



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
New England Regional Laboratory
11 Technology Drive, North Chelmsford, MA 01863

August 15, 2019

Tracy Babbidge, Chief
Bureau of Air Management
State of Connecticut Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

Dear Ms. Babbidge:

Thank you for your submission of the Connecticut 2019 Annual Air Monitoring Network Plan (ANP) which was submitted to us on June 27, 2019. That submittal also included your Enhanced Monitoring Plan (EMP) which we approved on October 25, 2018. We appreciate that you addressed the comments we provided to you on May 16, 2019. EPA New England has evaluated your plan and finds that your plan meets the minimum requirements of 40 CFR Part 58.

We acknowledge that in addition to infrastructure maintenance and improvements, DEEP proposes the following changes to the monitoring network during the period 2019-2020:

- *Discontinue carbon monoxide (CO) sampling at Bridgeport Roosevelt School as of January 1, 2020, given that monitored concentrations are approximately 7 and 15 percent of NAAQS levels for the 1-hour and 8-hour standards, respectively, and that monitoring in the Connecticut portion of the New York/New Jersey/Connecticut maintenance area will not be required under Connecticut's CO Limited Maintenance Plan (LMP) after 2019.*
 - *Discontinue manual FRM PM₁₀ monitoring at the East Hartford McAuliffe Park site as of January 1, 2020. Automated FEM PM₁₀ monitoring will continue at the site.*
 - *Discontinue manual FRM PM_{2.5} monitoring at the East Hartford McAuliffe Park, Groton Fort Griswold and Waterbury Bank Street sites as of January 1, 2020. Automated FEM PM_{2.5} monitoring will continue at these locations.*
 - *Reduce Hartford PM_{2.5} FRM sampling frequency from a 1-in-3 day to a 1-in-6 day schedule. The PM_{2.5} FRM data is supplemented with data from a co-located automated continuous FEM PM sampler.*
 - *Commence operation of a second continuous FEM PM_{2.5}/PM₁₀ monitor at New Haven Criscuolo Park to better compare and understand the capabilities of the Teledyne T640X instrument.*
 - *Commence formaldehyde (HCHO) monitoring at Westport, possibly during 2020 or 2021, pending acceptable commercially available models*.*
 - *Commence mixing height monitoring at Westport during the period 2020 – 2021*.*
- * Note: these last two proposed changes were previously requested in the 2018 Network Plan as part of the Enhanced Monitoring Plan (EMP), which was submitted one year in advance as requested by EPA.*

We understand that due to severe short-term staffing issues, you are unable to fulfill one the commitments made as part of your approved Enhanced Monitoring Plan; the operation of an ozone monitor on the Bridgeport to Long Island Ferry. We anticipate this being operational next season. We also note that DEEP will be utilizing all its continuous PM_{2.5} monitors for NAAQS

compliance purposes. If each of these continuous PM_{2.5} monitors were considered the primary monitor at each of these locations, additional efficiencies in your network could be achieved by further reducing collocated FRM measurements. As you are aware, EPA- New England has developed a GIS tool which can be helpful to identify valley locations across the region which may be impacted by wood smoke. Given the proposed changes to your network and associated resource savings, we think there might be additional opportunities to conduct PM_{2.5} monitoring in Connecticut, and we urge you to consider the results of that tool as it relates to some areas in Connecticut that may be impacted by wood smoke.

Finally, EPA supports the overall description of the State EMP as articulated in this Plan and approved it on October 25, 2018. With this letter, I am approving this Annual Air Monitoring Network Plan. We will work with our Headquarters offices to address the portions of the plan which would require their attention, most notably monitoring associated with NCore, IMPROVE, and STN. EPA-New England appreciates your partnership in conducting ambient air monitoring. We look forward to working with you to continuously improve the quality of ambient air in Connecticut. If you have any questions or comments regarding this network review, please contact Bob Judge at (617) 918-8387.

Sincerely,



Johanna M. Hunter, Director
Laboratory Services and Applied Science Division
EPA New England

cc: Paul Farrell, CT DEEP
Randall Semagin, CT DEEP

Connecticut 2019 Annual Air Monitoring Network Plan



Connecticut Department of Energy and Environmental Protection
Bureau of Air Management

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Acronyms and Abbreviations

AQI – Air Quality Index
AQS – Air Quality System
BAM – Beta Attenuation Monitor
BC – Black Carbon (Aethalometer)
CAA – Clean Air Act
CBSA – Core-Based Statistical area
CFR – Code of Federal Regulations
CO – carbon monoxide
CSA – combined statistical area
CSN – Chemical Speciation Network
DEEP – Connecticut Department of Energy and Environmental Protection
DAS – data acquisition system
EC/OC – Elemental Carbon/Organic Carbon
EMP – Enhanced Monitoring Plan for ozone
EPA – Environmental Protection Agency
FEM – Federal Equivalent Method
FRM – Federal Reference Method
GC – gas chromatography
GC/MS – gas chromatography/mass spectrometry
HAP – hazardous air pollutant
IMPROVE – Interagency Monitoring of Protected Visual Environments
LC – local conditions of temperature and pressure
LISTOS – Long Island Sound Tropospheric Ozone Study
LMP – limited maintenance plan
MPA – monitoring planning area
MSA – metropolitan statistical area
NAAQS – National Ambient Air Quality Standards
NCore – National Core Monitoring Stations
NOAA – National Oceanic and Atmospheric Administration
NO_x – nitrogen oxides
NO_y – reactive oxides of nitrogen
OAQPS – Office of Air Quality Planning and Standards
OTR – Ozone Transport Region
PAMS – Photochemical Assessment Monitoring Stations
PM_{2.5} – fine particulate matter (<2.5 microns)
PM₁₀ – respirable particulate matter (<10 microns)
PM_{10-2.5} – coarse particulate matter (PM₁₀ – PM_{2.5})
QA – quality assurance
QA/QC – quality assurance/quality control
QAPP – quality assurance project plan
QMP – quality management plan
RH – relative humidity
SIP – State Implementation Plan
SLAMS – state and local monitoring stations
SO₂ – sulfur dioxide
SOP – standard operating procedure
STP – standard conditions of temperature and pressure (40 CFR 50.3: 25°C and 760 mm Hg)
TSA – technical system audit
TSP – total suspended particulate
UVC – Ultra-violet carbon (aethalometer)
VOC – volatile organic compound

Introduction

The Connecticut 2019 Air Monitoring Network Plan (Network Plan) is prepared by the Connecticut Department of Energy and Environmental Protection (DEEP) in accordance with 40 CFR 58.10. This plan meets the requirement to develop and submit to the Environmental Protection Agency (EPA) an annual air quality monitoring network plan to describe the air monitoring network and propose any planned changes to air quality monitoring sites and monitored air pollutants to occur within 18 months following submittal.

The draft Network Plan is posted on DEEP's website at [DEEP: Air Monitoring Network](#). DEEP accepted public comments on this draft Network Plan from April 15, 2019 to June 15, 2019. Comments were submitted to:

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Connecticut Department of Energy and Environmental Protection
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Background

The Clean Air Act of 1970 (CAA) established the EPA as the principal administrative body to enact regulations to meet the requirements of the CAA and subsequent amendments thereto. One such requirement directed EPA to set primary and secondary air quality standards, known as the National Ambient Air Quality Standards (NAAQS) for the six "criteria pollutants" that Congress determined presented serious negative impacts to human health and welfare. For areas within Connecticut that do not meet a NAAQS, DEEP develops State Implementation Plans (SIPs) to detail the steps to be taken to bring air quality into attainment. Ambient air quality monitoring is essential to track progress towards meeting clean air goals and demonstrate attainment.

While DEEP monitors ambient air quality in Connecticut primarily for comparison with the NAAQS, there are other important objectives to ambient air quality monitoring. This monitoring provides local air quality data to the public, supports air quality forecasting and the Air Quality Index (AQI), supports long-term health assessments and other scientific research, assists with air permitting and identifying long-term air quality trends to gauge effectiveness of air pollution control strategies and serves as an accuracy check on computer based air quality models.

DEEP's ability to manage the air quality monitoring network greatly depends on federal grant support from EPA. In previous years, Connecticut supported air monitoring operating expenses with state funds, specifically, a portion of the Clean Air Act fee collected pursuant to Conn. Gen. Stat. 14-49b. As the state budget challenges have continued to impact DEEP, all general fund revenue is now used to support staff costs. Therefore, the air network operation is totally dependent on federal funds. Future federal funding levels for air monitoring programs continue to remain uncertain and many indications are that federal funding will be reduced during the time period covered by this plan. In addition, as with state governmental operations everywhere, state resources allocated to ambient air quality monitoring are unable to keep pace with rising costs. DEEP will strive to provide an acceptable level of service within these constraints by continually improving operations and focusing its efforts to ensure the completion of the most critical ambient air quality monitoring. As operating costs and federal monitoring requirements increase, DEEP must operate within its means by either improving operational efficiencies or reducing other aspects of the air monitoring network. Efficiencies being employed and expanded include improving data acquisition software and hardware, streamlining access to the public through DEEP's website, and reducing the number of monitoring sites or parameters measured by increasing multi-pollutant monitoring or terminating duplicative or unnecessary monitors.

Network Overview

DEEP currently operates 14 stations in its air monitoring network (Figure 1) as part of the national State and Local Air Monitoring Stations (SLAMS) network, established under the CAA. In October 2006, EPA instituted a network of core multi-pollutant sites. These sites are known as the National Core (NCore) network, the primary purpose of which is to consolidate monitoring of multiple pollutants at fewer sites for efficiency and cost savings. In addition, the NCore sites provide a comprehensive suite of high-resolution pollutant data for NAAQS compliance assessment, research studies and long-term trends analysis. There are two NCore sites located in Connecticut: Criscoolo Park in New Haven, and Mohawk Mountain in Cornwall. The NCore network is considered as a subset of the SLAMS network.

