressway travel, where available, and was updated in 2005.

ShoreLine East, Hartford Rail Line, New Haven Rail Line, and its branch line schedules were updated in 2018 to reflect new headways and routes. Rail station boardings were then calibrated to 2015 actual counts in 2018 for both A.M. peak period and Midday off-peak service along all Connecticut rail lines.

Two special cases exist in the travel demand modeling process. These are centroid connectors and intrazonal trips:

- Centroid connectors represent the local roads used to gain access to the model network from centers of activity in each traffic analysis zone (TAZ). A speed of 25 mph is utilized for these links; and
- Intrazonal trips are trips that are too short to get on to the model network. VMT for intrazonal trips is calculated based on the size of each individual TAZ. A speed of 20 to 24 mph is utilized for peak period and 25 to 29 mph for off-peak.

The Daily Vehicle Miles of Travel (DVMT) is calculated using a methodology based on disaggregate speed and summarized by inventory area, functional classification, and speed. The annual VMT and speed profiles developed by this process are then combined with the emission factors from the MOVES2014b model to produce emission estimates for each scenario and time frame.

b. Emissions Model

For this transportation conformity analysis, the MOVES model, specifically MOVES2014b, was used to estimate on-road vehicle emissions for the action scenarios. MOVES is a state-of-the-science emission modeling system, developed by EPA, that estimates emissions for mobile sources at the national, county, and project level for criteria air pollutants, greenhouse gases, and air toxics.

MOVES estimates exhaust and evaporative emissions as well as brake and tire wear emissions from all types of on-road vehicles. It also uses a vehicle classification system based on the way vehicles are classified in the FHWA's Highway Performance Monitoring System (HPMS). Other parameters include VMT by vehicle and road type, vehicle hours traveled (VHT) by vehicle and road type, the number of each type of vehicle in the fleet, vehicle age distribution, model year, travel speed, roadway type, fuel information, meteorological data, such as ambient temperature and humidity, and applicable control measures such as reformulated gasoline (RFG) and inspection and maintenance (I/M) programs. Local inputs were cooperatively developed by CTDEEP and CTDOT, where applicable, using EPA recommended methods.[4]

The HPMS Vehicle Mix file was updated to reflect the average vehicle mix for the 2015-2017 timeframe. A Three year average was determined to be a more accurate representation of actual vehicle mix than the previous one year counts as the CTDOT rotates traffic and vehicle counts on a three-year basis.

CTDEEP supplemented the 2011 DMV vehicle registration data with 2018 DMV vehicle registration data for motorcycle (source type 11) and school buses (source type 43).

In November 2012, EPA confirmed by telephone to CTDEEP that future conformity determinations utilizing newer versions of MOVES can be made by comparing emission results to the existing budgets based on older versions of MOVES. As new MVEBs are determined by EPA to be adequate for each area, they will be used to make conformity determinations.

For the ozone analysis, MOVES was only run to obtain VOC and NOx emissions on a typical summer weekday to compare to the ton per summer day ozone MVEBs. For the PM2.5 analyses, an annual emissions run was conducted for PM2.5 and NOx to compare to the ton per year PM2.5 MVEBs. All runs also included the National Low Emission Vehicle (NLEV) program in 2008 and all future years.

6. Conformity Tests and Air Quality Emissions Results

For the NY-NJ-CT ozone nonattainment area, VOC and NOx transportation emissions from the Action Scenarios must be less than the 2017 transportation emission budgets if analysis year is 2017 or later.

For the Greater Connecticut ozone nonattainment area, VOC and NOx transportation emissions from the Action Scenarios must be less than the 2017 transportation emission budgets if analysis year is 2017 or later.

For the NY-NJ-CT PM2.5 maintenance area, PM2.5 and NOx transportation emissions from the Action Scenarios must be less than the 2017 transportation emission budgets if analysis year is between 2017 and 2024.

For the NY-NJ-CT PM2.5 maintenance area, PM2.5 and NOx transportation emissions from the Action Scenarios must be less than the 2025 transportation emission budgets if analysis year is 2025 or later.

No tests for CO are required because the CO areas have been approved by EPA for Limited Maintenance Plan status.

[4] "MOVES2014, MOVES2014a, and MOVES2014b Technical Guidance: Using MOVES to Prepare Emission Inventories for State Implementation Plans and Transportation Conformity", EPA-420-B-18-039, August 2018.

The following tables show the MOVES2014b modeled emissions for both ozone and PM2.5 areas compared to the applicable MVEBs for each pollutant. In all cases, the Metropolitan Transportation Plans meet the required conformity tests.

Table 5: Ozone Conformity - NOx and VOC Emissions Budget Test Results

Year	Ozone Area	Tons per day					
		Series 31G		Budgets		Difference	
		VOC	NOx	VOC	NOx	VOC	NOx
2018	CT Portion of NY-NJ-CT Area	16.61	23.74	17.6	24.6	- 0.99	- 0.86
	Greater CT Area	14.96	21.18	15.9	22.2	- 0.94	- 1.02
2020	Greater CT Area	13.54	17.84	15.9	22.2	- 2.36	- 4.36
2023	CT Portion of NY-NJ-CT Area	13.06	15.70	17.6	24.6	- 4.54	- 8.90
2025	CT Portion of NY-NJ-CT Area	12.39	13.94	17.6	24.6	- 5.21	-10.66
	Greater CT Area	11.18	12.53	15.9	22.2	- 4.72	- 9.67
2035	CT Portion of NY-NJ-CT Area	7.27	8.45	17.6	24.6	-10.33	-16.15
	Greater CT Area	6.49	7.53	15.9	22.2	- 9.41	-14.67
2045	CT Portion of NY-NJ-CT Area	6.41	7.85	17.6	24.6	-11.19	-16.75
	Greater CT Area	5.76	7.01	15.9	22.2	-10.14	-15.19

Table 6: PM2.5 Conformity - Direct PM2.5 and NOx Emission Budget Test Results

Year	PM2.5 Area	Tons per year					
		Series 31G		Budgets		Difference	
		Direct $PM_{2.5}$	NOx	Direct $PM_{2.5}$	NOx	Direct $PM_{2.5}$	NOx
2018	CT Portion of NY-NJ-CT Area	318.1	7,837.5	575.8	12,791.8	-257.7	-4,954.3
2025	CT Portion of NY-NJ-CT Area	221.6	4,707.9	516.0	9,728.1	-294.4	-5,020.2
2035	CT Portion of NY-NJ-CT Area	169.2	2,987.4	516.0	9,728.1	-346.8	-6,740.7
2045	CT Portion of NY-NJ-CT Area	152.4	2,803.5	516.0	9,728.1	-363.6	-6,924.6

Emission Summary Tables are posted in Appendix D.

