Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

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Massachusetts 2019 Air Monitoring Network Plan

Air Assessment Branch
Bureau of Air and Waste

October 30, 2019

This is the Massachusetts 2019 Air Monitoring Network Plan, prepared by the Massachusetts Department of Environmental Protection (MassDEP) in accordance with Title 40 CFR Part 58.10. Each year, MassDEP is required to submit a Network Plan to the U.S. Environmental Protection Agency (EPA) for review and approval.

MassDEP operates a network of 21 ambient air quality monitoring stations in 17 communities located across the state. The Wampanoag Tribe of Gay Head (Aquinnah) operates one ozone monitoring station on Martha's Vineyard. MassDEP and the Wampanoag Tribe are members of the same Primary Quality Assurance Organization (PQAO), which ensures consistent quality assurance of ambient air quality data collected in Massachusetts.

The Massachusetts monitoring network is part of a comprehensive program to collect and provide information about air quality to the public and to determine compliance with National Ambient Air Quality Standards (NAAQS). This Network Plan reviews MassDEP's ambient air monitoring network to demonstrate that the requirements of 40 CFR Part 58 Appendices A, C, D and E are met, describes which pollutants and other parameters MassDEP measures at its various ambient air monitoring stations, and discusses recent and planned changes to the network. For detailed information on monitor locations, pollutants analyzed, and methods used, see Attachments 1 – 3.

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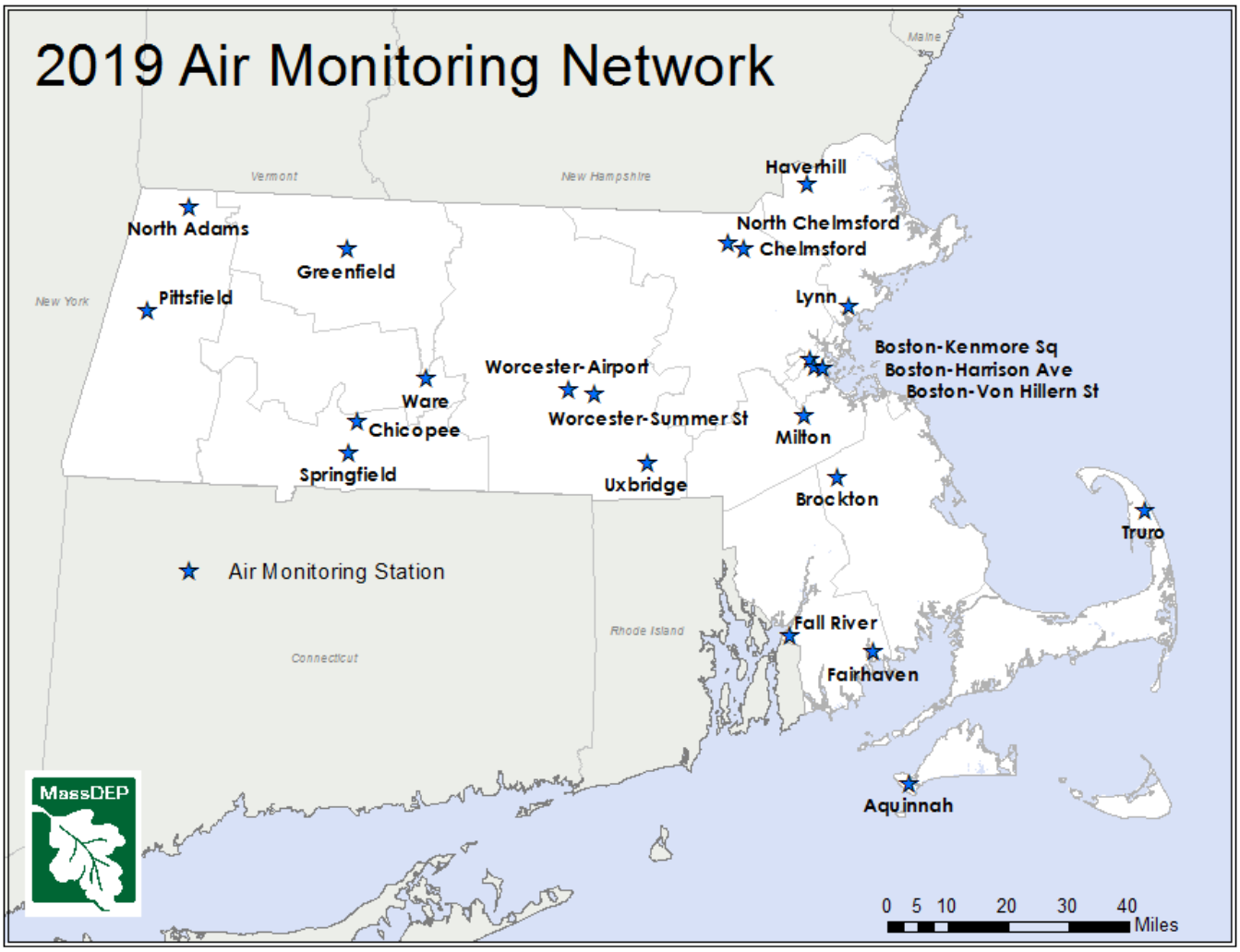
List of Abbreviations

(3 day) ..... Every 3rd day
(6 day) ..... Every 6th day
AAB ..... Air Assessment Branch
BAM ..... Beta Attenuation Monitor
BC..... Black Carbon
BP..... Barometric Pressure
CAA..... Clean Air Act
CFR ..... Code of Federal Regulations
CO ..... Carbon Monoxide
CO_2 ..... Carbon Dioxide
FEM ..... Federal Equivalent Method
FRM..... Federal Reference Method
EPA..... United States Environmental Protection Agency
IMPROVE..... Interagency Monitoring of Protected Visual Environments
MassDEP ..... Massachusetts Department of Environmental Protection
NAAQS..... National Ambient Air Quality Standards (for criteria pollutants)
NATTS..... National Air Toxics Trends Station
NCore ..... National Core Monitoring Network
NO ..... Nitric Oxide
NO_x..... Nitrogen Oxides
NO_y..... Total Reactive Oxidized Nitrogen
NO_2..... Nitrogen Dioxide
NO_2C..... Nitrogen Dioxide Caps direct absorption
NO_3..... Nitrate
O_3 ..... Ozone
OTR..... Ozone Transport Region
PAH ..... Polycyclic Aromatic Hydrocarbon
PAMS..... Photochemical Assessment Monitoring Stations
Pb ..... Lead
pH..... Concentration of hydrogen cations (H^+) in solution (an indicator of acidity)
ppb ..... parts per billion by volume
ppm ..... parts per million by volume
$PM_{2.5}$..... Particulate matter ≤ 2.5 microns aerodynamic diameter
PM_{10} ..... Particulate matter ≤ 10 microns aerodynamic diameter
RH..... Relative Humidity
SIP ..... State Implementation Plan
SO_2..... Sulfur Dioxide
SO_4..... Sulfate
SR ..... Solar Radiation
SVOC ..... Semi-Volatile Organic Compounds
TEMP..... Temperature
TSA ..... Technical Systems Audit
TSP ..... Total Suspended Particulates
$\mu g/m^3$ ..... micrograms per cubic meter
VOCs..... Volatile Organic Compounds
WS/WD ..... Wind Speed/Wind Direction
WSv/WDv..... Wind Speed/Wind Direction Vector


2019 Air Monitoring Network
Maine
Vermont
New Hampshire
New York
Connecticut
Rhode Island
Haverhill
North Adams
Greenfield
North Chelmsford
Chelmsford
Pittsfield
Lynn
Boston-Kenmore Sq
Boston-Harrison Ave
Boston-Von Hillern St
Worcester-Airport
Ware
Worcester-Summer St
Chicopee
Milton
Springfield
Uxbridge
Brockton
Truro
Air Monitoring Station
Fall River
Fairhaven
Aquinnah
MassDEP
0 5 10 20 30 40
Miles

1. Criteria Pollutants

This section describes MassDEP's network for monitoring criteria pollutants listed in the federal Clean Air Act for which EPA has set National Ambient Air Quality Standards (NAAQS), including ozone, sulfur dioxide, nitrogen dioxide, carbon monoxide, particulate matter (PM_{10} and $PM_{2.5}$) and lead. EPA periodically reviews and revises these standards based on new public health and scientific information. These revisions often require changes to air monitoring networks and methodologies.