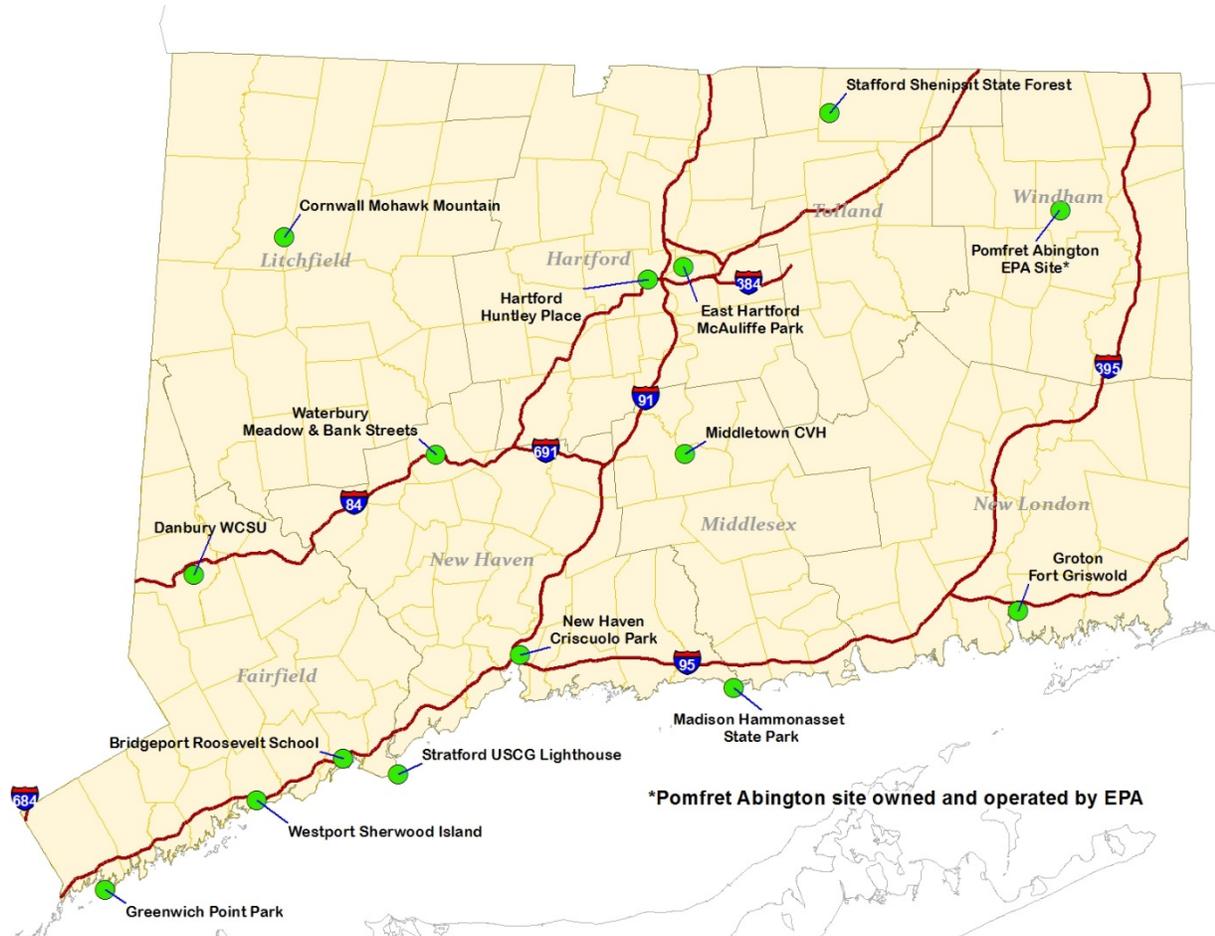


Figure 1: Connecticut DEEP Air Monitoring Network

Proposed Network Changes

Details of the proposed monitoring network configuration are described in the following site information pages. In addition to infrastructure maintenance and improvements, DEEP proposes the following changes to the monitoring network during the period 2019-2020:

- Discontinue carbon monoxide (CO) sampling at Bridgeport Roosevelt School as of January 1, 2020, given that monitored concentrations are approximately 7 and 15 percent of NAAQS levels for the 1-hour and 8-hour standards, respectively, and that monitoring in the Connecticut portion of the New York/New Jersey/Connecticut maintenance area will not be required under Connecticut's CO Limited Maintenance Plan (LMP) after 2019.
- Discontinue manual FRM PM₁₀ monitoring at the East Hartford McAuliffe Park site as of January 1, 2020. Automated FEM PM₁₀ monitoring will continue at the site.
- Discontinue manual FRM PM_{2.5} monitoring at the East Hartford McAuliffe Park, Groton Fort Griswold and Waterbury Bank Street sites as of January 1, 2020. Automated FEM PM_{2.5} monitoring will continue at these locations.
- Reduce Hartford PM_{2.5} FRM sampling frequency from a 1-in-3 day to a 1-in-6 day schedule. The PM_{2.5} FRM data is supplemented with data from a co-located automated continuous FEM PM sampler.
- Commence operation of a second continuous FEM PM_{2.5}/PM₁₀ monitor at New Haven Criscuolo Park to better compare and understand the capabilities of the Teledyne T640X instrument.
- Commence formaldehyde (HCHO) monitoring at Westport, possibly during 2020 or 2021, pending acceptable commercially available models*.
- Commence mixing height monitoring at Westport during the period 2020 – 2021*.

* Note: these last two proposed changes were previously requested in the 2018 Network Plan as part of the Enhanced Monitoring Plan, which was submitted one year in advance as requested by EPA.

Monitoring Site Information

The ambient air monitoring sites currently operated by DEEP are listed in the Table 1 below. Detailed information for each monitoring site is provided in a later section of this plan.

Table 1: Monitoring Network Summary

Town	Site	PM2.5 (FRM)	PM2.5 (FRM, collocated)	PM2.5 (continuous FEM)	PM2.5 (continuous FEM, secondary)	PM10/PM10-2.5 (FRM)	PM10/PM10-2.5 (FRM, collocated)	PM10/PM10-2.5 (continuous FEM)	PM10/PM10-2.5 (cont. FEM, secondary)	PM Speciation (CSN)	PM Speciation (IMPROVE)	PM2.5 Carbon (BC/UVC, continuous)	Ozone	SO2	CO	NO2	NO/NOy	HCHO (continuous)	Total Column NO2/HCHO	Traffic Count	Wind Speed	Wind Direction	Temperature	Dew Point / Rel. Humidity	Barometric Pressure	Solar Radiation	Mixing Height
Bridgeport	Roosevelt School		1/6	X				X						X	T								X				
Bridgeport	LIS Ferry												X														
Cornwall	Mohawk Mountain	1/3		X				X		1/3	X	X	X	X			X				X	X	X	X	X	X	
Danbury	Western Connecticut State University	1/6		X				X				X	X								X	X	X		X		
East Hartford	McAuliffe Park	T		X				X				X	X			X					X	X	X	X	X		
Greenwich	Point Park												X								X	X	X				
Groton	Fort Griswold		T	X				X					X										X				
Hartford	Huntley Place	1/6		X				X				X			X	X				X	X	X	X		X		
Madison	Hammonasset State Park												X					X			X	X	X				
Middletown	Connecticut Valley Hospital												X								X	X	X		X		
New Haven	Criscuolo Park	1/3	1/6	X	P	1/3	1/6	X	P	1/3		X	X	X	X	X	X		X		X	X	X	X	X	X	X
Stafford	Shenipsit State Forest												X								X	X	X				
Stratford	Stratford Lighthouse												X										X				
Waterbury	Meadow & Bank Street	T		X				X													X	X	X				
Westport	Sherwood Island State Park												X			X		P	X		X	X	X		X		P

X=Existing P = Planned in 2019/2020 T = Terminated in 2019/2020

National Ambient Air Quality Standards (NAAQS)

The EPA's Office of Air Quality Planning and Standards (OAQPS) has set NAAQS for six principal pollutants, known as the criteria pollutants. Table 2, reprinted here from EPA's website¹, summarizes the current NAAQS compliance requirements for the criteria pollutants.

Table 2: National Ambient Air Quality Standards

Pollutant [links to historical tables of NAAQS reviews]		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead (Pb)		primary and secondary	Rolling 3 month average	0.15 µg/m ³ (a)	Not to be exceeded
Nitrogen Dioxide (NO₂)		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	1 year	53 ppb (b)	Annual Mean
Ozone (O₃)		primary and secondary	8 hours	0.070 ppm (c)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	PM _{2.5}	primary	1 year	12.0 µg/m ³	annual mean, averaged over 3 years
		secondary	1 year	15.0 µg/m ³	annual mean, averaged over 3 years
	PM ₁₀	primary and secondary	24 hours	35 µg/m ³	98th percentile, averaged over 3 years
		primary and secondary	24 hours	150 µg/m ³	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO₂)		primary	1 hour	75 ppb (d)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

Notes for Table 2:

^a In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m³ as a calendar quarter average) also remain in effect.

^b The level of the annual NO₂ standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

^c Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O₃ standards additionally remain in effect in some areas. Revocation of the previous (2008) O₃ standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

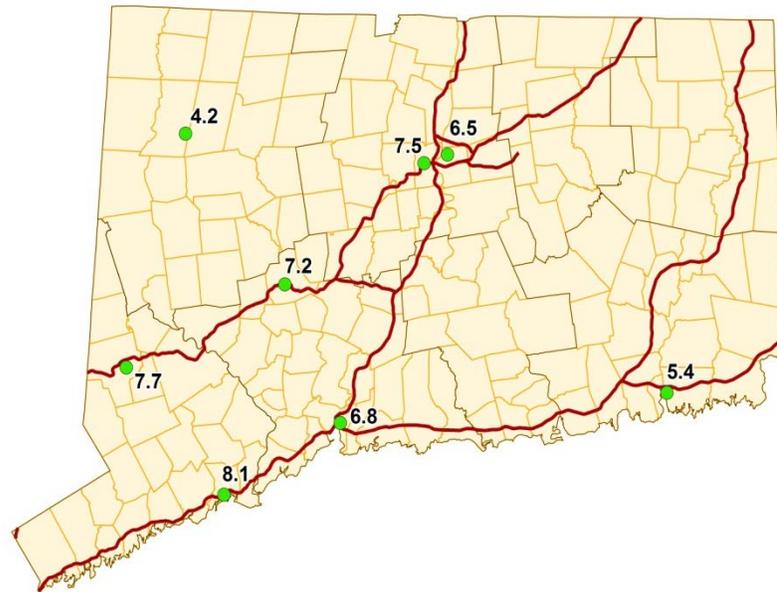
^d The previous SO₂ standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous SO₂ standards or is not meeting the requirements of a SIP call under the previous SO₂ standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.

¹ <https://www.epa.gov/criteria-air-pollutants/naaqs-table>

PM_{2.5} Annual Design Values (2018)

The 2018 annual design values for PM_{2.5}, based on 2016 through 2018 data, are presented in the table and figure below. PM_{2.5} annual design values are calculated using the 3-year average of the respective annual weighted averages. The current annual PM_{2.5} NAAQS is 12.0 µg/m³. All Connecticut monitors demonstrate compliance with the design value for the annual PM_{2.5} NAAQS.

Site	Design Value (µg/m ³)
Bridgeport	8.1
Cornwall	4.2
Danbury	7.7
East Hartford	6.5
Groton	5.4*
Hartford	7.5
New Haven	6.8
Waterbury	7.2*
NAAQS	12.0

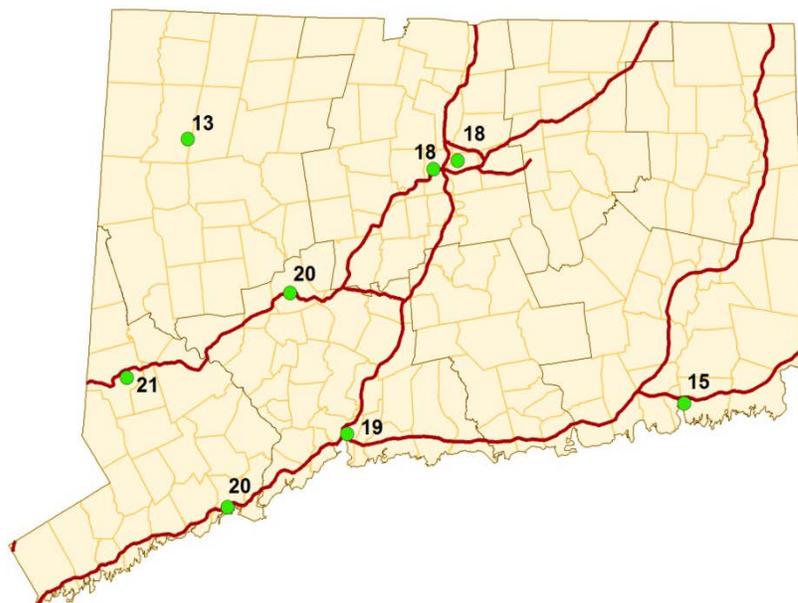


*Design values considered invalid due to incomplete quarters over the period 2016-2018.

PM_{2.5} Daily Design Values (2018)

Daily design values for PM_{2.5} using 2016 through 2018 data are given below. PM_{2.5} daily design values are calculated using the 3-year average of the annual 98th percentile values. The daily PM_{2.5} NAAQS is 35 µg/m³. Final designations relative to the 2006 24-hour PM_{2.5} NAAQS were finalized by EPA in November 2009 (effective as of December 14, 2009), based upon measured data from 2006 through 2008. All Connecticut monitors demonstrate compliance with the design value for the 24-hour PM_{2.5} NAAQS.