This analysis in no way reflects the full benefit in air quality from the MTPs. The network-based modeling process is capable of assessing the impact of major new highway or transit service. It does not reflect the impact from the many projects, which are categorically excluded from the requirement of conformity. These projects include numerous improvements to intersections, which will allow traffic to flow more efficiently, thus reducing delay, fuel usage and emissions. Included in the MTPs, but not reflected in this analysis, are many projects to maintain existing rail and bus systems. Without these projects, those systems could not offer the high level of service they do. With them, the mass transit systems function more efficiently, improve safety, and provide a more dependable and aesthetically appealing service. These advantages will retain existing patrons and attract additional riders to the system. The technology to quantify the air quality benefits from these programs is not currently available.

Changes in the transportation system will not produce significant emissions reductions because of the massive existing rail, bus, highway systems, and land development already in place. Change in these aspects is always at the margin, producing very small impacts.

As shown in this analysis, transportation emissions are declining dramatically and will continue to do so. This is primarily due to programs such as federal heavy-duty vehicle standards, reformulated fuels, enhanced inspection and maintenance programs, and Connecticut's low emissions vehicle (LEV) program.

7. Conclusions

CTDOT has assessed its compliance with the applicable conformity criteria requirements of the 1990 CAAA. Based upon this analysis, it is concluded that all elements of Metropolitan Transportation Plans conform to applicable SIP and 1990 CAAA Conformity Guidance criteria and the approved transportation conformity budgets.

8. Contact Information

Please direct any questions you may have on the air quality emission analysis to:

Connecticut Department of Transportation
Bureau of Policy and Planning
Division of Coordination, Modeling and Crash Data
Travel Demand / Air Quality Modeling Unit
2800 Berlin Turnpike
Newington, CT. 06111
(860) 594-2032
Email: Judy.Raymond@ct.gov

All MOVES modeling files and runstreams are available for review upon request on the Department's MOVES FTP site. The files will remain available during the 30-day public review period.

9. Appendices

In addition to the information required for a conformity determination, the following is attached:

Appendix A:	Acronyms
Appendix B:	List of Projects Included in Conformity Analysis by Network Year
Appendix C:	Interagency Consultation Meeting
Appendix D:	Emissions Summary Tables
Appendix E:	Comments Received During Public Review Period

Appendix A

Acronyms

Acronym	Meaning
ADT	Average Daily Traffic
AQI	Air Quality Index
CAAA	Clean Air Act Amendments (1990)
CO	Carbon Monoxide
CFR	Code of Federal Regulations
CTDEEP	Connecticut Department of Energy and Environmental Protection
CTDOT	Connecticut Department of Transportation
CMAQ	Congestion Mitigation and Air Quality Improvement Program
DHV	Design Hourly Volume
DVMT	Daily Vehicle Miles of Travel
ECO	Employee Commute Option
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FTP	File Transfer Protocol
FR	Federal Register
HPMS	Highway Performance Monitoring System
I/M	Inspection Maintenance Program
MTP	Metropolitan Transportation Plan
MOVES	Mobile Vehicle Emission Simulator
MPO	Metropolitan Planning Organization
MVEB	Motor Vehicle Emission Budget
NAAQS	National Ambient Air Quality Standards
NLEV	National Low Emission Vehicle
NOx	Nitrogen Oxides
PHF	Peak Hour Factor
$PM_{2.5}$	Fine Particulate Matter less than 2.5 micrometers
PM_{10}	Fine Particulate Matter less than 10 micrometers
SFL	Service Flow Levels
SIP	State Implementation Plan
STIP	Statewide Transportation Improvement Program
TAZ	Traffic Analysis Zone
TCM	Transportation Control Measure
TIP	Transportation Improvement Program
U.S.C.	United States Code
U.S. DOT	U.S. Department of Transportation
V/C	Volume to Capacity
VHT	Vehicle Hours Traveled
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound

