District of Columbia
2012 Annual Ambient Air Monitoring Network Plan

June 20, 2012

Monitoring and Assessment Branch
Air Quality Division
District Department of the Environment
1200 First Street, NE, Fifth Floor
Washington, DC 20002

(Page intentionally left blank)

Table of Contents

Table of Contents i
Acronyms and Definitions ii
Executive Summary 1
1.0 Introduction 2
2.0 District of Columbia's Ambient Air Network 5
3.0 District of Columbia's Air Monitoring Stations 17
4.0 Ozone and $PM_{2.5}$ Design Values 22
5.0 Network Changes and Upgrades 25
6.0 Air Monitoring Program and Data Contacts 27
Appendix A – Near-Road NO_2 Ambient Monitoring Network

Acronyms and Definitions

AQI	Air Quality Index
AQS	Air Quality Subsystem
AQD	Air Quality Division
BAM/BAMM	Beta Attenuation (Mass) Monitor - used for continuous measurements of particulate matter
CAA	Clean Air Act
C.F.R.	Code of Federal Regulations
CSN	$PM_{2.5}$ Chemical Speciation Network
CO	Carbon Monoxide
DDOE	District Department of the Environment
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
IMPROVE	Interagency Monitoring of Protected Visual Environments
IR	Infrared (radiation)
MAB	Monitoring and Assessment Branch, Air Quality Division
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

In October 2006, the U.S. Environmental Protection Agency (EPA) amended the ambient air monitoring regulations codified in 40 Code of Federal Regulations (C.F.R.) Part 58. The amendments require state and local monitoring agencies to conduct periodic assessment of the ambient air monitoring networks and propose any changes in an annual air monitoring network plan. The annual network plans are due to the Regional Administrator by the July 1st. The District Department of the Environment (DDOE) conducted a review of the District of Columbia's (DC) air monitoring network and presented the annual assessment in this 2012 Annual Ambient Air Monitoring Network Plan.

Specifically, DDOE is proposing additions and changes to DC's ambient air monitoring network as below and seeks the Regional Administrator's approval.

1. Discontinue Takoma School (11-001-0025) monitoring station. The Takoma School facilities underwent a major renovation during 2011 because of a fire incident. An evaluation of the available space at the newly renovated facility indicated that the station would not meet the air monitoring guidelines and likely fail the probe siting criteria. Efforts are underway for identifying a substitute location for the Takoma School monitoring station and expect to have the new station established by the end of 2012.

2. DDOE deployed Viasala WXT 520 meteorological monitoring sensors on a new 10-meter tower in 2011 at the McMillan Reservoir (11-001-0043) PAMS/NCore site. DDOE is proposing to decommission the old (now redundant) Climatronics meteorological monitoring sensors at the McMillan station by the end of September 2012. The new meteorological sensors, while meeting the PAMS monitoring requirements, will also supplement the NCore monitoring in DC.

3. Discontinue the existing TEOM continuous $PM_{2.5}$ monitor and designate the recently deployed BAM $PM_{2.5}$ continuous FEM monitor at the McMillan Reservoir (11-001-0043) site as the AQI Local Conditions monitor for DC.

The revised NO_2 standards warrant establishment of a new network of near-road NO_2 monitors. Appendix A of this draft plan contains information related to the near-roadway NO_2 ambient monitoring network in DC.

The Ambient Air Monitoring Group at EPA's Office of Air Quality Planning and Standards (OAQPS) contacted DDOE in April 2011 requesting participation in a national evaluation study of the Sunset Model 4 Semi-Continuous OC/EC monitor. A Sunset EC/OC monitor was deployed on January 23, 2012 at the McMillan Reservoir $PM_{2.5}$ CSN station.

As required by 40 C.F.R. § 58.10, DC's draft 2012 Annual Ambient Monitoring Network Plan was made available to the public on the DDOE website for a 30-day public examination. No comments were received from the public on the draft 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 shown to threaten human health and welfare. Primary standards were set according to criteria designed to protect public health, including an adequate margin of safety to protect sensitive populations such as children and the elderly. Secondary standards were set to protect public welfare (decreased visibility, damage to crops, vegetation, and buildings, etc). The CAA requires that the state and local air agencies operate and maintain ambient air surveillance networks. 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 the "*criteria*" air pollutants. When air quality does not meet the NAAQS for one of the criteria pollutants, the area is said to be in "non-attainment" for that pollutant.

Air pollution comes from many sources. On-road vehicles (cars, trucks, buses and motorcycles), off-road equipment (locomotives, boats, construction equipment, lawn mowers etc), area sources (gas stations, auto maintenance facilities, painting operations, and consumer products usage, etc.) factories, power plants and even fires can create pollution that will harm our environment. Determining the ambient air quality through monitoring is essential to effective control of air pollution. Control measures implemented by the federal and state/local governments, subsequent to the 1970 CAA and the 1990 CAA Amendments, resulted in significant improvements to ambient air quality.

The District Department of the Environment (DDOE) regulates air pollution sources in the District of Columbia (DC) to protect public health and the environment. DDOE uses its ambient network to track changes in DC's air quality and to evaluate compliance with NAAQS. Ambient air quality monitoring in DC began in the late 1950s, prior to the establishment of the 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 operating monitoring systems and air pollution data collection in the late 1970s and early 1980s was critical to the development of the core monitoring network that exists today.

Over the years, monitoring goals shifted to include measuring high pollution concentrations in population centers, detecting trends, and determining compliance with the new national and state air quality standards, as well as establishing background levels and measuring pollution transported from areas outside. As required by the federal air monitoring regulation, DC follows the guidance for air monitoring in areas of 1) expected high concentrations, 2) high population density, 3) significant sources, 4) general background concentrations, and 5) regional transport.

In October 2006, the U.S. EPA issued final regulations concerning state and local agency ambient air monitoring networks. These regulations require periodic assessments of the monitoring networks. The Annual Monitoring Network Plan and periodic network assessment as described in § 58.10 must contain the following information for existing and proposed site(s):

1. Air Quality System (AQS) site identification number;
2. 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. pt. 58;
10. Any source-oriented monitors for which a waiver has been requested or granted by the EPA Regional Administrator as allowed for under paragraph 4.5(a)(ii) of Appendix D to 40 C.F.R. pt. 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 per paragraph 2.10 of Appendix C to 40 C.F.R. pt. 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. pt. 58. This information is needed with reference to a plan to be submitted to the Administrator by July 1, 2012, for establishing NO_2 monitoring sites, if any.

This document is an annual revision of DC's Ambient Air Monitoring Network Plan and it contains a description of DC's monitoring network, various parameters within the network, monitoring station and data information. This annual review document also confirms that DC's air monitoring program continues to meet federally established monitoring and data assessment criteria.

1.1 District of Columbia's Ambient Air Monitoring Strategy

Ambient air monitoring systems are a critical part of DC's air quality management program. Air quality management involves a cycle of air quality monitoring, setting standards and objectives, identifying and implementing control strategies, assessing the results of the control strategies, and measuring progress. Air monitoring data provide accountability for emission strategy progress through tracking long-term trends of criteria and non-criteria pollutants and their precursors. The data also form the basis for air quality forecasts and other public outreach air quality reports. Ambient monitoring data have many uses throughout this process, such as:

- determining compliance with the NAAQS;
- characterizing air quality and trends;
- estimating health risks and ecosystem impacts;
- developing and evaluating emission control strategies;
- evaluating source-receptor relationships;
- providing input data for models and to evaluate models; and
- to measure overall progress of air pollution control programs.

Over the last 20 years, monitored levels of the criteria pollutants have decreased significantly in DC due to the implementation of various control measures. The decade of the 1980s was a transition for air quality with the introduction of automobiles equipped with catalytic converters and the accompanying air pollution reductions for NO_2, CO and volatile organic compounds (VOCs). Ozone, $PM_{2.5}$ and PM_{10} air pollution levels have been greatly reduced, although DC still remains in non-attainment for ozone. Pollution reduction strategies for stationary sources, off-road vehicles and disperse area sources have reduced SO_2, NOx and VOCs. The phasing out of leaded gasoline in the 1980s led to a significant drop in ambient Pb levels.

2.0 District of Columbia's Ambient Air Network

The Monitoring and Assessment Branch in DDOE's Air Quality Division operates, maintains, and performs all functions of the ambient air monitoring program required by the Clean Air Act. DC's network currently consists of four (4) monitoring sites. A fifth station at the Takoma School (11-001-0025) had to be discontinued in 2011 because of a fire incident. Efforts are underway to identify a substitute location. Sampling covers criteria air pollutants, air toxics, $PM_{2.5}$ mass and chemical speciation, and enhanced monitoring for ozone and its precursor pollutants with a photochemical assessment monitoring station (PAMS) for measuring speciated VOCs, NOx, carbonyls, and meteorological parameters.

One of the significant elements of the October 2006 monitoring regulations is the establishment of new multi-pollutant National Core (NCore) monitoring network to provide more real-time air quality data. DC launched an NCore station at its McMillan Reservoir site (11-001-0043) on January 1, 2011. DDOE established an ambient Pb monitor at its NCore site on January 1, 2012, to fulfill the monitoring requirements of the new and more stringent 2008 Pb NAAQS.

Figure 2-1 and Tables 2-1 through Table 2-5 below show DC's air monitoring network and information related to the sites and the measured pollutant parameters.

