District of Columbia
Calendar Year 2027 Annual Ambient Air Monitoring Network Plan

June 2026

Air Monitoring Branch
Air Quality Division
Department of Energy & Environment
1200 First Street, NE, Fifth Floor
Washington, DC 20002

(Page intentionally left blank)

Table of Contents

Acronyms and Definitions v
Executive Summary 1
1.0 Introduction 2
1.1 The District's Ambient Air Monitoring Strategy 3
2.0 District's Ambient Air Network 5
3.0 District of Columbia's Air Monitoring Stations 20
3.1 River Terrace Station (11-001-0041) 20
3.2 McMillan Station (11-001-0043) 21
3.3 Takoma Recreation Center Station (11-001-0050) 22
3.4 Anacostia Freeway Near-Road Station (11-001-0051) 23
3.5 King Greenleaf Recreation Center Station (11-001-0053) 23
3.6 Bald Eagle Recreation Center Station (11-001-0055) 25
4.0 Ozone and $PM_{2.5}$ Air Quality 26
4.1 Annual $PM_{2.5}$ Design Concentrations 26
4.2 Daily $PM_{2.5}$ Design Concentrations 26
4.3 Ozone Design Concentrations 27
5.0 Network Changes and Upgrades 30
5.1 River Terrace School (Site ID 11-001-0041) 30
5.2 McMillan (Site ID 11-001-0043) 30
5.3 Takoma Recreation Center Site ID 11-001-0050) 30
5.4 Anacostia Freeway Near-Road station (Site ID 11-001-0051) 30
5.5 King Greenleaf Recreation Center (Site ID 11-001-0053) 30
5.6 Bald Eagle Recreation Center (Site ID 11-001-0055) 30
6.0 Air Monitoring Program and Data Contacts 31

List of Tables

Table 2-1: Ambient Air Monitoring Network and Monitor Details 7
Table 2-2: Monitoring Sites and Parameters of Each Monitor 7
Table 2-3: Monitor Count for the District's Network 9
Table 2-4: Monitoring Methods and AQS Codes 10
Table 2-5: Constituent Compounds and Species Measured in the District 11
Table 2-6: Number of $PM_{2.5}$ SLAMS Sites 15
Table 2-7: Number of Ozone SLAMS Sites 16

List of Figures

Figure 2-1: The District's Ambient Air Monitoring Network 6
Figure 3-1: River Terrace Site Locator Maps 20
Figure 3-2: McMillan Reservoir Site Locator Maps 21
Figure 3-3: Takoma Recreation Center Site Locator Maps 22
Figure 3-4: Anacostia Freeway Near-Road Site Locator Maps 23
Figure 3-5: King Greenleaf Recreation Center Site Locator Maps 24
Figure 3-6: Bald Eagle Recreation Center Site Locator Maps 26
Figure 4-1: Annual $PM_{2.5}$ Design Values 27
Figure 4-2: Daily $PM_{2.5}$ Design Values 28
Figure 4-3: Ozone Design Values 29

Acronyms and Definitions

AQI	Air Quality Index
AQS	Air Quality System
BAM	Beta Attenuation (Mass) Monitor – used for continuous measurements of particulate matter
CAA	Clean Air Act
CAPS	Cavity Attenuated Phase Shift
C.F.R.	Code of Federal Regulations
CSN	$PM_{2.5}$ Chemical Speciation Network
CO	Carbon Monoxide
DOEE	Department of Energy and Environment
EMP	Enhanced Monitoring Plan
EPA	U.S. Environmental Protection Agency
FEM	Federal Equivalent Method
FID	Flame Ionization Detector
FRM	Federal Reference Method
GC	Gas Chromatograph
HAPs	Hazardous Air Pollutants
IR	Infrared (radiation)
MSA	Metropolitan Statistical Area
NAA	Non-Attainment Area
NAAQS	National Ambient Air Quality Standard
NATTS	National Air Toxic Trends Stations
NAMS	National Air Monitoring Station
NCore	National Core Monitoring Network
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen (ozone precursor)
NOy	Total Reactive Nitrogen Species (ozone precursor)
O_3	Ozone
OC/EC	Organic Carbon/Elemental Carbon
PAHs	Polycyclic Aromatic Hydrocarbons
PAMS	Photochemical Assessment Monitoring network Stations
Pb	Lead
$PM_{2.5}$	Particulate matter with an equivalent diameter less than or equal to 2.5 µm
PM_{10}	Particulate matter with an equivalent diameter less than or equal to 10 µm
QA	Quality Assurance
SIP	State Implementation Plan
SLAMS	State and Local Air Monitoring Stations
SO_2	Sulfur Dioxide
TSP	Total Suspended Particles
TEOM	Tapered Element Oscillating Microbalance – used for continuous measurements of PM_{10} or $PM_{2.5}$
UV	Ultraviolet (radiation)
VOCs	Volatile Organic Compounds

Executive Summary

The Clean Air Act mandates an ambient air quality surveillance system in state and local jurisdictions, including the District of Columbia (District). The U.S. Environmental Protection Agency (EPA) codified the national ambient air monitoring regulations in Title 40 Code of Federal Regulations (C.F.R.) Part 58. The regulations require state and local monitoring agencies to conduct a periodic assessment of ambient air monitoring networks and propose any changes in an annual ambient air monitoring network plan. Annual network plans need to be submitted to EPA by July 1st of every year. This is the District's Annual Ambient Air Network Plan (Network Plan) for the calendar year 2027.

DOEE is proposing no changes to the District's current six-station ambient air monitoring network in the calendar year 2027. The District's ambient monitoring network will be maintained as described in the subsequent sections of this Network Plan.

1.0 Introduction

In 1970, Congress passed the Clean Air Act (CAA) and authorized the U.S. Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) for pollutants that threaten human health and welfare. Primary standards are set according to criteria designed to protect public health, including sensitive populations such as children and the elderly. Secondary standards are set to minimize harm to public welfare and the environment (*e.g.*, decreased visibility, damage to crops, vegetation, and buildings).

Six pollutants currently have NAAQS: ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), particulate matter (less than 10 microns, PM_{10}; and less than 2.5 microns aerodynamic diameter, $PM_{2.5}$), and lead (Pb). These are commonly known as "criteria" air pollutants. When air quality does not meet the NAAQS for one of the criteria pollutants, the area is said to be in "nonattainment" of the standard for that pollutant.

Air pollution comes from many sources including on-road vehicles (cars, trucks, buses, and motorcycles), off-road equipment (locomotives, boats, construction equipment, lawn mowers), area sources (small stationary sources that cumulatively impact air quality such as gas stations, auto maintenance facilities, painting operations, consumer products usage), large stationary sources (factories, power plants), and even fires. The CAA requires state and local air agencies operate and maintain ambient air surveillance networks to measure pollutant concentrations. DOEE uses its ambient monitoring network to track changes in the District's ambient air and to evaluate the District's compliance with the NAAQS.

Ambient air quality monitoring in the District began in the late 1950s, prior to the establishment of EPA. The first monitors were simple mechanisms or passive collectors such as dust-fall buckets and tape samplers. These were followed in the 1960s by wet-chemistry instruments, which were soon replaced by more advanced electronic automated instruments. The addition of computer technology in the late 1970s and early 1980s to operate monitoring systems and collect air data was critical to the development of the core monitoring network that exists today.

Over the years, monitoring goals have shifted based on changes in the NAAQS. On October 1, 2015, EPA strengthened the NAAQS for ground-level ozone to 70 parts per billion (ppb), based on extensive scientific evidence about ozone's effects on public health and welfare. The updated standards will improve public health protection, particularly for at-risk groups including children, older adults, people of all ages who have lung diseases such as asthma, and people who are active outdoors, especially outdoor workers.

EPA designated the District as a marginal nonattainment area for the 2015 ozone NAAQS, based on 2014-2016 air quality data, then was reclassified as moderate on more recent data, and finally was determined to have clean data for the 2015 ozone NAAQS based on 2021-2023 certified data. District attained the 2008 ozone NAAQS and submitted a redesignation request and maintenance plan for the 2008 NAAQS to EPA, which both have been approved as of July 16, 2019.

In 2014, EPA redesignated the District from nonattainment to attainment of the 1997 annual NAAQS for $PM_{2.5}$ (15 $\mu g/m^3$) and also designated the District as an attainment area for the more

stringent 2012 annual NAAQS (12 μg/m^3). 79 Fed. Reg. 60081 (October 6, 2014). The District is in compliance with the 2012 $PM_{2.5}$ NAAQS and continues to maintain the standards. More recently on February 7, 2024, EPA further strengthened the $PM_{2.5}$ primary annual NAAQS and set it at 9.0 μg/m^3. Based on 2023 and preliminary 2024 data, the District is in compliance with the more stringent new 2024 $PM_{2.5}$ annual standard.

The Air Monitoring Branch (AMB) in DOEE's Air Quality Division (AQD) operates, maintains, and performs all functions of the ambient air monitoring program required by the CAA. As required by federal air monitoring regulations, the District's monitoring network is designed to study expected high pollutant concentrations, high population density, significant sources, general background concentrations, and regional transport.

In October 2006, EPA issued final regulations that require periodic assessment of monitoring networks. As described in 40 C.F.R. § 58.10, the following information for existing and proposed site(s) must be included in a Network Plan:

1. Air Quality System (AQS) site identification number;
2. Site location, including street address and geographical coordinates;
3. Sampling and analysis method(s) for each measured parameter;
4. Operating schedules for each monitor;
5. Any proposals to remove or move a monitoring station within a period of 18 months following plan submittal;
6. Monitoring objective and spatial scale of representativeness for each monitor;
7. The identification of any sites that are suitable and sites that are not suitable for comparison against the annual $PM_{2.5}$ NAAQS or 24-hour $PM_{10-2.5}$ NAAQS as described in § 58.30;
8. Metropolitan Statistical Area (MSA), Core Based Statistical Area (CBSA), Combined Statistical Area (CSA), or other area represented by the monitor;
9. The designation of any Pb monitors as either source-oriented or non-source-oriented according to Appendix D to 40 C.F.R. Part 58;
10. Any source-oriented monitors for which a waiver has been requested or granted by the EPA Regional Administrator as allowed for under § 4.5(a)(ii) of Appendix D to 40 C.F.R. Part 58;
11. Any source-oriented or non-source-oriented site for which a waiver has been requested or granted by the EPA Regional Administrator for the use of Pb-PM_{10} monitoring in lieu of Pb-TSP monitoring as allowed in § 2.10 of Appendix C to 40 C.F.R. Part 58; and
12. The identification of required NO_2 monitors as either near-road or area-wide sites in accordance with Appendix D, Section 4.3 of 40 C.F.R. Part 58.

This Annual Ambient Air Monitoring Network Plan for the District for calendar year 2027 contains a description of the District's monitoring program, various parameters within the network, and additional monitoring station information. It also confirms that the District's air monitoring program continues to meet federally established monitoring and data assessment criteria.

1.1 The District's Ambient Air Monitoring Strategy

Ambient air monitoring systems are a critical part of the District's air quality management program. Air quality management involves a cycle of monitoring the quality of the ambient air, setting air quality standards and objectives, identifying and implementing control strategies, and measuring progress. Air monitoring data is used throughout this process to help:

- Determine compliance with the NAAQS;
- Characterize air quality and pollutant trends;
- Estimate health risks and ecosystem impacts;
- Develop and evaluate emission control strategies;
- Evaluate source-receptor relationships;
- Provide input data for models and evaluating models;
- Measure overall progress of air pollution control programs; and
- Inform air quality forecasts and other public outreach air quality reports.

Over the last 25 years, ambient levels of criteria pollutants have decreased significantly in the District due to the implementation of various control measures. In the 1980s, the introduction of automobiles equipped with catalytic converters resulted in significant reductions in NO_2, CO, and volatile organic compounds (VOCs). The phasing out of lead in gasoline led to a significant drop in ambient lead (Pb) levels. Since then, various control strategies for stationary sources, on-road and off-road vehicles, and non-point area sources have reduced SO_2, nitrogen oxide (NO_x), $PM_{2.5}$, and PM_{10} levels in the ambient air. There is also less formation of problematic ozone, although the District remains in nonattainment of 8-hour ground-level ozone standards. However, the District received a Clean Data Determination from the EPA in April of 2025.

2.0 District's Ambient Air Network

The District's network currently consists of six (6) monitoring sites. Sampling covers criteria air pollutants, $PM_{2.5}$ mass and chemical speciation, and enhanced monitoring for ozone and its precursor pollutants with a photochemical assessment monitoring station (PAMS) for measuring speciated VOCs, NO_x, carbonyls, air toxics, and surface and boundary-layer meteorological parameters.