Site	Design Value (µg/m ³)
Bridgeport	20
Cornwall	13
Danbury	21
East Hartford	18
Groton	15*
Hartford	18
New Haven	19
Waterbury	20*
NAAQS	35

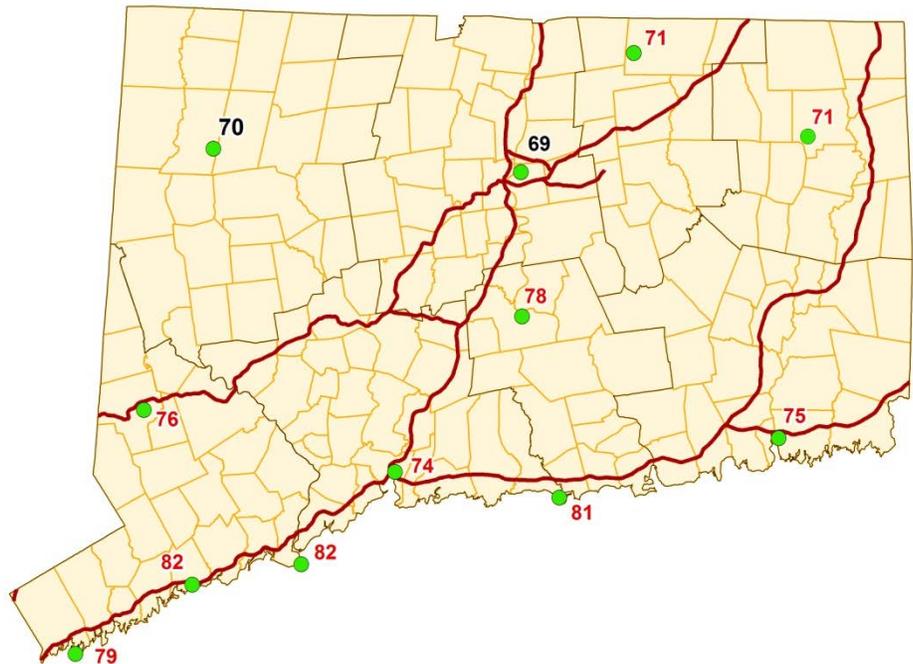


*Design values considered invalid due to incomplete quarters over the period 2016-2018.

Ozone Design Values (2018)

The 2018 ozone 8-hour design values for the 2015 NAAQS are given in the table below. Ozone design values are derived by averaging three consecutive annual fourth highest daily maximum 8-hour ozone values. Based on both the 2008 ozone standard of 0.075 ppm (75 ppb) and the October 2015 revised ozone standard of 0.070 ppm (70 ppb), 11 out of 12 sites indicate nonattainment, shown in red font below. Starting in 2017, the ozone monitoring season in Connecticut is extended by a month, beginning March 1 and ending September 30.

Site	Design Value (ppb)
Abington	71
Cornwall	70
Danbury	76
East Hartford	69
Greenwich	79
Groton	75
Madison	81
Middletown	78
New Haven	74
Stafford	71
Stratford	82
Westport	82
NAAQS	70



CO, SO₂, NO₂, PM₁₀ and Pb NAAQS Comparisons (2018)

Comparisons of ambient levels of CO, SO₂, NO₂, PM₁₀ and Pb to the primary NAAQS are provided in the tables below. The design values for each pollutant were derived in accordance with 40 CFR 50. For PM₁₀, the 3-year fourth-high value, rounded to the tens place, is given to indicate the ambient level relative to the standard, as the actual design value is the expected number of annual exceedances of the standard, averaged over a 3-year period, which is in attainment with a value of less than or equal to one.

CO NAAQS Comparison

Site	1-Hr Design Value (ppm)	8-Hr Design Value (ppm)
Bridgeport	2.4	1.4
Cornwall	0.5	0.3
Hartford	1.5	1.0
New Haven	2.1	1.2
NAAQS	35	9

SO₂ NAAQS Comparison

Site	1-Hr Design Value (ppb)
Bridgeport	4
Cornwall	2
New Haven	3
NAAQS	75

NO₂ NAAQS Comparison

Site	1-Hr Design Value (ppb)	Annual Design Value (ppb)
East Hartford	43	8
Hartford	50	13
New Haven	55	12
Westport*	40*	9
NAAQS	100	53

*Invalid design value based on only 1 year of complete data (2018)

PM₁₀ NAAQS Comparison

Site	Daily "Design Value"* ($\mu\text{g}/\text{m}^3$ STP)
Bridgeport	30
Cornwall	30
East Hartford	20
Hartford	50
New Haven	30
NAAQS	150

*Daily "design values" given are the fourth high daily concentrations over three years (2016-2018), presented here for comparison to the standard. The actual PM₁₀ design value form is the expected number of exceedance days per year, averaged over three years, which should be less than or equal to one.

Overview of Network Operation

DEEP operates a network of 14 State and Local Air Monitoring Stations (SLAMS) sites throughout Connecticut used for monitoring air pollutants and meteorological parameters. This section contains information about monitoring methods and sampling frequencies, as well as monitoring network maps for each pollutant parameter. Network changes planned before the end of 2019 are discussed as are any anticipated network changes beyond that period.

PM_{2.5} Monitoring

Network Design The DEEP PM_{2.5} network consists of Thermo Partisol®-Plus 2025i sequential FRM air samplers with BGI VSCC (RFPS-0498-118/EQPM-020-145) and Teledyne API T640X continuous air samplers (EQPM-0516-238) for NAAQS compliance at eight air monitoring stations. The distribution of PM_{2.5} monitors in the network and their applicability to NAAQS attainment are shown in Table 3. All valid data from designated primary monitors is used in the derivation of NAAQS design values. Additionally, valid data from collocated and supplemental monitors, respectively, are used to fill in any missing or invalidated scheduled or nonscheduled days for the primary monitor data used for computing the design values.



The filter-based FRM monitors operate at a one-in-six day frequency, except for at the two NCore sites, New Haven and Cornwall, and the near road site in Hartford, all of which run on a one-in-three day schedule. As shown in Table 3, there are six primary PM_{2.5} FRM monitors, so the collocated monitor in New Haven meets the collocation requirement of 15 percent of the network². The FEM monitors in Bridgeport and Groton are designated as primary, collocated with FRM monitors, to meet collocation requirements for the FEM network³ and to provide precision data.

DEEP is proposing to remove PM_{2.5} FRM monitors from East Hartford McAuliffe Park, Groton Fort Griswold and Waterbury Bank Street, where the current FEM samplers will be designated the primary monitors.

² 40 CFR 58 Appendix A 3.2.3

³ Ibid.

Table 3: Current PM_{2.5} FRM/FEM Network Summary

Site	Primary	Collocated	Supplemental
Bridgeport-Roosevelt Sch.	Continuous FEM	1-in-6 FRM	
Cornwall-Mohawk Mt.	1-in-3 FRM		Continuous FEM
Danbury-WCSU	1-in-6 FRM		Continuous FEM
East Hartford-McAuliffe Pk.	1-in-6 FRM		Continuous FEM
Groton-Ft. Griswold	Continuous FEM		1-in-6 FRM
Hartford-Huntley Pl.	1-in-3 FRM		Continuous FEM
New Haven-Criscuolo Pk.	1-in-3 FRM	1-in-6 FRM	2 Continuous FEMs*
Waterbury-Bank St.	1-in-6 FRM		Continuous FEM

*Operation of second FEM began 10/3/2018. Approval is sought in this Plan.

Table 4: Proposed PM_{2.5} Network Configuration

Site	Primary	Collocated	Supplemental
Bridgeport-Roosevelt Sch.	Continuous FEM	1-in-6 FRM	
Cornwall-Mohawk Mt.	1-in-3 FRM		Continuous FEM
Danbury-WCSU	1-in-6 FRM		Continuous FEM
East Hartford-McAuliffe Pk.	Continuous FEM		
Groton-Ft. Griswold	Continuous FEM		
Hartford-Huntley Pl.	Continuous FEM		1-in-6 FRM
New Haven-Criscuolo Pk.	1-in-3 FRM	1-in-6 FRM	2 Continuous FEMs
Waterbury-Bank St.	Continuous FEM		

PM₁₀/PM_{10-2.5} Monitoring

DEEP operates two PM₁₀/PM_{10-2.5} FRM sites in the air monitoring network using Thermo Partisol®-Plus 2025i sequential air samplers (RFPS-1298-127). The New Haven NCore site operates on a 1-in-3 day sample schedule, while the East Hartford site is operated on a 1-in-6 day schedule. The New Haven site has a collocated PM₁₀ FRM sampler operating on a 1-in-6 day sample schedule. All primary and collocated PM₁₀ FRM samplers are paired with PM_{2.5} FRM samplers for coarse PM (PM_{10-2.5}). The New Haven site has PM_{10-2.5} collocated FRM monitors, as requested by EPA as part of a minimum number of PM_{10-2.5} collocated sites for data quality assessment.



In addition to the FRM PM₁₀ monitors, 8 sites have FEM Teledyne API T640 continuous PM mass monitors with 640X option for FEM PM₁₀ (EQPM-0516-239). The current PM₁₀ network configuration is shown in Table 5. The T640X analyzers produce 1-minute and 60-minute

average PM_{2.5}, PM₁₀ (at local (LC) and standard (STP) conditions of temperature and pressure) and PM_{10-2.5} (coarse PM). Coarse PM is defined as thoracic PM having particle aerodynamic diameters between 2.5 and 10 microns, operationally defined as the difference PM₁₀ minus PM_{2.5}.

Table 5: Current PM₁₀ Network Configuration

Site	Primary	Collocated	Supplemental
Bridgeport-Roosevelt Sch.	Continuous FEM		
Cornwall-Mohawk Mt.	Continuous FEM		
Danbury-WCSU	Continuous FEM		
East Hartford-McAuliffe Pk.	1-in-6 FRM		Continuous FEM
Groton-Ft. Griswold	Continuous FEM		
Hartford-Huntley Pl.	Continuous FEM		
New Haven-Criscuolo Pk.	1-in-3 FRM	1-in-6 FRM	2 Continuous FEMs*
Waterbury-Bank St.	Continuous FEM		

*Operation of second FEM began 10/3/2018. Approval is sought in this Plan.

DEEP proposes to eliminate the PM₁₀ FRM monitor at East Hartford McAuliffe Park on December 31, 2019, when the T640X FEM monitor will become the primary, as shown in Table 6.