Table 2-1 District of Columbia 2012 Ambient Air Monitoring Network and Monitor Details*

Site Name, AQS ID	Street Address	City, County	Zip Code	Latitude, Longitude	Location Setting	Nearest Road	Traffic Count	Traffic Count Year	Distance (m)	Metro Statistical Area (MSA)
McMillan 11-001-0043	2500 1st St., N.W.	Washington DC	20001	38°55'18.81"N 77° 0'47.58"W	Urban	First Street NW	7600	2008	50	DC-Arlington-Alexandria
River Terrace 11-001-0041	420 34th Street N.E.,	Washington, DC	20019	38°53'44.06"N 76°57'29.06"W	Urban	Benning Rd.	45700	2008	100	DC-Arlington-Alexandria
Verizon 11-001-0023	2055 L St., N.W.,	Washington, DC	20036	38°54'13.94"N 77° 2'45.03"W	City Center	L St.	11200	2008	5	DC-Arlington-Alexandria
Hains Point 11-001-0042	1100 Ohio Drive S.W.,	Washington, DC	20242	8°52'34.40"N 77° 2'3.78"W	Urban	I-395	209200	2008	250	DC-Arlington-Alexandria

*Takoma School (11-001-0025) station discontinued in 2011 because of a fire incident; efforts are underway to identify a substitute location.

Table 2-2 Parameter information for DC's ambient air monitoring sites

Site Name, AQS ID	Parameter	Start Date	Method Code	Probe Height (m)	Scale of Representative	Monitoring Objective	Type	Sample Schedule
McMillan 11-001-0043	Nitrogen Dioxide, Nitric Oxide	06/01/1994	074	3	Urban	Population Exposure/Max Precursor	PAMS/SLAMS	Hourly
	Nitrogen Dioxide, Nitric Oxide	1/1/2011	074	3	Urban	General/Background	NCore	Hourly
	SO2 (trace)	1/1/2011	092	3	Urban	General/Background	NCore	Hourly
	CO (trace)	1/1/2011	088	3	Urban	General/Background	NCore	Hourly
	PMcoarse	1/1/2011		3	Urban	General/Background	NCore	Hourly
	Type 2 PAMS	06/01/1994	128	3	Urban	General/Background	PAMS	Hourly
	Ozone	06/01/1994	047	3	Urban	Population Exposure/Max Precursor	PAMS/SLAMS/NCore	Hourly
	PM2.5 Continuous	01/01/2003	701	4	Urban	Population Exposure/Max Precursor	SLAMS	Hourly
	PM2.5	01/01/1999	120	4	Urban	Population Exposure/Max Precursor	NCore/SLAMS	Daily
	PM2.5 Chemical Speciation	01/01/2002	810	4	Urban	Population Exposure/Trends	CSN	Every 3 days
	Air Toxics	1/1/2001	150	4	Urban	Population Exposure/Trends	NATTS	Every 6 Days
	Pb	01/01/2012	189	4	Neighborhood	Population Exposure/Trends	NCore/SLAMS	Every 6 Days
	PM10 LowVol	1/4/2012		4	Urban	Population Exposure/Trends	SLAMS	Every 6 Days
	Black Carbon	1/1/2001	862	4	Urban	Population Exposure/Trends	SLAMS	Hourly
	Organic/Elemental Carbon	02/02/2012	N/A	4	Urban	Population Exposure/Trends	Special Study	Hourly
River Terrace 11-001-0041	Carbon Monoxide	5/1/1993	054	10	Neighborhood	Population Exposure	SLAMS	Hourly
	Nitric Oxide	5/1/1993	074	10	Neighborhood	Population Exposure	SLAMS	Hourly
	Nitrogen Dioxide	5/1/1993	074	10	Neighborhood	Population Exposure	SLAMS	Hourly
	Oxides of Nitrogen	5/1/1993	074	10	Neighborhood	Population Exposure	SLAMS	Hourly
	Ozone	5/1/1993	047	10	Neighborhood	Population Exposure	SLAMS	Hourly
	PM2.5	01/01/1999	120	10	Neighborhood	Population Exposure	SLAMS	Daily
	Sulfur Dioxide	5/1/1993	060	10	Neighborhood	Population Exposure	SLAMS	Hourly
Verizon 11-001-0023	Carbon Monoxide	10/1/1980	054	3	Urban	Population Exposure	SLAMS/NAMS	Hourly
Hains Point 11-001-0042	PM2.5	03/01/1999	120	10	Urban	Population Exposure	SLAMS	Every 3 Days

Table 2-3 Parameter counts by site (cross-reference to Table 2-2).

Site Name			Pollutant Parameter / Pollutant Group																							
	Pb TSP	Air Toxics	Black Carbon, OC,EC	Chromium-6 (Air Toxics)	PAH Compounds (Air Toxics)	CO	NO	NO2	NOx	NOy	O3	PAMS VOCs	PAMS VOCs Continuous (Auto-GC)	PM2.5	PM2.5 Elemental/Organic Carbon	PM2.5 (Continuous)	Air Toxics Metals (PM10)	PM10 LowVol	PM10 -2.5 (Continuous) PMcoarse	Speciated PM2.5	SO2	Trace CO	Trace SO2	NCore – Surface Meteorology	PAMS – Surface Meteorology	**TOTALS***
McMillan Reservoir	1	1	2	1	1		1	1	1	1	1	1	1	2	1	1	1	2	1	1		1	1	1	1	**26**
River Terrace School						1	1	1	1		1			1							1					**7**
Verizon Building						1																				**1**
Hains Point														1												**1**

*Takoma School (11-001-0025) station discontinued in 2011 because of a fire incident; Efforts are underway for identifying a substitute location.

Table 2-4 Monitoring methods and associated AQS codes used in DC's ambient air monitoring network.

Parameter	Method Code	Sample Analysis Description
Air Toxics	150	Capillary GC ITD Mass Spectrometer
Carbon Monoxide	054	Nondispersive Infrared Photometry
Carbon Monoxide, Trace	588	Nondispersive Infrared Photometry
Nitric Oxide and Nitrogen Dioxide	074	Chemiluminescence
Nitric Oxide, Nitrogen Dioxide, and Reactive Oxides of Nitrogen	075	Chemiluminescence
Oxides of Nitrogen	074	Chemiluminescence
PAMS VOCs	128	Gas Chromatograph with Flame; GC/FID
PAMS VOCs	126	Cryogenic Pre-concentration Trap GC/FID
Ozone	047	Ultra Violet Photometry
PM2.5	120	Gravimetric
PM2.5 Speciation: Trace Elements	821	Energy Dispersive XRF using Teflon Filter
PM2.5 Species Constituents: Ions	812	Ion Chromatography using Nylon Filter
PM2.5 Species Constituents: Organics	813	Using quartz filter – Thermo-Optical Transmittance
PM2.5 Continuous	701	Non-corrected TEOM
PM2.5 - Elemental and Organic Carbon	862	BC/EC, Self-contained Non-dispersive Infrared (NDIR) Detector System
Sulfur Dioxide	060	Pulsed Fluorescence
Sulfur Dioxide, trace	592	Pulsed Fluorescence
Pb (Lead) TSP	189	ICP-MS Extracted on a hot plate with 3M HNO3 according to SW-846 Meth 6020A

Table 2-5 Constituent compounds and species measured in DC.

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, and Hexachloro-1,3-Butadiene
PAMS VOCs	Acetone, Ethane, 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, 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
Speciated PM2.5 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

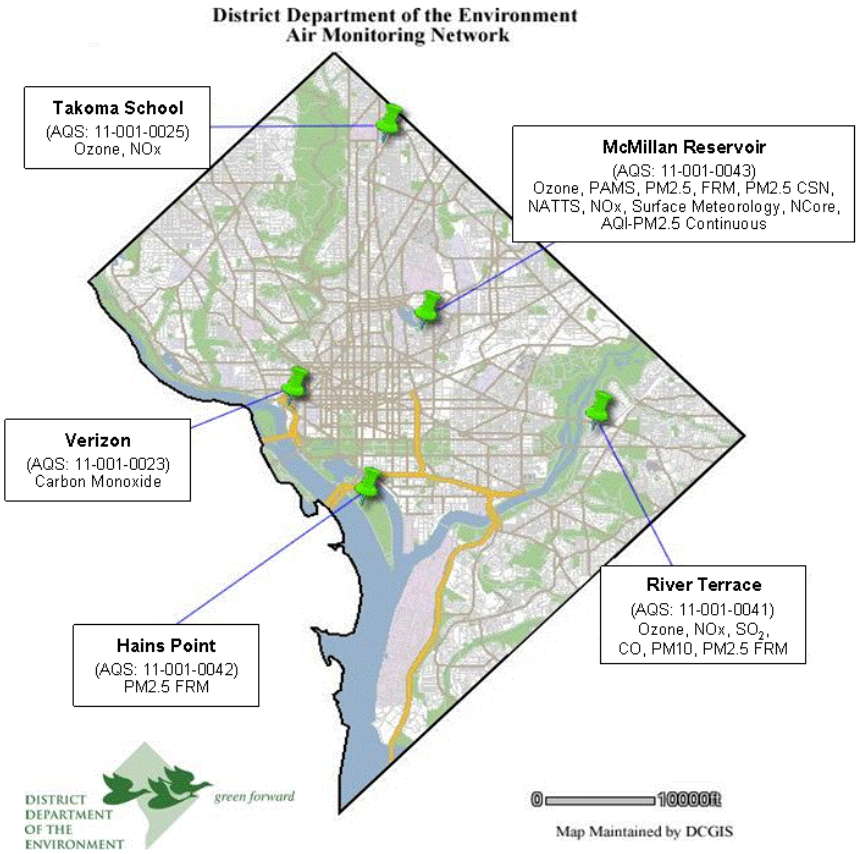


Figure 2-1

2.1 Air Monitoring Networks

DC's monitoring stations individually are 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 Station:

The state and local ambient monitoring stations (SLAMS) measure ambient levels of gaseous and particulate air pollutants. SLAMS and national ambient monitoring stations (NAMS) represent the majority of all criteria pollutant (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 non-attainment for 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 State Implementation Plan (SIP) requirements. DC's network consists of <u>four</u> SLAMS.

National Air Monitoring Station Network:

The NAMS network is a subset of the SLAMS network and was developed in the 1970s. These stations use federal reference or equivalent methods (FRM/FEM) for direct comparison to the

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 $PM_{2.5}$ network consists of ambient monitoring sites that measure $PM_{2.5}$ mass. The NAMS are designated as national trends sites and, in some cases, also serve as the design value sites for a Metropolitan Statistical Area (MSA). DDOE operates one NAMS in DC.