One of the significant elements of the October 2006 monitoring regulations was the establishment of a multi-pollutant National Core (NCore) monitoring network to provide trace-level air quality measurements. The District launched an NCore station at its McMillan site (11-001-0043) in January 2011. Then, to fulfill the monitoring requirements of the 2008 Pb NAAQS, DOEE established an ambient Pb monitor at the NCore site in January 2012, which was later terminated at the end of 2016 after monitoring requirements were revised.

In early 2015, an experimental Village Green park-bench air monitoring station with low-cost emerging air sensor technology was established in the District. The park-bench air monitoring station is primarily for technology demonstration and public education purposes, and it is not part of the District's regulatory network of air monitoring stations.

During the calendar year 2015, the District's network expanded with the addition of a new Anacostia Freeway Near-Road air monitoring station. In August 2017, a special-purpose monitor was installed to determine $PM_{2.5}$ pollution at the King Greenleaf Recreation Center in the Buzzard Point community. The King Greenleaf Recreation Center site (11-001-0053) officially became part of the SLAMS network in January 2018.

In March 2024, DOEE added a sixth station to its ambient network at the Bald Eagle Recreation Center (11-001-0055) in the District's 8th Ward. Subsequently, in 2025, the Ward 8 air monitoring station expanded to monitor additional pollutants. This station was funded by the federal ARP Direct Award Air Monitoring grant.

Figure 2-1 and Tables 2-1 through Table 2-5 below give information about the District's six (6) regulatory air monitoring stations and the measured pollutant parameters.

Figure 2-1: The District's Ambient Air Monitoring Network

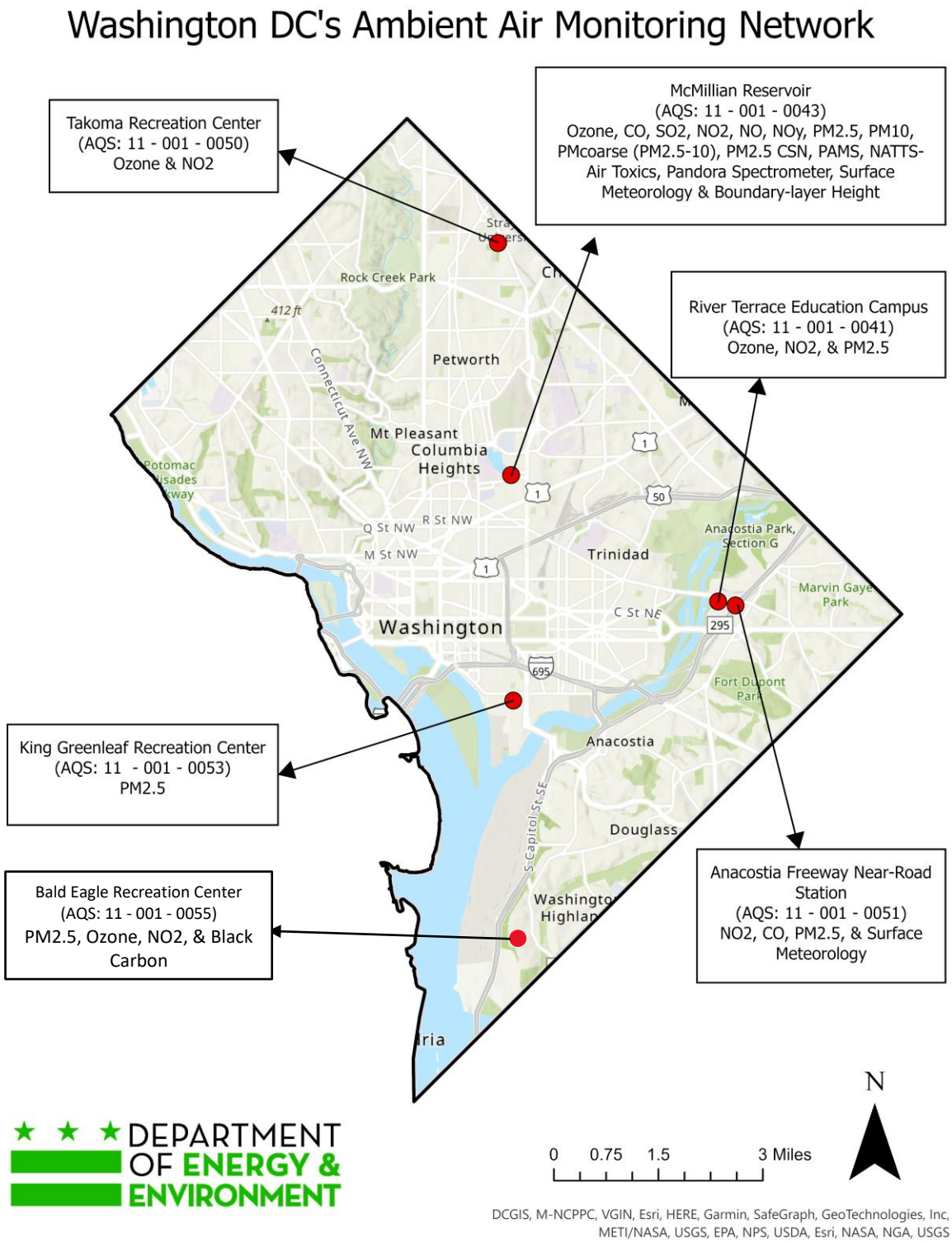


Table 2-1: Ambient Air Monitoring Network and Monitor Details

Site Name, AQS ID	Street Address	City, County, ZIP	Latitude, Longitude (UTM)	Location Setting	Nearest Road	Traffic Count	Traffic Count Year	Distance From nearest road (m)	Metro Statistical Area (MSA)
McMillan 11-001-0043	2500 First Street, N.W.	Washington DC 20001	+38.921847 -77.013178	Urban	Michigan Ave. NW	20.752	2023	100	DC-Arlington-Alexandria
River Terrace 11-001-0041	420 34th Street, N.E.	Washington, DC 20019	+38.895572 -76.958072	Urban	Benning Rd.	33,643	2023	100	DC-Arlington-Alexandria
Takoma Recreation Center 11-001-0050	301 Van Buren Street, N.W.	Washington, DC 20012	+38.970092 -77.016715	Urban	Blair Rd., N.W.	13,491	2023	200	DC-Arlington-Alexandria
Anacostia Freeway Near-Road Station 11-001-0051	3600 Benning Road N.E. @ Anacostia Freeway	Washington, DC 20019	+38.894770 -76.953426	Urban	Anacostia Freeway I-295	120,422	2023	10	DC-Arlington-Alexandria
King Greenleaf Recreation Center 11-001-0053	201 N Street, S.W.	Washington, DC 20024	+38.875161 -77.012816	Urban	South Capitol SW	39,463	2023	320	DC-Arlington-Alexandria
Bald Eagle Recreation Center 11-001-0055	100 Joliet Street, S.W.	Washington, DC 20032	+38.8187243, -77.0102537	Urban	MLK Jr Avenue SW	4,725	2023	100	DC-Arlington-Alexandria

Table 2-2: Monitoring Sites and Parameters of Each Monitor

Site Name, AQS ID	Parameter	Start Date	Method Code	Probe Height (m)	Measurement Scale	Monitoring Objective	Network Type	Sample Schedule
McMillan 11-001-0043	Nitric Oxide	6/1/1994	074/599	3	Urban	Population Exposure/Max Precursor	SLAMS/PAMS	Hourly
	Nitrogen Dioxide	6/1/1994	074/599	3	Urban	Population Exposure/Max Precursor	SLAMS/PAMS	Hourly
	Oxides of Nitrogen	6/1/1994	074/599	3	Urban	Population Exposure/Max Precursor	SLAMS/PAMS	Hourly
	NOy (Total reactive nitrogen oxides)	1/1/2011	699	3	Urban	Population Exposure General/Background	SLAMS/NCore	Hourly
	True Nitrogen Dioxide	1/1/2020	212	3	Urban	General/Background Max Precursor	PAMS	Hourly
	SO_2 (trace)	1/1/2011	100	3	Urban	Population Exposure General/Background	SLAMS/NCore	Hourly
	CO (trace)	1/1/2011	593/588	3	Urban	Population Exposure General/Background	SLAMS/NCore	Hourly
	Type 2 PAMS	6/1/1994	102/228	3	Neighborhood/ Urban	General/Background, Max Precursor	PAMS	Hourly/ Every 3 Days
	Ozone	6/1/1994	087	3	Neighborhood/ Urban	Population Exposure/Highest Concentration	SLAMS/PAMS NCore	Hourly
	$PM_{2.5}$ Continuous	1/1/2003	209	4	Urban	Population Exposure	SLAMS	Hourly
	PM_{10} Continuous	1/1/2003	639	4	Urban	Population Exposure	SLAMS	Hourly
	$PM_{10-2.5}$ Continuous	1/1/2003	639/640	4	Urban	Population Exposure	SLAMS/NCore	Hourly

Site Name, AQS ID	Parameter	Start Date	Method Code	Probe Height (m)	Measurement Scale	Monitoring Objective	Network Type	Sample Schedule
	$PM_{2.5}$	1/1/1999	145	4	Urban	Population Exposure	SLAMS/NCore	Every 3 Days
	$PM_{2.5}$ Chemical Speciation	1/1/2002	000	4	Urban	Population Exposure/Trends	CSN	Every 3 days
	Air Toxics	1/1/2001	150	4	Urban	Population Exposure/Trends	NATTS	Every 6 Days
	PM_{10} High-Vol	1/1/2001	162	4	Urban	Population Exposure/Trends	NATTS	Every 6 Days
	Black Carbon	1/1/2001	894	4	Urban	Population Exposure/Trends	NATTS	Hourly
River Terrace 11-001-0041	Nitric Oxide	5/1/1993	599	4	Neighborhood	Population Exposure	SLAMS	Hourly
	Nitrogen Dioxide	5/1/1993	599	4	Neighborhood	Population Exposure	SLAMS	Hourly
	Oxides of Nitrogen	5/1/1993	599	4	Neighborhood	Population Exposure	SLAMS	Hourly
	Ozone	5/1/1993	087	4	Neighborhood	Population Exposure/Highest Concentration	SLAMS	Hourly
	$PM_{2.5}$	1/1/1999	209	4	Neighborhood	Population Exposure	SLAMS	Hourly
Takoma Recreation Center 11-001-0050	Nitric Oxide	1/1/2013	599	4	Neighborhood	Population Exposure	SLAMS	Hourly
	Nitrogen Dioxide	1/1/2013	599	4	Neighborhood	Population Exposure	SLAMS	Hourly
	Oxides of Nitrogen	1/1/2013	599	4	Neighborhood	Population Exposure	SLAMS	Hourly
	Ozone	1/1/2013	087	4	Neighborhood	Population Exposure/Max Ozone Concentration	SLAMS	Hourly
Anacostia Freeway Near-Road Station 11-001-0051	Nitric Oxide	1/1/2015	599	4	Microscale	Source Oriented/Highest Concentration	Near-Road SLAMS	Hourly
	Nitrogen Dioxide	1/1/2015	599	4	Microscale	Source Oriented/Highest Concentration	Near-Road SLAMS	Hourly
	Oxides of Nitrogen	1/1/2015	599	4	Microscale	Source Oriented/Highest Concentration	Near-Road SLAMS	Hourly
	Carbon Monoxide	1/1/2015	593	4	Middlescale	Source Oriented/Highest Concentration	Near-Road SLAMS	Hourly
	$PM_{2.5}$	1/1/2015	209	4	Microscale	Source Oriented/Highest Concentration	Near-Road SLAMS	Hourly
	Black Carbon	1/1/2026	894	4	Microscale	Source Oriented/Highest Concentration	Near-Road SLAMS	Hourly
King Greenleaf Recreation Center 11-001-0053	$PM_{2.5}$	1/1/2018	209	4	Urban	Population Exposure	SLAMS	Hourly

Site Name, AQS ID	Parameter	Start Date	Method Code	Probe Height (m)	Measurement Scale	Monitoring Objective	Network Type	Sample Schedule
Bald Eagle Recreation Center 11-001-0055	$PM_{2.5}$	4/1/2024	209	4	Neighborhood	Population Exposure	SLAMS	Hourly
	Nitric Oxide	7/1/2025	599	4	Neighborhood	Population Exposure/Highest Concentration	SLAMS	Hourly
	Nitrogen Dioxide	7/1/2025	599	4	Neighborhood	Population Exposure/Highest Concentration	SLAMS	Hourly
	Oxides of Nitrogen	7/1/2025	599	4	Neighborhood	Population Exposure/Highest Concentration	SLAMS	Hourly
	Ozone	7/1/2025	087	4	Neighborhood	Population Exposure/Highest Concentration	SLAMS	Hourly
	Black Carbon	10/1/2025	894	4	Neighborhood	Population Exposure/Highest Concentration	SLAMS	Hourly