Appendix B

List of Projects Included in Conformity Analysis by Network Year

MPO	Project #	Town	Route/Street Number	Project Description	Network Year
CRCOG		Various	CTFastrak	CTFastrak Stations & Fixed Guideway	2015
GBVMPO	0036-0179	Derby	Route 8	Reconstruct interchanges 16 & 17; extend Pershing Drive & construct local roads	2016
CNV MPO	0017-0182	Bristol	Route 6	Addition of a second through lane on Route 6 Eastbound from Carol Drive to Peggy Lane	2018
CNV MPO	0051-xxxx	Waterbury	Various	TIGER Grant includes various roadway changes including reconstruction/extension of Jackson Street. Extension will meet at Freight Street and continue to West Main	2018
CRCOG	0051-0259	Farmington	I-84/Route 4/Route 6	Interchange BSWY	2018
CRCOG		Hartford	Hartford Line	Hartford Line - Existing Stations - Hartford	2018
GBVMPO	0138-0211	Stratford	Route 1	Addition of a through lane on Rt 1 Southbound from Nobel Street to Soundview Avenue	2018
MULTIPLE	0170-2296	Berlin	Hartford Line	Hartford Line - Existing Stations - Berlin	2018
MULTIPLE	0170-2296	Various	Hartford Line	Hartford Line - Grade Crossing Elimination Program	2018
MULTIPLE	0170-2296	Meriden	Hartford Line	Hartford Line - Existing Stations - Meriden	2018
MULTIPLE	0170-2296	Wallingford	Hartford Line	Hartford Line - Existing Stations - Wallingford	2018
MULTIPLE	0320-0015	Various	Hartford Line	Hartford Line-Windsor Station (FDP 9/16/2020)	2018
MULTIPLE	0320-0016	Various	Hartford Line	Hartford Line-Windsor Locks (FDP 10/2/2019)	2018
MULTIPLE	Various	Various	Hartford Line	Hartford Line	2018
WESTCOG	0102-0325	Norwalk	Route 1	Addition of a through lane on Rt. 1 Northbound from France Street to Rt. 53	2018
WESTCOG	0135-0301	Stamford	Atlantic Street	Reconstruction of I-95 off ramps and Atlantic Street in vicinity of Metro North Railroad Bridge No. 08012R	2018
CNV MPO	0151-0273	Waterbury	I-84	Upgrade Expressway - Phase 3 (80%)	2020
CNV MPO	0124-xxx	Seymour	Route 113	Between Interchange 22 and 23 to improve access	2020
CNV MPO	0124-xxxx	Seymour	Route 8	Realign interchange with new extension of Derby Road	2020
CNV MPO	0126-xxxx	Shelton	Route 8	Interchange 11 - Construct new SB entrance ramp, Widen Bridgeport Avenue	2020
CNV MPO	0126-xxxx	Shelton	Route 714	Between Huntington Avenue and Constitution Boulevard	2020
GBVMPO	0015-0371	Bridgeport	Seaview Ave	Seaview Avenue corridor: Operational improvements to corridor, and north of Rt 1 to provide access for proposed Lake Success Business Park and future local developments	2020
GBVMPO	0015-xxxx	Bridgeport	Route 130	Reconstruct and widen Rt 130 from Stratford Avenue bridge to Yellow Mill bridge	2020
GBVMPO		Stratford	Main St/Route 113	Main St Complete Street Implementation: Narrow Main St. from 4 lanes to 3, add buffered bike lanes, expand sidewalks and increase landscaped buffer	2020
WESTCOG	0034-0347	Danbury	SR 806 (Newtown Rd)	Improvements: Old Newtown to Plumtrees and Eagle to Industrial Plaza Rd	2020
WESTCOG	0008-xxxx	Danbury	White Street	Operational Improvements on White Street at Locust Avenue and Eighth Avenue	2020
CNV MPO	0080-0128	Middlebury	I-84/Route 63/Route 64	Improvements on Routes 63, 64 & I-84 WB Interchange 17: Build new connector road and realign existing state routes	2025
CNV MPO		Beacon Falls	NRG	NRG Beacon Falls -- Phase II: Naugatuck River Greenway: Extend the road diet along South Main Street and install a multi-use trail	2025
CNV MPO		Beacon Falls	NRG	NRG Beacon Falls -- Phase III: Naugatuck River Greenway: Extend the road diet along North Main Street and install a multi-use trail from about Depot Street to Church Street	2025
CNV MPO		Prospect	Route 69	Route 69 Traffic & Pedestrian Improvements: Optimize signal timing. Provide a lead or lag phase for the NB Route 69 approach left turners and prohibit the SB left turn onto Scott Road	2025
CNV MPO		Thomaston	US Route 6	Main St Safety Improvements: Narrowing lanes, eliminating one of the EB Main St lanes west of the ramps, and providing turn (deceleration) lanes into Pleasant St	2025
CNV MPO		Waterbury	SR 801	East Main St Spot Improvements & Lane configurations: Reconfigure to provide a uniform road width and number of lanes – one travel lane in each direction	2025
CNV MPO		Waterbury	SR 801	Safety improvments East Main Street: Remove 1 through lane in eastbound direction between Cherry Street and Brass Mill Dr. Shorten pedestrian crossing distances.	2025
CNV MPO		Waterbury	CT Transit	Lakewood Road Bus: Add new 1 hour headway service along Lakewood Road. Stagger service with 422 to reduce headways to one half hour on trunk.	2025
CRCOG	0042-0317	East Hartford	Route 2	Rt. 2 Operational & Safety Improvements Between Exits 3 and 5	2025
CRCOG	0055-0142	Granby	10/202	Major Intersection Improvement at CT 20/189	2025
CRCOG	0063-0703	Hartford	I-91/Route 15	Relocation & Reconfigure Interchange 29 (CN)	2025
CRCOG	0131-0190	Southington	CT 10	NHS - Remove Br 00518, reconstruct CT10/322 intersection	2025