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. Parameters to be measured at a PAMS site vary with the ozone nonattainment designation of the area (moderate, serious, severe or extreme) and whether the site is upwind or downwind of ozone precursor source areas. The parameters to measure are ozone, VOCs, and NOx. The national PAMS network consists of 75 sites in 25 metropolitan areas. The PAMS was a major addition to the state/local networks with near research grade measurements for over 56 VOC compounds during core part of the ozone season (June-August). DC operates one PAMS Type 2 station at the McMillan Reservoir site.

DDOE deployed Viasala WXT 520 meteorological monitoring sensors on a new 10-meter tower in 2011 at the McMillan Reservoir (11-001-0043) PAMS/NCore site. DDOE is proposing to decommission the old (now redundant) Climatronics meteorological monitoring sensors at the McMillan station by the end of September 2012. The new meteorological sensors, while meeting the PAMS monitoring requirements, will also supplement the NCore monitoring in DC.

Special Purpose Monitoring Networks:

Special Purpose Monitoring (SPM) networks include National Air Toxic Trends Stations (NATTS), $PM_{2.5}$ Chemical Speciation Network (CSN), Air Quality Index (AQI) and any other special purpose monitoring. Currently, DC's network consists of: one NATTS, one CSN station, one continuous $PM_{2.5}$ AQI station and one OC/EC Sunset semi-continuous carbon analyzer SPM at the McMillan Reservoir site.

NCore Monitoring Network:

In October 2006, EPA revised the national air quality monitoring regulations (40 C.F.R., pt. 58). The most significant element of the revised regulations is to establish a new NCore multi-pollutant monitoring network by January 1, 2011. Measurements for pollutants such as ozone, trace SO_2, trace CO, total reactive nitrogen oxides (NOy) 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 is also required at the NCore sites by January 1, 2012.

In November 2009, DC received EPA's approval for establishing an NCore station at the McMillan Reservoir site (11-001-0043). On January 1, 2011, DC's NCore station was launched with SO2 and CO trace gas analyzers, NOy analyzer and Beta Attenuation Mass Monitor (BAMM) FEM monitors to measure $PM_{10-2.5}$. DDOE deployed a TSP-Pb FRM monitor at the McMillan Reservoir NCore station on January 1, 2012.

Interagency Monitoring of Protected Visual Environments Network:

The Interagency Monitoring of Protected Visual Environments (IMPROVE) program was established in 1985 to aid with the implementation plans for the protection of visibility in Class I areas (national parks and wilderness areas) as stipulated in the Clean Air Act. There are about 110 IMPROVE sites in Class I visibility protection areas. These sites collect aerosol samples and analyze the filters for trace elements, major ions, and carbon fractions. Most of the IMPROVE sites are operated by federal agencies within the U.S. Department of the Interior.

The U.S. National Park Service (NPS) operates one IMPROVE site along with a nephelometer at the Hains Point station in DC. DDOE operates a $PM_{2.5}$ FRM monitor at DC's IMPROVE site.

Near-roadway NO_2 Monitoring Network:

Appendix A contains information related to the near-roadway NO_2 ambient monitoring network in DC.

2.2 Pollutant Parameters

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

i) Fine Particulate Matter ($PM_{2.5}$)

$PM_{2.5}$ Continuous: DDOE currently operates one continuous $PM_{2.5}$ station equipped with Tapered Element Oscillating Microbalance (TEOM) at the McMillan Reservoir site. This continuous $PM_{2.5}$ monitor operates year-round and hourly data is sent to EPA's AirNow real-time air quality information website. DDOE recently added a pair of BAMM monitors to measure $PM_{10-2.5}$ at the McMillan Reservoir NCore station.

DDOE is proposing to discontinue the existing TEOM $PM_{2.5}$ monitor for AirNow reporting. Instead, DDOE is proposing to designate the recently deployed BAM $PM_{2.5}$ continuous FEM monitor at the McMillan Reservoir (11-001-0043) site as the $PM_{2.5}$ AQI monitor for DC.

$PM_{2.5}$ FRM Monitors: DDOE operates four $PM_{2.5}$ FRM monitors in its air monitoring network – one each at the McMillan and Hains Point stations, and two $PM_{2.5}$ FRMs collocated at the River Terrace station. The McMillan and River Terrace primary monitors are daily sampling sites while the Hains Point monitor is on a 1-in-3 day sampling schedule. The collocated secondary $PM_{2.5}$ monitor at River Terrace is operated on a 1-in-6 day sampling schedule.

In 2011, EPA approved DDOE's proposal to relocate the secondary $PM_{2.5}$ FRM monitor from the River Terrace (11-001-0041) site to the McMillan Reservoir (11-001-0043) site. DDOE implemented the network change and began $PM_{2.5}$ FRM sampling with two Partisol 2025 FRM monitors at the McMillan station on January 1, 2012 – one primary monitor on a daily sampling schedule and a secondary monitor on a 1-in-6 day schedule. The River Terrace station currently operates one Partisol 2025 monitor on a daily schedule.

$PM_{2.5}$ Chemical Speciation Network: DDOE currently operates one $PM_{2.5}$ CSN monitor at the McMillan Reservoir site. DC implemented the carbon channel upgrade (URG 3000N) for the CSN monitor during 2007. The CSN monitor at the McMillan Reservoir site operates on a 1-in-3 day sampling schedule to measure $PM_{2.5}$ chemical species. NPS operates an IMPROVE $PM_{2.5}$ speciation monitor and a nephelometer at the Hains Point site.

ii) PM_{10}

In 2011, EPA approved DDOE's proposal to relocate the PM_{10} sampling from the River Terrace (11-001-0041) site to the McMillan Reservoir (11-001-0043) site. DDOE implemented the network change and began sampling PM_{10} at the McMillan Reservoir site. As approved by EPA, DDOE discontinued the Hi-Vol PM_{10} monitors at River Terrace station and established two Low-Vol PM_{10} monitors at the McMillan Reservoir station by converting the old Andersen FRM monitors.

iii) Ozone (O_3)

DDOE currently operates Thermo-49i series ozone analyzers at two sites in DC - River Terrace and McMillan Reservoir. A third ozone monitor was in operation at the Takoma School until 2010. However, because of a major fire incident at the Takoma School late December 2010, DDOE temporarily terminated the monitoring site. DDOE was to resume normal operations at the Takoma station after the school reopened in January 2012, but realized the monitoring room and probe for air intake line have been compromised by the new structure. Therefore, the Takoma School monitoring station had to be closed permanently and efforts are underway to find a suitable replacement location in the general area. DDOE expects to re-establish a new monitoring station by the end of 2012.

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. Even though 40 C.F.R. pt. 58 Appendix D requires ozone monitoring during the ozone season (April 1-September 30) only, DDOE is committed to year-round measurements and collects ozone data on an hourly basis.

Ozone is not emitted directly from a pollution source but is formed in the lower atmosphere by the reaction of NOx and VOCs in the presence of sunlight and warm temperatures. Sources of NOx include automobiles, power plants and other combustion activities. VOCs can come from automobiles, gasoline vapors, and a variety of large and small commercial and industrial sources that use chemical solvents, paint thinners, and other chemical compounds. These compounds or "precursors of ozone" can travel for many miles before chemical reactions in the atmosphere form ozone.

iv) Carbon Monoxide (CO) / CO-Trace

DDOE operates two carbon monoxide monitoring stations year-round at the River Terrace and Verizon sites. DDOE deployed Thermo-48i CO analyzers in 2009.

In January 2011, DDOE installed Ecotech EC9830T trace CO analyzer at the McMillan site for the Ncore monitoring requirements.

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 less than 4 ppb and uses a high performance modified vacuum pump. CO concentrations are highest along heavily traveled roadways and decrease significantly the further away the monitor is from traffic. Therefore, CO monitors are usually located close to roadways or in urban areas.

v) Nitrogen Dioxide (NO_2)

DDOE currently operates NO_2 monitors at two sites collocated with ozone measurement sensors. DC's NO-NO_2-NOx monitors are operated year-round and are located at the River Terrace and McMillan sites, using Thermo-42i analyzers. A third NO_2 monitor was in operation at the Takoma School monitor until 2010. However, because of a major fire incident at the Takoma School in late December 2010, DDOE temporarily terminated the monitoring site. DDOE was to resume normal operations at the Takoma station after the school reopened in January 2012, but realized the monitoring room and probe for air intake line have been compromised by the new structure. Therefore, the Takoma School monitoring station was shut down and efforts are underway to find a suitable replacement location in the general area. DDOE expects to re-establish the monitoring station by the end of 2012.

Additionally, the 2010 NO_2 NAAQS requires establishment of a new network of near-roadway NO_2 monitors. Appendix A contains information related to the near-roadway NO_2 ambient monitoring network in DC.

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 the 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, NOx 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 NOx. The NO_2 concentration is equal to the difference between NOx and NO.

Oxides of nitrogen are produced during high-temperature burning of fuels. Sources of NOx include motor vehicles and stationary sources that burn fossil fuels such as power plants and industrial boilers.

vi) Total Reactive Nitrogen Oxides (NOy)

In January 2011, DDOE installed an Ecotech EC9841A model NOy analyzer at its NCore station. This is a chemiluminesence based analyzer which uses a high performance NOy converter to measure trace levels of NOy and NO.

vii) Sulfur Dioxide (SO_2)/ SO_2-Trace

DDOE operates one SO_2 monitor in its air monitoring network. A Thermo 43i continuous SO_2 monitor is operated at the River Terrace station and it collects hourly data year-round. January 2011, DDOE deployed an Ecotech EC9850T trace SO_2 analyzer at the McMillan NCore station.