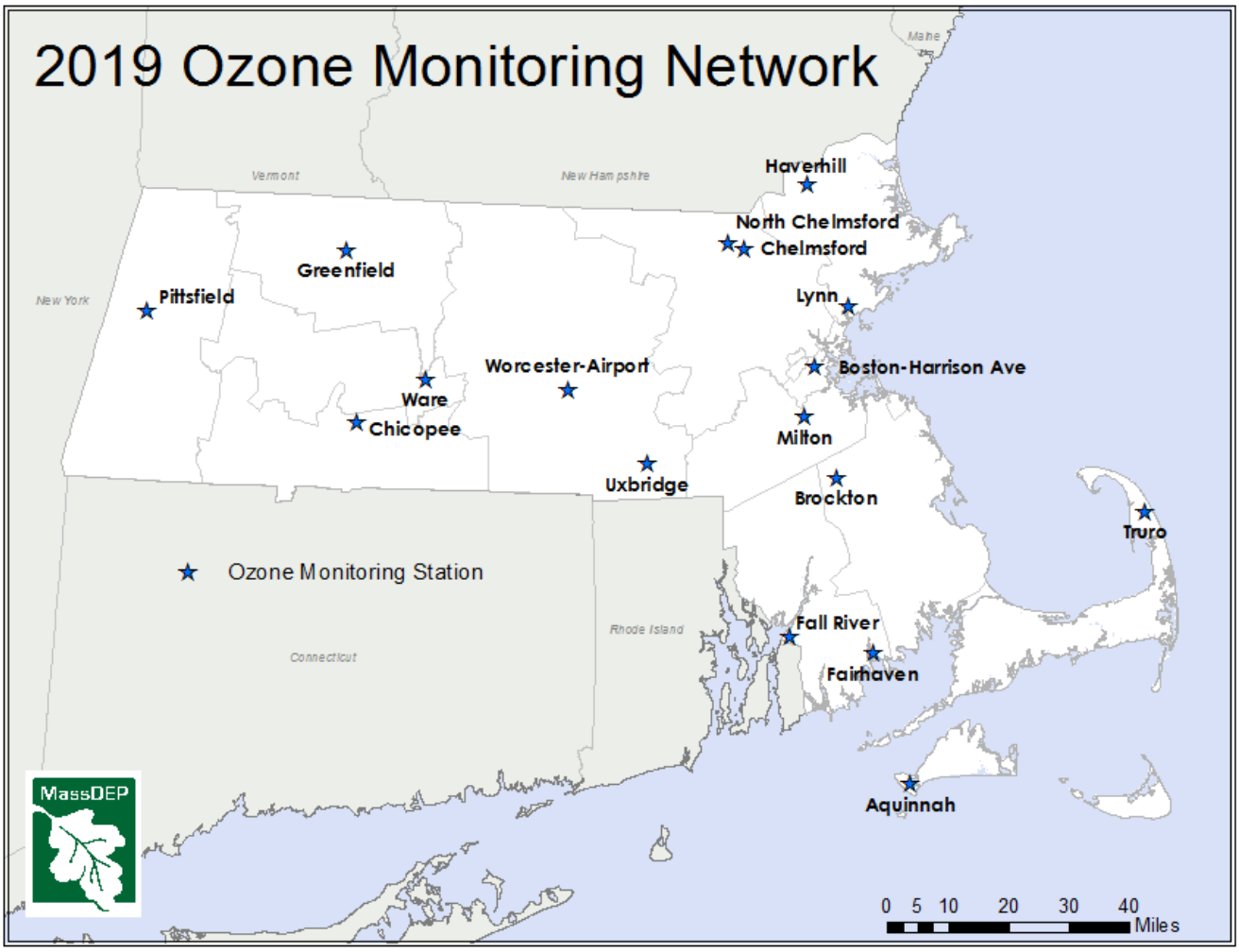
National Ambient Air Quality Standards					
Pollutant		**Primary/ Secondary**	**Averaging Time**	**Level**	**Form**
Carbon Monoxide		primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead		primary and secondary	Rolling 3 month average	0.15 µg/m^3	Not to be exceeded
Nitrogen Dioxide		primary	1-hour	100 ppb	98th percentile of 1-hr daily maximum concentrations, averaged over 3 years
		primary and secondary	Annual	53 ppb	Annual Mean
Ozone		primary and secondary	8-hour	0.070 ppm	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particle Pollution	$PM_{2.5}$	primary	Annual	12 µg/m^3	annual mean, averaged over 3 years
		secondary	Annual	15 µg/m^3	annual mean, averaged over 3 years
		primary and secondary	24-hour	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24-hour	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide		primary	1-hour	75 ppb	99th percentile of 1-hr daily maximum concentrations, averaged over 3 years
		secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

µg/m^3 = micrograms per cubic meter
ppm = parts per million
ppb = parts per billion

A. OZONE

MassDEP operates 16 ozone monitoring stations at the locations listed below. The Wampanoag Tribe of Gay Head (Aquinnah) on Martha's Vineyard operates the ozone monitor in Aquinnah. The existing ozone monitoring network meets EPA monitoring requirements for the ozone NAAQS. MassDEP is not planning changes to the existing ozone monitoring network in 2019.