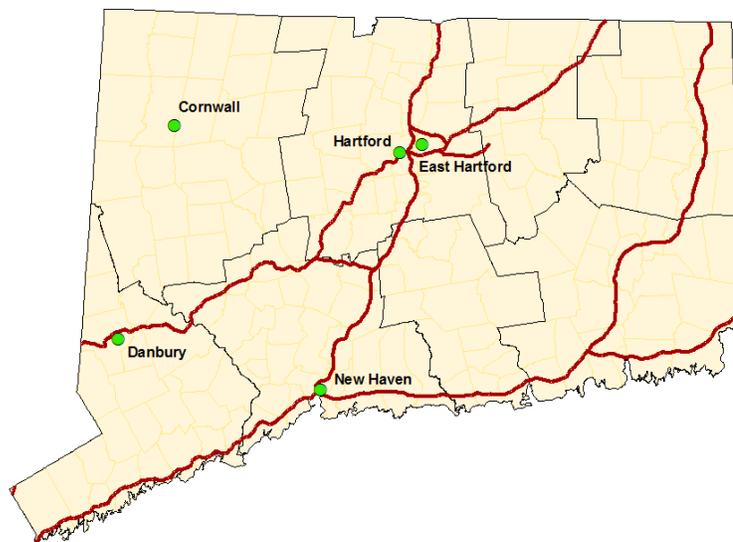
Table 6: Proposed PM₁₀ Network Configuration

Site	Primary	Collocated	Supplemental
Bridgeport-Roosevelt Sch.	Continuous FEM		
Cornwall-Mohawk Mt.	Continuous FEM		
Danbury-WCSU	Continuous FEM		
East Hartford-McAuliffe Pk.	Continuous FEM		
Groton-Ft. Griswold	Continuous FEM		
Hartford-Huntley Pl.	Continuous FEM		
New Haven-Criscuolo Pk.	1-in-3 FRM	1-in-6 FRM	2 Continuous FEMs
Waterbury-Bank St.	Continuous FEM		

PM Speciation Monitoring

PM_{2.5} chemical speciation measurements are obtained at five sites in the DEEP air monitoring network. These include filter-based daily composite 1-in-3 day samples at the 2 NCore sites, and continuous hourly black carbon at five sites.

The Interagency Monitoring of Protected Visual Environments (IMPROVE) monitor is located at the Cornwall site and the Chemical Speciation Network (CSN) monitor is at the New Haven Criscuolo Park site. Both sites are operated on the standard EPA 1-in-3 day PM sample



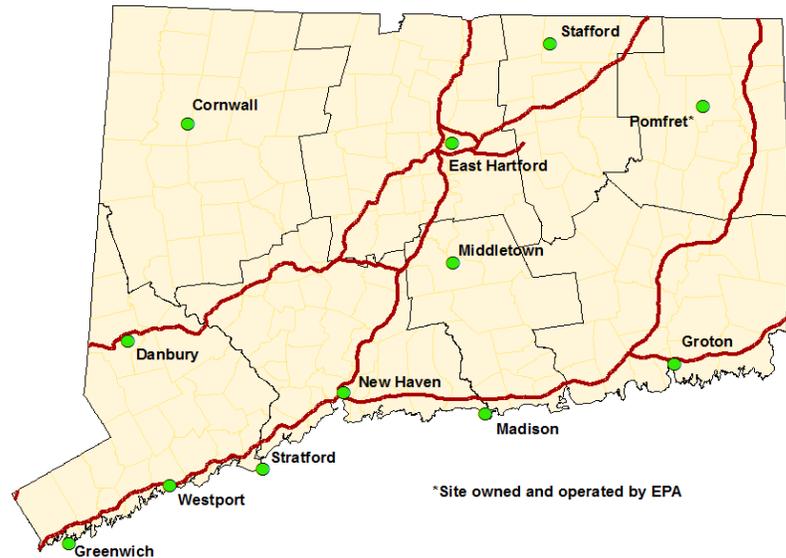
schedule and provide 24-hour integrated filter-base measurements.

Black carbon (BC) and ultra-violet channel carbon (UVC), a wood smoke PM surrogate, are monitored at the Criscoolo Park, Cornwall, Hartford, East Hartford McAuliffe Park and Danbury WCSU sites using 7-channel TAPI Model 633 aethalometers. No changes are proposed to the PM speciation network during 2019-2020.

Ozone Monitoring

DEEP operates eleven ozone sites in its air monitoring network for NAAQS compliance. The ozone analyzers at the Cornwall Mohawk Mountain, East Hartford McAuliffe Park and New Haven Criscoolo Park sites are operated year-round, while the remaining sites are operated during the EPA-defined ozone season, which for Connecticut is from March 1 to September 30. In addition to the DEEP network, EPA operates an ozone monitor in Abington (Pomfret) during the ozone season as part of its Clean Air Status and Trends (CASTNET) network.

NAAQS compliance ozone monitoring in the DEEP network is conducted using Teledyne-API Model T400 UV photometric ozone analyzers (method EQOA-992-087). Ozone measurements are sent to the EPA AIRNow website for AQI purposes on an hourly basis.



In addition to the NAAQS compliance monitors discussed above, DEEP has installed a portable ozone monitor (Teledyne API model 430) on a ferry operating between Bridgeport and Port Jefferson, NY. The ferry crosses Long Island Sound several times each day during daytime hours. The monitor will operate during the ozone season (see the Ozone Enhanced Monitoring Plan section of this Plan for more information). The monitor is intended for scientific study only and will not be used to determine NAAQS compliance.

Ozone Enhanced Monitoring Plan

This section consists of the Enhanced Monitoring Plan (EMP) for Connecticut pursuant to 40 CFR sections 58.10 (a) (11) and 58 App D 5(h). These federal regulations, revised under the 2015 National Ambient Air Quality Standards (NAAQS) for ozone⁴, require that any state with any area designated moderate nonattainment or above, or any state within the Ozone Transport Region (OTR), submit an Enhanced Monitoring Plan for ozone (EMP) to the regional office of the Environmental Protection Agency (EPA) no later than October 1, 2019.

⁴ FR 80 65292, October 26, 2015

Background

Recent ozone (O₃) levels in Connecticut are generally the highest in the eastern U.S, placing all regions of the state in moderate nonattainment for the 2008 ozone National Ambient Air Quality Standards (NAAQS), with a likely reclassification to serious nonattainment for the 2008 NAAQS in 2019. The southwestern three counties of the state (Connecticut portion of the New York-N. New Jersey-Long Island, NY-NJ-CT non-attainment area) have been designated moderate for the 2015 ozone NAAQS, while the remainder of the state is designated marginal, under the 2015 NAAQS. These levels largely result from transport of ozone precursors into Connecticut from the south-west direction along the northeast urban corridor. Modeling and other analyses have shown significant contributions to ozone levels in Connecticut from sources both inside and outside of the greater New York and greater Connecticut nonattainment areas⁵.

DEEP has documented through numerous submissions and communications with EPA⁶ that purposeful implementation of the interstate transport provisions of the Clean Air Act is needed before Connecticut can reasonably expect to attain either the 2008 or 2015 ozone NAAQS. Nonetheless, EPA continues to fail to adopt sufficiently stringent national measures to control ozone precursor emissions or enforce the tools EPA claims the states possess (CAA section 176A or 126 petitions). As such, DEEP is proposing monitoring activities under this EMP to increase the scientific knowledge and understanding of the fate and transport mechanisms of ozone and related ozone precursor pollutants in this region, with specific attention to impacts of the water-land boundary. DEEP expects the data from these enhanced monitoring activities will further clarify the critical role that interstate air pollution transport plays in the Northern New Jersey-New York-Connecticut and Greater Connecticut nonattainment areas and further inform the development and implementation of meaningful national programs that will protect public health and the environment.

The 2015 O₃ NAAQS amended monitoring requirements for the Photochemical Air Monitoring Stations (PAMS) network. Previously, Connecticut operated PAMS volatile organic compounds (VOC) monitors at three sites: East Hartford McAuliffe Park, New Haven Criscuolo Park and Westport Sherwood Island State Park. The revised rule now requires VOC monitoring at all National Core (NCORE) monitoring sites in Core-Based Statistical Areas (CBSAs) having populations greater than 1 million. In addition, areas with moderate or higher levels of O₃ nonattainment, as well as all areas within the Ozone Transport Region (OTR), are required to develop Enhanced Monitoring Plans (EMPs). EMPs are required to provide for any additional monitoring beyond the minimum requirements for State and Local Air Monitoring Stations (SLAMS) that would be beneficial in identifying pollutant levels, sources, transport and progress towards attainment. The EMP mandate is intended to provide state and local environmental agencies an opportunity to implement additional monitoring beyond SLAMS that addresses the particular needs of nonattainment areas not explicitly covered under the revised PAMS network.

Strategic Approach and Objectives

State and local environmental agencies have conducted considerable surface monitoring of O₃, O₃ precursors [e.g.: nitrogen oxides (NO, NO₂, NO_x, NO_y), volatile organic compounds (VOCs)] and meteorological parameters for many years as part SLAMS and PAMS networks. Current strategies for analyzing O₃ production and transport are typically based on computer modeling with source emissions and meteorological inputs, where high resolution speciated VOC data have limited usefulness in model development or validation.

PAMS monitoring programs also include, in addition to VOCs, three carbonyls that are more typically abundant: formaldehyde, acetaldehyde and acetone. The most significant of these, formaldehyde (HCHO), has been used extensively as a proxy for VOC free radical formation in research and analyses

⁵ FR 82 1733, January 6, 2017

⁶ [Greater CT Ozone Attainment Demonstration for the 2008 NAAQS](#)

on tropospheric ozone⁷. Given the understanding that O₃ formation may be sensitive to changes in either VOCs (VOC limited regime) or NO_x (NO_x limited regime), as demonstrated with photochemical numeric computer models, the ratio of HCHO to NO₂ from ambient air monitoring during high O₃ events can be key in the validation of computer modeling approaches.

In addition to monitoring strategies aimed at understanding aspects of the regional O₃ chemistry, collecting data that clearly show the spatial variability of surface O₃ concentrations is critical to developing approaches to effectively address non-attainment in Connecticut. DEEP maintains an extensive network of O₃ monitoring sites, particularly along its prevailing upwind (south-southwestern) border to effectively track ozone plumes transported into the state, and these sites consistently show the highest ozone concentrations in Connecticut.

Proposed Enhanced Monitoring Activities

DEEP is proposing the following activities and resource commitments to meet the objectives for enhanced monitoring under this EMP. DEEP believes these proposed actions meet the requirements of the EMP and will assist DEEP's ongoing efforts toward assessing and understanding ozone nonattainment issues in Connecticut:

- Continued operation of two additional O₃ monitors beyond those minimally required for the State and Local Air Monitoring Station (SLAMS) in the Bridgeport-Stamford-Norwalk Core-Based Statistical Area (CBSA).
- Continued operation of one additional ozone monitor beyond those minimally required in the Hartford-West Hartford-East Hartford CBSA.
- Continued operation of one additional NO₂ monitor, located at the Westport Sherwood Island State Park site.
- Installation and operation of a compact O₃ monitor on one of the Bridgeport, CT – Port Jefferson, NY ferry crossing the Long Island Sound.
- Installation of one HCHO continuous monitor, located at the Westport site.
- Installation and operation of two ceilometers, at Westport and New Haven, for atmospheric mixing height (boundary layer depth).
- Provision of on-site technical support for EPA's Pandora spectrophotometers, which continuously monitor total column NO₂ and HCHO, at three coastal monitoring sites (Westport Sherwood Island, New Haven Criscuolo Park and Madison Hammonasset State Park).
- Provision of technical and/or financial support for select scientific or engineering research projects that have the potential to further develop understanding of the mechanisms of ozone production and transport impacting Connecticut. For example, DEEP participated in the multi-faceted LISTOS (Long Island Sound Tropospheric Ozone Study) project in 2017 – 2018. In particular, DEEP hosted enhanced surface and upper air monitoring at multiple coastal sites. In addition, DEEP (1) contracted with Stony Brook University for a study to characterize the meteorology of the Long Island Sound region; (2) contributed funding and planning support for air quality and meteorological monitoring from a light aircraft during multiple high ozone episodes; and (3) contributed funding for continuous VOC monitoring on the north shore of Long Island, which was conducted by Stony Brook University.

DEEP has participated as a joint effort with multiple state and federal agencies, academic researchers, non-governmental organizations and private businesses in the development, planning and implementation of these activities. Figure 2 shows the proposed DEEP monitoring network with EMP activities included.