MPO	Project #	Town	Route/Street Number	Project Description	Network Year
CRCOG	0155-0171	West Hartford	I-84	I-84 West Hartford Exits 40 & 42	2025
CRCOG		Manchester	I-84	Auxiliary lanes between Exits 62 and 63	2025
CRCOG		Manchester	I-84	Auxiliary lanes between Exits 63 and 64/65	2025
GBVMPO	0015-0368	Bridgeport	Route 700	Lafayatte Circle realignment: Realign from a large, irregular one-way circulating configuration to several more typical roadway intersections connecting several city streets	2025
GBVMPO	0036-0184	Derby	Route 34	Reconstruct and widen Main Street from Bridge St. to Ausonio Dr. to 4 travel lanes	2025
GBVMPO	0138-0248	Stratford	I-95	Interchange 33: Reconstruct the partial interchange and replace it with a full-directional, diamond interchange.	2025
GBVMPO		Fairfield	Route 58 at Black Rock Tpke.	Provide a 4-leg single-lane roundabout: Modify access with Moritz Pl and Rt. 58 to be right-in/right-out access preceding roundabout. Remove access from Rt 58 to Whitewood Dr.	2025
GBVMPO		Fairfield	Route 58	Formalize left lane southbound as a dedicated left-turn lane	2025
GBVMPO		Fairfield	Route 58	Widen Black Rock Turnpike transition from 2 lanes to 4 in area of Samp Mortar to Tahmore Drive	2025
GBVMPO		Monroe	Route 25	Additional Southbound through lane; Widening on Purdy Hill Rd and Judd Rd for an exclusive left, exclusive through, and an exclusive right turn lanes.	2025
GBVMPO		Seymour	New Road	Route 42 & Route 67 Connector: Construct new connector arterial (2 lanes) between Route 42 in Beacon Falls and Route 67 in Seymour.	2025
GBVMPO		Seymour	WBL	Relocate the Seymour Rail Station to north of Route 67 as part of TOD redevelopment project	2025
GBVMPO		Stratford	Main St/Route 113	Main St Complete Street Implementation: Narrow Main St. from 4 lanes to 3 (Barnum Ave to Fenelon Pl) Single lane in each direction w/a center turn lane.	2025
MULTIPLE	0096-0204	Newtown	I-84	Exit 11 Intersection Improvements at Rt. 34/SR 490	2025
RiverCOG	0082-0316	Middletown	Route 9/Route 17	Rt. 9 / Rt. 17 Operational & Safety Improvements at Ramp (Reconfigure Rt 17 On-ramp to Rt 9 NB)	2025
RiverCOG	0082-0318	Middletown	Route 9	Rt. 9 Removal of Lights in Middletown	2025
SCCOG	0085-0146	Montville/Salem	Route 85	Corridor Improvements South of CT 82	2025
SCCOG	0120-0079	Montville	Route 85	Addition of a second through lane on Route 85 Northbound - north of Chesterfield Rd to south of Deer Run	2025
SCCOG	0120-0094	Salem	Route 85	Corridor Improvements North of CT 82	2025
SCCOG		Colchester	Route 2	Interchange improvements at Exit 17, add eastbound on-ramp, westbound off-ramp	2025
SCCOG		Norwich/New London	CT Transit	New BRT-like service - Norwich and New London	2025
SCCOG		Various	SEAT	25% increase in service frequency,	2025
WESTCOG	0102-0297	Norwalk	East Ave	Reconstruction @ Metro North Br No. 42.14	2025
SCCOG		Norwich	Route 82	Removal of a through lane on Rt 82 eastbound from west of Pine St to west of Fairmont St	2028
CNV MPO		Naugatuck	Route 8	Interchange 27 Improvements: Widening SB off-ramp on structure at Interchange 27 to provide right turn lane; Close NB off-ramp to North Main St; Close SB on-ramp from North Main St;	2030
CNV MPO		Naugatuck	Route 8	Interchange 28/29 Improvements: Close SB on-ramp from Exit 29 and SB off-ramp to North Main St; Install barrier to provide local access between Platts Mill Rd & North Main St; New SB on-ramp from local	2030
CRCOG	0109-xxxx	Plainville	New Britain Ave	Add lane from New Britain Ave/Cooke Street to Hooker Street	2030
GBVMPO	0036-xxxx	Derby	Route 8	Route 8 Interchange 16 and 17; Construct new NB ramps. Close old ramps	2030
GBVMPO	0126-xxxx	Shelton	Route 8	Interchange 14 - Construct new SB entrance ramp	2030
GBVMPO		Bridgeport	I-95	Reconstruct and modify the southbound approach I-95 project to eliminate the weave section created by the entrance to Rt 8/25 from Washington Ave followed by the exit to Myrtle Ave.	2030
GBVMPO		Bridgeport	Route 8/Route 25	Construct a third lane for Rt 8 northbound from the split to the vicinity of off-ramp to Rt 15.	2030
GBVMPO		Fairfield	Mill Plain Road	Addition of lane to southbound approach from I-95 ramps to US 1	2030
GBVMPO		Fairfield	Route 58	Reduce Rt. 58 to one travel lane in each direction - Black Rock Tpke and Burroughs Dr	2030
GBVMPO		Fairfield	Route 58	Provide a 4-leg single-lane roundabout with a right-turn bypass lane for SB approach at Burroughs Dr & Katona Dr	2030
GBVMPO		Fairfield	Route 58	Narrow Rt 58 to one through lane in each direction. Shoprite to Stillson Rd	2030
GBVMPO		Fairfield	Route 58	Narrow Rt. 58 to one through lane in the southbound direction. Old Navy to Fairfield Woods Rd	2030
GBVMPO		Shelton	SR 714	Widening of Bridgeport Avenue to provide a consistent 4-lane cross section with turn lanes from Trumbull town line to Constitution Boulevard	2030
MULTIPLE	0320-0012	Various	Hartford Line	Hartford Line-North Haven Station (FDP 7/1/2020)	2030
MULTIPLE	0320-0013	Newington	Hartford Line	Hartford Line - Future Stations - Newington	2030
MULTIPLE	0320-0014	West Hartford	Hartford Line	Hartford Line - Future Stations - West Hartford	2030