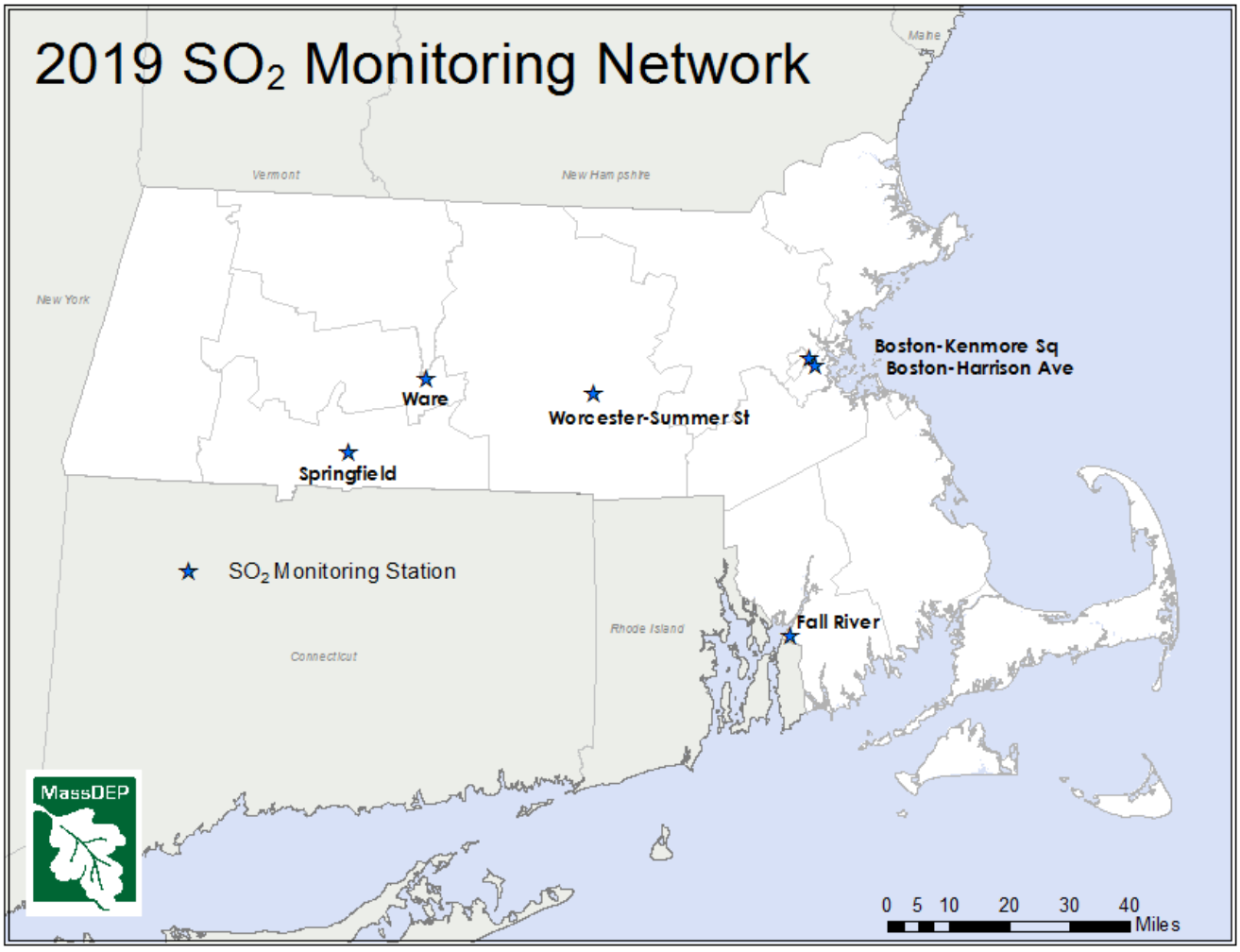
Ozone (O_3)		
ID Number	**City / Town**	**Location**
25-025-0042	Boston (Roxbury)	Harrison Avenue
25-023-0005	Brockton	Buckley Playground
25-017-0009	North Chelmsford	EPA Laboratory
25-017-0010	Chelmsford	Manning Road
25-013-0008	Chicopee	Westover AFB
25-005-1006	Fairhaven	Hastings School
25-005-1004	Fall River	Globe Street
25-011-2005	Greenfield	Veterans Field
25-009-5005	Haverhill	Consentino School
25-009-2006	Lynn	Parkland Avenue
25-021-3003	Milton	Blue Hill Summit
25-003-0008	Pittsfield	Silver Lake Drive
25-001-0002	Truro	Fox Bottom Area
25-027-0024	Uxbridge	East Hatford Avenue
25-015-4002	Ware	Quabbin Summit
25-027-0015	Worcester	Worcester Airport
25-007-0001	*Aquinnah*	*Wampanoag Tribe*


2019 Ozone Monitoring Network
Maine
Vermont
New Hampshire
New York
Connecticut
Rhode Island
Haverhill
North Chelmsford
Chelmsford
Greenfield
Pittsfield
Lynn
Worcester-Airport
Boston-Harrison Ave
Ware
Chicopee
Milton
Uxbridge
Brockton
Truro
Ozone Monitoring Station
Fall River
Fairhaven
Aquinnah
MassDEP
0 5 10 20 30 40
Miles

B. SULFUR DIOXIDE

MassDEP operates six trace-level (i.e., very low concentration) sulfur dioxide (SO_2) monitors at the locations listed below. The existing SO_2 monitoring network meets EPA monitoring requirements for the SO_2 NAAQS. MassDEP is not planning changes to the existing SO_2 monitoring network in 2019.

Sulfur Dioxide (SO_2)		
ID Number	**City /Town**	**Location**
25-025-0002	Boston	Kenmore Square
25-025-0042	Boston (Roxbury)	Harrison Avenue
25-005-1004	Fall River	Globe Street
25-013-0018	Springfield	Liberty Street
25-015-4002	Ware	Quabbin Summit
25-027-0023	Worcester	Summer Street

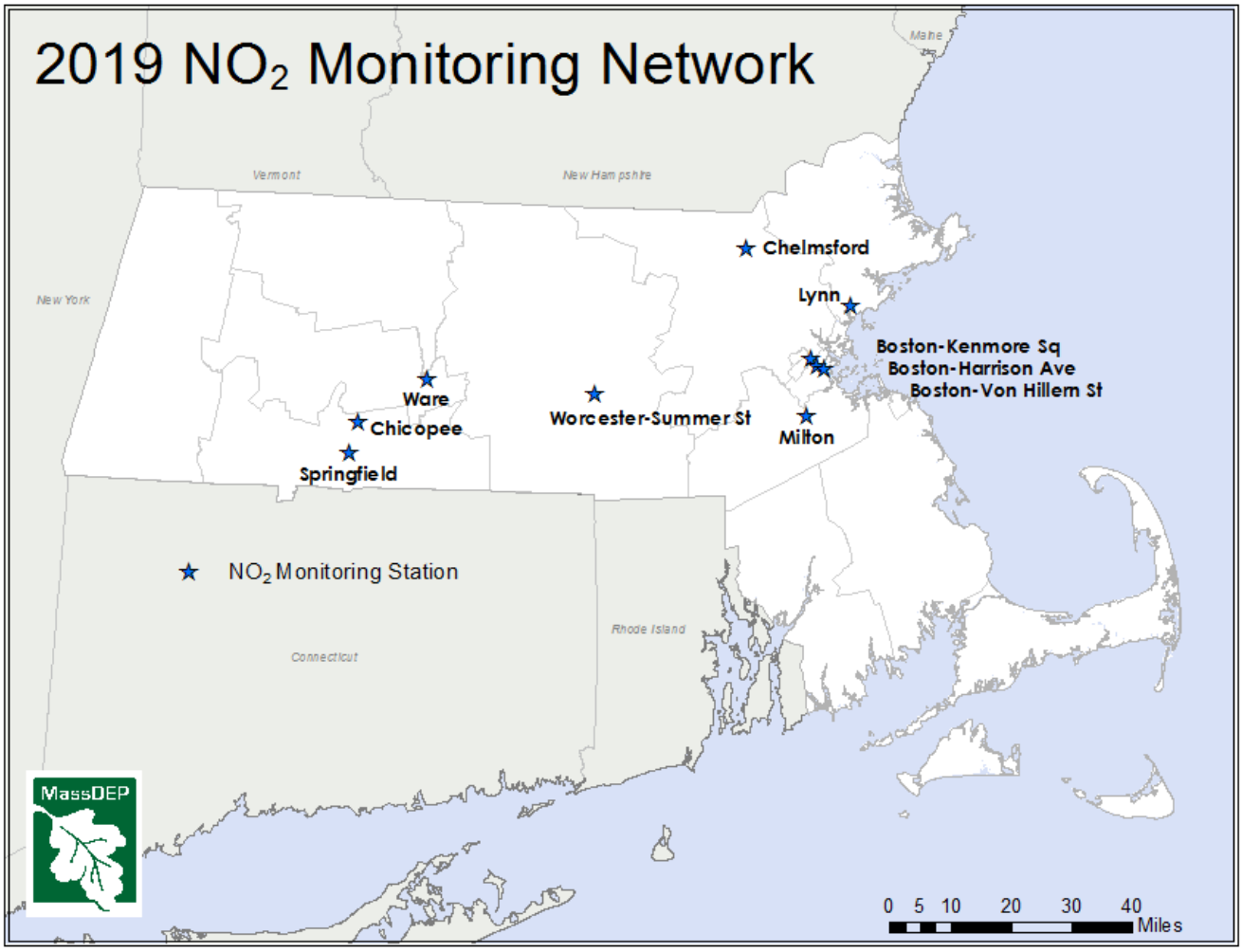


C. NITROGEN DIOXIDE

MassDEP operates 11 nitrogen dioxide (NO_2) monitors at the locations listed below. The existing NO_2 monitoring network meets EPA monitoring requirements for the NO_2 NAAQS. MassDEP is not planning changes to the existing NO_2 monitoring network in 2019. MassDEP NO_2 network monitors measure NO_2 and nitrogen oxides [NO_x, which is NO_2 plus NO (nitric oxide)]. NO_2 is monitored as an NAAQS pollutant and as an ozone precursor. MassDEP operates seven NO_2 monitors to determine compliance with NAAQS, including the near-road monitors in Boston and Chelmsford. The Lynn site includes two collocated NO_2 samplers, including one direct absorption. EPA has designated three monitors (Boston – Harrison Ave., Boston – Kenmore Square, and Springfield – Liberty Street) as representing susceptible and vulnerable populations. MassDEP also operates four additional monitors to measure NO_2 as an ozone precursor.