⁷ Jin, X et. al, 2017, Evaluating a Space-Based Indicator of Surface Ozone-NO_x-VOC Sensitivity Over Midlatitude Source Regions and Application to Decadal Trends, J. of Geophysical Research, 122 (19) 10,439-10,461

SLAMS Ozone Monitoring

The ozone monitoring requirements in 40 CFR 58 for state and local air monitoring stations (SLAMS) set minimum numbers of monitors based on ozone NAAQS design values and population for each core-based statistical area (CBSA). In addition, the months of the ozone season are determined for each location, which for Connecticut is March through September. Ozone monitors at National Core (NCore) multipollutant sites operate year-round, using Teledyne API 400E analyzers (reference method ID EQOA-0992-087).

Minimum SLAMS ozone monitoring requirements are provided in Table D-2 of Appendix D, 40 CFR 58. An assessment for the Connecticut network, shown in Table 1 below, gives populations and design values for each CBSA. For both the Bridgeport-Stamford-Norwalk and Hartford-West Hartford-East Hartford CBSAs, a minimum of 2 monitors are required, while there are 4 and 3 monitors in each CBSA, respectively. DEEP proposes to consider these 3 additional monitors as part of this EMP.

Table 7: Summary of Connecticut Ozone Monitoring Network Design Compliance

CBSA	2016 Population (estimated)	Maximum 2017 design value	No. of required SLAMS monitors	Current no. of SLAMS monitors
Bridgeport-Stamford-Norwalk, CT	944,177	83	2	4
Hartford-West Hartford-East Hartford, CT	1,206,836	79	2	3
New Haven-Milford, CT	856,875	82	2	2
Norwich-New London, CT	269,801	76	1	1
Worcester, MA-CT	935,781	68	2	3
Torrington, CT	182,571	72	1	1

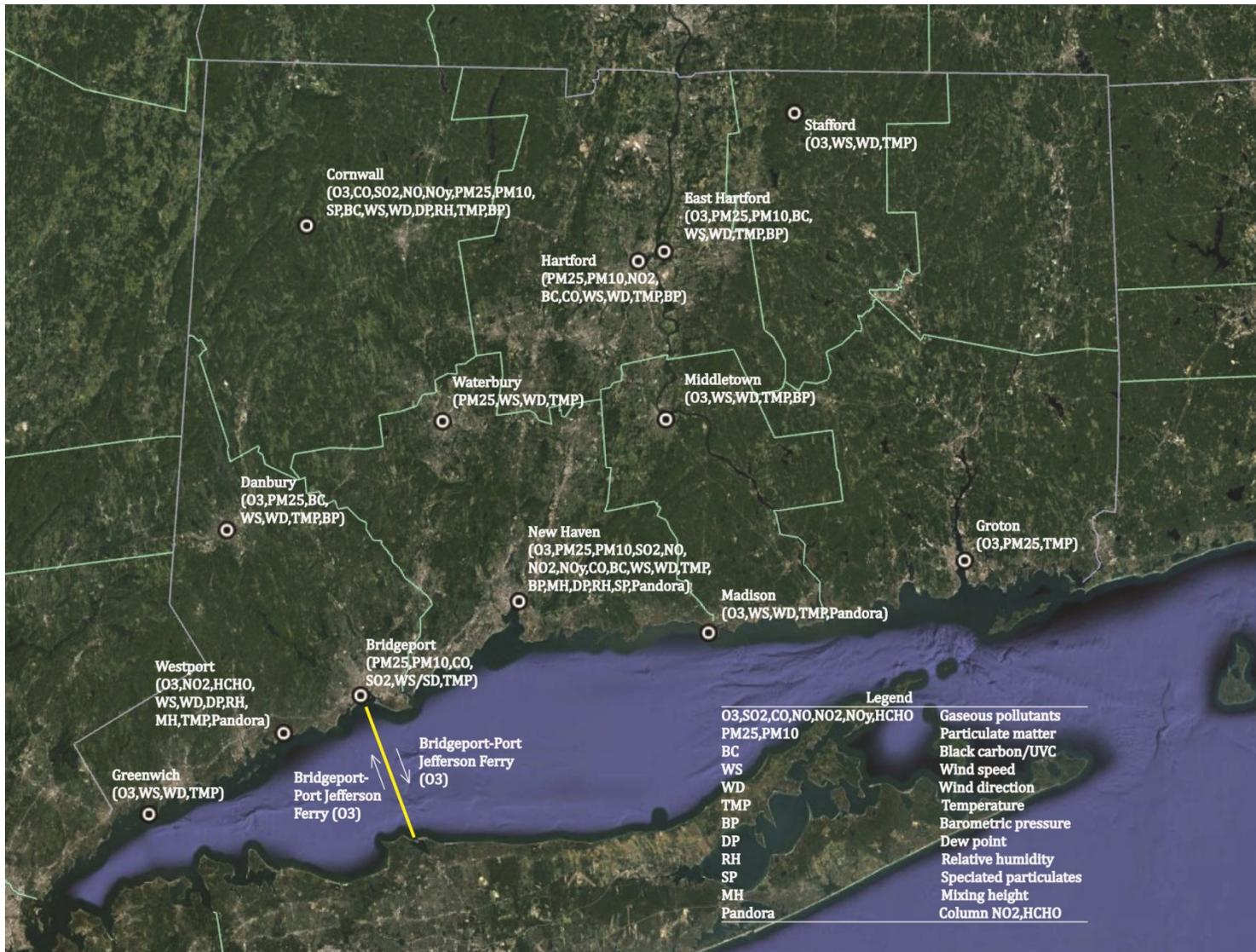


Figure 2: Map of CT DEEP SLAMS and Proposed EMP Monitoring

SLAMS NO₂ Monitoring

Connecticut meets its regulatory NO₂ monitoring requirements for near road and area-wide monitors with two monitors in the Hartford CBSA. An additional NO₂ monitor required by the Regional Administrators for the protection of sensitive and vulnerable populations is located at the New Haven NCore site. A fourth monitor, in Westport, is in excess of these minimum SLAMS requirements. This fourth monitor is intended to provide further data to assist in understanding ozone precursor transport into Connecticut. All NO₂ monitors are Teledyne API T500U cavity attenuated phase shift spectroscopy (CAPS) (reference method ID EQNA-0514-212).

Long Island Sound Ferry-Based Monitoring

In an effort to collect surface data on Long Island Sound, DEEP is conducting ozone monitoring on a ferry operating continuously during daytime hours between Bridgeport, CT and Port Jefferson, NY during the ozone season. The portable ozone monitoring modules in use are Teledyne API model 430 analyzers, equipped with battery back-up, global positioning system (GPS) sensor and cellular data transmission equipment.

Formaldehyde Monitoring

DEEP proposes to deploy a continuous automated formaldehyde (HCHO) sensor at Westport during the ozone monitoring season. HCHO measurements will be a complement to NO₂ measurements, as the ratio is an important indicator to assess whether the ozone production regime is VOC or NO_x limited. The particular analyzer make or model is yet to be determined at this time.

Upper Air Measurements

The planetary boundary layer (PBL) is the near-surface portion of the troposphere that is generally considered to be well mixed, such that pollutants emitted or created are more or less mixed but confined within the PBL. As such, lower boundary layer heights are associated with higher pollutant concentrations. The different radiative and absorptive capacities of land and water can affect the PBL height, also known as the mixing height (MH). Thus, coastal areas downwind of large water bodies may have higher concentrations than inland levels where the mixing heights are increased. DEEP is proposing to operate two ceilometers, at New Haven and Westport, for automated mixing height measurements. The ceilometers are model CL51, manufactured by Vaisala, Oyj, that operate based on optical backscattering by fine particulate aerosols that tend to concentrate just below the mixing height. The New Haven ceilometer has been in operation since November 2015, and the Westport ceilometer is expected to be purchased and deployed during the period 2019-2020.

Long Island Sound Tropospheric Ozone Study

Starting in 2017, and continuing through 2018, DEEP has been partnering with EPA, the National Aeronautics and Space Administration (NASA), the Northeast States for Coordinated Air Use Management (NESCAUM), other states and academic institutions to conduct field studies of O₃ atmospheric chemistry and transport in the greater New York – Long Island Sound – Connecticut area, with a particular focus on the mechanisms that result in the high O₃ levels observed along the Connecticut coastline. This study, named the Long Island Tropospheric Ozone Study (LISTOS)⁸, has utilized, in addition to the enhanced monitoring conducted by DEEP as described above (fixed site and ferry O₃, NO₂ HCHO, MH), ground-based upper air monitoring, investigations into coastal meteorology, intensive upper air chemical and meteorological monitoring during high O₃ events, aircraft-based high resolution remote sensing of trace gases for source identification during high O₃ events, and ground-based episode monitoring of trace NO₂ and VOCs using a mobile laboratory.

LISTOS activities for which DEEP provides monetary or in-kind support include:

- Three Pandora spectrophotometers, located at the Madison, New Haven and Westport sites, for column NO₂ and HCHO.

⁸ <http://www.nescaum.org/documents/listos/>

- An O₃ Light Detection and Ranging (LIDAR) sensor, located at Westport from mid-July 2018 to the end of the O₃ season, for upper air ozone concentration vertical profiling.
- Multiple balloon sonde launches at Westport for upper air ozone and meteorological profiling. Ozone sonde data will allow for calibration of the O₃ LIDAR.
- Low altitude atmospheric meteorological and chemical monitoring with the University of Maryland (UMD) experimental light aircraft during several forecasted high O₃ events. This was first conducted in 2017, and is planned for the 2018 and 2019 ozone seasons.
- An intensive meteorological study of the Long Island Sound region conducted by Stony Brook University. The study will use measurements collected from ground-based and aircraft wind field monitoring, combined with computer modeling, to determine atmospheric transport characteristics typical of high ozone events.
- A monitoring study of reactive VOCs by Stony Brook University based at a site located on the north shore of Long Island, approximately forty miles east of New York City. Surface ambient air monitoring will be conducted during selected high ozone events for VOC, trace gas and meteorological parameters. VOC analysis will employ Stony Brook's high resolution proton transfer time of flight mass spectrometer.

Project Assessment and Future Planning

Assessment of the LISTOS project will be ongoing, and most of the activities described above were planned only for the 2018 period. Additional monitoring may be deployed in the future if the results and analysis of LISTOS indicate that new directions of investigation are warranted to further characterize the regional O₃ chemistry and transport.

NO₂ and NO/NO_y Monitoring

DEEP monitors nitrogen dioxide (NO₂) at four sites in the monitoring network using Teledyne-API Model T500U (EQNA-0514-212), which are capable of directly measuring NO₂ using cavity attenuated phase shift (CAPS) spectroscopy methodology. The NO₂ monitors are maintained at Hartford Huntley Place, East Hartford McAuliffe Park, New Haven Criscuolo Park and Westport Sherwood Island State Park for regulatory compliance.

DEEP also operates two nitrogen oxide/total reactive oxides of nitrogen (NO/NO_y) TAPI model T200U/501 monitors, at Cornwall Mohawk Mountain and New Haven Criscuolo Park, to comply with NCore requirements. NO_y is defined as

NO + NO₂ + NO_z, where NO_z represents higher oxides of nitrogen. The major components of NO_z include nitrous acids [nitric acid (HNO₃), and nitrous acid (HONO)], organic nitrates [peroxyl acetyl nitrate (PAN), methyl peroxyl acetyl nitrate (MPAN), and peroxyl propionyl nitrate, (PPN)], and particulate nitrates.



The NO₂ and NO/NO_y networks fulfill requirements for NCore and SLAMS monitoring of these parameters. These requirements include: near road and area wide NO₂ monitoring in a core-based statistical area (CBSA) with a population greater than 1,000,000 (Hartford and East Hartford sites, respectively); nationwide NO₂ monitoring for susceptible and vulnerable populations at site selected by EPA (New Haven) and NCore NO/NO_y monitoring (Cornwall and New Haven).