MPO	Project #	Town	Route/Street Number	Project Description	Network Year
MULTIPLE	0320-0017	Enfield	Hartford Line	Hartford Line - Future Stations - Enfield	2030
MULTIPLE	0034-xxxx	Various	I-84	Add lane between Interchanges 3 and 4. Between Interchanges 12 and 13	2030
SCCOG		New London	I-95	Close exit 84E to Williams Street	2030
SCCOG		Norwich	12/2	Convert downtown circulation to two-way, convert chelsea harbor drive to local parking/park facility, streetscape - Water Street to carry Chelsea Harbor Drive traffic	2030
SCCOG		Preston	Route 2A	New Parallel 2-lane Route 2A Bridge (Add Second Span to Mohegan Pequot Bridge)	2030
SCCOG		Windham	Plains Road/Route 203	New Road Connecting Plains Road to Route 203	2030
SCROG	0014-xxxx	Branford	Route 1	Widening East Haven Town Line to Alps Road (Echlin Road Private)	2030
SCROG	0014-xxxx	Branford	Route 1	Widening Route 146 to Cedar Street	2030
SCROG	0014-xxxx	Branford	Route 1	Widening Cedar Street to East Main	2030
SCROG	0014-xxxx	Branford	Route 1	Widening East Main to 1-95 Exit 55	2030
SCROG	0014-xxxx	Branford	Route 1	Widening I-95 Exit 55 to Leetes Island Road	2030
SCROG	0059-xxxx	Guilford	Route 1	Widening Bullard Road extension to Route 77	2030
SCROG	0059-xxxx	Guilford	Route 1	Widening State Street to Tanner Marsh Road	2030
SCROG	0061-xxxx	Hamden	Route 10	Widening Washington Avenue to Route 40	2030
SCROG	0061-xxxx	Hamden	Route 10	Widening Route 40 to Todd Street	2030
SCROG	0061-xxxx	Hamden	Route 10	Widening Todd Street to Shepard Avenue	2030
SCROG	0061-xxxx	Hamden	Route 10	Widening River Street to Cheshire Town Line	2030
SCROG	0061-xxxx	Hamden/North Haven	Route 5	Widening Olds Street (Hamden) to Sackett Point Road	2030
SCROG		Orange	NHL	NHL - New Stations/Parking - Orange	2030
SCROG	0079-xxxx	Meriden	Route 5	Widening Wallingford Town Line to Olive Street (Route 71)	2030
SCROG	0083-xxxx	Milford	Route 162	Widening from West of Old Gate Lane to Gulf Street/Clark Street to Route 1	2030
SCROG	0092-0649	New Haven		Long Wharf access Plan Widen I-95 (in separate project), Eliminate Long Wharf Drive to expand park, add new road from Long Wharf Drive	2030
SCROG	0092-xxxx	New Haven/Woodbridge	Route 69	Widening from Route 63 to Landin Street	2030
SCROG	0092-xxxx	New Haven/Woodbridge	Route 63	Widening from Dayton Street (NH) to Landin Street (Wdbg)	2030
SCROG	0098-xxxx	North Branford	Route 80	Widening from East Haven Town Line to Doral Farms Road and Route 22 to Guilford Town Line	2030
SCROG	0106-xxxx	Orange	Route 162	Widening from West Haven Town Line to US 1	2030
SCROG	0148-xxxx	Wallingford	Route 5	Widening from South Orchard Street. to Ward Street and Christian Road to Meriden Town Line	2030
SCROG	0148-xxxx	Wallingford	Route 5	Widening from Route 71 overpass South of Old Colony Road to Route 68	2030
SCROG	0156-xxxx	West Haven	Route 122	Widening from Route 1 to Elm Street	2030
SCROG	0156-xxxx	West Haven	Route 1	Widening from Campbell Avenue to Orange Town Line	2030
SCROG	0156-xxxx	West Haven	Route 162	Widening from Elm Street to Greta Street	2030
SCROG	0156-xxxx	West Haven	Route 162	Widening from Bull Hill Ln to Orange Town Line	2030
WESTCOG	0018-0124	Brookfield	US 202	Widening South of Old State Road to Route 133	2030
WESTCOG	0034-0288	Danbury	Route 6	Add lane from Kenosia Avenue easterly to I-84 (Exit 4)	2030
WESTCOG	0102-0269	Norwalk	Route 7/Route 15	Upgrade to full interchange at Merritt Parkway (Route 15)	2030
WESTCOG	0102-0312	Norwalk	Route 7/Route 15	Reconstruction of Interchange 40 Merritt Parkway and Route 7 (Main Avenue).	2030
WESTCOG	0102-0358	Norwalk	Route 7	Rt. 7/Rt. 15 Interchange Reconstruction and Reconfiguration	2030
WESTCOG	0034-xxxx	Danbury	Route 6	Add lane from I-84 (Exit 2) East to Kenosia Avenue	2030
WESTCOG	0034-xxxx	Danbury	Route 37	Add lane from Route I-84 (Exit 6) Northerly to Jeanette Street	2030
WESTCOG	0034-xxxx	Danbury	Route 37	Add lane from Route 53 (Main Street) northerly to I-84 (Exit 6)	2030
WESTCOG	0034-xxxx	Danbury	Kenosia Ave	Add lane Kenosia Avenue from Backus Avenue to Vicinity of Lake Kenosia	2030
WESTCOG	0034-xxxx	Danbury	Backus Ave	Add lane Backus Avenue from Kenosia Avenue to Miry Brook Road	2030
WESTCOG	0034-xxxx	Danbury	Route 53	Add lane from South Street northerly to Boughton Street	2030
WESTCOG	0096-xxxx	Newtown	New Road	New Road across Old Fairfield Hills Hospital Campus, From Route 6 South to Route 860	2030
WESTCOG	0403-xxxx	Stamford	CT Transit	Route 1 BRT - Norwalk/Stamford	2030
CRCOG		Manchester	New Road	Buckland: Redstone Rd Extension - Modify existing I-84E off-ramp at Exit 62 to provide access from the existing ramp to proposed structures over Buckland Street and existing on-ramp to I-84 eastbound.	2035
CRCOG		Rocky Hill	Elm Street	Elm Street Connector Roadway - Create an extension from Corporate Place to Elm Street	2035