Nitrogen Dioxide (NO_2)		
ID Number	**City / Town**	**Location**
25-025-0002	Boston	Kenmore Square
25-025-0042	Boston (Roxbury)	Harrison Avenue
25-025-0044	Boston	Von Hillern Street
25-017-0010	Chelmsford	Manning Road
25-013-0008	Chicopee	Westover AFB
25-009-2006[1]	Lynn	Parkland Avenue
25-021-3003	Milton	Blue Hill
25-013-0018	Springfield	Liberty Street
25-015-4002	Ware	Quabbin Summit
25-027-0023	Worcester	Summer Street

[1] Two monitors (Collocated)


2019 NO2 Monitoring Network
Maine
Vermont
New Hampshire
New York
Chelmsford
Lynn
Boston-Kenmore Sq
Boston-Harrison Ave
Boston-Von Hillern St
Ware
Chicopee
Springfield
Worcester-Summer St
Milton
NO2 Monitoring Station
Rhode Island
Connecticut
MassDEP
0 5 10 20 30 40
Miles

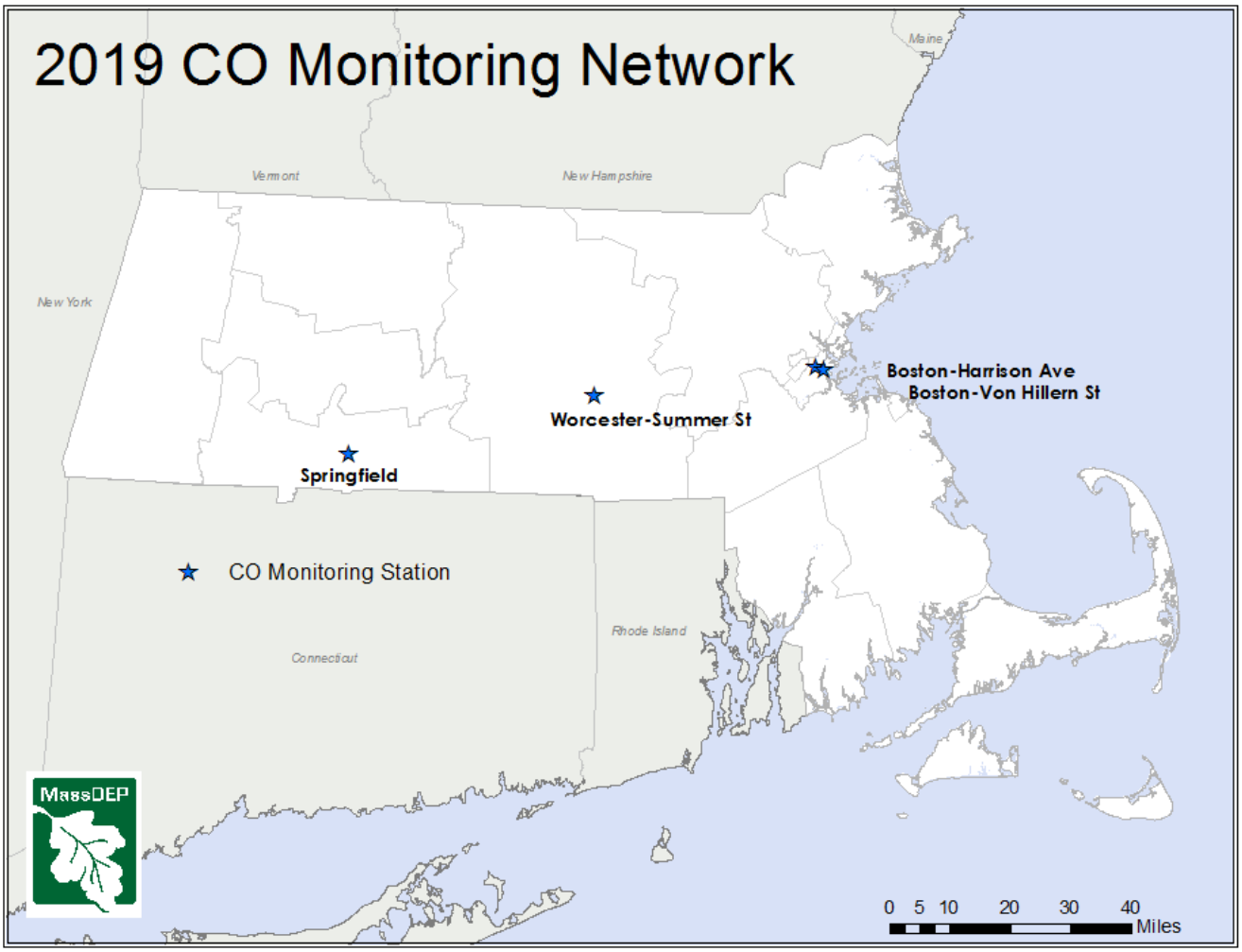
D. CARBON MONOXIDE

MassDEP operates four trace-level carbon monoxide (CO) monitors at the locations listed below. The existing CO monitoring network meets EPA monitoring requirements for the CO NAAQS.

Carbon Monoxide (CO)		
ID Number	**City / Town**	**Location**
25-025-0042	Boston (Roxbury)	Harrison Avenue
25-025-0044	Boston	Von Hillern Street
25-013-0018	Springfield	Liberty Street
25-027-0023	Worcester	Summer Street

MassDEP plans to discontinue CO monitoring at the Springfield (25-013-0018) monitoring station. On February 9, 2018, MassDEP submitted to EPA a Second 10-Year Limited Maintenance Plan for Carbon Monoxide for the Boston Metropolitan Area, Lowell, Springfield, Waltham, and Worcester. In this Limited Maintenance Plan MassDEP proposed to discontinue CO monitoring in Springfield because:

> "(1) the concentrations measured for many years at all locations are very low (well below the NAAQS); (2) MassDEP expects that CO levels will remain well below the NAAQS; and (3) the CO network exceeds EPA requirements for the CO NAAQS. This will leave CO monitors in the two cities with the highest populations in Massachusetts (Boston and Worcester). CO concentrations in Springfield and Worcester have tracked very closely for many years and both are well below the NAAQS. Based on these characteristics, ambient CO concentrations in Worcester are a valid surrogate for CO concentrations in Springfield. In the event the second-highest monitored CO concentration in any calendar year in Worcester reaches 75 percent of the 1-hour or 8-hour NAAQS for CO, MassDEP will, within 9 months of the date such concentrations are recorded, re-establish a CO monitoring site in Springfield consistent with EPA siting criteria, and resume analyzing and reporting CO concentrations in Springfield."