CO Monitoring

DEEP operates four carbon monoxide (CO) sites in the air monitoring network, as shown on the map at right. All CO samplers are operated year-round and employ TEI 48i-TLE analyzers (RFCA-0981-054). Of the 4 sites, New Haven and Cornwall satisfy the requirement for CO monitoring at NCore sites and Hartford fulfills requirements for co-location with an NO₂ near road monitor in a CBSA having a population greater than 1 million.⁹ The EPA Regional Administrator has not indicated any locations in the state for additional CO monitoring aimed at susceptible and vulnerable populations.



The Bridgeport CO monitor was intended to cover monitoring required under Connecticut's CO Limited Maintenance Plan (LMP). The Hartford and New Haven areas are no longer subject to the LMP monitoring requirements, and CO monitoring in the Connecticut portion of the New York/New Jersey/Connecticut CO limited maintenance area will not be required after December 31, 2019.¹⁰ As such, DEEP is proposing discontinuing CO monitoring at the Bridgeport Roosevelt School location at that time.

SO₂ Monitoring

DEEP currently operates three sulfur dioxide (SO₂) sites in the air monitoring network

All samplers are TEI 43i-TLE SO₂ analyzers (EQSA-0486-060) and are operated year-round. Both 1-hour average and 5-minute block average SO₂ data are validated and reported to EPA.

The network requirements for SO₂ monitoring include NCore, population-weighted emissions index (PWEI) and Regional Administrator-required monitoring.¹¹ The Cornwall and New Haven sites satisfy the NCore SO₂ requirement.



⁹ [76 FR 54294; August 31, 2011](#)

¹⁰ [69 FR 50071; August 12, 2004](#)

¹¹ [75 FR 35520; June 22, 2010](#)

Table 5 shows the PWEI values for CBSAs that are within or intersecting Connecticut, based on the 2014 National Emissions Inventory and US Census Bureau 2015 county population estimates. The SO₂ NAAQS monitoring requirements based on PWEI values state that a monitor is required in areas having PWEI values greater than or equal to 5,000 MMperson-tons/yr. Therefore, no PWEI SO₂ monitors are currently required in the state. Also, the EPA has not indicated any additional SO₂ monitors in areas having the potential to violate the NAAQS, areas where vulnerable or sensitive populations may be impacted, or near large sources not conducive to modeling. We also note that the SO₂ primary design values, as provided in an earlier section of this Network Plan, range from 2 to 4 ppb, and are well below the 1-hour NAAQS of 75 ppb.

Although not covered by PWEI requirements, DEEP intends to continue SO₂ monitoring at Bridgeport Roosevelt School at this time, given that it is located in an area of higher concentrations, vulnerable and sensitive populations and a large emission source. The source, Bridgeport Harbor Unit 3, is scheduled for a complete shut-down in 2021.

Table 8: Population Weighted Emissions Index (PWEI) Values for Connecticut CBSAs

Core-Based Statistical Area (CBSA)	SO ₂ (tpy)	Population	PWEI (MMperson-tons/yr)
Bridgeport-Stamford-Norwalk, CT	3573.11	948053	3387
Hartford-West Hartford-East Hartford, CT	3762.76	1211324	4558
Torrington, CT	731.01	183603	134
New Haven-Milford, CT	2690.13	859470	2312
Norwich-New London, CT	1209.38	271863	329
Worcester, MA-CT	2258.63	935536	2113

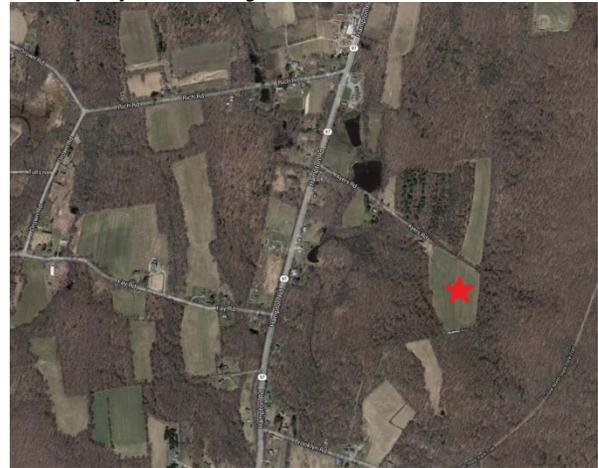
Detailed Site Information

The following section presents detailed information for each monitoring site, such as: identification code, location, history, monitored parameters, monitoring objectives, history and descriptive information.

Town – Site: **Pomfret – Abington**
 County: **Windham** Latitude: **41.84046°**
 Address: **80 Ayers Road** Longitude: **-72.010368°**
 AQS Site ID: **09-015-9991** Elevation: **209 m (686 ft)**
 Spatial Scale: **Regional** Year Established: **1993**
 Statistical Area: **CBSA Willimantic, CT**



This site is not under the operational control or purview of DEEP and is included in this Network Plan for informational purposes only



PM2.5 (FRM)	
PM2.5 (FRM, Collocated)	
PM2.5 (Continuous - FEM)	
PM10/PM-Coarse (FRM)	
PM10/PM-Coarse (FRM, Collocated)	
PM10/PM-Coarse (Continuous)	
Lead-PM10	
Lead-PM10 (Collocated)	
PM Speciation (CSN)	
PM Speciation (IMPROVE)	
PM2.5 Carbon (BC/UVC, Continuous)	
Ozone	X
SO2	
CO	
Direct NO ₂	
NO/NO ₂ /NOx	
NO/NOy	
VOCs (PAMS)	
Traffic Count	
Wind Speed	
Wind Direction	
Temperature	
Dew Point / Rel. Humidity	
Barometric Pressure	
Solar Radiation	

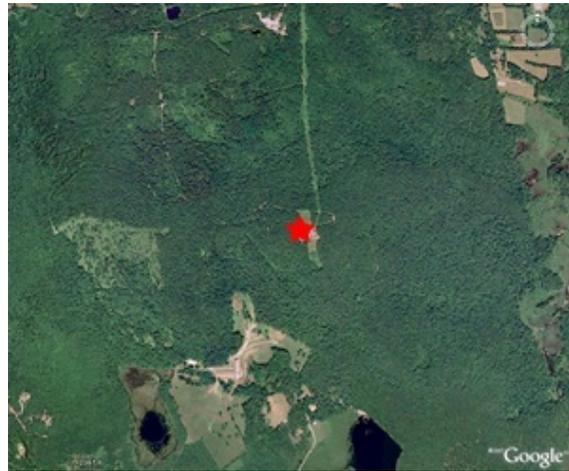
X=Existing **P** = Planned in 2019/20 **T** = Proposed to terminate in 2019/2020

Site Description: The Abington site is a regional-scale site located in a rural/agricultural area in northeast Connecticut in the town of Pomfret. This site is operated by the National Park Service under the direction of EPA as part of their Clean Air Status and Trends Network (CASTNET). It is located on a hilltop approximately 2.3 km south of State Route (SR) 44 and 0.6 km east of SR 97. The site includes a portable shed located in the center of an agricultural field that is surrounded by forest. DEEP tracks ambient air quality and quality assurance data from the site but is not responsible for site operations and planning.

Monitoring Objectives: The Abington monitoring site objective is to collect ozone measurements to assess long-term trends as part of the national CASTNET network. The site will also be used to determine compliance with the ozone NAAQS in Windham County.

Planned changes for 2019-2020: This site is not under the operational control or purview of DEEP and is included in this Network Plan for informational purposes only.

Town – Site: **Cornwall – Mohawk Mountain**
 County: **Litchfield** Latitude: **41.82140°**
 Address: **Mohawk Mountain** Longitude: **-73.29733°**
 AQS Site ID: **09-005-0005** Elevation: **505 m (1656 ft)**
 Spatial Scale: **Regional** Year Established: **1988**
 Statistical Area: **CSA (New York-Newark-Bridgeport)**



PM2.5 (FRM)	PM2.5 (FRM, Collocated)	PM2.5 (Continuous - FEM)	PM10/PM-Coarse (FRM)	PM10/PM-Coarse (FRM, Collocated)	PM10/PM-Coarse (Continuous)	Lead-PM10	Lead-PM10 (Collocated)	PM Speciation (CSN)	PM Speciation (IMPROVE)	PM2.5 Carbon (BC/UVC, Continuous)	Ozone	SO2	CO	Direct NO2	NO/NO2/NOx	NO/NOy	VOCs (PAMS)	Traffic Count	Wind Speed	Wind Direction	Temperature	Dew Point / Rel. Humidity	Barometric Pressure	Solar Radiation
1/3		X			X				1/3	X	X	X	X			X			X	X	X	X	X	X

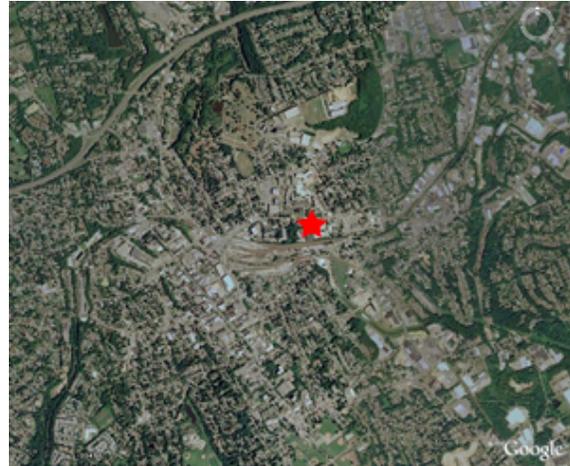
X=Existing **P** = Planned in 2019/20 **T** = Proposed to terminate in 2019/2020

Site Description: The Mohawk Mountain site is a rural regional-scale site located in northwestern Connecticut in the town of Cornwall. The site is located at the summit of Mohawk Mountain with an elevation of 505 m (1656 ft), and is approximately 17 km to the east of the New York border and 25 km to the south of the Massachusetts border. This site meets all siting requirements and criteria and has been approved by EPA as an NCore site.

Monitoring Objectives: The primary monitoring objectives are to meet NCore requirements for O₃, CO, SO₂, NO, NO_y, PM_{2.5} FRM, PM₁₀ FRM, PM_{10-2.5} FRM, PM_{2.5} speciation, continuous PM_{2.5} and surface meteorology. PM_{2.5} chemical speciation measurements are collected through the IMPROVE network as one-in-three day 24-hour samples and by continuous analyzers for fine particulate carbon parameters (BC/UVC).

Planned changes for 2019-2020: None.

Town – Site: **Danbury – Western Connecticut State University**
 County: **Fairfield** Latitude: **41.398692°**
 Address: **White Street** Longitude: **-73.443148°**
 AQS Site ID: **09-001-1123** Elevation: **116 m (380 ft)**
 Spatial Scale: **Neighborhood** Year Established: **1974**
 Statistical Area: **CSA (New York-Newark-Bridgeport)**



PM2.5 (FRM)	PM2.5 (FRM, Collocated)	PM2.5 (Continuous - FEM)	PM10/PM-Coarse (FRM)	PM10/PM-Coarse (FRM, Collocated)	PM10/PM-Coarse (Continuous)	Lead-PM10	Lead-PM10 (Collocated)	PM Speciation (CSN)	PM Speciation (IMPROVE)	PM2.5 Carbon (BC/UVC, Continuous)	Ozone	SO2	CO	Direct NO2	NO/NO2/NOx	NO/NOy	VOCs (PAMS)	Traffic Count	Wind Speed	Wind Direction	Temperature	Dew Point / Rel. Humidity	Barometric Pressure	Solar Radiation
1/6		X			X					X	X								X	X	X		X	

X=Existing **P** = Planned in 2019/20 **T** = Proposed to terminate in 2019/2020

Site Description: The Western Connecticut State University (WCSU) site is a neighborhood-scale site for PM_{2.5} and an urban-scale site for O₃, located in western Connecticut in the city of Danbury. This site is located on the top level of a parking garage on the WCSU campus. This site is located approximately 140 m to the southeast of I-84 on White Street. Residential neighborhoods are located in all directions of the site. This site meets all siting requirements and criteria and has been approved by EPA Region I. The downtown area of Danbury has a generally bowl-shaped topography, and therefore is subject to occasional high PM_{2.5} events during the winter.