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 U.V. fluorescence analyzer designed to measure background concentration of SO_2 with a lower detection limit less than 200 parts per trillion. The main sources of SO_2 are combustion of coal and oil (mostly from electrical generating units, refineries, smelters and industrial boilers).

viii) Air Toxics

DDOE operates one National Air Toxics Trends Station (NATTS) at the McMillan Reservoir site. Air toxics, or hazardous air pollutants (HAPs), are those pollutants which are known or suspected to cause cancer or other serious health effects, such as reproductive or birth defects, or adverse environmental effects. Air toxics samples are collected for 24 hours with a model 910A Environmental Systems Inc. canister sampler on a 1-in-6 day schedule.

NATTS monitors at the McMillan site include: hexavalent chromium (ERG Cr+6 analyzer), PAH (Tisch Puf+ analyzer), heavy metals (PM_{10} High-Vol), and VOCs and carbonyls (Model 910A, Environmental Systems Inc). The sampled canisters and carbonyls sep-paks are returned to the laboratory for analysis on an Entech/Agilent gas chromatograph (GC) mass spectrometer system. DC's NATTS site also includes an Aethalometer (Magee Scientific) for continuous hourly sampling of black carbon (OC/EC).

Toxics can come from automobiles, gasoline vapors, and large variety of large and small commercial and industrial sources that use chemical solvents, paint thinner and other chemical compounds.

ix) Ozone Precursors - Photochemical Assessment Monitoring Stations (PAMS)

DDOE operates one PAMS Type 2 station at the McMillan Reservoir site. The parameters measured are O_3, NO, NOx, NO_2, speciated VOCs, and surface meteorology.

During the core ozone season (June-August), 3-hour canister air samples are collected on a 1-in-3 day schedule by using a XonTech Model 910A sampler. Additionally, 24-hour canister air samples are collected on a 1-in-6 day sampling schedule with a XonTech Model 910A sampler. The canisters are returned to the laboratory for analysis on an EnTech/Agilent GC/FID system for speciated VOCs.

During June-August, hourly measurements for a set of 56 target hydrocarbons are made on-site using a Perkin Elmer VOC Air Analyzer with dual flame ionization detectors (Perkin-Elmer 350ATD ozone precursor sampler and Clarus 500 PAMS Gas Chromatograph sampling system).

DDOE also operates continuous O_3 and NO_x analyzers complemented with surface meteorological measurements at the McMillan (11-001-0043) PAMS site. In 2011, DDOE deployed Viasala WXT 520 meteorological monitoring sensors on a new 10-meter tower at the McMillan Reservoir PAMS/NCore site. DDOE is proposing to decommission the old (now redundant) Climatronics meteorological monitoring sensors at the McMillan station by the end of September 2012. The new meteorological sensors, while meeting the PAMS monitoring requirements, will also supplement the NCore monitoring in DC.

PAMS VOCs can come from automobiles, gasoline vapors, and vast variety of large and small commercial and industrial sources that use chemical solvents, paint thinners and other chemical compounds.

x) Lead (Pb)

In 2008, EPA substantially strengthened NAAQS for lead (73 FR 66964). In conjunction with strengthening the Pb NAAQS, EPA identified the need for states to improve existing monitoring networks by requiring monitors to be placed in areas with sources that emit 0.5 ton per year (tpy) or more of Pb and at the NCore stations. DDOE, in conjunction with EPA Region 3, reviewed the Pb emissions inventory in DC and found no sources with emissions of 0.5 tpy or greater. Hence, source-oriented Pb monitors are not required. However, DC is required to establish a Pb monitor at its McMillan Reservoir NCore site.

DDOE deployed a new TSP-Pb monitor (AQS Parameter 14129) at McMillan Reservoir site and initiated sample collection on January 1, 2012 for the revised lead standard. The samples are sent to the West Virginia Department of Environmental Protection's (WVDEP) Air Monitoring Laboratory for chemical analysis. WVDEP successfully tested the Region 9 Pb-FEM SOP "Heated Nitric Acid Hot Block Digestion and ICP/MS Analysis for Lead (Pb) on TSP High-Volume Filters" and will be using the method for analyzing samples from DC's TSP-Pb monitor. WVDEP expects to receive EPA's approval for their Quality Assurance Project Plan (QAPP) during this year.

The 2008 Pb standard is based on the lead concentration being reported in units of micrograms per cubic meter at local conditions. Under the old NAAQS, lead concentrations were reported as parameter 12128 in micrograms per cubic meter under conditions of standard temperature and pressure. This change in reporting units requires the creation of new parameter codes for reporting of data that will be compared to the revised NAAQS.

3.0 District of Columbia's Air Monitoring Stations

DDOE currently maintains a network of four ambient air monitoring stations. Hains Point, McMillan Reservoir, River Terrace, and Verizon are the descriptive names of these stations. A fifth site at the Takoma School (11-001-0025) station was discontinued in 2011 because of a fire incident. Efforts are underway to identify a substitute location. The sections below give additional information. Maps for the individual sites are shown in Figures 3-1 to Figure 3-5.

3.1 Hains Point Station

The Hains Point monitoring station has been operational since January 1988 and the measurement sensors are perched on the rooftop of U.S. National Park Police building. DDOE operates a $PM_{2.5}$ FRM monitor at this location. This is also one of the very few urban IMPROVE sites in the nation. NPS operates IMPROVE $PM_{2.5}$ mass and speciation and PM_{10} monitors at this site.

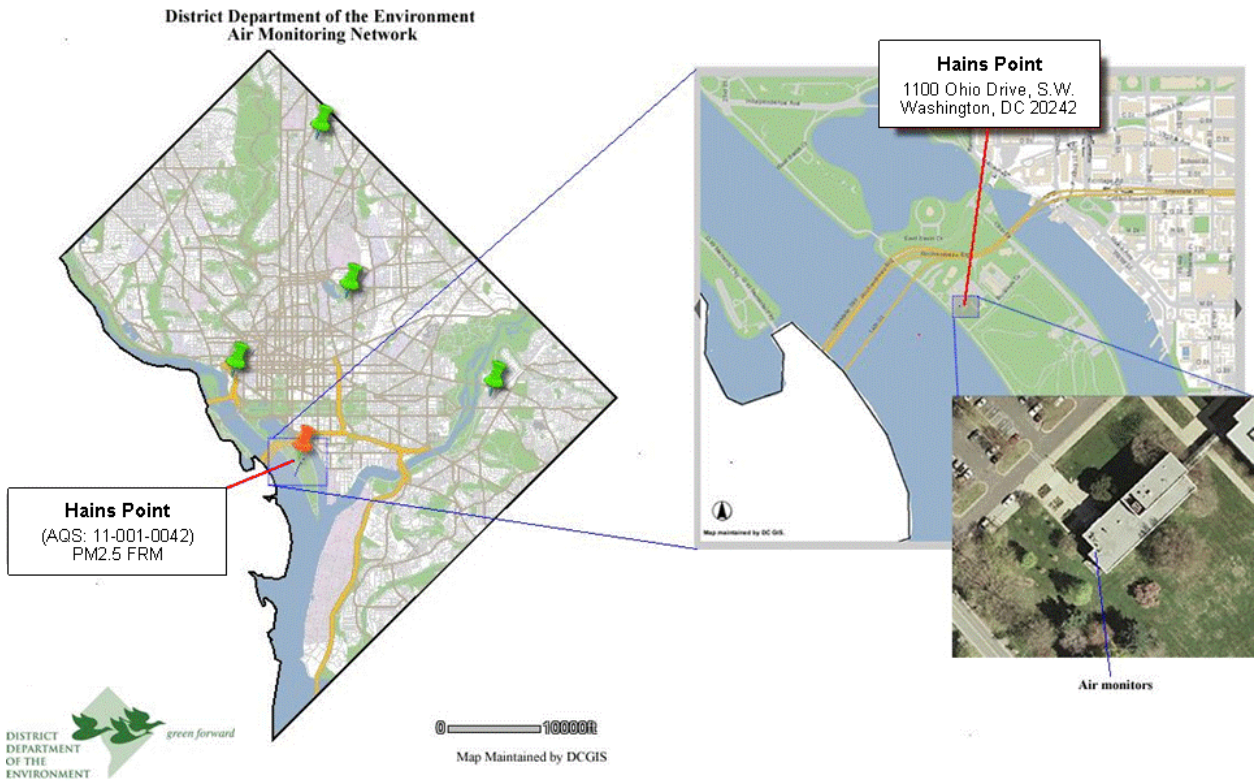


Figure 3-1: Hains Point Monitoring Station Locator Maps

3.2 McMillan Reservoir Station

The McMillan Reservoir air monitoring station is the most comprehensive ambient air station in DC. 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 during 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 the PAMS monitoring. Also, McMillan station was the first NATTS site in EPA Region 3. In January 2011, the McMillan site has expanded into an NCore network monitoring station. In January 2012, a Sunset Model 4 Semi-Continuous OC/EC monitor was deployed at the McMillan Reservoir PM2.5 CSN station under EPA/OAQPS guidance.