Table 2-3: Monitor Count for the District's Network

Pollutant Parameter/ Pollutant Group	Site						
	McMillan Reservoir	River Terrace School	Takoma Recreation Center	King Greenleaf Recreation Center	Bald Eagle Recreation Center	Anacostia Freeway Near-Road	Monitor Count Totals
CO						1	1
O_3	1	1	1		1		4
$PM_{2.5}$ (FRM)	1						1
NO	1	1	1		1	1	5
NO2	1	1	1		1	1	5
NOx	1	1	1		1	1	5
NOy	1						1
True NO2	1						1
Trace CO	1						1
Trace SO2	1						1
$PM_{2.5}$ (Continuous)	1	1		1	1	1	5
PM_{10} (Continuous)	1						1
$PM_{10-2.5}$ (Continuous) PM_{coarse}	1						1
Speciated $PM_{2.5}$	1						1
$PM_{2.5}$ Black Carbon (OC/EC)-URG	1				1	1	3
Air Toxics	1						1
PAH Compounds (Air Toxics)	1						1
Air Toxics Metals (PM_{10})	1						1
OC/EC - Aethalometer	1				1	1	3
PAMS VOCs /Carbonyls	1						1
PAMS VOCs Continuous (Auto-GC)	1						1
Surface Meteorology	1					1	2
Ceilometer	1						1
Total	22	5	4	1	7	8	47

Table 2-4: Monitoring Methods and AQS Codes

Parameter	Method Code	Sample Analysis Description
Air Toxics	150	Cryogenic Pre-concentration: GC/MS Solid Phase Micro Extraction: GC/MS
Carbon Monoxide, Trace	593	Gas Filter correlation API T300U
Carbon Monoxide	588	Gas Filter Correlation EC9830T
Nitric Oxide and Nitrogen Dioxide	074	Chemiluminescence Thermo 42i
Nitric Oxide and Nitrogen Dioxide	599	Chemiluminescence API T200U
Total Reactive Nitrogen Oxides	691	Chemiluminescence EcoTech EC9843
Total Reactive Nitrogen Oxides	699	Chemiluminescene API T200U
True-Nitrogen Dioxide	212	API T500U - CAPS (Cavity Attenuated Phase Shift)
PAH	118	Tisch PUF
PAMS Carbonyls	102	High Performance Liquid Chromatography
PAMS VOCs	228	Cryogenic Pre-concentration Trap GC/FID Markes-Agilent Auto-GC
Ozone	047	UV Photometry Thermo 49i
Ozone	087	UV Photometry API T/N400
PM_{10} Continuous	639	Scattered Light Spectrometry Teledyne T640x
PM_{10} High-Vol	162	Gravimetric Hi Vol SSI EcoTech 3000
$PM_{2.5}$	145	Gravimetric R&P Model 2025
$PM_{2.5}$ Speciation: Trace Elements	811	Energy Dispersive XRF using Teflon Filter
$PM_{2.5}$ Species Constituents: Ions	812	Ion Chromatography using Nylon Filter
$PM_{2.5}$ Species Constituents: Organics	838	Thermo-Optical Transmittance using Quartz Filter
$PM_{10-2.5}$ Coarse	639/640	Scattered Light Spectrometry Teledyne T640x
$PM_{2.5}$ Continuous	209	Met One BAM-1022 Monitor – $PM_{2.5}$ FEM
$PM_{2.5}$ – Black Carbon	894	Magee Scientific Model AE33-7/AE36-7 Dual Spot
Sulfur Dioxide, Trace	592	Ultraviolet Pulsed Fluorescence EC9850T
Sulfur Dioxide, Trace	100	Ultraviolet Fluorescence API 100 EU

Table 2-5: Constituent Compounds and Species Measured in the District

Constituent Group	Compounds in the Constituent Group
Air Toxics	Dichlorodifluoromethane, Chloromethane, 1,2-Dichloro-1,1,2,2,tetrafluoroleth, Chloroethene, 1,3-Butadiene, Bromomethane, Chloroethane, Trichlorofluoromethane, Acrolein, Acetone, 1,1-Dichloroethene, Methylene Chloride, Carbon disulfide, Isopropyl Alcohol, 1,1,2-Trichloro-1,2,2-trifluoroethane, Trans-1,2-Dichloroethene, 1,1-Dichloroethane, 2-methoxy-2-methyl-Propane, Methyl ethyl Ketone (2-butanone), Cis-1,2-Dichloroethene, Hexane, Chloroform, Ethyl Acetate, Tetrahydrofuran, 1,2-Dichloroethane, 1,1,1-Trichloroethane, Benzene, Carbon tetrachloride, Cyclohexane, 1,2-Dichloropropane, Bromodichloromethane, Trichloroethylene, Heptane, Cis-1,3-Dichloro-1-Propene, Methyl Isobutyl Ketone , Trans-1,3-Dichloro-1-Propene, 1,1,2-Trichloroethane, Toluene, Dibrochloromethane, Methyl butyl Ketone, (2-Hexanone), 1,2-Dibromoethane, Tetrachloroethylene, Chlorobenzene, Ethyl benzene, m & p- Xylene, Bromoform (Tribromomethane), Styrene, 1,1,2,2-Tetrachloroethane, o-Xylene, 1-Ethyl-4-Methylbenzene, 1,3,5-Trimethylbenzene, 1,2,4-Trimethylbenzene, Benzyl Chloride, 1,3-dichlorobenzene,1,4-Dichlorobenzene, 1,2-Dichlorobenzene, 1,2,4-Trichlorobenzene, Hexachloro-1,3-Butadiene, and Ethylene Oxide
PAMS VOCs	Acetone, Ethane, Ethylene, Acetylene, Propane, 2,2-dimethylbutane, Benzene, i-Butane, n-Butane, i-Pentane, n-Pentane, 2,2,4-trimethylpentane, i-Propylbenzene, n-hexane, 2-methylpentane, 2,3-dimethylbutane, Cyclopentane, Ethylbenzene, n-Propylbenzene, 3-methylpentane, Toluene, Styrene, n-Heptane, 2-methylhexane, 2,4-dimethylpentane, 2,3,4-trimethylpentane, o-Xylene, 3-methylhexane, 2,3-dimethylpentane, Formaldehyde, n-Octane, 2-methylheptane, Cyclohexane, 3-methylheptane, n-Nonane, m&p-Xylenes, Methylcyclohexane, Methylcyclopentane, n-Decane, n-Undecane, Acetaldehyde, P-Ethyltoluene, M-Ethyltoluene, O-Ethyltoluene, 1,2,3-Trimethylbenzene, 1,2,4-Trimethylbenzene, 3-methyl-1-butene, 1-Butene, Propene, 1-Pentene, 1,3,5-Trimethylbenzene, 2-methyl-1-pentene, 2-methyl-2-butene, c-2-hexene, c-2-pentene, c-2-Butene, Cyclopentene, 4-methyl-1-pentene, t-2-hexene, t-2-Butene, t-2-pentene, Isoprene, 1,3 Butadiene, Alpha Pinene, Beta Pinene
PAMS Carbonyls	Acetaldehyde, Formaldehyde, Acetone,Methyl Isobutyl Ketone,Methyl Ethyl Ketone,Propionaldehyde, Benzaldehyde
Speciated $PM_{2.5}$ Mass	Aluminum, Ammonium, Antimony, Arsenic, Barium, Bromine, Cadmium, Calcium, Carbonate carbon, Cerium, Cesium, Chlorine, Chromium, Cobalt, Copper, Elemental carbon, Europium, Gallium, Gold, Hafnium, Indium, Iridium, Iron, Lanthanum, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Niobium, Nitrate, OCX, OCX2, Organic carbon, Phosphorus, Pk1_OC, Pk2_OC, Pk3_OC, Pk4_OC, Potassium, PyrolC, Rubidium, Samarium, Scandium, Selenium, Silicon, Silver, Sodium, Strontium, Sulfate, Sulfur, Tantalum, Terbium, Tin, Titanium, Total carbon, Vanadium, Wolfram, Yttrium, Zinc, and Zirconium

2.1 Ambient Air Monitoring Networks

Each of the District's monitoring stations is individually part of one or more of the national ambient air monitoring networks. The following sections describe each monitoring network type.

State and Local Air Monitoring Stations (SLAMS):

SLAMS measure ambient levels of gaseous and particulate air pollutants. SLAMS represent the majority of all criteria pollutants (SO_2, NO_2, CO, O_3, Pb, $PM_{2.5}$, PM_{10}) monitoring across the nation. These stations use federal reference or federal equivalent methods (FRM/FEM) for direct comparison to the NAAQS to determine whether areas are in attainment or nonattainment of the air quality standards. There are approximately 4,000 SLAMS monitoring stations nationwide. The distribution of stations in the SLAMS Network is determined in large part by the needs of state and local air pollution control agencies to meet State Implementation Plan (SIP) requirements.

The District's network currently consists of six (6) SLAMS.

National Air Monitoring Stations (NAMS) Network:

The NAMS network, developed in the 1970s, is a subset of the SLAMS network. NAMS stations use FRM/FEM for direct comparison to NAAQS. In the early 1980s, the networks began to add PM_{10} monitors, and then expanded to include $PM_{2.5}$ monitors, beginning in 1999, to assess attainment with the 1997 $PM_{2.5}$ NAAQS. The network consists of ambient monitoring sites that measure $PM_{2.5}$ mass. NAMS are designated as national trends sites and, in some cases, also serve as design value sites for Metropolitan Statistical Areas (MSAs).

Near-Roadway Monitoring Network:

The 2010 NO_2 NAAQS required the establishment of a network with at least two (2) near-roadway NO_2 monitors in the Washington DC-MD-VA-WV MSA. Measurements for pollutants such as NO_2, CO, $PM_{2.5,}$ and surface meteorological measurements for wind direction and wind speed are required at primary near-road sites.

The District established a near-road station along the Anacostia Freeway in the River Terrace community (site ID: 11-001-0051) in April 2015. The near-road station consists of NO_2 and CO trace gas analyzers, a black carbon analyzer, BAM FEM continuous monitor to measure $PM_{2.5}$, and surface meteorological measurements for wind speed, wind direction, relative humidity, barometric pressure, and ambient temperature.

NCore Monitoring Network:

In October 2006, EPA revised the national air quality monitoring regulations (40 C.F.R. Part 58). The most significant element of the revised regulations was to establish an NCore multi-pollutant monitoring network by January 1, 2011. Measurements for pollutants such as ozone, trace SO_2, trace CO, total reactive nitrogen oxides (NO_y), and PM_{coarse} ($PM_{10-2.5}$; PM between 10 microns

and 2.5 microns in diameter), and surface meteorological measurements for wind speed, wind direction, relative humidity, and ambient temperature are required at NCore sites. Ambient Pb monitoring was also required at NCore sites beginning in January 2012. In April 2016, EPA revised the national air quality monitoring regulations (40 C.F.R. Part 58 Appendix D) section 3(b) and section 4.5(b)(c) to remove the requirements for NCore sites to measure Pb as well as the speciated components of $PM_{10-2.5}$.

The District established an NCore station at the McMillan site (11-001-0043) in January 2011. The NCore station consists of SO_2 and CO trace gas analyzers, a NO_y analyzer, and a BAM FEM monitor to measure $PM_{10-2.5}$. A TSP-Pb FRM monitor was added at the McMillan NCore station in January 2012. DOEE shut down the Pb monitor under the provisions of the revised 40 C.F.R. Part 58, at the end of the 2016 monitoring period.

Photochemical Assessment Monitoring Stations Network:

The Photochemical Assessment Monitoring Stations (PAMS) network was developed in the 1990s to provide an air quality database that will assist in evaluating and modifying control strategies for attaining the ozone NAAQS. The measured parameters include ozone, VOCs, carbonyls, and NO_x. The national PAMS network consists of forty-three (43) sites in twenty-five (25) metropolitan areas. PAMS was a major addition to state and local networks, with near-research grade measurements for over 56 VOC compounds during the core part of the ozone season (June to August).

The District operates one (1) PAMS Type 2 station at the McMillan site. In 2011, DOEE deployed Vaisala WXT 520 meteorological monitoring sensors on a new 10-meter tower at the McMillan PAMS/NCore site. The District has since updated its suite of meteorological instruments to satisfy the 2015 PAMS monitoring requirements.