2019 CO Monitoring Network
Maine
Vermont
New Hampshire
New York
Boston-Harrison Ave
Boston-Von Hillern St
Worcester-Summer St
Springfield
CO Monitoring Station
Rhode Island
Connecticut
MassDEP
0 5 10 20 30 40
Miles

E. PARTICULATE MATTER

PM_{10}

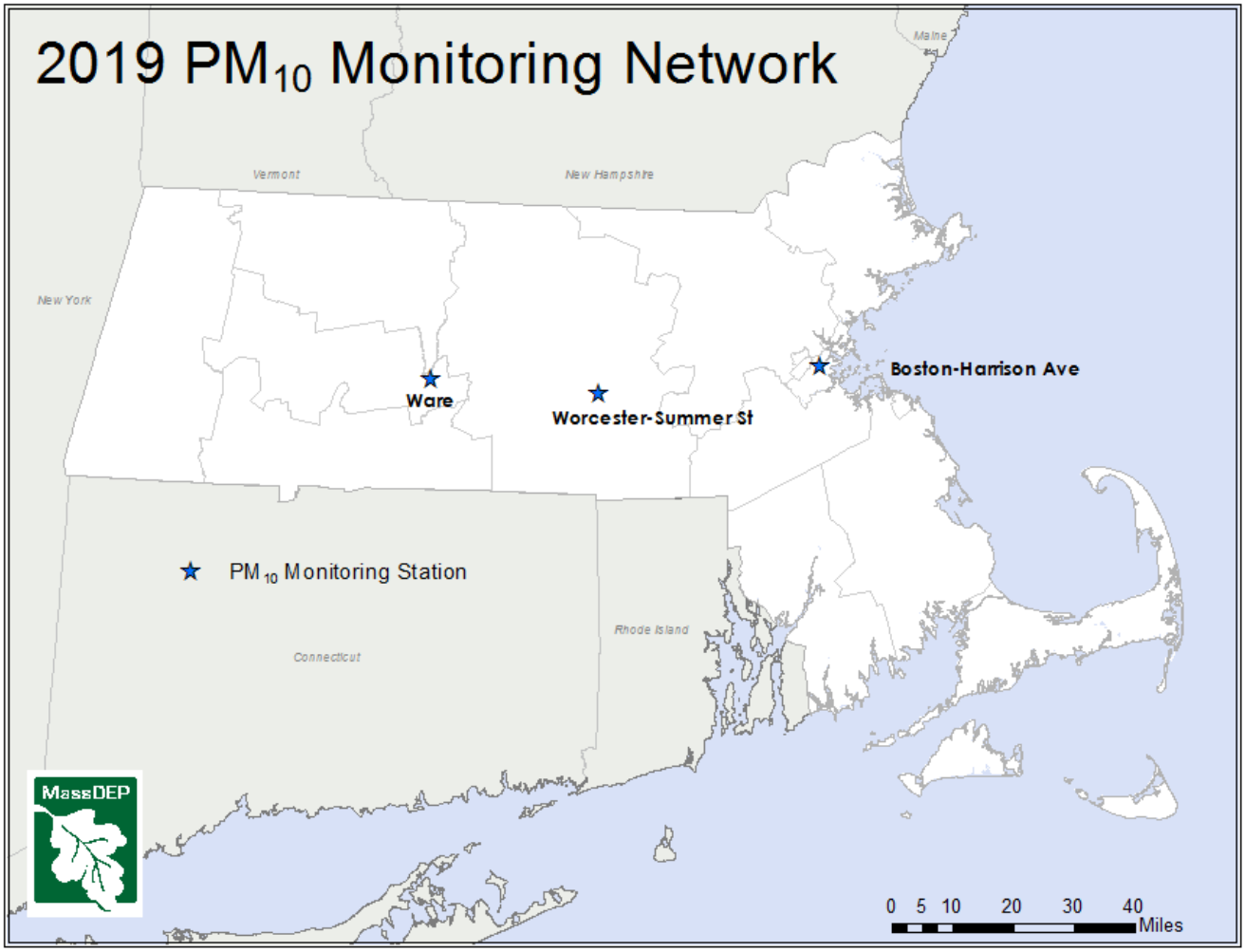
MassDEP operates four PM_{10} monitors (low volume instruments) at the locations listed below, including collocated monitors at the Boston - Harrison Avenue NCore site for quality assurance purposes. The existing PM_{10} monitoring network meets EPA monitoring requirements for the PM_{10} NAAQS. PM_{coarse} concentrations are calculated using data from PM_{10} monitors and $PM_{2.5}$ monitors at the Boston – Harrison Avenue site, which is an NCore requirement. These samples are also used for PM_{10}-based metals monitoring, which is a National Air Toxics Trends Sites (NATTS) requirement.

MassDEP plans to reduce the Boston - Harrison Avenue (25-025-0042) PM_{10} sampling schedule for one of the collocated monitors from 1 in 3 days to 1 in 6 days.

PM_{10} (Low Volume)		
ID Number	**City / Town**	**Location**
25-025-0042[1]	Boston (Roxbury)	Harrison Avenue
25-015-4002	Ware	Quabbin Summit
25-027-0023[2]	Worcester	Summer Street

[1] Two monitors (Collocated)

[2] MassDEP also operates a continuous atmospheric radiation sampler (TSP-based) at the Worcester - Summer Street station (25-027-0023) in cooperation with the EPA's National Air and Radiation Environmental Laboratory.


2019 PM10 Monitoring Network
Maine
Vermont
New Hampshire
New York
Ware
Worcester-Summer St
Boston-Harrison Ave
PM10 Monitoring Station
Rhode Island
Connecticut
MassDEP
0 5 10 20 30 40
Miles

$PM_{2.5}$

Filter-Based Monitors: MassDEP operates 11 fine particulate matter ($PM_{2.5}$) Federal Reference Method (FRM) monitors at the locations listed below, including collocated monitors at Chicopee (25-013-0008) for quality assurance purposes. The existing $PM_{2.5}$ monitoring network meets EPA monitoring requirements for the $PM_{2.5}$ NAAQS. MassDEP closed the Pittsfield – Center Street (25-003-5001) monitoring station in April 2019 and continues to operate FRM and continuous $PM_{2.5}$ monitors at Pittsfield – Silver Lake Drive (25-003-0008).

Filter-Based $PM_{2.5}$ (FRM)		
ID Number	**City / Town**	**Location**
25-025-0002	Boston	Kenmore Square
25-025-0042	Boston (Roxbury)	Harrison Avenue
25-025-0044	Boston	Von Hillern Street
25-023-0005	Brockton	Buckley Playground
25-013-0008[1]	Chicopee	Westover AFB
25-011-2005	Greenfield	Veterans Field
25-009-5005	Haverhill	Consentino School
25-003-0008	Pittsfield	Silver Lake Drive
25-013-0018	Springfield	Liberty Street
25-027-0023	Worcester	Summer Street