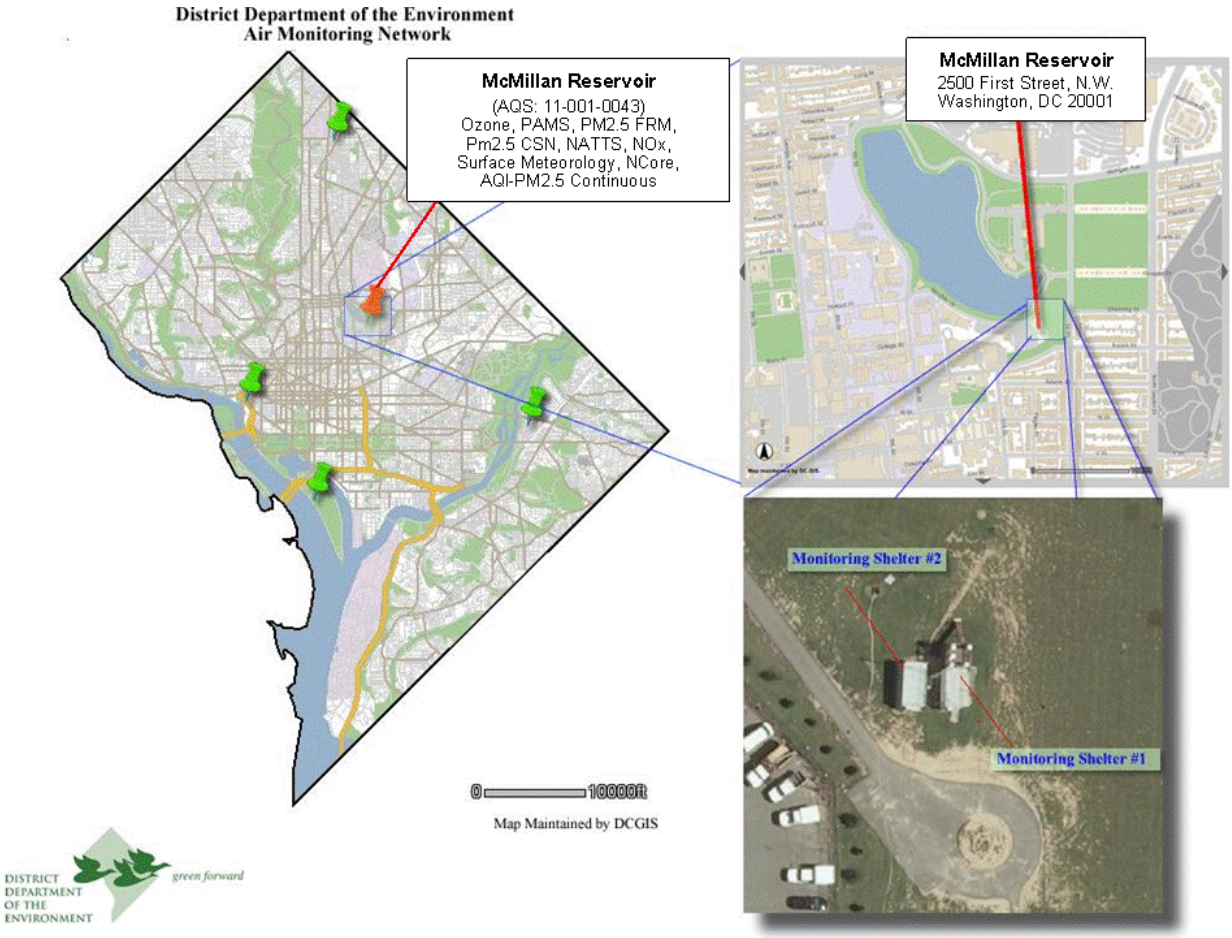


Figure 3-2: McMillan Reservoir Site Locator Maps

3.3 River Terrace Station

The River Terrace monitoring station has been operational since May of 1993. This location has measurement analyzers for ground-level ozone, sulfur dioxide, carbon monoxide, nitrogen oxides, and fine particulate matter ($PM_{2.5}$).

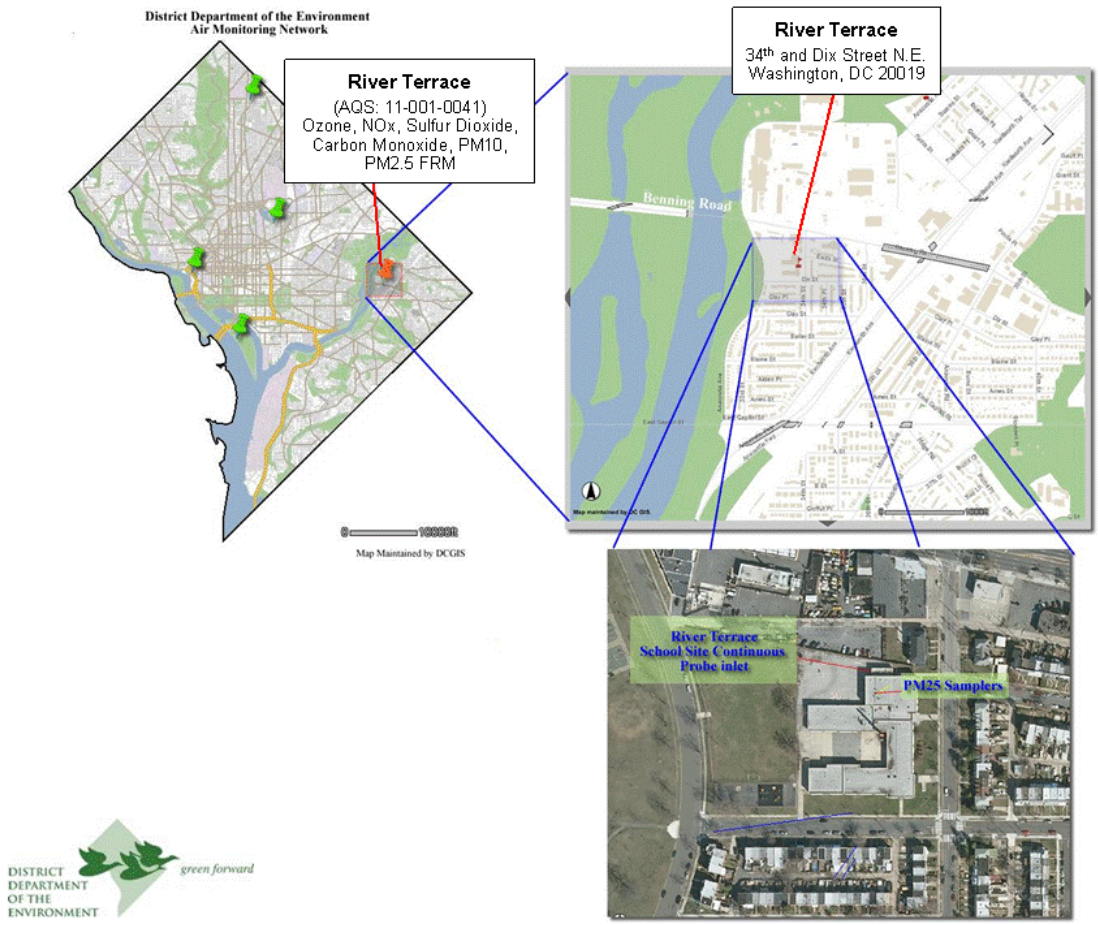


Figure 3-3: River Terrace Site Locator Maps

3.4 Takoma School Station (Discontinued in 2011)

The Takoma School (11-001-0025) station has been operational since January 1980. Ozone and NOx were measured with automated continuous analyzers at this location. The Takoma School station was discontinued in 2011 because of a fire incident. Efforts are underway to identify a substitute location. DDOE expects to launch a substitute monitoring site in the area of Takoma before the end of 2012.

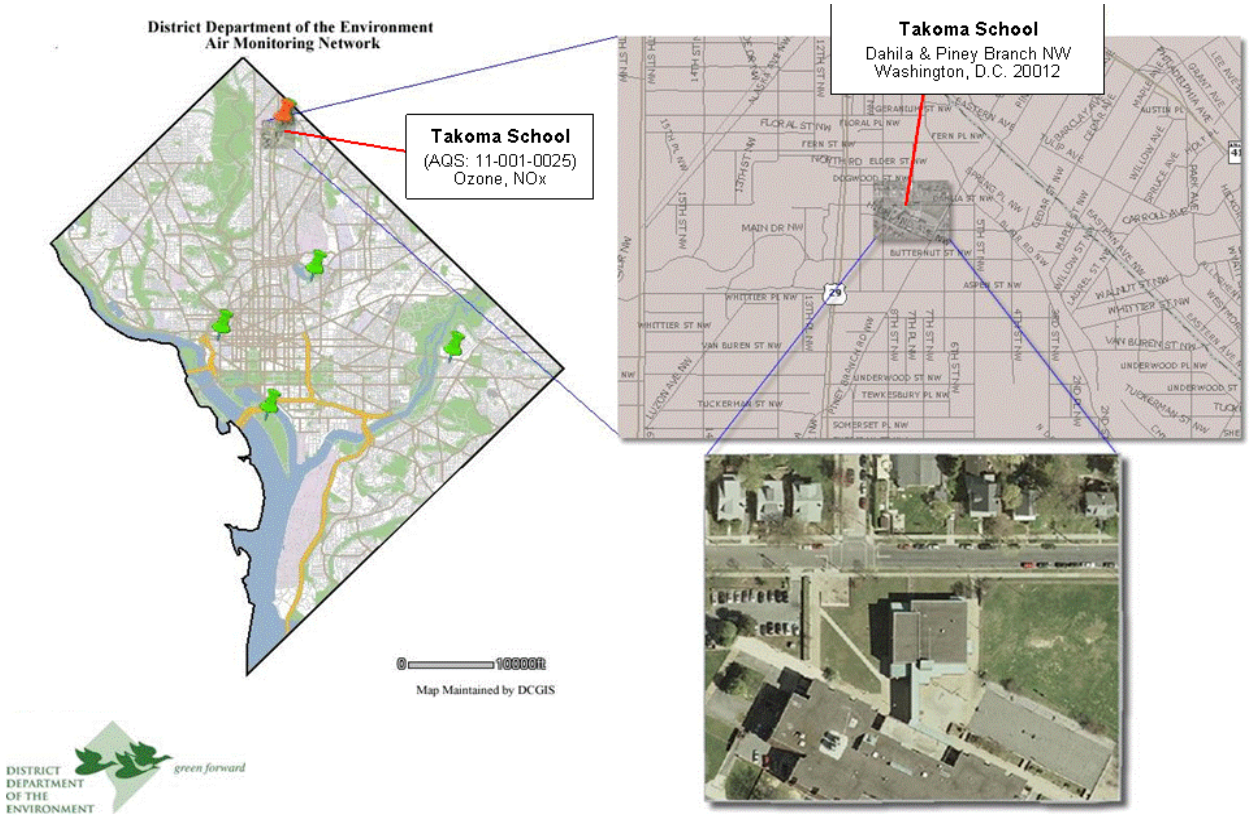


Figure 3-4: Takoma School Site Locator Maps

3.5 Verizon Station

The Verizon station was launched in October 1980 and houses a carbon monoxide measurement sensor. This measuring component is important for DC because it is located in the core business district where there are a lot of pedestrians as well as traffic congestion. Classified as a "Micro-scale" site, the Verizon station is in a city canyon type of environment.