Monitoring Objectives: The Danbury WCSU monitoring site objectives include collecting PM_{2.5} and PM₁₀/PM_{10-2.5} measurements for NAAQS compliance and for AQI forecasting purposes. Ozone is measured at the Danbury site for compliance assessment and AQI forecast reporting. Black carbon (BC/UVC) aethalometer monitoring is included to track the wood smoke contribution to PM pollution.

Planned changes for 2019-2020: None.

Town – Site: **Greenwich – Point Park**
 County: **Fairfield** Latitude: **41.005047°**
 Address: **Point Park** Longitude: **-73.58382°**
 AQS Site ID: **09-001-0017** Elevation: **3 m (10 ft)**
 Spatial Scale: **Urban** Year Established: **1978**
 Statistical Area: **CSA (New York-Newark-Bridgeport)**



PM2.5 (FRM)	
PM2.5 (FRM, Collocated)	
PM2.5 (Continuous - FEM)	
PM10/PM-Coarse (FRM)	
PM10/PM-Coarse (FRM, Collocated)	
PM10/PM-Coarse (Continuous)	
Lead-PM10	
Lead-PM10 (Collocated)	
PM Speciation (CSN)	
PM Speciation (IMPROVE)	
PM2.5 Carbon (BC/UVC, Continuous)	
Ozone	X
SO2	
CO	
Direct NO ₂	
NO/NO ₂ /NO _x	
NO/NO _y	
VOCs (PAMS)	
Traffic Count	
Wind Speed	X
Wind Direction	X
Temperature	X
Dew Point / Rel. Humidity	
Barometric Pressure	
Solar Radiation	

X=Existing **P** = Planned in 2019/20 **T** = Proposed to terminate in 2019/2020

Site Description: The Greenwich Point Park site is an urban-scale site located in southwestern Connecticut on the Long Island Sound in the town of Greenwich. This is a coastal site located approximately 3.0 km to the southeast and 5.0 km to the northeast of the New York border. This site meets all siting requirements and criteria and has been approved internally by DEEP and independently by EPA Region I.

Monitoring Objectives: The Greenwich Point Park monitoring site objectives include collecting ozone measurements for compliance assessment and AQI and forecast reporting.

Planned changes for 2019-2020: There are no changes planned for the period 2019-2020.

Town – Site: **Hartford – Huntley Place**
 County: **Hartford** Latitude: **41.771444°**
 Address: **10 Huntley Place** Longitude: **-72.679923°**
 AQS Site ID: **09-003-0025** Elevation: **57.2 m (187.7 ft)**
 Spatial Scale: **Near Road** Year Established: **2013**
 Statistical Area: **CSA (Hartford-West Hartford-Willimantic)**



PM2.5 (FRM)	PM2.5 (FRM, Collocated)	PM2.5 (Continuous - FEM)	PM10/PM-Coarse (FRM)	PM10/PM-Coarse (FRM, Collocated)	PM10/PM-Coarse (Continuous)	Lead-PM10	Lead-PM10 (Collocated)	PM Speciation (CSN)	PM Speciation (IMPROVE)	PM2.5 Carbon (BC/UVC, Continuous)	Ozone	SO2	CO	Direct NO2	NO/NO2/NOx	NO/NOy	VOCs (PAMS)	Traffic Count	Wind Speed	Wind Direction	Temperature	Dew Point / Rel. Humidity	Barometric Pressure	Solar Radiation
1/6		X			X					X			X	X				X	X	X	X		X	

X=Existing **P** = Planned in 2019/20 **T** = Proposed to terminate in 2019/2020

Site Description: The Huntley Place site is a near-road site located in north central Hartford. The site, located on the north west side of US I-84, is approximately 0.25 km to the west of the US I-91 corridor and the Founders and Buckley Bridges over the Connecticut River. Residential neighborhoods are located to the north, east and west of the site. This site meets all siting requirements for a near-road NO₂ site, and has been approved by EPA.

Monitoring Objectives: The primary monitoring objectives for the site are to capture NO₂ concentrations near heavily trafficked roads, to assess area-wide NO₂ concentrations, and to assess NO₂ concentrations for vulnerable and susceptible populations in adjacent neighborhoods. The data will be also used to help determine compliance with the 1-hour NO₂ NAAQS as established by EPA in 2010. This site also collects CO, FRM PM_{2.5}, continuous FEM PM_{2.5} & PM₁₀, BC/UVC and traffic counts.

Planned changes for 2019-2020: DEEP is proposing to change the sampling frequency for the gravimetric PM_{2.5} FRM sampler from 1-in-3 days to 1-in-6 days on 12/31/2019.

Town – Site: **Madison – Hammonasset State Park**
 County: **New Haven** Latitude: **41.25984°**
 Address: **Hammonasset SP** Longitude: **-72.55018°**
 AQS Site ID: **09-009-9002** Elevation: **3 m (10 ft)**
 Spatial Scale: **Regional** Year Established: **1981**
 Statistical Area: **CSA (New York-Newark-Bridgeport)**



PM2.5 (FRM)	
PM2.5 (FRM, Collocated)	
PM2.5 (Continuous - FEM)	
PM10/PM-Coarse (FRM)	
PM10/PM-Coarse (FRM, Collocated)	
PM10/PM-Coarse (Continuous)	
Lead-PM10	
Lead-PM10 (Collocated)	
PM Speciation (CSN)	
PM Speciation (IMPROVE)	
PM2.5 Carbon (BC/LV/C, Continuous)	
Ozone	X
SO2	
CO	
Direct NO2	
NO/NOy	
VOCs (PAMS)	
Total Column NO2/HCHO	X
Wind Speed	X
Wind Direction	X
Temperature	X
Dew Point / Rel. Humidity	
Barometric Pressure	
Solar Radiation	

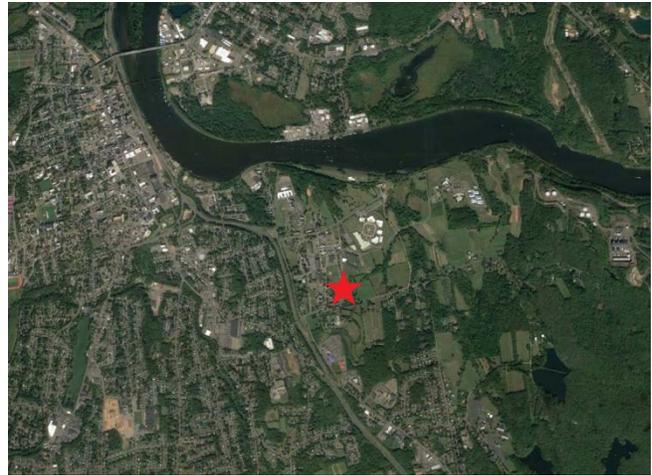
X=Existing **P** = Planned in 2019/20 **T** = Proposed to terminate in 2019/2020

Site Description: The Hammonasset State Park site is a regional-scale site located in central coastal Connecticut in the town of Madison. This site is located approximately 1.5 km to the south of Rte 1 and 3.0 km to the south of I-95 on the Long Island Sound. Residential neighborhoods are located primarily to the northeast, north and northwest of the site. This site meets all siting requirements and criteria and has been approved internally by DEEP and independently by EPA Region I.

Monitoring Objectives: The Madison Hammonasset State Park monitoring site objective is to collect ozone measurements for compliance assessment and AQI forecast reporting. A second objective is to collect data in support of the Enhanced Monitoring Plan (Appendix B of this Network Plan) for research on regional ozone transport.

Planned changes for 2019-2020: None.

Town – Site: **Middletown – Connecticut Valley Hospital**
 County: **Middlesex** Latitude: **41.55224°**
 Address: **Shew Hall** Longitude: **-72.63004°**
 AQS Site ID: **09-007-9007** Elevation: **58 m (190 ft)**
 Spatial Scale: **Neighborhood** Year Established: **1980**
 Statistical Area: **CSA (Hartford-West Hartford-Willimantic)**



PM2.5 (FRM)	
PM2.5 (FRM, Collocated)	
PM2.5 (Continuous - FEM)	
PM10/PM-Coarse (FRM)	
PM10/PM-Coarse (FRM, Collocated)	
PM10/PM-Coarse (Continuous)	
Lead-PM10	
Lead-PM10 (Collocated)	
PM Speciation (CSN)	
PM Speciation (IMPROVE)	
PM2.5 Carbon (BC/UVC, Continuous)	
Ozone	X
SO2	
CO	
Direct NO ₂	
NO/NO ₂ /NOx	
NO/NOy	
VOCs (PAMS)	
Traffic Count	
Wind Speed	X
Wind Direction	X
Temperature	X
Dew Point / Rel. Humidity	
Barometric Pressure	X
Solar Radiation	

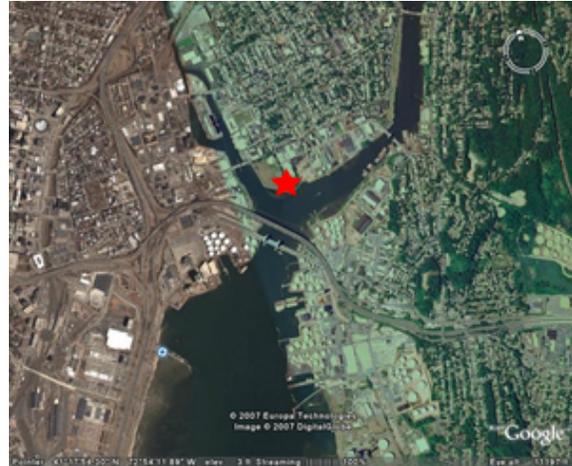
X=Existing **P** = Planned in 2019/20 **T** = Proposed to terminate in 2019/2020

Site Description: The Middletown Connecticut Valley Hospital (CVH) site is an urban-scale ozone site located in central Connecticut. This site is located approximately 0.2 km to the east of Rte 9. Residential neighborhoods are located to the west, north and south of this site. This site meets all siting requirements. DEEP relocated the site within the CVH campus to a shed near Battelle Hall in 2017.

Monitoring Objectives: The CVH monitoring site objective is to collect ozone measurements for compliance assessment and AQI forecast reporting.

Planned changes for 2019-2020: None.