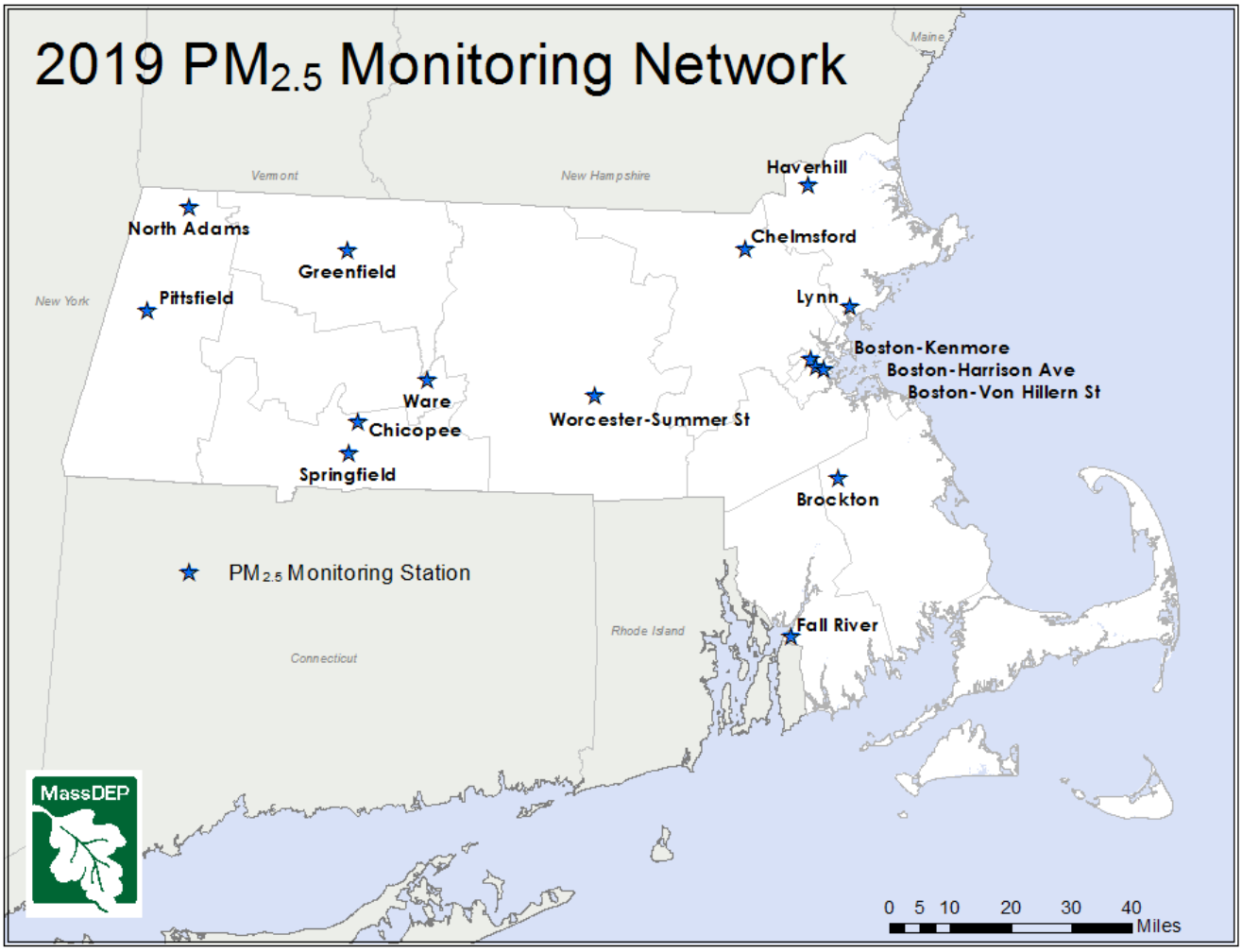
[1] Two monitors (Collocated)

Continuous Monitors: MassDEP operates 15 continuous $PM_{2.5}$ Beta Attenuation Monitors (BAMs) at the locations listed below, including collocated monitors at the Boston – Von Hillern Street (25-025-0044) site for quality assurance purposes. The existing $PM_{2.5}$ monitoring network meets EPA monitoring requirements for the $PM_{2.5}$ NAAQS. All of MassDEP's continuous $PM_{2.5}$ monitors have a Federal Equivalent Method (FEM) designation. FEM monitors provide the hourly $PM_{2.5}$ data that appears on MassDEP's MassAir website. MassDEP is using data from all FEM monitors for comparison to the $PM_{2.5}$ NAAQS.

MassDEP began operating a continuous $PM_{2.5}$ monitor at the Chicopee (25-013-0008) site in October 2018. MassDEP closed the Boston – North Street monitoring station (25-025-0043) in April 2018 due to loss of access to the site. MassDEP is in the process of identifying a replacement $PM_{2.5}$ site in the Boston downtown area.

Continuous $PM_{2.5}$ BAM (FEM)		
ID Number	**City / Town**	**Location**
25-025-0042	Boston (Roxbury)	Harrison Avenue
25-025-0044[1]	Boston	Von Hillern Street
25-023-0005	Brockton	Buckley Playground
25-017-0010	Chelmsford	Manning Road
25-013-0008	Chicopee	Westover AFB
25-005-1004	Fall River	Globe Street
25-011-2005	Greenfield	Veterans Field
25-009-5005	Haverhill	Consentino School
25-009-2006	Lynn	Parkland Avenue
25-003-6001	North Adams	Holden Street
25-003-0008	Pittsfield	Silver Lake Drive
25-013-0018	Springfield	Liberty Street
25-015-4002	Ware	Quabbin Summit
25-027-0023	Worcester	Summer Street

[1] Two monitors (Collocated)



Speciated $PM_{2.5}$

MassDEP collects speciated $PM_{2.5}$ samples at Boston – Harrison Avenue (25-025-0042) and Chicopee (25-013-0008). The speciated $PM_{2.5}$ program is designed to determine some of the chemical components (elements, sulfates/nitrates, carbon species) that are contained in $PM_{2.5}$.

IMPROVE sampling sites also provide speciated $PM_{2.5}$ data. The IMPROVE program measures parameters that are similar to those measured by the speciation program, and is designed to measure species at rural locations to evaluate the contribution of fine particulates and their constituents to the degradation of visibility. The National Park Service operates an IMPROVE sampler at Truro – National Sea Shore (25-001-0002) and the Wampanoag Tribe on Martha's Vineyard also operates an IMPROVE sampler.

Speciated $PM_{2.5}$		
ID Number	**City / Town**	**Location**
25-025-0042	Boston (Roxbury)	Harrison Avenue
25-013-0008	Chicopee	Westover AFB
25-001-0002	Truro	Fox Bottom Area
25-007-0001	Aquinnah	Wampanoag Tribe

PM_{coarse}

MassDEP uses FRM for PM_{coarse} in compliance with NCore requirements at the Boston – Harrison Avenue (25-025-0042) NCore site. This method consists of the subtraction of $PM_{2.5}$ values from PM_{10} values at a site that has side-by-side samplers of each type sampling on the same dates.

F. LEAD

MassDEP monitors lead at the Boston – Harrison Avenue NCore (25-025-0042) site using a low-volume PM_{10} method. While EPA allows states to discontinue lead monitoring at NCore sites that show concentrations below the NAAQS, MassDEP plans to continue lead monitoring at the Boston – Harrison Avenue NCore site for non-NAAQS purposes under the National Air Toxics Trends Site (NATTS) program.

2. Photochemical Assessment Monitoring Stations

MassDEP has operated enhanced ozone Photochemical Assessment Monitoring Stations (PAMS) in the Boston Metropolitan and Springfield Areas since 1994. PAMS monitoring in the Springfield Metropolitan Area was discontinued in 2018. PAMS are designed to measure ozone precursors (airborne compounds) and meteorological parameters in order to provide data about ozone formation and the effect of precursor controls on ozone production.

MassDEP monitors nitrogen oxides and other ozone precursors, such as volatile organic compounds (VOCs), including hydrocarbons and carbonyl compounds (formaldehyde, acetaldehyde). These are measured by taking discrete samples and by operating hourly gas chromatographs that measure individual hydrocarbon compounds at PAMS locations.

During the 2018 season, MassDEP monitored PAMS parameters in Chicopee (25-013-0008) and Lynn (25-009-2006), but only measured carbonyls at the Lynn site due to resource constraints. PAMS monitoring was discontinued at the Chicopee location after the 2018 ozone season. In 2019, MassDEP installed a new Automated Gas Chromatograph (Auto GC) at the Lynn site, and plans to add an NO_y analyzer and a ceilometer.

3. Total Reactive Nitrogen (NO_y)

MassDEP operates NO_y analyzers at Ware (25-015-4002) and at the NCore site at Boston – Harrison Avenue (25-025-0042) to meet NCore requirements. MassDEP plans to add an NO_y analyzer to the Lynn (25-009-2006) site in 2019 to meet PAMS requirements.

4. Air Toxics

Boston – Harrison Avenue (25-025-0042) is a NATTS monitoring station, in addition to being an NCore site. NATTS is an EPA program comprised of monitoring sites across the country equipped to measure a wide range of toxic air pollutants, including metals, VOCs, carbonyls, black carbon and semi-volatile organic compounds (SVOCs). At the Harrison Avenue site, MassDEP monitors black carbon (using an aethalometer), VOCs, carbonyls (formaldehyde and acetaldehyde), toxic metals (from PM_{10} filters), and polycyclic aromatic hydrocarbons (PAHs).