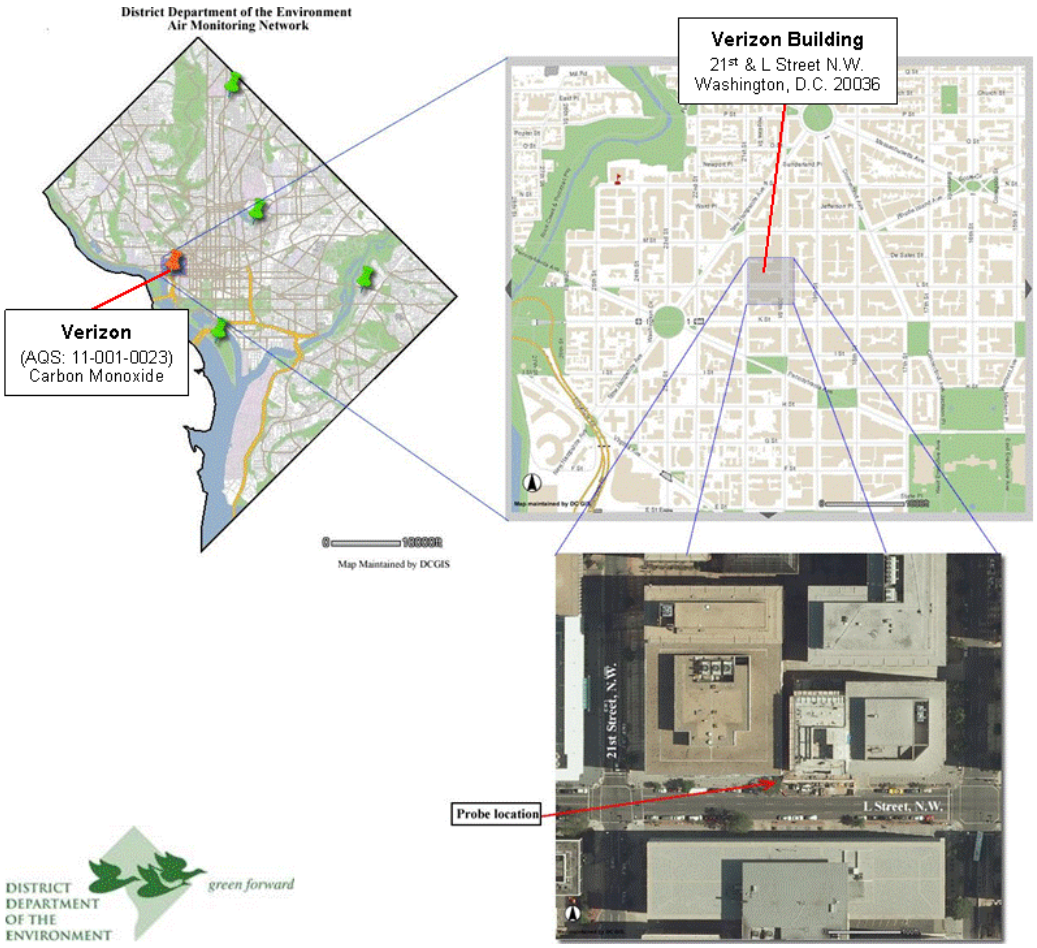


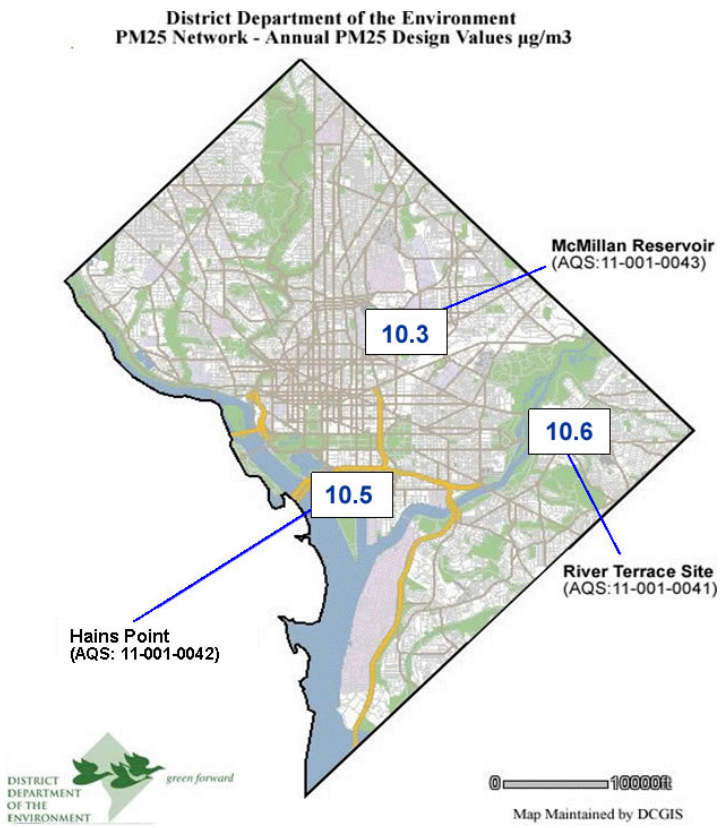
Figure 3-5: Verizon Monitoring Site Locator Maps

4.0 Ozone and $PM_{2.5}$ Design Values

DDOE uses design value calculations for criteria air pollutants to determine if the monitored air quality in DC is in compliance with the NAAQS. Design values are defined in the Clean Air Act guidance and they are often based on multiple years of data, ensuring a stable indicator. Design values are typically used to classify non-attainment areas, assess progress towards meeting the NAAQS, and develop control strategies. Design values are computed and published annually by EPA's Office of Air Quality Planning and Standards (OAQPS) and reviewed in conjunction with the EPA Regional Offices.

4.1 Annual $PM_{2.5}$ Design Values

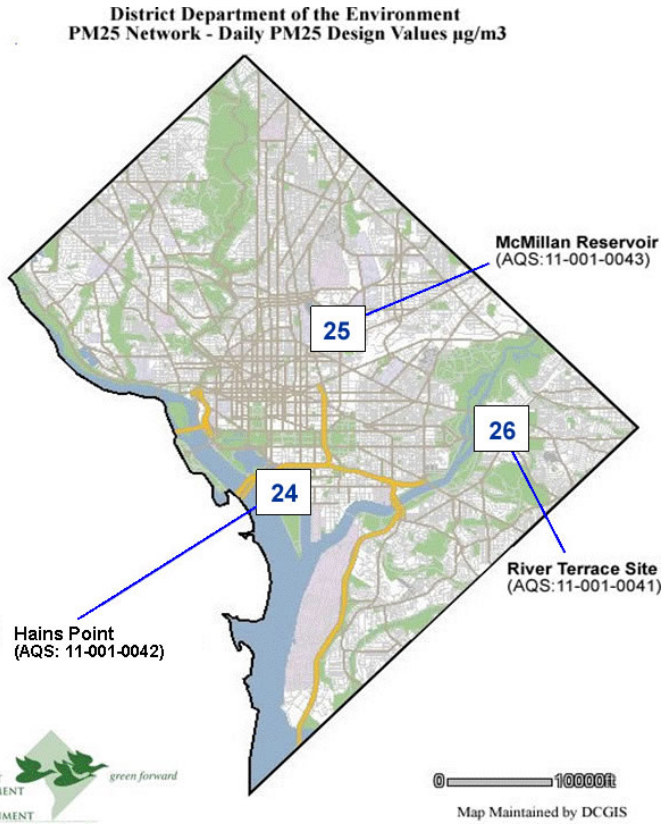
The figure and table below show the annual design values for $PM_{2.5}$ at DC's sites for the recent period. The $PM_{2.5}$ annual design values were calculated using the average of the respective annual averages for a consecutive three-year period. The Annual $PM_{2.5}$ NAAQS is 15 $\mu g/m^3$. The design values based on the 2009-2011 data indicate that DC's monitors show attainment for the Annual $PM_{2.5}$ NAAQS.



Annual PM2.5 Design Values ($\mu g/m^3$)				
Site	**AIRS ID**	**2009**	**2010**	**2011**
Hains Point	110010042	12.0	11.2	10.5
McMillan Reservoir	110010043	11.6	10.8	10.3
River Terrace	110010041	12.1	11.2	10.6

4.2 Daily $PM_{2.5}$ Design Values

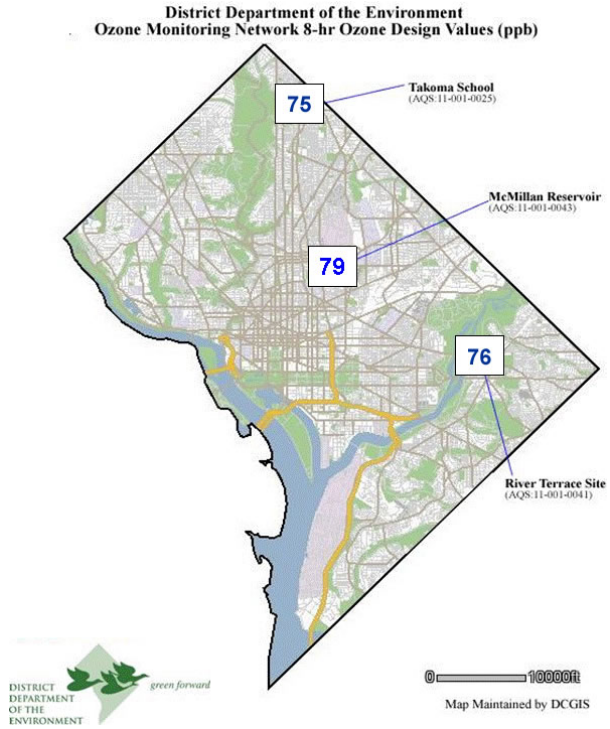
Daily $PM_{2.5}$ design values are calculated from the 98th percentile concentration value from each year for a given consecutive three-year period. The design value is the average of the three 98th percentile concentration values. The table below gives the design values for daily $PM_{2.5}$ using data from 2008-2011. The current daily design value threshold for $PM_{2.5}$ in the 98th percentile at a monitoring site is less than or equal to 35 µg/m3. The design values based on the 2009-2011 data indicate that DC's monitors show attainment for the Daily $PM_{2.5}$ NAAQS.