The 2015 amendments to the national ambient monitoring regulations (40 C.F.R. Part 58, Appendix D, Section 5) revised the PAMS monitoring requirements in conjunction with the promulgation of the 2015 8-hour ozone NAAQS of 70 ppb. These amendments require changes to PAMS monitoring and implementation of an enhanced monitoring plan (EMP) by 2021 in certain areas of the nation, including the District. The new requirements are as follows:

- Hourly averaged speciated VOCs;
- Three 8-hour averaged carbonyl samples per day on a 1 in 3-day schedule;
- Hourly averaged O_3, NO, true NO_2, and NO_y;
- Hourly averaged ambient temperature, vector-averaged wind direction and wind speed, atmospheric pressure, relative humidity, precipitation, solar radiation, and ultraviolet radiation; and
- Hourly averaged mixing-height.

For the District, this requirement has been met by collecting PAMS measurements at the McMillan NCore station. This site is already designated as a PAMS site under the existing PAMS regulatory requirements. The District adopted the national PAMS QAPP and SOPs and will follow the guidance presented in the PAMS TAD. These required DC-specific documents have been approved by EPA in July 2020. A revised PAMS QAPP is in progress and is set to be reviewed by EPA in April 2026.

Based on 40 C.F.R. part 58, Appendix D, state air monitoring agencies were initially required to begin making PAMS measurements at their NCore location(s) by June 1, 2019. The equipment needed to measure PAMS parameters was to be purchased by EPA using a nationally negotiated contract and delivered to the monitoring agencies. EPA has announced that, due to contract delays, the necessary equipment would not be delivered in time to begin making PAMS measurements by June 1, 2019. EPA finalized a rule on January 8, 2020, to extend the start date of PAMS measurements to June 1, 2021. The District was able to deploy the entire suite and make all PAMS measurements at the McMillan NCore site by January 2020. As part of the new requirements, DOEE also updated PAMS suite of meteorological instruments.

DOEE has started measurements at the District's PAMS site for the following PAMS compounds/parameters:

Ozone
Hourly averaged ozone is measured year-round using either a Thermo 49i or Teledyne API T/N400.

Nitrogen Oxides
Hourly averaged NO, NOy and true NO_2 will be measured at a minimum, from June through August. True NO_2 will be measured using Teledyne API Model 500U CAPS NO2 analyzer. NO and NOy will be measured using a Teledyne API Model T200U.

Hourly Speciated VOCs
Hourly averaged speciated VOCs will be measured during the core ozone season June-August with Markes-Agilent Auto GC system. This is primarily operated by Orsat.

Carbonyls
Carbonyls will be sampled at a frequency of three 8-hour samples on a 1-in-3-day basis during the core ozone season (i.e., June, July, August) using an ATEC Model 8000-2 Eight Channel Automated Carbonyl sampler with a co-located independent channel. Samples will be analyzed by EPA Method TO-11A.

Meteorological Parameters
Hourly averages of ambient temperature and relative humidity are measured using the Vaisala HMP155; vector-averaged wind direction and wind speed are measured by the Vaisala WMT702; atmospheric pressure is recorded using the Vaisala PTB110; precipitation is measured using the Met One 385; solar radiation is measured by the Kipp and Zonen CMP6; ultraviolet A and B radiation is measured by the Kipp and Zonen SUV5; and the hourly averaged mixing layer height is measured using the Vaisala Model CL51 ceilometer.

As a jurisdiction in the Ozone Transport Region (OTR), the District is required to adopt an EMP no later than October 1, 2019. The District's EMP was approved by EPA on October 28, 2019. A Pandora spectrometer was deployed at the McMillan PAMS site in August 2020. The Pandora instruments study the atmosphere by using spectroscopy, delivering total column profiles of the atmosphere, including ozone, NO_2, and formaldehyde. Pandora spectrometer tracks either the sun or moon to collect light through the total atmospheric column at wavelengths between 291

nm to 523 nm; collected data gives information on the trace gases, specifically ozone, NO_2, and formaldehyde.

Special Purpose Monitoring Networks:

Special Purpose Monitoring (SPM) networks include National Air Toxic Trends Stations (NATTS), $PM_{2.5}$ Chemical Speciation Network (CSN), and other special purpose monitors.

Currently, the District's SPM network consists of one (1) NATTS, and one (1) CSN station at the McMillan site.

Through a partnership with DOEE, EPA installed a Village Green station at the Smithsonian National Zoological Park (National Zoo) in the District in 2015. The Village Green park bench community air monitoring station is intended for research and education on air quality and it is not meant for use as a regulatory monitor.

2.2 Pollutant Parameters

DOEE operates a comprehensive air monitoring network covering a range of pollutants. This section presents descriptions segregated by pollutant parameter.

Fine Particulate Matter ($PM_{2.5}$)

$PM_{2.5}$ FEM Monitors: DOEE operates five (5) automated BAM 1022 $PM_{2.5}$ monitors in its air monitoring network – one (1) each at the Anacostia Freeway Near Road, River Terrace, McMillan, King Greenleaf Recreation Center, and Bald Eagle Recreation Center sites. The McMillan, Anacostia Freeway Near-Road, River Terrace, King Greenleaf Recreation Center, and Bald Eagle Recreation Center primary monitors are continuous, hourly sampling schedule. The required collocated secondary $PM_{2.5}$ FRM monitor at McMillan is operated on a 1-in-3-day sampling schedule.

DOEE replaced the $PM_{2.5}$ network FRM monitors with continuous FEM monitors at the beginning of the calendar year 2017.

Table 2-6: Number of $PM_{2.5}$ SLAMS Sites (based on Table D–5, Appendix D, 4.7.1(a) to 40 C.F.R. Part 58, $PM_{2.5}$ Minimum Monitoring Requirements)

MSA Name	Population	Annual Design Value 2016-2018	Daily Design Value 2016-2018	Required SLAMS Monitors	Monitors Active in DC/Total[A,B]	Required ≥ 85% NAAQS
Washington-Arlington-Alexandria, DC-VA-MD-WV	6,251,240	9.0	20	2	5/10	3

A - Based on tables available at https://www.epa.gov/air-trends/air-quality-design-values.
B- Total number of monitors includes those located in other jurisdictions within the MSA.

$PM_{2.5}$ Chemical Speciation Network (CSN): DOEE currently operates one (1) $PM_{2.5}$ CSN (Met One SuperSASS) monitor at the McMillan site. The District implemented the carbon channel upgrade (URG 3000N) for the CSN monitor in 2007. The CSN monitor at the McMillan site operates on a 1-in-3-day sampling schedule to measure $PM_{2.5}$ chemical species.

Particulate Matter (PM_{10})

DOEE operates one (1) continuous Teledyne 640x PM_{10} FEM sampler at the McMillan site for reporting PM_{10} mass measurements. In 2013, EPA approved co-designation of the McMillan NCore station's PM_{10} FEM BAM1020 automated sampler for PM_{10} network to fulfill the PM_{10} NAAQS monitoring requirements in the District. After receiving EPA's approval, DOEE decommissioned the two (2) very old and aging filter-based manual PM_{10} FRM samplers (primary and secondary monitors) in January 2014.

Additionally, DOEE operates a High-Volume PM_{10} sampler for NATTS toxic metals analysis.

Ozone (O_3)

DOEE currently operates either a Teledyne API T/N400 or Thermo-49i series ozone analyzer at four (4) sites in the District: River Terrace, McMillan Reservoir, Bald Eagle, and Takoma Recreation Center.

Ozone is measured by ultraviolet absorption photometry. Air is drawn continuously through a sample cell where ultraviolet light passes through it. Ozone molecules in the air absorb part of the ultraviolet light, reducing the intensity of the light reaching a light sensor. The light is converted into an electric signal related to the concentration of ozone in the sample cell.

Ozone season begins on March 1 and continues through October 31. DOEE already conducts year-round ozone measurements and collects ozone data on an hourly basis, so no additional changes are necessary.

Ozone monitoring requirements are determined by the MSA population and design value, as specified in Table D-2 of 40 C.F.R. Part 58 Appendix D. Table 2-1 shows that the DOEE monitoring network meets or exceeds the minimum requirements.

Table 2-7: Number of Ozone SLAMS Sites (based on Table D–2, Appendix D,4.1(a) to 40 C.F.R. Part 58, Ozone Minimum Monitoring Requirements)

MSA Name	Population	Monitors Deployed by State [A]				Total Monitors	Required ≥ 85% NAAQS
		DC	MD	VA	WV		
Washington-Arlington-Alexandria, DC-VA-MD-WV	6,251,240	4	7	7	0	18	3
Total		4	7	7	0	18	3

^ - Based on tables available at https://www.epa.gov/air-trends/air-quality-design-values.
All areas had their maximum site >= 85% Ozone NAAQS.

Within an O_3 network, at least one O_3 site for each MSA must be designed to record the maximum concentration for that particular metropolitan area. More than one maximum concentration site may be necessary in some areas. Since O_3 requires appreciable formation time, the mixing of reactants and products occurs over large volumes of air, and this reduces the importance of monitoring small-scale spatial variability. The appropriate spatial scales for O_3 sites are neighborhood, urban, and regional.

The prospective maximum concentration monitor site should be selected in a direction from the city that is most likely to observe the highest O_3 concentrations, more specifically, downwind during periods of photochemical activity. For the Washington-Arlington-Alexandria, DC-MD-VA-WV MSA, the ozone monitor at the Takoma Recreation Center site is assigned this designation for the District portion of the MSA.

Carbon Monoxide/Trace-CO

CO is measured by infrared absorption photometry. Air is drawn continuously through a sample cell where infrared light passes through it. CO molecules in the air absorb part of the infrared light, reducing the intensity of the light reaching a light sensor. The light is converted into an electric signal related to the CO concentration in the sample cell. The CO trace analyzer is designed to measure background concentrations of CO with a lower detection limit of less than 4 ppb and uses a high-performance modified vacuum pump. CO concentrations are highest along heavily traveled roadways and decrease significantly with distance from traffic. Therefore, CO monitors are usually located close to roadways or in urban areas.

One CO monitor is required to be collocated with a near-road NO_2 monitor. EPA revised the minimum monitoring requirements for CO on August 12, 2011. Since two (2) CO monitors are collocated with a near-road NO_2 monitor as required, DOEE proposed to discontinue two CO monitors (one at the River Terrace station and one at the Verizon station) at the end of 2016 in our 2017 network plan. DOEE's 2017 Annual Network Plan was approved by EPA on November 10, 2016. Currently, DOEE operates an API T300U trace CO analyzer at the Anacostia Freeway Near-Road station and the McMillan Reservoir station.

DOEE will continue maintaining the two remaining CO monitors: one at the NCore station and one at the Anacostia Freeway Near-Road station.

Nitrogen Dioxide (NO_2)

NO_x emissions are produced during high-temperature burning of fuels. Sources of NO_x include motor vehicles and stationary sources such as power plants and industrial boilers.

NO_2 is measured indirectly. First, nitrogen oxide (NO) is measured using the chemiluminescence reaction of NO with O_3. Air is drawn into a reaction chamber where it is mixed with a high concentration of ozone from an internal ozone generator. Any NO in the air reacts with ozone to produce NO_2. Light emitted from this reaction is detected with a photomultiplier tube and converted to an electrical signal proportional to the NO concentration. Next, NO_x is measured by passing the air through a converter where any NO_2 in the air is

reduced to NO before the air is passed to the reaction chamber. By alternately passing the air directly to the reaction chamber and through the converter before the reaction chamber, the analyzer alternately measures NO and NO_x. The NO_2 concentration is equal to the difference between NO_x and NO.

True NO_2 is a direct measurement of NO_2, which uses cavity-attenuated phase shift (CAPS) NO_2 monitors to provide a direct absorption measurement of nitrogen dioxide. Unlike standard chemiluminescence-based monitors, these instruments require no conversion of NO_2 to another species and thus are not sensitive to other nitrogen-containing species. The CAPS NO_2 monitor operates as an optical absorption spectrometer that yields both reliable and accurate measurements of ambient nitrogen dioxide down to sub ppb concentrations, with lower noise levels than chemiluminescence-based monitors.

DOEE currently operates NO_2 monitors at five (5) sites, and four of those sites are collocated with ozone measurement sensors. A NO-NO_2-NO_x Thermo-42i analyzer is operated year-round at the McMillan Reservoir station. The API T200u NO-NO_2-NO_x analyzers are operated year-round at the River Terrace, Anacostia Freeway, Bald Eagle, and Takoma Recreation Center stations. The true-NO2 API model T500U-CAPS sampler has been deployed since January 2020 at McMillan.

RA-40: The monitoring regulations for the 2010 NO_2 NAAQS say that the EPA Regional Administrator can require a minimum of forty (40) monitors to be sited inside or outside of CBSAs nationwide in locations with "susceptible and vulnerable" populations. The community-level NO_2 network monitors are called "RA-40" designated monitors. DOEE and EPA assigned a RA-40 designation to the NO_2 monitor at the River Terrace station.