In addition to the NATTS site, MassDEP collects 24-hour VOC canister samples every sixth day for VOC analysis from Lynn (which serves as a Boston Area background location), and sends the samples, along with the Boston VOC samples, to the Rhode Island Department of Health Laboratory for analysis.

From July 2018 through November 2018, MassDEP conducted VOC monitoring in the Fore River Basin area in Weymouth, Quincy, Braintree, and Hingham as part of the Health Impact Assessment conducted for the proposed Atlantic Bridge natural gas compressor station project. Results of MassDEP's monitoring are found in the Health Impact Assessment Report published in January 2019 and on MassDEP's website at https://www.mass.gov/service-details/algonquin-natural-gas-compressor-station-weymouth. MassDEP is in the process of establishing a new air quality monitoring station in the Fore River Basin area, and will work with local citizens, officials and EPA in siting the station.

MassDEP also monitors black carbon at the following locations:

Black Carbon		
ID Number	**City / Town**	**Location**
25-025-0042	Boston (Roxbury)	Harrison Avenue
25-025-0044	Boston	Von Hillern Street
25-017-0010	Chelmsford	Manning Road
25-011-2005	Greenfield	Veterans Field
25-003-6001	North Adams	Holden Street
25-003-0008	Pittsfield	Silver Lake Drive
25-013-0018	Springfield	Liberty Street

5. Summary of Recent and Proposed Network Changes

MassDEP made the following recent changes to the monitoring network:

- Closed the Pittsfield – Center Street (25-003-5001) monitoring station in April 2019 and continues to operate a continuous $PM_{2.5}$ monitor at Pittsfield – Silver Lake Drive (25-003-0008).
- Began operating a continuous $PM_{2.5}$ monitor at the Chicopee station (25-013-0008) in October 2018.
- Closed the Boston – North Street monitoring station (25-025-0043) in April 2018 due to loss of access to the site.
- Discontinued PAMS monitoring in Chicopee in 2018.

MassDEP plans to make the following changes to the monitoring network:

- Discontinue carbon monoxide (CO) monitoring at the Springfield (25-013-0018) monitoring station.
- Reduce the Boston - Harrison Avenue (25-025-0042) course particulate matter (PM_{10}) sampling schedule for one of the collocated monitors from 1 in 3 days to 1 in 6 days.
- Identify a replacement $PM_{2.5}$ site in the Boston downtown area.
- Establish a new monitoring station in the Fore River Basin Area.

Attachment 1
Monitoring Site Descriptions

This section provides descriptions of each monitoring site in the Massachusetts air monitoring network, including location, monitored parameters, monitoring objectives, and descriptive information.

Boston – Kenmore Square (25-025-0002)	
Address:	Kenmore Square, 590 Commonwealth Ave, Boston
Latitude/Longitude:	42.34894, -71.097708
Parameters:	SO_2, NO_2, NO, NO_x, $PM_{2.5}$ filter (3 day)
Year Established:	1965 for population exposure
MSA/CMSA:	Boston CMSA, Boston Metropolitan MSA

The Kenmore Square site was established in 1965 and provides a long historical record of air pollution trends in Boston. It is located in a commercial and residential area. The site includes continuous SO_2 and NO_2 monitors. Particulate measurements include $PM_{2.5}$.

Boston (Roxbury) – Harrison Avenue (25-025-0042)	
Address:	1159 Harrison Avenue, Boston
Latitude/Longitude:	42.3295, -71.082619
Parameters:	O_3, SO_2, NO_2, NO, NO_x, NO_y, CO, $PM_{2.5}$, $PM_{2.5}$ filter (3 day), PM_{10} filter (3 day), speciated $PM_{2.5}$, black carbon, toxics, carbonyls (6 day), VOCs
Year Established:	1998 for population exposure
MSA/CMSA:	Boston CMSA, Boston Metropolitan MSA

The Harrison Avenue site was established in 1998 to provide population exposure monitoring, and in 2011 it became the state's NCore location. It is located in a commercial and residential area. NCore is a multi-pollutant network that integrates several advanced measurement systems for particles, pollutant gases and meteorology. The site includes continuous O_3, SO_2, NO_2 and CO monitors. Particulate measurements include $PM_{2.5}$, PM_{10}, speciated $PM_{2.5}$, and black carbon. Toxics sampling is also conducted at this site in association with the NATTS program. NATTS parameters include VOCs, carbonyls, metals and PAHs.

Boston – Von Hillern (25-025-0044)	
Address:	19 Von Hillern Street, Boston
Latitude/Longitude:	42.32519, -71.0561
Parameters:	NO_2, NO, NO_x, CO, $PM_{2.5}$, $PM_{2.5}$ filter (6 day), black carbon
Year Established:	2013 for near-road monitoring
MSA/CMSA:	Boston CMSA, Boston Metropolitan MSA

The Von Hillern site was established in 2013 as the first near-road sampling location in MassDEP's network, and is sited to measure peak hourly NO_2 concentrations that are expected to occur in the near-road environment. This site is located in a commercial area, adjacent to a heavily traveled urban highway. The site includes continuous NO_2 and CO monitors. Particulate measurements include $PM_{2.5}$ and black carbon.

Brockton (25-023-0005)	
Address:	Gilmore School, 170 Clinton St., Brockton
Latitude/Longitude:	42.065131, -71.12667
Parameters:	O_3, $PM_{2.5}$, $PM_{2.5}$ filter (6 day)
Year Established:	2013 for population exposure
MSA/CMSA:	Boston CMSA/Brockton MSA

The Brockton site was established in 2013. The site provides population exposure monitoring. It is located in a commercial and residential area, adjacent to a playground. The site includes a continuous O_3 monitoring. Particulate measurements include $PM_{2.5}$.

North Chelmsford (25-017-0009)	
Address:	EPA NERL, 11 Technology Drive, Chelmsford
Latitude/Longitude:	42.626925, -71.362128
Parameters:	O_3
Year Established:	2012 for population exposure
MSA/CMSA:	Boston CMSA/Lowell MSA

The North Chelmsford site was established in 2005 by EPA and was added to the MassDEP network in 2012. The site provides population exposure monitoring. It is located in a mixed commercial and residential area, inside the EPA Northeast Regional Laboratory (NERL). The site includes a continuous O_3 monitor.

Chelmsford – Manning Road (25-017-0010)	
Address:	5 Manning Road, Chelmsford
Latitude/Longitude:	42.612156, -71.307255
Parameters:	NO_2, NO, NO_x, $PM_{2.5}$, O_3, black carbon
Year Established:	2018 for near-road monitoring
MSA/CMSA:	Boston CMSA/Lowell MSA

The Chelmsford Manning Road site was established in June 2018 as the second near-road sampling location in MassDEP's network. It site to measure peak hourly NO_2 concentrations that are expected to occur in the near-road environment. This site is located in a residential area, adjacent to a heavily traveled urban highway. The site includes continuous NO_2 amd O_3 monitors. Particulate measurements include $PM_{2.5}$ and black carbon.

Chicopee (25-013-0008)	
Address:	Anderson Road, Chicopee (Westover AFB)
Latitude/Longitude:	42.194444, -72.555628
Parameters:	O_3, NO_2, NO, NO_x, $PM_{2.5}$, $PM_{2.5}$ filter (3 day), speciated $PM_{2.5}$
Year Established:	1983 for population exposure
MSA/CMSA:	Springfield MSA

The Chicopee site was established in 1983 to provide population exposure monitoring. It is located at the Westover Air Reserve Base. The site includes continuous O_3 and NO_2 monitors. Particulate measurements include $PM_{2.5}$ and speciated $PM_{2.5}$.