Daily PM2.5 Design Values (µg/m3)				
Site	**AIRS ID**	**2009**	**2010**	**2011**
Hains Point	110010042	28	26	24
McMillan	110010043	29	26	25
River Terrace	110010041	29	27	26

4.3 Ozone Design Values

In the table shown below are the current design values for ground-level ozone using the data from 2009-2011. The ozone design values are calculated by taking the 3-year average of the annual 4th highest daily maximum 8-hr average concentrations. The current 8-hr ozone NAAQS is 0.075 ppm or 75 ppb. Monitored data indicate that the air quality levels are in violation of the NAAQS at all three stations in DC. The Takoma School (11-001-0025) station was discontinued in 2011 because of a fire incident. The design value for Takoma was based on two years data.



Design Values (ppb)					
Site	**AIRS ID**	**2008**	**2009**	**2010**	**2011**
McMillan Reservoir	110010043	87	**80**	**79**	**79**
River Terrace	110010041	86	**78**	**77**	**76**
Takoma	110010025	80	**77**	**75**	**75***

* Takoma station did not operate in 2011 because of a fire incident. The 2011 design value for Takoma was based on two years (2009 and 2010) data.

5.0 Network Changes and Upgrades

DC supports EPA project goals for the national monitoring strategies and the national networks. DDOE is working with the EPA Region 3 and EPA's OAQPS in determining changes or modifications to DC's network, including changes to the monitoring sites, sampling schedules, sampling equipment and technologies, to ensure that the DC's ambient air monitoring program meets the regulatory requirements and the goals for public health and natural resources protection.

In November 2009, DC received EPA's approval for establishing an NCore station at the McMillan Reservoir site (11-001-0043). DC's NCore monitoring station was launched on January 1, 2011.

The 2010 NO_2 standards require establishment of a minimum of two near-road NO_2 monitors in the Washington DC-MD-VA metropolitan area. DC is very keen to evaluate and verify if the NO_2 air quality near its busiest roadways is in compliance with the new standards. To this end, DDOE is working with the DC's Department of Transportation (DDOT) and NPS to identify suitable site(s) specifically for the near-roadway NO_2 monitoring in DC. DDOE is exploring a near roadway NO_2 monitoring pilot study.

The sections below give additional details of the recently implemented changes and proposed changes.

5.1 McMillan Reservoir – Site ID 11-001-0043

- Lead: As part of the revised Pb NAAQS and NCore monitoring requirements, DDOE added a Hi-Vol TSP-Pb monitor at the McMillan Reservoir NCore station on January 1, 2012. The samples are analyzed by WVDEP Air Monitoring Laboratory. WVDEP successfully tested the Region 9 Pb-FEM SOP "Heated Nitric Acid Hot Block Digestion and ICP/MS Analysis for Lead (Pb) on TSP High-Volume Filters" and will be using the method for analyzing samples from DC's TSP-Pb monitor. WVDEP expects to receive EPA's approval for their QAPP during this year.

- $PM_{2.5}$ CSN: The Ambient Air Monitoring Group at EPA's OAQPS contacted DC in April 2011 requesting participation in a national evaluation study of the Sunset Model 4 Semi-Continuous OC/EC monitor. A Sunset EC/OC monitor was deployed on January 23, 2012 at the McMillan Reservoir $PM_{2.5}$ CSN station under EPA/OAQPS guidance.

- $PM_{2.5}$ FRM Secondary Monitor: DDOE has deployed a secondary Partisol 2025 $PM_{2.5}$ FRM monitor collocated with the existing primary Partisol 2025 $PM_{2.5}$ FRM monitor at the McMillan Reservoir station on January 1, 2012. This change was approved by the Regional Administrator in 2011. The first $PM_{2.5}$ collocated sampling event at the McMillan Reservoir site occurred on Wednesday, January 4, 2012.

- PM_{10} FRM Monitors: Regional Administrator approved deployment of Lo-Vol PM_{10} FRMs at the McMillan Reservoir station. On January 1, 2012, two Anderson Lo-Vol

PM_{10} FRMs monitors- primary and secondary, were deployed. The first event of Lo-Vol PM_{10} collocated sampling occurred on Wednesday, January 4, 2012.

- In 2011, Viasala WXT 520 meteorological monitoring sensors were deployed on a new 10-meter tower. DDOE is proposing to decommission the old (now redundant) Climatronics meteorological monitoring sensors at the McMillan station by the end of 2012. The new Viasala meteorological sensors, while meeting the PAMS monitoring requirements, will also supplement the NCore monitoring in DC.

- Discontinue the existing TEOM continuous $PM_{2.5}$ monitor and designate the recently deployed BAM $PM_{2.5}$ continuous FEM monitor at the McMillan Reservoir site as the AQI Local Conditions monitor for DC.

5.2 River Terrace School – Site ID 11-001-0041

- $PM_{2.5}$ FRM Secondary Monitor: Partisol 2025 $PM_{2.5}$ FRM secondary monitor was removed from River Terrace and deployed at the McMillan Reservoir (11-001-0043) site on January 1, 2012. This change was approved by the Regional Administrator in 2011.

- PM_{10} FRM Monitors: DDOE discontinued the PM_{10} sampling, both primary and secondary, at the River Terrace site at the end of the calendar year 2011. The last event of PM_{10} sampling was on Thursday, December 29, 2011 at the River Terrace site. This change was approved by the Regional Administrator in 2011.

5.3 Takoma School – Site ID 11-001-0025

- Discontinue Takoma School monitoring station. The Takoma School facilities underwent a major renovation during 2011 because of a fire incident. An evaluation of the available space at the newly renovated facility indicated that the station would not meet the air monitoring guidelines and likely fail the probe siting criteria. Efforts are underway for identifying a substitute location for the Takoma School monitoring station.

5.4 Hains Point - Site ID 11-001-0042

- No changes planned for 2012.

5.5 Verizon - Site ID 11-001-0023

- No changes planned for 2012.

6.0 Air Monitoring Program and Data Contacts

The Monitoring and Assessment Branch in DDOE's Air Quality Division maintains the District of Columbia's ambient air monitoring network and performs quality assurance and quality control on the ambient data. Data is stored locally for use by staff and for preparation of special reports and data charts or Freedom of Information Act requests.

Data is delivered to the EPA's AQS national database and reported on a schedule set forth in 40 C.F.R. pt. 58 of the Clean Air Act. EPA controls the access to the raw ambient air quality data DDOE transmits to the national database. Annual data reports are generated from AQS and data certifications are prepared by DDOE according to the reporting requirements in 40 C.F.R. pt. 58. Data requests can be directed via email to: robert.day@dc.gov.

DC's air monitoring program main contact:

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

Appendix A

Near-Road Nitrogen Dioxide (NO_2) Ambient Monitoring Network

District of Columbia's 2012 Ambient Air Monitoring Network Plan

June 20, 2012

Background

In February 2010, EPA promulgated (75 FR 6474) new minimum monitoring requirements for the nitrogen dioxide (NO_2) monitoring network in support of a revised NO_2 National Ambient Air Quality Standard (NAAQS). The NO_2 NAAQS was revised to include a 1-hour standard with a 98th percentile form and a level of 100 parts per billion (ppb), intending to protect against peak 1-hour exposures while retaining the annual standard of 53 ppb.

In its evaluation for the 2010 NO_2 NAAQS, EPA recognized that roadway-associated exposures account for a majority of ambient exposures to peak NO_2 concentrations. In particular, EPA recognized that the combination of increased vehicle-miles-traveled (VMT), which correspond to on-road mobile source emissions, with higher urban population densities can result in an increased potential for exposure and associated risks to human health and welfare. As a result, the EPA promulgated requirements for near-road NO_2 monitors in urban areas where peak, ambient 1-hour NO_2 concentrations can be expected to occur that are particularly attributable to on-road mobile sources. Monitoring requirements are based upon population levels and a specific traffic metric within Core Based Statistical Areas (CBSAs). State and local ambient air monitoring agencies are required (per 40 C.F.R. pt. 58 Appendix D, Section 4.3.2.a) to use the latest available census figures (e.g., census counts and/or estimates) and available traffic data. The air agencies are required to consider traffic volumes, fleet mix, roadway design, traffic congestion patterns, local terrain or topography, and meteorology in determining where a required near-road NO_2 monitor should be placed. In addition to the required considerations listed above, there are other factors that impact the selection and implementation of a near-road monitoring station, including satisfying siting criteria, site logistics (e.g., gaining access to property and safety) and population exposure.

EPA is developing Near-Road NO_2 Monitoring Technical Assistance Document (TAD) which is expected to provide air monitoring agencies with recommendations and ideas on how to successfully implement near-road NO_2 monitoring networks. The required near-road NO_2 monitoring network is to be implemented and operational by January 1, 2013. State and local ambient air monitoring agencies are required to submit plans for required near-road NO_2 stations in annual monitoring network plans due July 1, 2012.