MPO	Project #	Town	Route/Street Number	Project Description	Network Year
CRCOG		Simsbury	Route 10	Rt.10 between Ely Lane and Wolcott Rd - build parallel road west of Rt.10 between Hoskins Rd and north through new development properties.	2035
CRCOG		Windsor Locks	Bradley Park Road	Bradley Airport-East Granby - Bradley Park Road Extension	2035
CRCOG		Windsor Locks	Northern Bradley Connector	A new Northern Bradley Connector Roadway is recommended to connect Rt. 75 near Bradley Airport to Rt. 190 over the Connecticut River.	2035
GBVMPO		Monroe/Trumbull	Route 25	Major widening of Main Street (Rt. 25) to four lanes with turn lanes at major intersections from the end of the divided section north of Rt. 111 to the Monroe-Newtown town line.	2035
GBVMPO		Stratford	I-95	Interchanges 31 & 32: Reduce the number of ramps and provide separation of the interchanges, relocating and constructing a new diamond interchange at Rt. 130	2035
GBVMPO		Bridgeport	NHL	NHL - New Stations/Parking - Barnum	2040
MULTIPLE		Various	WBL	Operations: Expand service along the Waterbury branch line to provide 30-minute headways during the AM & PM peak periods	2040
CNV MPO		Various	I-84	I-84 Widening: Increase I-84 to three lanes west of Waterbury	2045
CNV MPO		Various	WBL	Operations: Expand service along the Waterbury branch line to provide 30-minute headways during the AM & PM peak periods	2045
CRCOG	0051-0259	Farmington	I-84	I-84 Interchange at Rt. 4 & Rt. 6 in Farmington	2045
GBVMPO		Bridgeport/Fairfield	I-95	I-95 Northbound Widening Between Exits 19 and 27A (Phase 1 - Route 8 Connector)	2045
GBVMPO		Bridgeport/Fairfield	I-95	I-95 Northbound Widening Between Exits 19 and 27A (Phase 2 - Exits 19-25)	2045
GBVMPO		Bridgeport/Fairfield/Stratford	Route 1	Provide lane continuity over its entire length by widening US Rt. 1 to a uniform four travel lanes with left turn lanes at signalized intersections. Westport/Fairfield line to Stratford/Milford line	2045
GBVMPO		Trumbull	Route 25	Rt. 25 at Whitney Avenue: Construct a partial interchange to provide access to and from Whitney Ave	2045
MULTIPLE		Stamford/Darien/Norwalk	I-95	I-95 Northbound Widening Between Exits 9 and 19	2045
MULTIPLE	0173-xxxx	Statewide	I-95	Widen I-95 between Stamford to Bridgeport (PE), $99 million total	2045
MULTIPLE		Various	SLE	SLE - Extension of Rail Service to Rhode Island	2045
SCCOG	0044-xxxx	East Lyme/New London	I-95	Placeholder - Widen I-95 b/t I-395 and Gold Star Bridge	2045
SCCOG	0044-xxxx	East Lyme/New London	I-95	Placeholder - Widen I-95 b/t I-395 and Gold Star Bridge - extend the frontage roads between the two projects 2 lanes additional in each direction (mainline and frontage road combined)	2045
SCCOG	0172-xxxx	Old Saybrook/New London	I-95	Placeholder - Widen I-95 from the Baldwin to Gold Star Bridge (3 lanes in each direction)	2045
SCCOG		East Lyme	I-95	I-95 Exit 70 to Exit 74 widening from Baldwin to I-395 Interchange	2045
SCCOG		Niantic	SLE	SLE - Niantic Station	2045
SCCOG		Various	I-95	I-95 Spot Improvements East of Thames River to Rhode Island State Line (at Exits 88,89 and 90)	2045
SCCOG		Waterford	I-95	I-95 Improvements between Exit 80 and Exit 82A	2045
SCROG		Branford	I-95	I-95 Northbound Widening from Branford Exit 54 to Exit 56	2045
WESTCOG		Darien/Norwalk	I-95	I-95 Northbound & Southbound Widening & Reconfiguration Between Exits 13 &16	2045
WESTCOG		Greenwich/Stamford	I-95	I-95 Southbound Widening Between Exits 1 and 7 and Replacing Bridge #0001	2045

Appendix C

Interagency Consultation Meeting

Interagency Consultation Meeting
2019-2045 Metropolitan Transportation Plan
Connecticut Department of Transportation
November 19, 2018 Room 2141
GoTo Meeting

Attendees:

Ken Shooshan-Stoller – FHWA
Erik Shortell – FHWA
Kurt Salmoiraghi - FHWA
Leah Sirmin - FTA
Ariel Garcia – EPA
Eric Rackauskas – EPA
Louis Corsino - CTDEEP
Tom Malone – CRCOG
Devon Lechtenberg - CRCOG
Rob Aloise – CRCOG
Christian Meyer – CNVMPO
Zachary Guarino – CNVMPO
Matt Fulda – CTMetro COG
Patrick Carlton – CTMetro COG
Mark Hoover – CTMetro COG
Robert Haramut – LCRVCOG
Kate Rattan – SECCOG
Kristen Hadjstylianos – Western COG
Jamie Bastian – Western COG
Robbin Cabelus - CTDOT
Maribeth Wojenski – CTDOT
Judy Raymond – CTDOT
Kasey Faraci – CTDOT
Edgar Wynkoop - CTDOT
Grayson Wright – CTDOT
Sara Radacsi – CTDOT
Matthew Cegielski – CTDOT
Steven Giannitti - CTDOT
Greg Pacelli – CTDOT

The Interagency Consultation Meeting was held to review projects submitted for the 2019-2045 MTP.

The Conformity Documents will be electronically distributed to the MPOs, FHWA, FTA, EPA and CTDEEP. The MPOs will need to hold a 30-day public review and comment period. At the end of this review period, the MPO will hold a Policy Board meeting to endorse the Air Quality Conformity determination.

There was also a brief discussion on the travel demand model and emissions software planning assumptions employed in the conformity analysis. CTDEEP is updating the Vehicle Registration Data and should have it available for use by the end of November 2018.

The schedule for the 2019-2045 Metropolitan Transportation Plan Conformity Determination Analysis is as follows:

- MPOs transmit signed and dated Concurrence Form to judy.raymond@ct.gov by November 20, 2018
- CTDOT Travel Demand Model Unit performs the air quality analysis and sends the Air Quality Conformity Determination Report electronically to all MPOs in early February 2019
- MPOs advertise and hold a 30-day public review and comment period for the Air Quality Conformity
- MPOs hold a Policy Board meeting approving and endorsing the Air Quality Conformity and transmit resolutions to judy.raymond@ct.gov after Policy Board meeting.

It is important that all MPOs follow this schedule to ensure that the MTP Conformity Determinations can go forward on schedule.