Fairhaven (25-005-1006)	
Address:	Hastings Middle School, 30 School Street, Fairhaven
Latitude/Longitude:	41.645403, -70.898402
Parameters:	O_3
Year Established:	2013 for population exposure and ozone transport monitoring
MSA/CMSA:	Providence-New Bedford-Fall River, RI-MA MSA

The Fairhaven site was established in 2013 as a replacement for a previous site at the Wood School in Fairhaven. The site provides population exposure and ozone transport monitoring. It is located in a mixed commercial and residential area, adjacent to a school. The site includes a continuous O3 monitor.

Fall River (25-005-1004)	
Address:	659 Globe Street, Fall River
Latitude/Longitude:	41.685728, -71.169764
Parameters:	O_3, SO_2, $PM_{2.5}$
Year Established:	1975 for population exposure monitoring
MSA/CMSA:	Providence-New Bedford-Fall River, RI-MA MSA

The Fall River site was established in 1975 to provide population exposure monitoring. It is located at a fire department station, in a mixed commercial and residential area, adjacent to a recreational park. The site includes continuous O_3 and SO_2 monitors. Particulate measurements include $PM_{2.5}$.

Greenfield (25-011-2005)	
Address:	16 Barr Avenue, Greenfield
Latitude/Longitude:	42.605832, -72.596647
Parameters:	O_3, $PM_{2.5}$, $PM_{2.5}$ filter (3 day), black carbon
Year Established:	2014 for population exposure monitoring
MSA/CMSA:	Springfield MSA

The Greenfield site was established in 2014 to provide population exposure monitoring. It is located in a residential area, adjacent to a school. The site includes a continuous O_3 monitor. Particulate measurements include $PM_{2.5}$ and black carbon.

Haverhill (25-009-5005)	
Address:	Consentino School, 685 Washington Street, Haverhill
Latitude/Longitude:	42.770867, -71.102831
Parameters:	O_3, $PM_{2.5}$, $PM_{2.5}$ filter (6 day)
Year Established:	1994 for population exposure monitoring
MSA/CMSA:	Boston CMSA, Lawrence MSA

The Haverhill site was established in 1994 to provide population exposure monitoring. It is located in a residential area, adjacent to a school. The site includes a continuous O_3 monitor. Particulate measurements include $PM_{2.5}$.

25-009-2006: Lynn	
Address:	390 Parkland Avenue, Lynn
Latitude/Longitude:	42.474671, -70.971358
Parameters:	O_3, NO_2, NO, NO_x, $PM_{2.5}$, VOCs, Carbonyls
Year Established:	1983 for population exposure
MSA/CMSA:	Boston CMSA; Boston Metropolitan MSA

The Lynn site was established in 1992 as a PAMS station as well as for population exposure monitoring. It is located in a residential area, adjacent to a public water supply. The site includes continuous O_3, NO_2, and CO monitors. Particulate measurements include $PM_{2.5}$. Year round, 24-hour PAMS VOC and carbonyls (6 day).

Blue Hill (25-021-3003)	
Address:	Blue Hill Observatory, 1904 Canton Ave, Milton
Latitude/Longitude:	42.2118, -71.114506
Parameters:	O_3, NO, NO_2, NO_x
Year Established:	2002
MSA/CMSA:	Boston CMSA, Boston Metropolitan MSA

The Blue Hill site was established in 2002 and provides population exposure monitoring. It is located on a hilltop next to a weather observatory. The site includes continuous O_3 and NO_2 monitors.

North Adams (25-003-6001)	
Address:	86 Holden Street, North Adams
Latitude/Longitude:	42.702191, -73.110485
Parameters:	$PM_{2.5}$, black carbon
Year Established:	2017 for population exposure monitoring
MSA/CMSA:	Springfield MSA

The North Adams site was established in 2017 to monitor the effects of wood smoke in a valley environment. It is located in a mixed residential and commercial area. Particulate measurements include $PM_{2.5}$ and black carbon.

Pittsfield (25-003-0008)	
Address:	25 Silver Lake Drive
Latitude/Longitude:	42.453035, -73.238776
Parameters:	O_3, $PM_{2.5}$, black carbon
Year Established:	2018 for population exposure
MSA/CMSA:	Pittsfield MSA

The Pittsfield site was established in August 2018 to provide population exposure monitoring. It is located in a mixed commercial and residential area. The site includes a continuous O_3 monitor. Particulate measurements include $PM_{2.5}$ and black carbon.

Springfield (25-013-0018)	
Address:	600 Liberty Street
Latitude/Longitude:	42.120163, -72.585146
Parameters:	SO_2, NO, NO_2, NO_x, CO, $PM_{2.5}$, $PM_{2.5}$ filter (6 day), black carbon
Year Established:	2018 for population exposure
MSA/CMSA:	Springfield MSA

The Springfield site was established in May 2018 as a replacement for a previous site at 165 Liberty Street in Springfield. The site provides population exposure monitoring. It is located in a mixed commercial and residential area. The site includes continuous SO_2, NO_2 and CO monitors. Particulate measurements include $PM_{2.5}$ and black carbon.

Truro (25-001-0002)	
Address:	6 Collins Road, Truro (Fox Bottom Area)
Latitude/Longitude:	41.975833, -70.024167
Parameters:	O3, speciated $PM_{2.5}$
Year Established:	1987 for population exposure and ozone transport monitoring
MSA/CMSA:	Barnstable MSA

The Truro site was established in 1987 to provide population exposure and ozone transport monitoring. It is located in a rural area adjacent to conservation land. The site includes a continuous O_3 monitor. Particulate measurements include speciated $PM_{2.5}$.

Uxbridge (25-027-0024)	
Address:	366 East Hartford Avenue, Uxbridge
Latitude/Longitude:	42.099722, -71.619917
Parameters:	O_3
Year Established:	2008 for population exposure and ozone transport monitoring
MSA/CMSA:	Boston CMSA, Worcester MSA

The Uxbridge site was established in 2008 to provide population exposure and ozone transport monitoring. It is located in a residential area, adjacent to a park. The site includes a continuous O_3 monitor.

Ware (25-015-4002)	
Address:	36 Skyline Drive, Ware (Quabbin Summit)
Latitude/Longitude:	42.298514, -72.334575
Parameters:	O_3, SO_2, NO, NO_2, NO_x, NO_y, $PM_{2.5}$, PM_{10} (6 day)
Year Established:	1985 for population exposure
MSA/CMSA:	Springfield MSA

The Ware site was established in 1985. It provides population exposure and is located in a rural area adjacent to the Quabbin reservoir. The site includes continuous O_3, SO_2, NO_2, NO_y monitors. Particulate measurements include $PM_{2.5}$ and PM_{10}.

Worcester – Airport(25-027-0015)	
Address:	375 Airport Drive, Worcester
Latitude/Longitude:	42.274342, -71.876022
Parameters:	O_3
Year Established:	1979 for population exposure monitoring
MSA/CMSA:	Boston CMSA, Worcester MSA

The Worcester – Airport site was established in 1979 to provide population exposure monitoring. It is located in a commercial area, adjacent to an airport. The site includes a continuous O_3 monitor.

Worcester – Summer Street (25-027-0023)	
Address:	260 Asylum Street, Worcester
Latitude/Longitude:	42.263978, -71.794836
Parameters:	SO_2, NO, NO_2, NO_x, CO, $PM_{2.5}$, $PM_{2.5}$ filter (6 day), PM_{10} filter (6 day)
Year Established:	2004 for population exposure monitoring
MSA/CMSA:	Boston CMSA, Worcester MSA

The Worcester – Summer Street site was established in 2004 as a replacement for a previous site in downtown Worcester and provides population exposure monitoring. It is located in an urban commercial and residential area, adjacent to several major roadways. The site includes continuous SO_2 and NO_2 monitors. Particulate measurements include $PM_{2.5}$ and PM_{10}.