Total Reactive Nitrogen Oxides (NO_y): Since July 2017, DOEE has operated a Teledyne API T200u configured for NO-NO_2-NO_y measurements at the McMillan Reservoir station. These samplers are a chemiluminescence-based analyzer that uses a high-performance NO_y converter to measure trace levels of NO_y and NO.

Near-Road NO_2 Network: In January 2015, DOEE established one (1) NO_2 near-road monitoring station collocated with trace CO measurements along the Anacostia Freeway (Site: 11-001-0051). Valid data collection began in June 2015.

Sulfur Dioxide/Trace-SO_2

SO_2 is measured with a fluorescence analyzer. Air is drawn through a sample cell, where it is subjected to high-intensity ultraviolet light. This causes the SO_2 molecules in the air to fluoresce and release light. The fluorescence is detected with a photo multiplier tube and converted to an electrical signal proportional to the SO_2 concentration. The SO_2 trace analyzer is a high-performance UV fluorescence analyzer designed to measure background concentration of SO_2 with a lower detection limit less than 200 parts per trillion.

DOEE operates one (1) Teledyne T100U trace-SO_2 analyzer at the McMillan NCore station.

Air Toxics

DOEE operates one (1) NATTS station at the McMillan site. Air toxics samples are collected for 24 hours on a 1-in-6-day schedule.

NATTS monitors at the McMillan site capture PAH (Tisch PUF+ analyzer), toxic heavy metals (EcoTech 3000 PM_{10} High-Vol), and VOCs (Model 2200-22 Atmospheric Technology Inc., ATEC) and carbonyls (Model 8000 Atmospheric Technology Inc., ATEC). The sampled canisters are returned to the laboratory for analysis on an Entech/Agilent gas chromatograph (GC) mass spectrometer system. The District's NATTS site also includes an Aethalometer (Aerosol Magee Scientific AE33) for continuous sampling of black carbon (OC/EC). In 2025, DOEE added another Aethalometer (Aerosol Magee Scientific AE33) to the Bald Eagle Recreation Center site for black carbon (OC/EC) monitoring.

PAMS Ozone Precursors

DOEE operates one (1) PAMS Type 2 station at the McMillan site. The parameters measured are O_3, NO, NO_x, NO_2, Tru NO2, speciated VOCs, carbonyls, and surface meteorology.

During the peak ozone season (June to August), hourly measurements for a set of 56 target hydrocarbons are made on-site using a Markes/Agilent VOC Air Analyzer with dual flame ionization detector (Markes Unity-xr with CIA Advantage ozone precursor sampler and Agilent 7890B PAMS Gas Chromatograph sampling system). The measurement method for carbonyls is based on EPA's Compendium Method TO-11A, which incorporates the use of sorbent cartridges coated with 2,4-dinitrophenylhydrazine and ATEC Model 8000-3 sampler for sample collection on a 1-in-3-day schedule during the core ozone season. The sample analysis is performed with high-performance liquid chromatography.

DOEE also operates continuous O_3 and NO_x analyzers complemented with surface meteorological measurements at the McMillan PAMS site. In 2011, DOEE deployed Vaisala WXT 520 meteorological monitoring sensors on a new 10-meter tower at the McMillan PAMS/NCore site. DOEE has replaced the meteorological sensor with the Vaisala HMP155 temperature and humidity probe, the Vaisala WMT702 wind speed and direction sonic anemometer, the Vaisala PTB110 pressure sensor, the Met One 385 tipping bucket rain gauge, the Kipp and Zonen CMP6 solar radiation pyranometer, the Kipp and Zonen SUV5 ultraviolet radiation radiometer, and the Vaisala CL51 mixing layer height ceilometer.

Lead (Pb)
DOEE discontinued Pb sampling at the end of 2016 through a waiver process under EPA guidelines.

In January 2012, DOEE began operating a TSP-Pb monitor at its McMillan NCore site on a 1-in-6-day sampling schedule. Data collected for four years were measuring concentrations at about 4% of the NAAQS.

3.0 District of Columbia's Air Monitoring Stations

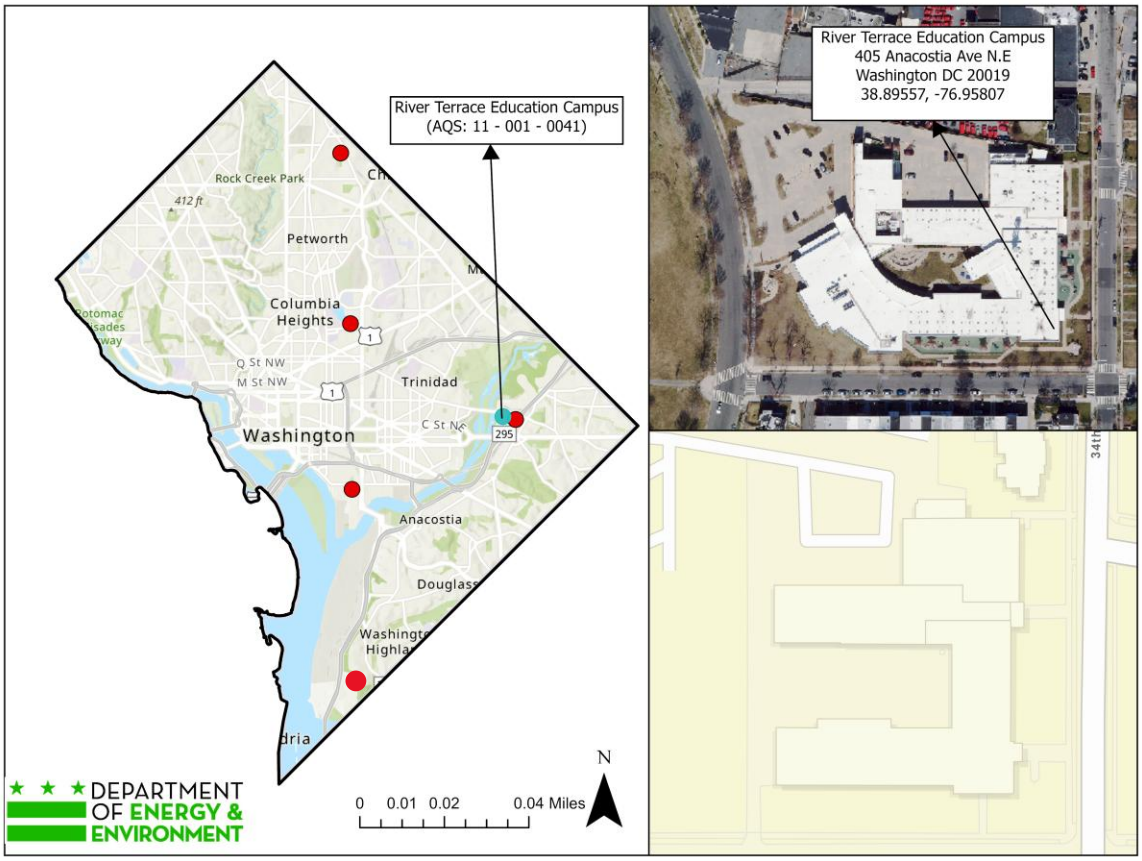
DOEE currently maintains a network of six (6) ambient air monitoring stations: River Terrace, McMillan, Takoma Recreation Center, Anacostia Freeway near-road, King Greenleaf Recreation Center, and Bald Eagle Recreation Center stations. The following sections provide additional information. Maps for the individual sites are shown in Figures 3-1 to 3-6.

3.1 River Terrace Station (11-001-0041)

The River Terrace monitoring station has been in operation since 1993. The site consists of measurement analyzers for O_3, NO_x, and $PM_{2.5}$.

Starting calendar year 2017, the $PM_{2.5}$ FRM monitor was replaced with a FEM monitor, and the CO monitor was discontinued. DOEE discontinued the SO_2 monitor in 2019 due to redundancy with the trace SO_2 monitor for NCore at the McMillan Reservoir monitoring site (11-001-0043).

Figure 3-1: River Terrace Site Locator Maps



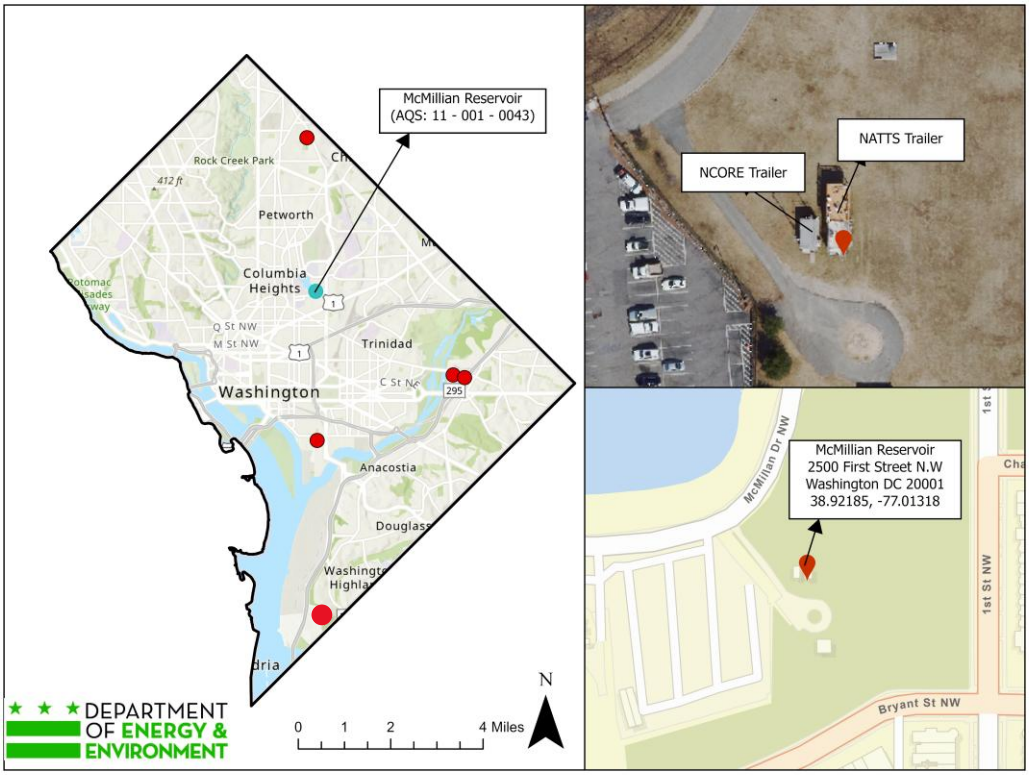
3.2 McMillan Station (11-001-0043)

The McMillan monitoring station is the most comprehensive ambient air station in the District. It was launched in 1994 as a PAMS Type 2 station. Measurements for 56 target hydrocarbons are conducted with a PAMS automatic GC ambient air sampling system. The station was expanded in 2000 and 2001 with the addition of $PM_{2.5}$ FRM, $PM_{2.5}$ CSN monitoring, $PM_{2.5}$ continuous, NATTS and BC/EC sensors. Surface meteorological measurements are carried out at the McMillan Reservoir site as part of PAMS monitoring.

The McMillan site was the first NATTS site in EPA Region III. In January 2011, the McMillan site expanded into an NCore network monitoring station. A TSP-Pb monitor was added in January 2012 and terminated at the end of 2016 after monitoring requirements were revised. Additionally, as part of the EPA's national pilot study, a Sunset Model 4 Semi-Continuous OC/EC monitor was deployed at McMillan station from January 2012 to August 2016. A Vaisala CL51 ceilometer was deployed in January 2020 and a Pandora spectrometer was deployed in August 2020.

Starting calendar year 2017, the $PM_{2.5}$ FRM monitor was replaced with a FEM monitor.