PLANNING ASSUMPTIONS

Ozone and $PM_{2.5}$
2019-2045 Metropolitan Transportation Plan
November 19, 2018

Planning Assumptions for Review	Frequency of Review*	Responsible Agency	Year of Data
Socioeconomic Data	At least every 5 years	CTDOT	2015 ACS Data 2015 DOL
DMV Vehicle Registration Data	At least every 5 years	CTDEEP	2018**
State Vehicle Inspection and Maintenance Program	Each conformity round	CTDEEP	Same as currently approved I&M SIP
State Low Emission Vehicle Program	Each conformity round following approval into the SIP	CTDEEP	Same as SIP
VMT Mix Data	At least every 5 years	CTDEEP	2018***
Analysis Years – $PM_{2.5}$	Each conformity round	CTDOT/CTDEEP	2018, 2025, 2035, 2045
Analysis Years – Ozone	Each conformity round	CTDOT/CTDEEP	2018, 2020, 2023, 2025, 2035, 2045
Emission Budget – $PM_{2.5}$	As SIP revised/updated	CTDEEP	2018: PM2.5 575.8 NOx 12,791.8 2025: PM2.5 516.0 NOx 9,728.1
Emission Budget – Ozone	As SIP revised/updated	CTDEEP	NY Area: VOC 17.6 NOx 24.6 Gr. CT: VOC 15.9 NOx 22.2
Temperatures and Humidity	As SIP revised/updated	CTDEEP	X
Control Strategies	Each conformity round	CTDEEP	X
HPMS VMT	Each conformity round	CTDOT	2015

* Review of Planning Assumptions does not necessarily prelude an update or calibration of the travel demand model.
** Data updated in 2018 based on 2011 DMV registration data and 2018 motorcycle and school bus registration data
*** Data available 2018 based on an average of 2015-2017

Appendix D

Emission Summary Tables

Pollutants		2018 Emission Quantities (Tons/Day)										
		NY/NJ/CT Non-Attainment Area				Greater CT Non-Attainment Area						Statewide
ID	Name	Fairfield	Middlesex	New Haven	***Subtotal***	Hartford	Litchfield	New London	Tolland	Windham	***Subtotal***	
1	Hydrocarbons	7.8429	1.6358	7.0339	**16.5127**	7.8208	1.7419	2.5621	1.4183	1.2897	**14.8328**	**31.3455**
3	NOx	10.8518	2.4853	10.4053	**23.7424**	11.3999	1.8162	3.9036	2.2179	1.8427	**21.1802**	**44.9226**
79	NM Hydrocarbons	7.4463	1.5435	6.6463	**15.6361**	7.4085	1.6828	2.4178	1.3315	1.2249	**14.0655**	**29.7016**
87	VOC	7.9078	1.6403	7.0660	**16.6142**	7.8747	1.7877	2.5727	1.4197	1.3028	**14.9575**	**31.5717**

Pollutants		2020 Emission Quantities (Tons/Day)										
		NY/NJ/CT Non-Attainment Area				Greater CT Non-Attainment Area						Statewide
ID	Name	Fairfield	Middlesex	New Haven	***Subtotal***	Hartford	Litchfield	New London	Tolland	Windham	***Subtotal***	
1	Hydrocarbons	7.1593	1.4744	6.3860	**15.0198**	7.1704	1.5741	2.3097	1.2804	1.1816	**13.5162**	**28.5359**
3	NOx	9.0944	2.0822	8.7523	**19.9290**	9.6670	1.4963	3.2667	1.8605	1.5451	**17.8358**	**37.7648**
79	NM Hydrocarbons	6.7490	1.3784	5.9801	**14.1075**	6.7361	1.5154	2.1592	1.1893	1.1140	**12.7141**	**26.8216**
87	VOC	7.1758	1.4667	6.3665	**15.0090**	7.1694	1.6110	2.3005	1.2699	1.1863	**13.5373**	**28.5462**

Pollutants		2023 Emission Quantities (Tons/Day)										
		NY/NJ/CT Non-Attainment Area				Greater CT Non-Attainment Area						Statewide
ID	Name	Fairfield	Middlesex	New Haven	***Subtotal***	Hartford	Litchfield	New London	Tolland	Windham	***Subtotal***	
1	Hydrocarbons	6.2581	1.2787	5.6132	**13.1500**	6.3116	1.3561	2.0029	1.1117	1.0349	**11.8173**	**24.9673**
3	NOx	7.1304	1.6471	6.9208	**15.6982**	7.6381	1.1569	2.5760	1.4704	1.2001	**14.0415**	**29.7397**
79	NM Hydrocarbons	5.8588	1.1845	5.2131	**12.2564**	5.8843	1.3016	1.8551	1.0215	0.9691	**11.0317**	**23.2880**
87	VOC	6.2401	1.2626	5.5602	**13.0629**	6.2736	1.3858	1.9802	1.0931	1.0339	**11.7666**	**24.8295**

Pollutants		2025 Emission Quantities (Tons/Day)										
		NY/NJ/CT Non-Attainment Area				Greater CT Non-Attainment Area						Statewide
ID	Name	Fairfield	Middlesex	New Haven	***Subtotal***	Hartford	Litchfield	New London	Tolland	Windham	***Subtotal***	
1	Hydrocarbons	5.9434	1.2084	5.3267	**12.4785**	6.0399	1.2773	1.8854	1.0503	0.9844	**11.2373**	**23.7158**
3	NOx	6.3261	1.4598	6.1517	**13.9376**	6.8527	1.0129	2.2877	1.3191	1.0594	**12.5318**	**26.4694**
79	NM Hydrocarbons	5.5579	1.1174	4.9398	**11.6151**	5.6226	1.2263	1.7426	0.9619	0.9207	**10.4741**	**22.0892**
87	VOC	5.9232	1.1920	5.2723	**12.3875**	5.9986	1.3059	1.8615	1.0302	0.9830	**11.1791**	**23.5666**

Pollutants		2035 Emission Quantities (Tons/Day)										
		NY/NJ/CT Non-Attainment Area				Greater CT Non-Attainment Area						Statewide
ID	Name	Fairfield	Middlesex	New Haven	***Subtotal***	Hartford	Litchfield	New London	Tolland	Windham	***Subtotal***	
1	Hydrocarbons	3.4633	0.7223	3.2878	**7.4734**	3.5915	0.7110	1.1078	0.6373	0.6107	**6.6583**	**14.1317**
3	NOx	3.7052	0.8875	3.8597	**8.4524**	4.0978	0.5244	1.4034	0.8571	0.6426	**7.5253**	**15.9776**
79	NM Hydrocarbons	3.1410	0.6437	2.9414	**6.7261**	3.2356	0.6744	0.9839	0.5578	0.5552	**6.0070**	**12.7331**
87	VOC	3.3891	0.6963	3.1804	**7.2658**	3.4938	0.7251	1.0655	0.6063	0.5999	**6.4905**	**13.7564**