Town – Site: **New Haven – Criscuolo Park**
 County: **New Haven** Latitude: **41.30117°**
 Address: **1 James Street** Longitude: **-72.90288°**
 AQS Site ID: **09-009-0027** Elevation: **3 m (10 ft)**
 Spatial Scale: **Neighborhood** Year Established: **2004**
 Statistical Area: **CSA (New York-Newark-Bridgeport)**



PM2.5 (FRM)	PM2.5 (FRM, Collocated)	PM2.5 (Continuous - FEM)	PM10/PM-Coarse (FRM)	PM10/PM-Coarse (FRM, Collocated)	PM10/PM-Coarse (Continuous)	PM2.5 (Cont. FEM, non-reg collocated)	PM10/PM-Coarse (Cont. FEM, non-reg collocated)	PM Speciation (CSN)	PM Speciation (IMPROVE)	PM2.5 Carbon (BC/UVC, Continuous)	Ozone	SO2	CO	Direct NO2	NO/NOy	VOCs (PAMS)	Total Column NO2/HCO	Wind Speed	Wind Direction	Temperature	Dew Point / Rel. Humidity	Barometric Pressure	Solar Radiation	Mixing Height	
1/3	1/6	X	1/3	1/6	X	P	P	1/3		X	X	X	X	X	X		X	X	X	X	X	X	X	X	X

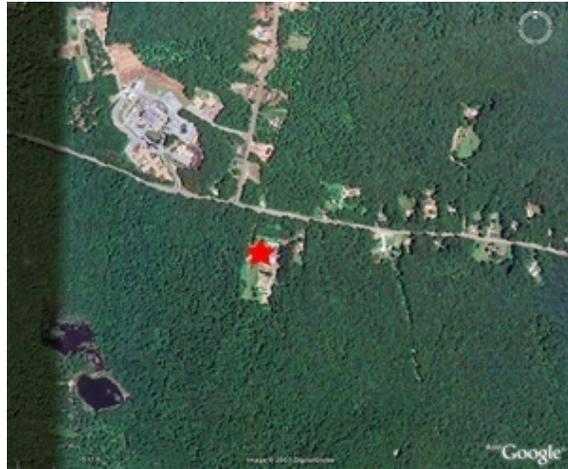
X=Existing **P** = Planned in 2019/20 **T** = Proposed to terminate in 2019/2020

Site Description: The Criscuolo Park site is a neighborhood-scale site located on the western side of the city of New Haven. The site is approximately 0.25 km to the north of the I-95 Quinnipiac River Bridge. The site is approximately 1.0 km to the east of the I-91 and I-95 interchange. Bulk petroleum transfer stations are located 0.3 to 2.0 km to the south of the site. Residential neighborhoods are located to the west, north and east of the site.

Monitoring Objectives: The primary monitoring objectives are to meet NCore requirements for O3, CO, SO2, PM2.5, PM10, PM10-2.5, PM2.5 speciation, NO/NOy and surface meteorology. NO2 monitoring is conducted in fulfillment of the requirement for NO2 monitoring of vulnerable and sensitive populations at 40 nationwide sites selected by the Regional Administrators. PM2.5 chemical speciation measurements are collected through the Chemical Speciation Network (CSN) as one-in-three day 24-hour samples and by continuous analyzers for fine particulate carbon parameters (BC/UVC and EC/OC) and sulfate.

Planned changes for 2019-2020: DEEP has commenced operation of a secondary PM2.5/PM10/PM10-2.5 FEM monitor, paired with the existing FEM monitor, in late 2018 for internal QA purposes. These are not designated as collocated in AQS as there are existing primary and collocated PM2.5 and PM10 FRM monitors at the site for these parameters.

Town – Site: **Stafford – Shenipsit State Forest**
 County: **Tolland** Latitude: **41.97568°**
 Address: **Route 190** Longitude: **-72.38674°**
 AQS Site ID: **09-013-1001** Elevation: **265 m (869 ft)**
 Spatial Scale: **Regional** Year Established: **1980**
 Statistical Area: **CBSA (Hartford-West Hartford-Willimantic)**



PM2.5 (FRM)	
PM2.5 (FRM, Collocated)	
PM2.5 (Continuous - FEM)	
PM10/PM-Coarse (FRM)	
PM10/PM-Coarse (FRM, Collocated)	
PM10/PM-Coarse (Continuous)	
Lead-PM10	
Lead-PM10 (Collocated)	
PM Speciation (CSN)	
PM Speciation (IMPROVE)	
PM2.5 Carbon (BC/UVC, Continuous)	
Ozone	X
SO2	
CO	
Direct NO ₂	
NO/NO ₂ /NOx	
NO/NOy	
VOCs (PAMS)	
Traffic Count	
Wind Speed	X
Wind Direction	X
Temperature	X
Dew Point / Rel. Humidity	
Barometric Pressure	
Solar Radiation	

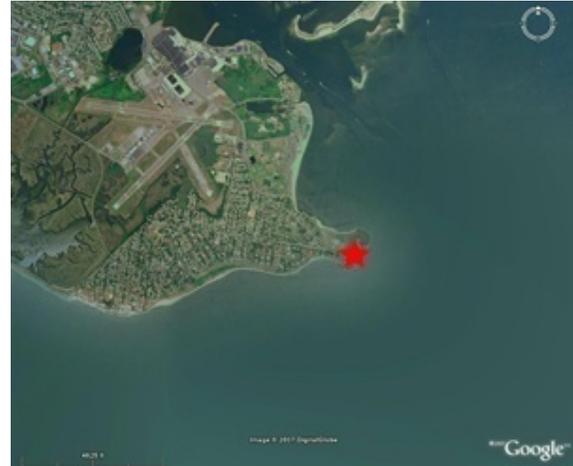
X=Existing **P** = Planned in 2019/20 **T** = Proposed to terminate in 2019/2020

Site Description: The Shenipsit State Forest site is a regional-scale site that is located in northern Connecticut in the town of Stafford. The site is approximately 100 m to the south of Rte 190, 17 km to the east of I-91 and 12 km to the northwest of I-84. This site is located 34 km to the northeast of the city of Hartford. This site meets all siting requirements and criteria and has been approved internally by DEEP and independently by EPA Region I.

Monitoring Objectives: The Stafford Shenipsit State Forest monitoring site objective is to collect ozone measurements for compliance assessment and AQI forecasting purposes.

Planned changes for 2019-2020: None.

Town – Site: **Stratford – Lighthouse**
 County: **Fairfield** Latitude: **41.15181°**
 Address: **Prospect Drive** Longitude: **-73.10334°**
 AQS Site ID: **09-001-3007** Elevation: **3 m (10 ft)**
 Spatial Scale: **Regional** Year Established: **1980**
 Statistical Area: **CSA (New York-Newark-Bridgeport)**



PM2.5 (FRM)	
PM2.5 (FRM, Collocated)	
PM2.5 (Continuous - FEM)	
PM10/PM-Coarse (FRM)	
PM10/PM-Coarse (FRM, Collocated)	
PM10/PM-Coarse (Continuous)	
Lead-PM10	
Lead-PM10 (Collocated)	
PM Speciation (CSN)	
PM Speciation (IMPROVE)	
PM2.5 Carbon (BC/UVC, Continuous)	
Ozone	X
SO2	
CO	
Direct NO ₂	
NO/NO ₂ /NO _x	
NO/NO _y	
VOCs (PAMS)	
Traffic Count	
Wind Speed	
Wind Direction	
Temperature	X
Dew Point / Rel. Humidity	
Barometric Pressure	
Solar Radiation	

X=Existing **P** = Planned in 2019/20 **T** = Proposed to terminate in 2019/2020

Site Description: The Stratford Lighthouse site is a regional-scale site located in southwestern Connecticut in the town of Stratford. This is a coastal site that is located 4.5 km to the southeast of I-95 and is directly on the Long Island Sound. This site is approximately 45 km to the northeast of the New York State border. This site meets all siting requirements and criteria and has been approved internally by DEEP and independently by EPA Region I.

Monitoring Objectives: The Stratford Lighthouse monitoring site objective is to collect ozone measurements for compliance assessment and AQI forecasting purposes.

Planned changes for 2019-2020: None

Appendix A: Network Plan Public Comments and Responses



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
OFFICE OF ENVIRONMENTAL MEASUREMENT AND EVALUATION
11 Technology Drive
North Chelmsford, MA 01863

May 16, 2019

Randall Semagin
Air Management, Planning and Standards Division
Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106

Dear Mr. Semagin:

Thank you for providing EPA with a draft of the Connecticut Department of Energy and Environmental Protection (CT DEEP) 2019 Annual Air Monitoring Network Plan which we received on May 8, 2019 for public comment. EPA-New England has reviewed your draft plan with respect to meeting the requirements of 40 CFR Part 58. Upon final submission of this document in July, we will move forward regarding approval of the Annual Network Plan. In addition, upon final submission of this document, we will work with our Headquarters offices to address the portions of the plan which require their attention, most notably monitoring associated with NCore and STN. The following are our comments:

1. We acknowledge the following overall changes to your network, on page 3:

Proposed Network Changes:

- Discontinue carbon monoxide (CO) sampling at Bridgeport Roosevelt School as of January 1, 2020, given that monitored concentrations are approximately 7 and 15 percent of NAAQS levels for the 1-hour and 8-hour standards, respectively, and that monitoring in the Connecticut portion of the New York/New Jersey/Connecticut maintenance area will not be required under Connecticut's CO Limited Maintenance Plan (LMP) after 2019.
- Discontinue manual FRM PM₁₀ monitoring at the East Hartford McAuliffe Park site as of January 1, 2020. Automated FEM PM₁₀ monitoring will continue at the site.
- Discontinue manual FRM PM_{2.5} monitoring at the East Hartford McAuliffe Park, Groton Fort Griswold and Waterbury Bank Street sites as of January 1, 2020. Automated FEM PM_{2.5} monitoring will continue at these locations.
- Reduce Hartford PM_{2.5} FRM sampling frequency from a 1-in-3 day to a 1-in-6 day schedule. The PM_{2.5} FRM data is supplemented with data from a co-located automated continuous FEM PM sampler.
- Commence operation of a second continuous FEM PM_{2.5}/PM₁₀ monitor at New Haven Criscuolo Park to better compare and understand the capabilities of the Teledyne T640X instrument.
- Commence formaldehyde (HCHO) monitoring at Westport, possibly during 2020 or 2021, pending acceptable commercially available models*.
- Commence mixing height monitoring at Westport during the period 2020 – 2021*.

* Note: these last two proposed changes were previously requested in the 2018 Network Plan as part of the Enhanced Monitoring Plan, which was submitted one year in advance as requested by EPA.

2. Pages 6-8. EPA expects to release design values for all criteria pollutants in July, 2019 which includes 2018 data for the entire country. We will work with you to ensure the design values represented here are consistent with those values.
3. Page 8 – typo in note for PM10 NAAQS Comparison. “Daily design values given are the ~~forth~~ fourth...”
4. Pages 12-14 notes that CT DEEP is utilizing all its continuous PM_{2.5} monitors for NAAQS compliance purposes and coded as 88101 effective the beginning of 2016. EPA supports CT in the other noted changes relative to collocated FRMs, FRM shutdowns and sampling frequency at locations that have these continuous PM_{2.5} monitors. We acknowledge that you have availed yourself of many of the resource saving opportunities we suggested in the PM_{2.5} network.

As you are aware, EPA- New England has developed a GIS tool which can be helpful to identify valley locations across the region which may be impacted by wood smoke. Given the proposed changes to your network and associated resource savings, we think there might be additional opportunities to conduct PM_{2.5} monitoring in CT, and we urge you to consider the results of that tool as it relates to some areas in Connecticut that may be impacted by wood smoke.

In addition, EPA supports the overall description of the State EMP as articulated in this Plan and approved it on October 25, 2018. EPA- New England appreciates your partnership in conducting ambient air monitoring, and we look forward to working with you to continuously improve the quality of ambient air in Connecticut. We look forward to the submission of the final Annual Air Monitoring Network Plan this July. If you have any questions or comments regarding these comments, please contact me at (617) 918-8387.

Sincerely,



Robert C. Judge
Air Monitoring Coordinator
Laboratory Services and Applied Science Division
EPA-New England

cc: Michele Chaffee CT DEEP
Paul Farrell CT DEEP

Connecticut DEEP responses to EPA Region 1 comments, dated May 16, 2019 (included above).

1. *No response required.*
2. DEEP will work with EPA to verify the NAAQS design values for Connecticut presented herein.
3. The typographical error on Page 8 has been corrected.
4. *No response required.*