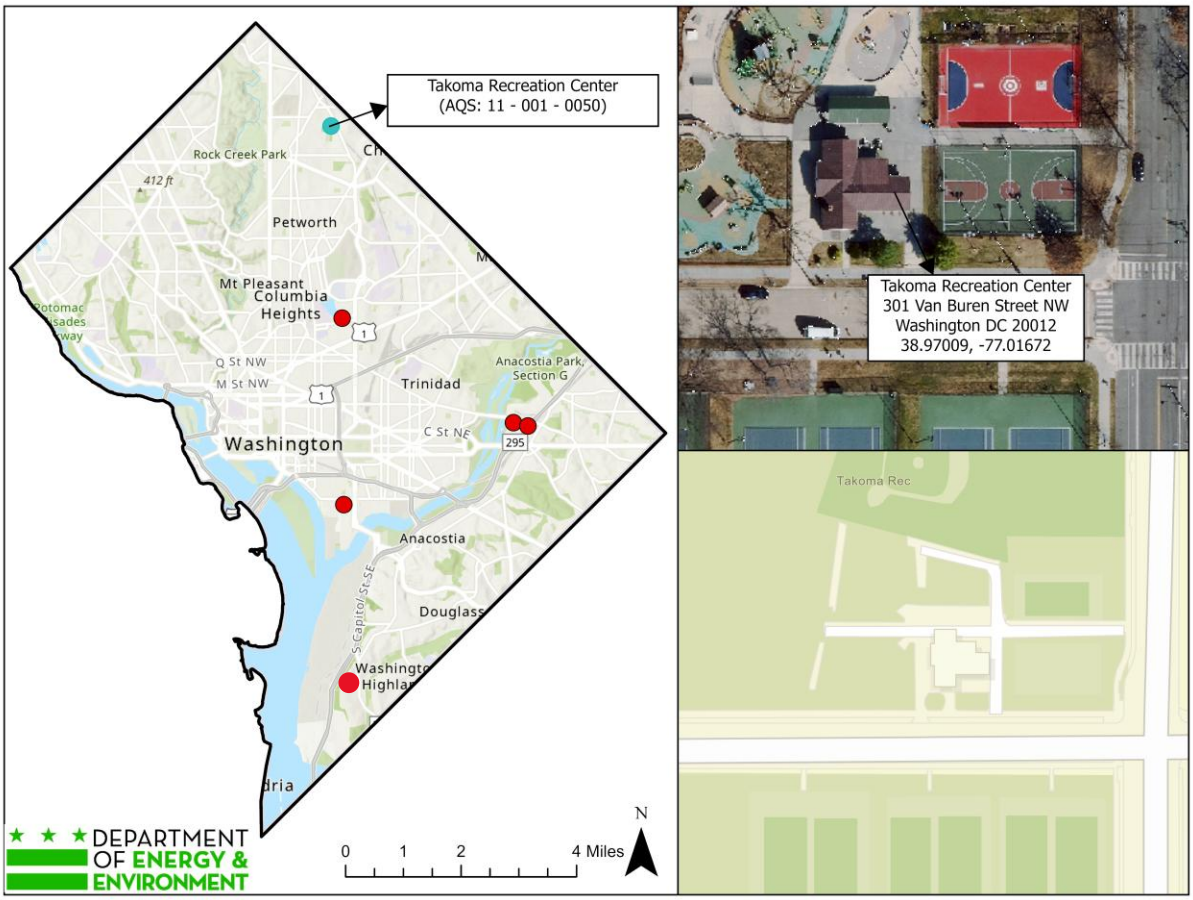
Figure 3-2: McMillan Reservoir Site Locator Maps



3.3 Takoma Recreation Center Station (11-001-0050)

The Takoma Recreation Center monitoring station has been in operation since January 2013[1]. The station consists of measurement analyzers for O_3 and NO_x. This station was established as a replacement site for Takoma School station (11-001-0025), where operations ended in 2011 because of a building fire incident.

Figure 3-3: Takoma Recreation Center Site Locator Maps

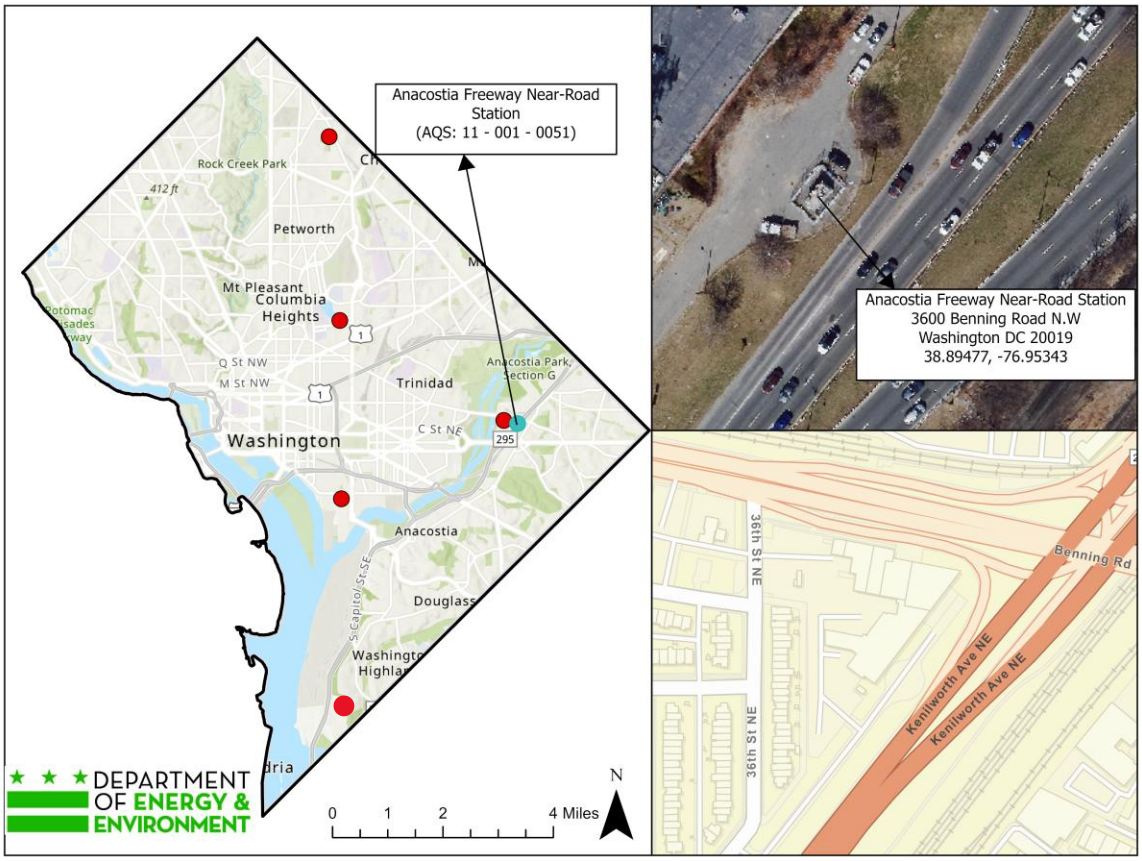


[1] Takoma Recreation Center monitoring station operations were temporarily halted in 2022 from 04/28/2022 to 10/07/2022 due to building repairs. Similarly, monitoring station operations were temporarily halted again in 2023 from 04/05/2023 to 09/14/2023 due to a burglary incident. Building security has been enhanced since and station operations and data collection resumed.

3.4 Anacostia Freeway Near-Road Station (11-001-0051)

The Anacostia Freeway Near-Road Station was launched in January 2015, and it houses NO_2, CO, Black Carbon, and $PM_{2.5}$ continuous measurement sensors. This station serves as an important and critical station in the metropolitan area and the District because of its location for capturing peak 1-hour NO_2 and CO concentrations expected in the near-road environment.

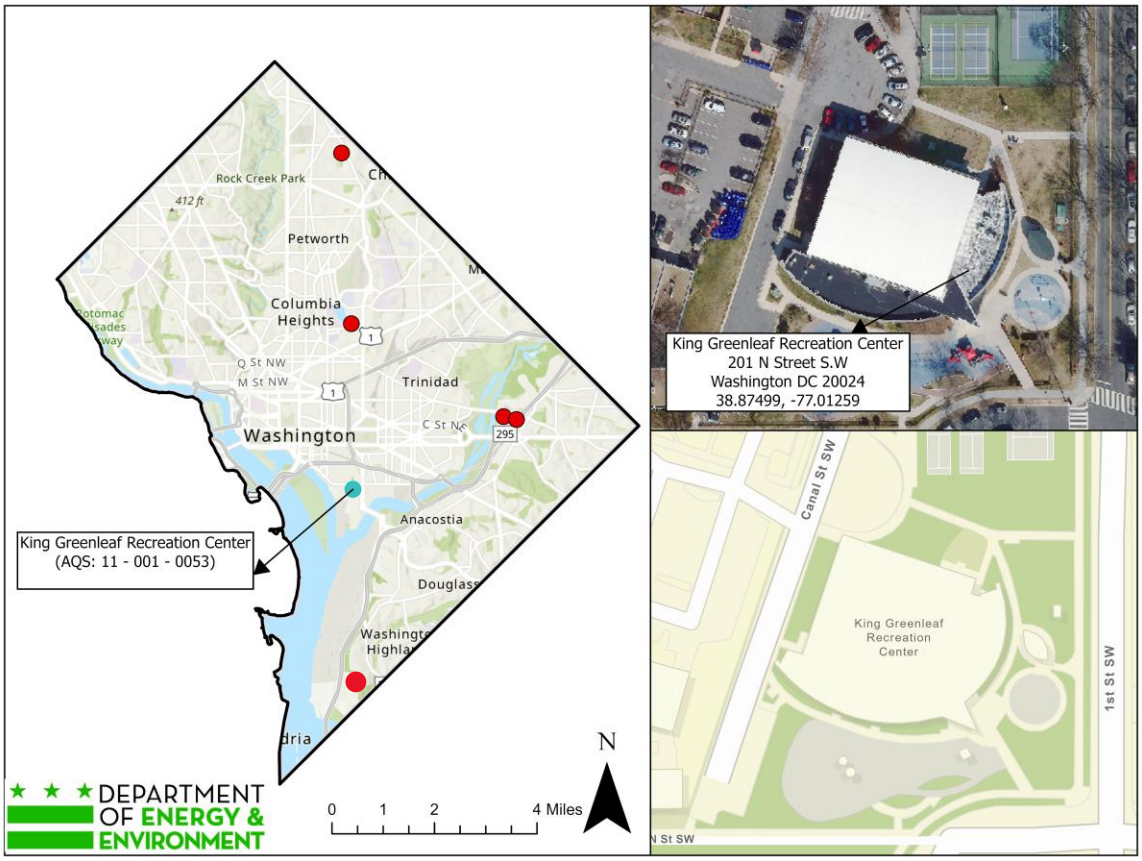
Figure 3-4: Anacostia Freeway Near-Road Site Locator Maps



3.5 King Greenleaf Recreation Center Station (11-001-0053)

The King Greenleaf monitoring station has been operational since August 2017, but was not added to the AQS until January 1, 2018. DOEE operates a $PM_{2.5}$ FEM monitor at this location on the rooftop of the recreation center. This station was first deployed as a special-purpose monitor but was added to the District's network in 2018.

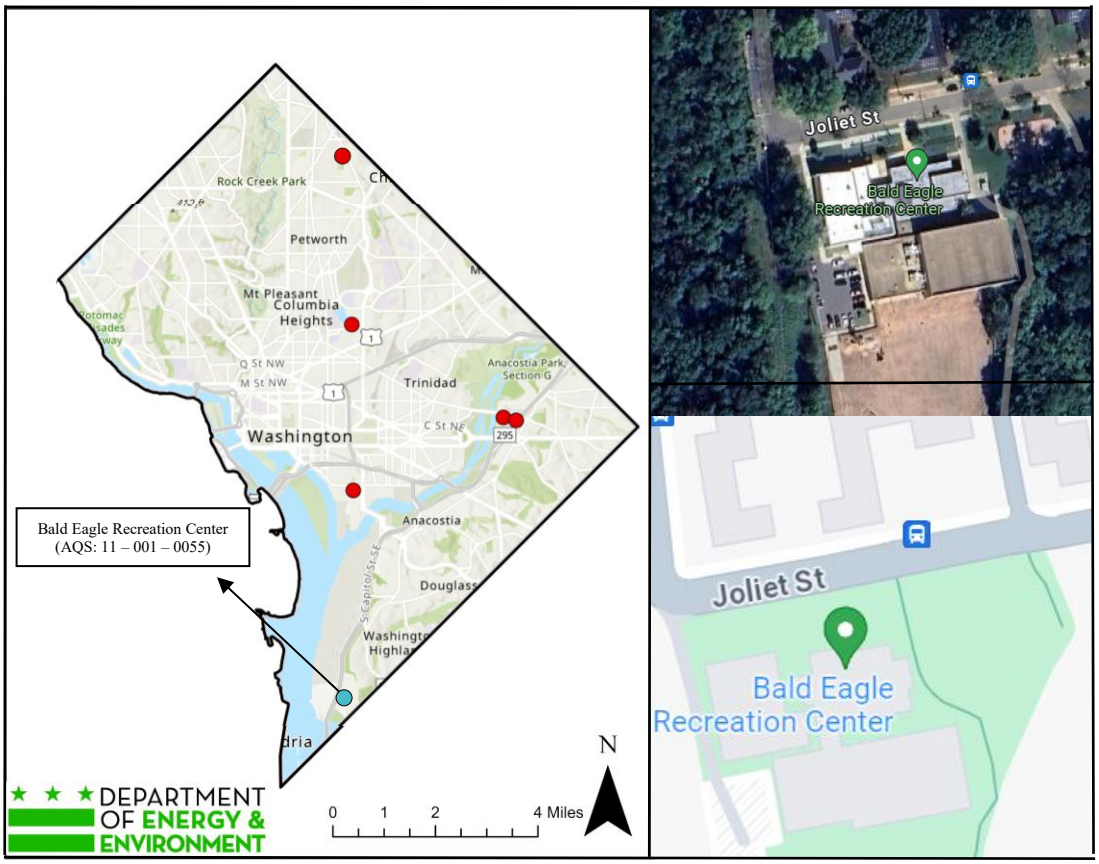
Figure 3-5: King Greenleaf Recreation Center Site Locator Maps



3.6 Bald Eagle Recreation Center Station (11-001-0055)

The Bald Eagle Recreational Center ambient air monitoring station has been operational since March 2024, initially with a $PM_{2.5}$ FEM monitor at this location. DOEE expanded the station in 2025 by adding ozone, black carbon, and nitrogen dioxide monitors. This station was deployed as a community-centric air monitoring site with ARP direct award federal grant funding.