Pollutants		2045 Emission Quantities (Tons/Day)										
		NY/NJ/CT Non-Attainment Area				Greater CT Non-Attainment Area						Statewide
ID	Name	Fairfield	Middlesex	New Haven	***Subtotal***	Hartford	Litchfield	New London	Tolland	Windham	***Subtotal***	
1	Hydrocarbons	3.0452	0.6457	2.9196	**6.6104**	3.1976	0.6161	0.9849	0.5754	0.5492	**5.9231**	**12.5336**
3	NOx	3.4243	0.8293	3.6006	**7.8542**	3.8143	0.4667	1.3158	0.8148	0.6011	**7.0127**	**14.8669**
79	NM Hydrocarbons	2.7335	0.5685	2.5800	**5.8820**	2.8486	0.5817	0.8632	0.4964	0.4945	**5.2844**	**11.1664**
87	VOC	2.9732	0.6201	2.8127	**6.4059**	3.1007	0.6298	0.9426	0.5441	0.5383	**5.7556**	**12.1615**

County	Total Energy Consumption 91 (Joules/Day)	2018 Pollutant Emission Quantities (Tons/Day)				
		NOx	PM 2.5			
		3 Oxides of Nitrogen	110 Engine Exhaust	116 Brakewear	117 Tirewear	**County Total**
Fairfield	4.4265E+16	3994.21623	123.36123	29.34219565	11.80939687	**164.51282**
New Haven	4.15247E+16	3843.30617	117.79660	24.81758188	10.98438051	**153.59856**
Totals	**8.57898E+16**	**7837.52240**	**241.15783**	**54.15978**	**22.79378**	**318.11139**

County	Total Energy Consumption 91 (Joules/Day)	2025 Pollutant Emission Quantities (Tons/Day)				
		NOx	PM 2.5			
		3 Oxides of Nitrogen	110 Engine Exhaust	116 Brakewear	117 Tirewear	**County Total**
Fairfield	3.88056E+16	2388.69194	71.22119	31.93961191	12.55215974	**115.71296**
New Haven	3.6392E+16	2319.18481	67.15783	27.0412736	11.6731486	**105.87225**
Totals	**7.51976E+16**	**4707.87675**	**138.37902**	**58.98089**	**24.22531**	**221.58521**

County	Total Energy Consumption 91 (Joules/Day)	2035 Pollutant Emission Quantities (Tons/Day)				
		NOx	PM 2.5			
		3 Oxides of Nitrogen	110 Engine Exhaust	116 Brakewear	117 Tirewear	**County Total**
Fairfield	3.27937E+16	1471.09154	39.64026	33.73769155	13.0972526	**86.47520**
New Haven	3.21317E+16	1516.28868	38.81126	31.18423878	12.6882525	**82.68376**
Totals	**6.49254E+16**	**2987.38022**	**78.45152**	**64.92193**	**25.78551**	**169.15896**

County	Total Energy Consumption 91 (Joules/Day)	2045 Pollutant Emission Quantities (Tons/Day)				
		NOx	PM 2.5			
		3 Oxides of Nitrogen	110 Engine Exhaust	116 Brakewear	117 Tirewear	**County Total**
Fairfield	3.19346E+16	1376.02777	30.88100	32.74441427	13.13581643	**76.76123**
New Haven	3.15232E+16	1427.50157	30.55733	32.18442155	12.9399948	**75.68175**
Totals	**6.34578E+16**	**2803.52935**	**61.43833**	**64.92884**	**26.07581**	**152.44298**

Appendix E

Comments Received During Public Review Period

CRCOG:

Phone conversation with Tim Malone regarding the correct designation status for the Greater Connecticut Ozone nonattainment area.

> Travel Demand/Air Quality Modeling staff contacted Ariel Garcia, EPA to clarify the designation status of the Greater Connecticut Ozone nonattainment area. The designation varies by NAAQS. For the 2008 standard the area is considered "Marginal" and "Moderate" for the 2015 standards.

The Ozone/PM2.5 map was revised to reflect both the 2008 and 2015 standards for the Greater Connecticut nonattainment area. The area is designated as "Moderate" for the 2008 NAAQS and is designated as "Marginal" for 2015 NAAQS.

EPA:

Ariel Garcia, Senior SIP Coordinator, Air Quality Unit, Region 1, EPA

Email dated March 19, 2019:

> Changes to the "Ozone PM2.5 Air Quality Conformity Determination 2019-2045 MTP report pertain to the 2015 Ozone NAAQS. . EPA's "Transportation Conformity Guidance for 2015 Ozone NAAQS Nonattainment Areas" (EPA-420-B-18-023, June 2018). Specifically, I will point out Sections 3.8 and 3.9 of the guidance covering analysis years based on the attainment dates.
>
> Based on 40 CFR 93.118(d)(2), MOVES would have to be run to include the following additional analysis years in the 2019-2045 MTP AQ analysis"

Emailed dated March 20, 2019:

> "The analysis years should be 2020 for the Greater CT 2015 ozone NAAQS marginal nonattainment area, and 2023 for the Southwest CT 2015 ozone NAAQS moderate nonattainment area.
>
> The reason being is that going-forward EPA will rely on the definition of "Attainment Year" to refer to the year containing the last fully completed ozone season preceding the attainment date (i.e. for Greater CT's marginal attainment date of August 3, 2021, the last full ozone season would be that of calendar year 2020's)." Emailed dated March 20, 2019:

Air Quality emission analysis was conducted for model year 2020 for the Greater CT Ozone nonattainment area and for model year 2023 for the CT. portion of the NY-NJ-CT Ozone nonattainment area and results included in the spreadsheets for the final updated version of the Conformity Determination.

FHWA:

Email from Kenneth Shooshan-Stoller dated March 20, 2019:

> "Leah Sirmin had asked me a question regarding the reference to TIP amendments in the Report. Does this mean that there are projects that were amended to the TIPs that are included in the Report's project list, besides the projects listed for MTP purposes?"

References to TIP "amendments" were eliminated from final report.