District of Columbia's Near-Road NO_2 Monitoring Network

The 2010 NO_2 NAAQS minimum monitoring requires establishment of a network with at least two near-road NO_2 monitors in the Washington DC-MD-VA CBSA. Tables A-1 to A-3 below list the major road segments in the CBSA along with Annual Average Daily Traffic (AADT) data.

The District of Columbia (DC) is very keen to evaluate and verify if NO_2 air quality near its busiest and congested roadways is in compliance with the new standards. DDOE is in consultation with EPA Region 3 regarding near-road NO_2 monitoring requirements. AADT data and other relevant guidance will be considered in making an informed decision on the need for a near-road NO_2 monitoring network in DC and also on the need for going beyond the minimum monitoring requirements in Washington DC-MD-VA CBSA by establishing a third near-road NO_2 monitor in DC.

Table A-1 : District of Columbia Roadway Segments in Washington DC-MD-VA CBSA - Annual Average Daily Traffic Data for 2008 (Courtesy: District Department of Transportation)

HPMSID	COUNT-2008 (Thousands)	ROADWAY SEGMENT DESCRIPTION
1701	209.2	14TH ST, SW FROM INTERSTATE 395 (S) TO ROCHAMBEAU BRG (N)
1501	153.7	INTERSTATE 395 FROM 14TH ST (S) TO 9TH ST (N)
1601	152.7	INTERSTATE 395 FROM 12TH ST EXPY TO INTERSTATE 695 (N)
2502	115.5	NEW YORK AVE, NE FROM SOUTH DAKOTA AVE TO MARYLAND LINE [STREET BREAK]
1402	113.2	INTERSTATE 695 FROM SOUTH CAPITOL ST (S) TO 11TH ST (N), INTERSTATE 295 (N) [STRE
1502	108.5	INTERSTATE 395 FROM INTERSTATE 695 (S) TO D ST (W)
2402	105.1	KENILWORTH AVE, NE FROM ANACOSTIA FWY (E), EAST CAPITOL ST (E) TO BENNING RD (W)
2401	104.5	KENILWORTH AVE, NE FROM NANNIE HELEN BURROUGHS AVE (E) TO MARYLAND LINE (W) [ST BREAK]
2501	104.5	KENILWORTH AVE, NE FROM BENNING RD (E) TO NANNIE HELEN BURROUGHS AVE (W)
1401	99.0	INTERSTATE 695 FROM INTERSTATE 395 (S) TO SOUTH CAPITOL ST (N)
1202	98.7	INTERSTATE 66 FROM VIRGINIA LINE (S) TO ROCK CREEK & POTOMAC PKY (M)
1403	95.3	INTERSTATE 295 FROM SUITLAND PKY (E) TO INTERSTATE 695 (S) [STREET BREAK]
7106	89.4	PENNSYLVANIA AVE, SE FROM POTOMAC AVE (E) TO MINNESOTA AVE (E)
2302	88.2	ANACOSTIA FWY, SE FROM EAST CAPITOL ST (W) TO PENNSYLVANIA AVE (E)
3907	86.0	NEW YORK AVE, NE FROM N ST, NORTH CAPITOL ST TO 9TH ST
1301	85.1	INTERSTATE 295 FROM SOUTH CAPITOL ST (E) TO SUITLAND PKY (W)
2301	71.5	ANACOSTIA FWY, SE FROM PENNSYLVANIA AVE (W) TO INTERSTATE 295 (E) [STREET BREAK]
1203	68.2	INTERSTATE 295 FROM MARYLAND LINE (E) TO SOUTH CAPITOL ST (W)
6001	68.0	G W MEMORIAL PKY, SW FROM VIRGINIA LINE (E) TO VIRGINIA LINE (M) [STREET BREAK]
7108	68.0	ARLINGTON MEMORIAL BRG, SW FROM LINCOLN MEMORIAL CIR TO G W MEMORIAL PKY, MEMORIA
7108A	68.0	MEMORIAL AVE, SW FROM G W MEMORIAL PKY, ARLINGTON MEMORIAL BRG TO MEMORIAL AVE (S
2502A	67.7	NEW YORK AVE, NE FROM 36TH PL (S) TO SOUTH DAKOTA AVE
3905	66.5	NEW YORK AVE, NE FROM BLADENSBURG RD TO 36TH PL (S)
7076	64.7	14TH ST, SW FROM INDEPENDENCE AVE TO INTERSTATE 395 (S)
3902	60.8	FRANCIS SCOTT KEY BRG, NW FROM M ST TO VIRGINIA LINE [STREET BREAK]
1201	58.4	INTERSTATE 295 FROM 11TH ST (S), INTERSTATE 695 (S) TO PENNSYLVANIA AVE (N) [STRE

Table A-2 : Maryland Roadway Segments in Washington DC-MD-VA CBSA- Annual Average Daily Traffic Data

STATION_ID	COUNTY_DESC	ROAD_SECTION	AADT_2005	AADT_2006	AADT_2007	AADT_2008	AADT_2009
B2850	Montgomery	IS 270Y TO MONTROSE RD	255875	255881	255882	250763	265320
B2848	Montgomery	MD 189 TO MD 28	263975	263981	253620	248551	262400
B2849	Montgomery	MONTROSE RD TO MD 189	260575	260581	252000	246961	261280
B3289	Prince Georges	MONTGOMERY CO/L TO IS 95X	197525	216190	216191	211872	242500
B2847	Montgomery	MD 28 TO SHADY GROVE RD	241375	241381	235640	230931	239460
B2901	Montgomery	MD 185 TO MD 97	219250	218850	218851	214472	239310
B2971	Montgomery	MD 355 TO MD 185	227575	245420	245421	240512	238050
B2972	Montgomery	MD 97 TO US 29	215150	233910	233911	229232	232010
B3147	Prince Georges	IS 595/US 50 TO MD 450	229425	234730	234731	230042	230880
B3143	Prince Georges	US 1 TO IS 495	241425	232180	232181	227542	226340
B2965	Montgomery	SHADY GROVE RD TO IS 370	219375	219381	207190	203051	222840
B3145	Prince Georges	MD 295 TO MD 201	234225	215700	215701	211392	220640
B2970	Montgomery	MD 190 TO IS 270Y	246825	227680	227681	223132	220020
B2966	Montgomery	IS 370 TO MD 117	207575	207581	208090	203931	216270
B3354	Prince Georges	GREENBELT COMMUTER STATION RD TO US 1	221225	221233	223580	219111	215560
B2902	Montgomery	US 29 TO MD 193	194350	200430	200431	196422	214980
P0040	Montgomery	VIRGINIA ST/L TO MD 190	222447	226622	225600	216015	214005
B3148	Prince Georges	MD 202 TO IS 595/US 50	216925	214280	214281	210002	212990
B3144	Prince Georges	MD 201 TO GREENBELT COMMUTER STATION RD	229525	210130	210131	205932	211410
P0041	Montgomery	MD 193 TO MD 650	214466	211938	212166	209718	210927

Table A-3 : Virginia Roadway Segments in Washington DC-MD-VA CBSA- Annual Average Daily Traffic Data

Link ID	Route Label	County Name	Start Label	End Label	AADT	Data Date
190006	I-95 SB	Fairfax County	29-644 Franconia Rd; Old Keene Mill Rd	I-395	140000	2008
190081	I-95 SB	Fairfax County	I-395	I-495 Capital Beltway	140000	2008
090200	I-95 NB	Fairfax County	I-395; 29-644 Franconia Rd; Old Keene Mill Rd	I-495 Capital Beltway	129000	2008
199747	I-95 Rev	Fairfax County	29-644 Franconia Rd	I-395 Reversible Lanes at I-495 Capital Beltway	27000	2008
190090	I-95 SB	Fairfax County	Ramp to Express Lanes	29-644 Franconia Rd; Old Keene Mill Rd	103000	2008
090218	I-95 NB	Fairfax County	Express Lane Ramp	I-395; 29-644 Franconia Rd; Old Keene Mill Rd	101000	2008
199745	I-95 Rev	Fairfax County	SB On Ramp South of 29-644	29-7900 Franconia-Springfield Pkwy Pointing South	28000	2008
199767	I-95 Rev	Fairfax County	29-7900 Franconia-Springfield Pkwy Pointing South	29-7900 Franconia-Springfield Pkwy Pointing North	28000	2008
199746	I-95 Rev	Fairfax County	29-7900 Franconia-Springfield Pkwy Pointing North	29-644 Franconia Rd	28000	2008
090199	I-95 NB	Fairfax County	29-617 Backlick Rd, 29-7100 Fairfax County Pkwy	Express Lane Ramp	101000	2008
190007	I-95 SB	Fairfax County	29-617 Backlick Rd; 29-7100 Fairfax County Pkwy	Ramp to Express Lanes	77000	2008
199766	I-95 Rev	Fairfax County	To I-95 NB North of 29-7100	Frm I-95 SB On Ramp South of 29-644	39000	2008
090196	I-95 NB	Fairfax County	US 1 Richmond Hwy	29-642 Lorton Rd	88000	2008
190009	I-95 SB	Fairfax County	US 1 Richmond Hwy	29-642 Lorton Rd	81000	2008
199762	I-95 Rev	Fairfax County	US 1	Frm I-95 NB North of 29-642 Lorton Rd	46000	2008
090128	I-95 NB	Fairfax County	29-642 Lorton Rd	Ramp to Express Lanes	91000	2008
190008	I-95 SB	Fairfax County	29-642 Lorton Rd	Ramp From Express Lanes	75000	2008
199744	I-95 Rev	Fairfax County	Frm I-95 NB North of 29-642 Lorton Rd	To I-95 SB South of Newington	46000	2008
090129	I-95 NB	Fairfax County	Ramp to Express Lanes	29-617 Backlick Rd, 29-7100 Fairfax County Pkwy	93000	2008
090194	I-95 NB	Fairfax County	Prince William County Line, Occoquan River	US 1 Richmond Hwy	86000	2008