Figure 3-6: Bald Eagle Recreation Center Site Locator Maps



4.0 Ozone and $PM_{2.5}$ Air Quality

Ambient data for criteria pollutants, as given by design value concentrations, are used to determine if the monitored air quality in the District is in compliance with the NAAQS. Design values (DV) are defined in CAA guidance and are often based on multiple years of data to ensure a stable indicator. Design value data is used to classify nonattainment areas, assess progress towards meeting the NAAQS, and develop control strategies. Design values are computed and published annually by EPA's OAQPS and reviewed in conjunction with the regional offices.

4.1 Annual $PM_{2.5}$ Design Concentrations

Figure 4-1 below gives the design concentrations for $PM_{2.5}$ at the District's sites for the recent period. The annual $PM_{2.5}$ design values were calculated using the average of the annual arithmetic mean for a consecutive three-year period. Design values based on 2018 to 2025 data indicate that the District is in attainment for the 2024 annual $PM_{2.5}$ NAAQS of 9 $\mu g/m^3$.

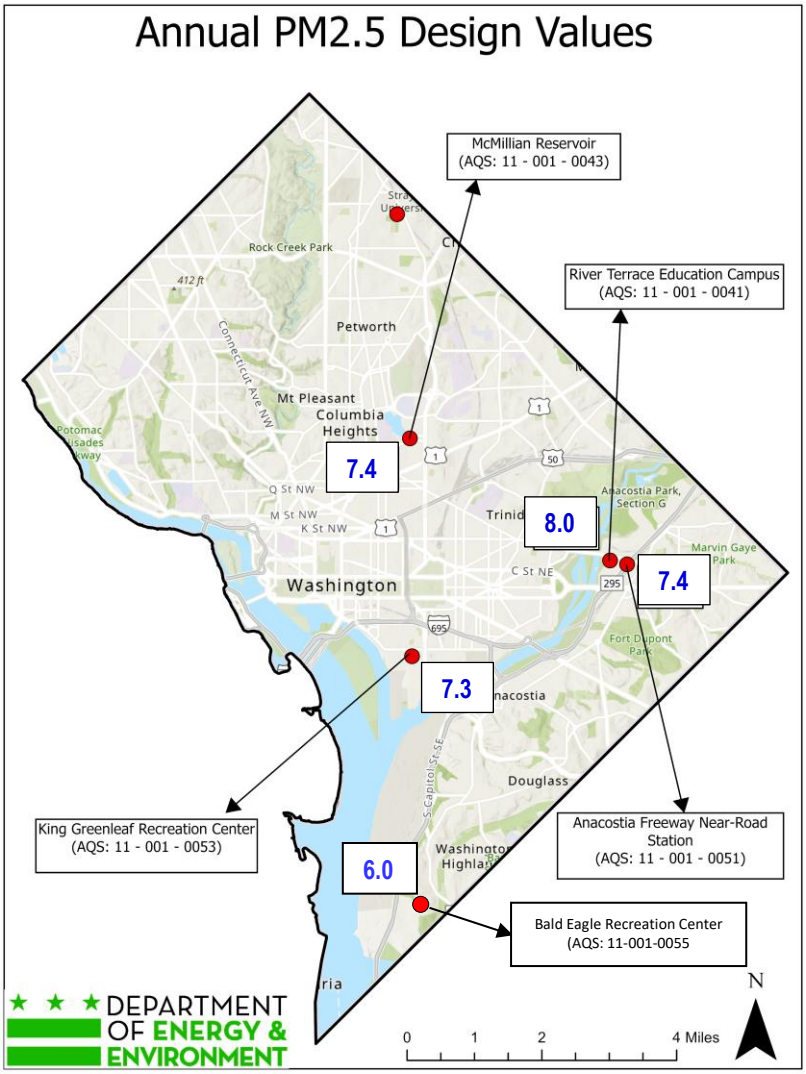
4.2 Daily $PM_{2.5}$ Design Concentrations

Daily $PM_{2.5}$ design concentrations are calculated using the 98^{th} percentile ambient concentration value from each year for a given consecutive three-year period. The design value is the average of the three 98^{th} percentile data. Figure 4-2 gives design values for daily $PM_{2.5}$ using data from 2018 to 2025. Design values based on the recent data indicate that the District is in attainment for the 2006 daily $PM_{2.5}$ NAAQS of 35 $\mu g/m^3$.

4.3 Ozone Design Concentrations

Figure 4-3 includes current design values for ground-level ozone using data from 2018 to 2025. The ozone design values are calculated by taking the three-year average of the annual 4^{th} highest daily maximum 8-hr average concentrations. The 2015 8-hr ozone NAAQS is 0.070 ppm, or 70 ppb. Monitored data indicate that the ambient air quality is in violation of the NAAQS at O_3 monitoring sites in the District.

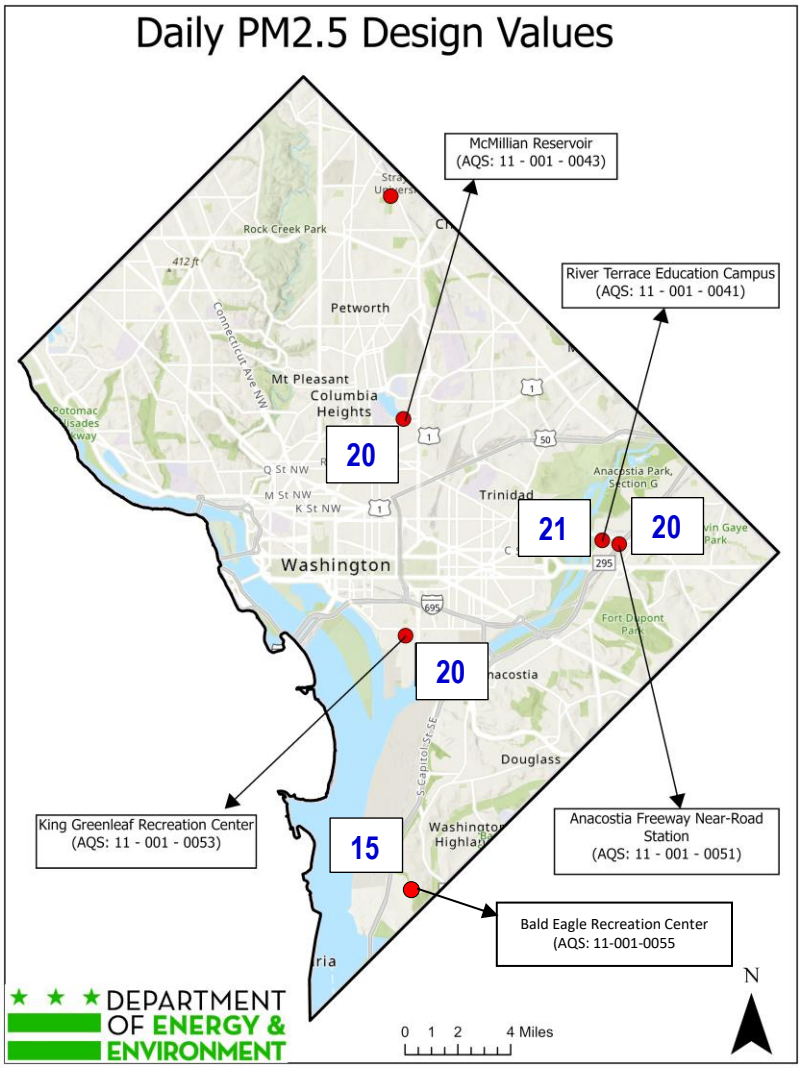
Figure 4-1: Annual $PM_{2.5}$ Design Values



Annual $PM_{2.5}$ Design Values ($\mu g/m^3$)									
Site	**AQS ID**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025[B]**
McMillan	11-001-0043	9.0	8.9	7.6	7.2	6.9	7.7	7.5	7.4
River Terrace	11-001-0041	8.5[A]	8.6	8.0	7.8	7.5	8.4	8.1	8.0
Anacostia Freeway Near-Road	11-001-0051	9.8	9.5	8.7	8.8	8.6	8.9	7.6	7.4
King Greenleaf	11-001-0053	8.2[A]	8.1[A]	7.6	7.9	7.9	8.8	7.8	7.3
Bald Eagle	11-001-0055	-	-	-	-	-	-	6.0[A]	6.0[A]

[A] *The Design Value is based on incomplete data.*
[B] *The Design Value is based preliminary data for calendar year 2025.*

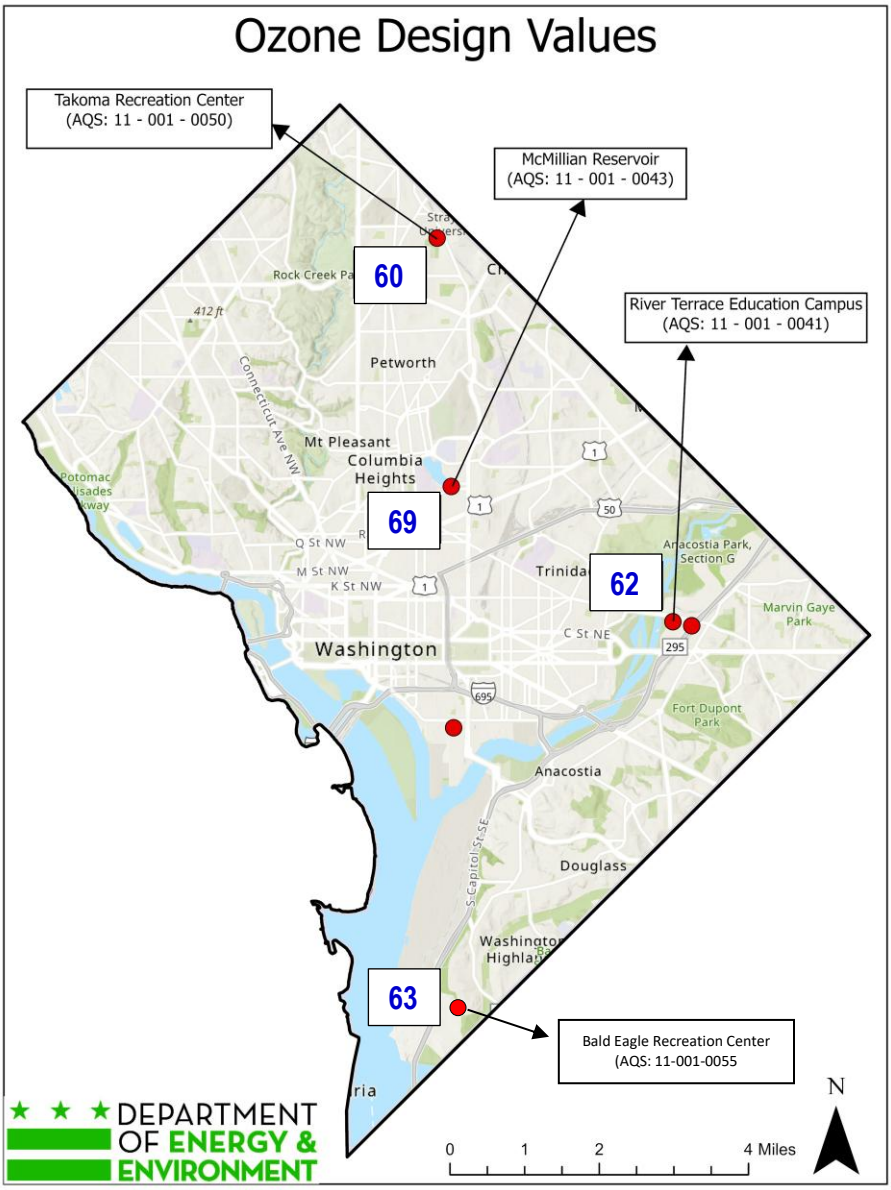
Figure 4-2: Daily $PM_{2.5}$ Design Values



Daily $PM_{2.5}$ Design Values ($\mu g/m^3$)									
Site	**AQS ID**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025[B]**
McMillan	11-001-0043	20	20	19	18	17	21	20	20
River Terrace	11-001-0041	18[A]	21	21	20	18	22	20	21
Anacostia Freeway Near-Road	11-001-0051	21	21	22	22	20	22	20	20
King Greenleaf Recreation Center	11-001-0053	19[A]	18[A]	19	19	18	22	20	20
Bald Eagle Recreation Center	11-001-0055	-	-	-	-	-	-	13[A]	15[A]

[A] *The Design Value is based on incomplete data.*
[B] *The Design Value is based preliminary data for calendar year 2025.*

Figure 4-3: Ozone Design Values



Ground-level Ozone Design Values (ppb)									
Site	**AQS ID**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025[B]**
McMillan	11-001-0043	72	71	69	68	67	70	69	69
River Terrace	11-001-0041	57	56	55	60	59	60	60	62
Takoma Recreation Center	11-001-0050	70	69	67	66	61	55	55	60
Bald Eagle Recreation Center	11-001-0055	-	-	-	-	-	-	-	63[A]

[A] *The Design Value was based on incomplete data.*
[B] *The Design Value is based preliminary data for calendar year 2025.*

5.0 Network Changes and Upgrades

The District supports EPA's efforts to protect public health and natural resources under the CAA. DOEE is working with EPA Region III and EPA's OAQPS to evaluate potential modifications to the District's network, including changes to the monitoring sites, sampling schedules, sampling equipment, and technologies, to ensure that the District's ambient air monitoring program meets all regulatory requirements. For calendar year 2027, there are no proposed changes.

The sections below give additional information for the District's monitoring network in calendar year 2027. DOEE seeks EPA's concurrence and Region III Regional Administrator's approval for these proposed changes, if any.

5.1 River Terrace School (Site ID 11-001-0041)

- SLAMS O_3 and NO_2 monitors: No changes planned
- $PM_{2.5}$ FEM monitor: No changes planned
- SLAMS monitors: SO_2 monitor was shut down in October 2019 and CO monitor shutdown end of December 2016, as approved by EPA

5.2 McMillan (Site ID 11-001-0043)

- PAMS monitors: No changes planned
- NATTS monitors: No changes planned
- NCore monitors: No changes planned
- $PM_{2.5}$ monitors: No changes planned
- $PM_{2.5}$ CSN: No changes planned
- PM_{10} FEM Monitors: No changes planned

5.3 Takoma Recreation Center Site ID 11-001-0050)

- SLAMS O_3 and NO_2 monitors: No changes planned

5.4 Anacostia Freeway Near-Road station (Site ID 11-001-0051)

- NO_2 and CO monitors: No changes planned
- $PM_{2.5}$ FEM monitor: No changes planned
- Air Toxics Black Carbon monitor: No changes planned

5.5 King Greenleaf Recreation Center (Site ID 11-001-0053)

- $PM_{2.5}$ FEM monitor: No changes planned

5.6 Bald Eagle Recreation Center (Site ID 11-001-0055)

- $PM_{2.5}$ FEM monitor: No changes planned
- SLAMS O_3 and NO_2 monitors: No changes planned
- Air Toxics Black Carbon monitor: No changes planned

6.0 Air Monitoring Program and Data Contacts

The Air Monitoring Branch in DOEE's Air Quality Division maintains the District's ambient air monitoring network and quality assures and quality controls the ambient air quality data. Data is stored locally for use by staff and for preparation of special reports, data charts, and special requests such as Freedom of Information Act requests.

Data is delivered to EPA's AQS database and reported on a schedule set forth in 40 C.F.R. Part 58. EPA controls access to the raw ambient air quality data that DOEE transmits to the national database. Ambient air quality monitoring data must be certified on an annual basis as accurate and complete. The certification process begins with the complete submittal of all SLAMS data to the federal AQS for the calendar year. State and local air monitoring agencies are required to transmit and certify the collected data for the previous calendar year by May 1.

DOEE has developed ambient monitoring guidelines in order to ensure that ambient air quality data collected at the state's ambient monitors are of the highest quality and conform to federal requirements for quality assurance under 40 C.F.R. 58.3.

DOEE uploaded fully quality-assured calendar year 2025 data for the District's network to the EPA's AQS national database. Submittal of precise and accurate data into AQS was accomplished, and a formal certification of calendar year 2025 data will be transmitted to EPA in April 2026.

Annual data reports are generated from AQS, and data certifications are prepared by DOEE, according to the reporting requirements in 40 C.F.R. Part 58. Data requests can be directed via email to air.monitoring@dc.gov.

The main contact for the District's air monitoring program is:

Dr. Rama Seshu Tangirala
Branch Chief, Air Monitoring Branch
Air Quality Division
Department of Energy & Environment
1200 First Street, N.E., Fifth Floor
Washington, D.C. 20002
Phone: (202) 535-2989
E-mail: rama.tangirala@dc.gov

Response to Comments

District of Columbia Department of Energy and Environment – Air Quality Division

2027 Ambient Air Monitoring Annual Network Plan

June 22, 2026

Overview

On May 15, 2026, the District of Columbia Department of Energy and Environment (DOEE) Air Quality Division (AQD) posted the proposed Ambient Air Monitoring Annual Network Plan for calendar year 2027 to our website at doee.dc.gov in the "Public Notice and Comment" section. The 30-day public inspection period ended at 5:00 pm on June 15, 2026. There were two commenters who submitted a set of comments jointly regarding the District's 2027 Ambient Air Monitoring Annual Network Plan ("the Plan"). Comments and DOEE's responses follow the List of Commenters. The original comments and DOEE's responses will be sent to the United States Environmental Protection Agency (EPA) Region 3, along with the final plan that needs to be submitted by no later than July 1. The final plan, along with comments and responses, will also be posted to DOEE's public website.

List of Commenters for DOEE's 2027 Annual Network Plan:

1. Earthjustice
2. Empower DC

Comment: Commenters request that DOEE reopen and extend the comment period.

Response: The Plan was published for the 30-day public inspection and comment period required by 40 CFR § 58.10(a).

DOEE declines to reopen or extend the comment period.

Comment: First, the Draft Plan continues to lack any monitors in or near the neighborhoods of Ivy City, Brentwood, or anywhere in Ward 5. As the Department is aware, over 50 percent of the District's industrial land is located in Ward 5. Neighborhoods in Ward 5 such as Ivy City and Brentwood are surrounded by highways, warehouses, and parking lots and also have limited green space and tree cover. As a result, temperatures in these neighborhoods are higher on average and air quality is worse, as compared to other parts of the District. DOEE should seek to accurately monitor, understand, and ultimately address these differences, starting by locating an ambient air monitoring station in Ivy City or Brentwood, to accurately represent this industrial character.

Response: DOEE acknowledges the commenter's concerns regarding industrial activity, transportation sources, heat exposure, and cumulative environmental burdens affecting communities in Ward 5, including Ivy City and Brentwood. However, the Ambient Air Monitoring Annual Network Plan is not the appropriate mechanism to address those concerns, as its purpose is primarily to monitor the District's compliance with the National Ambient Air Quality Standards (NAAQS).

DOEE follows the requirements stipulated in the Code of Federal Regulations (CFR) Part 58, Appendix D of 40 CFR (Network Design Criteria for Ambient Air Quality Monitoring) for the District of Columbia's ambient air monitoring network. The current network is highly representative of the District's ambient air quality and far exceeds the minimum number of monitors required by federal regulations.

The District's ambient air monitoring program is funded by federal grants. Currently, there are only enough grant funds to maintain the existing network.

DOEE is not making any changes to the Plan in response to this comment.

Comment: Second, DOEE should address the fact that certain monitors only measure for limited constituents. For example, the Takoma Recreation Center monitoring station (11-001-0050) only measures ozone and NOx, while every other monitoring station has a PM2.5 FEM monitor. The Draft Plan does not provide a reason that the Takoma Recreation Center monitoring station lacks a PM2.5 monitor. Given its role as the northern-most station in the District, the addition of PM2.5 monitoring at the Takoma Recreation Center station would benefit and improve DOEE's understanding of the District's ambient air quality and geographic variations.

Response: DOEE appreciates the commenters' recommendations regarding PM2.5 monitoring in the northern portion of the District. Historically, the primary function of the Takoma Recreation monitor has been to measure ground-level ozone and oxides of nitrogen, and as noted in the comment, does not currently measure Particulate Matter.

The fact that the station does not currently include a PM2.5 Federal Method monitor does not, by itself, indicate a deficiency in the District's PM monitoring network. Ambient monitoring stations are not necessarily designed to measure an identical suite of pollutants. DOEE evaluates the effectiveness of the PM monitoring network as a whole, and has determined that the existing sites satisfy applicable monitoring requirements and provide adequate coverage to effectively assess District-wide concentrations, population exposure, trends, and compliance with the National Ambient Air Quality Standards (NAAQS).

DOEE is not making any changes to the Plan in response to this comment.

Comment: **Third, to the same end, DOEE should incorporate its Village Green bench monitors into its monitoring network. While DOEE has recently (and correctly) touted these monitors as a useful tool for communities' understanding of their air quality, the Draft Plan states that the Village Green program is "primarily for technology demonstration and public education purposes, and it is not part of the District's regulatory network of air monitoring stations." More monitoring data from a wider range of locations in the District could improve the quality of the District's ambient air monitoring and transparency for the public. If feasible, DOEE should seek to bring these monitoring stations into the Draft Plan.**

Response: DOEE appreciates the commentors' support for the Village Green program and agrees that these monitors provide useful information for public education, community engagement, and a broader understanding of local air quality conditions.

The Village Green monitors, however, are not part of the District's regulatory ambient air monitoring network. They are not subject to the same siting, quality assurance, quality control, calibration, data validation, data completeness, and federal reporting requirements that apply to regulatory monitors as required by EPA. Because of this, the Village Green monitors are not eligible to be incorporated into the regulatory monitoring network.

DOEE is not making any changes to the Plan in response to this comment.

Comment: **Fourth, DOEE should increase its monitoring of hazardous air pollutants (HAPs), particularly in industrial areas where such air toxics are more frequently emitted. The NATTS monitors at McMillan Reservoir monitoring station provide important and useful information on a range of air toxics emissions, yet the site is likely not a good representation of the air toxics emissions in neighborhoods with industrial activities, such as the Ward 5 neighborhoods discussed above. Similar to DOEE's aims in locating the Anacostia Freeway Near-Road monitoring station (11-001-0051) "for capturing peak 1-hour NO2 and CO concentrations expected in the near-road environment," DOEE should seek to locate additional air toxics monitors in industrial areas where such pollutants are more likely to be emitted.**

Response: DOEE follows all siting and monitoring requirements set forth by 40 Code of Federal Regulations (CFR) Part 58 Appendix D. The National Air Toxics Trends Stations (NATTS) program is a specialized project managed by EPA, and therefore, EPA dictates where the sites are located. There are only 26 NATTS programs in the United States, with Washington, DC being one of them. DOEE has no control over where the monitoring sites are located.

Additionally, the NATTS program is funded in full by federal grants. DOEE does not have the grant funds to implement further air toxics monitoring. DOEE acknowledges the interest in

further air toxics monitoring at this site, but due to the reasons above, it is not incorporating additional NATTS monitoring into this Plan.

<u>Comment:</u> Finally, DOEE should work collaboratively across District agencies, to proactively monitor, reduce, and enforce limits on air emissions that disproportionately impact vulnerable communities. Agencies included should be agencies whose work indirectly or directly impacts air quality. In addition to agencies, residents from impacted communities and community-serving organizations should be included. Air quality data gathered by DOEE should lead to interagency coordination and collaboration that addresses the impacts of air pollution and prioritizes interventions in communities most affected. This interagency decision making is critical for improving enforcement of air quality regulations and laws, setting a standard for the inclusion of air quality data in planning, permitting and enforcement processes, and ensuring there is direct communication and collaboration with impacted communities.

<u>Response</u>: The network plan is strictly focused on demonstrating that the District's ambient air monitoring program comports with federal requirements, and this request is outside the scope of the network plan.