Appendix G

Air Quality Report

District Department of Transportation

Air Quality Report

Pennsylvania Avenue / Minnesota Avenue Intersection Improvements

Washington, DC

May 30, 2013

Revised October 3, 2013

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EXECUTIVE SUMMARY

This report evaluates the potential air quality impacts of two alternatives, the Revised Square Alternative and the Conventional Intersection Alternative, being considered for the Pennsylvania and Minnesota Avenues, SE Intersection Improvements EA. It was prepared in compliance with the Clean Air Act (CAA) and its amendments, related Federal regulations, Federal Highway Administration (FHWA) and District Department of Transportation (DDOT) Guidance and addresses regional and project level conformity in accordance with 40 CFR Part 93. The report presents the results of a CO-hot-spot analysis comparing the results to the National Ambient Air Quality Standards (NAAQS). The report also discusses project level conformity for ozone and fine particulate matter ($PM_{2.5}$) along with information on Mobile Source Air Toxics (MSATs).

The proposed project is located at the western end of the Pennsylvania Avenue SE *Great Streets* corridor at the intersection of Pennsylvania Avenue with Minnesota Avenue, SE, in the immediate vicinity of Twining Square Park, also referred to as L'Enfant Square in the *Great Streets Framework Plan*. The study area is a complex and congested intersection and actually consists of two separate signalized intersections that are separated by 250 feet. The proposed action includes improvements to the intersection to improve safety, mobility, and connectivity for pedestrians and motorists. The study area consists of medium-density residential, limited retail services, and recreational uses.

The proposed project is located within the National Capital Interstate Air Quality Control Region (AQCR #47). This AQCR includes the District of Columbia, Maryland, and Virginia Intrastate Air Quality Control Region. The District of Columbia is currently in attainment status for 4 of the 7 criteria pollutants, Pb, NO_2, PM_{10} and SO_2, re-classified from nonattainment to maintenance for CO, and has been classified as being in nonattainment for the 1997 and 2008 8-hour ozone, and the 1997 $PM_{2.5}$ standards.

The FHWA and the Federal Transit Administration (FTA) reviewed the *The 2012 Constrained Long Range Plan and The Fy2013-2018 Transportation Improvement Program* for the Washington Metropolitan Region and found that the "2012 CLRP and 2013-2018 TIP conform to the region's State Implementation Plans, and that the conformity determination has been performed in accordance with the Transportation Conformity Rule (40 CFR Part 93), as amended. The Pennsylvania Avenue/Minnesota Avenue Intersection Improvements Project (*Great Streets* Improvements project) is identified as TIP ID: 2743 in the Constrained Long Range Plan.

The results of the CO microscale air quality modeling indicate that none of the concentrations at the 31 receptors modeled exceed either the 1-hour (35 ppm) or 8-hour (9 ppm) NAAQS.

Ozone project level conformity is addressed through the approval of the LRP and the TIP which was approved by the FHWA and FTA.

The transportation conformity rule, 40 CFR 93.123(b)(1) requires a PM hot-spot analysis only for projects of local air quality concern. The proposed project is an intersection improvement project at individual intersections that is being designed to improve traffic flow and operational efficiencies, does not involve any increases in idling, and the no-build and build volumes through the intersection are the same. The project would be expected to have a neutral or

positive influence on $PM_{2.5}$ emissions. Therefore, the project is not one of local air quality concern and a hot-spot analysis is not required.

The project's purpose, as stated in the previous paragraph, meets the FHWA's definition of a project with no meaningful potential MSAT effects, as this project will not result in changes in traffic volumes, vehicle mix, basic project location, or any other factor that would cause an increase in MSAT impacts of the project from that of the no-build alternative.

Based on the air quality analysis completed for the proposed improvements, this project has met the 40 CFR Part 93 requirements for project level transportation conformity for CO, ozone and $PM_{2.5}$, and will not contribute to any violation of the NAAQS or result in any increase in MSAT emissions.

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1.0 PROJECT DESCRIPTION

The Federal Highway Administration (FHWA) in conjunction with the District Department of Transportation (DDOT) are proposing improvements to the Pennsylvania Avenue and Minnesota Avenue SE intersection that would include the transfer of land from the National Park Service (NPS) to DDOT. The land transfer would facilitate the proposed reconfiguration of this intersection, also known as the "Twining Square" area in Southeast Washington, DC.

As shown in Figure 1, the proposed project is located at the western end of the Pennsylvania Avenue SE *Great Streets* corridor at the intersection of Pennsylvania Avenue with Minnesota Avenue SE, in the immediate vicinity of Twining Square Park, also referred to as L'Enfant Square in the *Great Streets Framework Plan*. The study area is a complex and congested intersection and actually consists of two separate signalized intersections that are separated by 250 feet. The project intersection carries traffic to and from the bridges that cross the Anacostia River, as well as Minnesota Avenue SE. The proposed action includes improvements to the intersection to improve safety, mobility, and connectivity for pedestrians and motorists. A land transfer from NPS to DDOT would be necessary, pending National Capital Planning Commission (NCPC) approval, to carry out the proposed intersection improvements. Proposed improvements would not impact any private right-of-way.

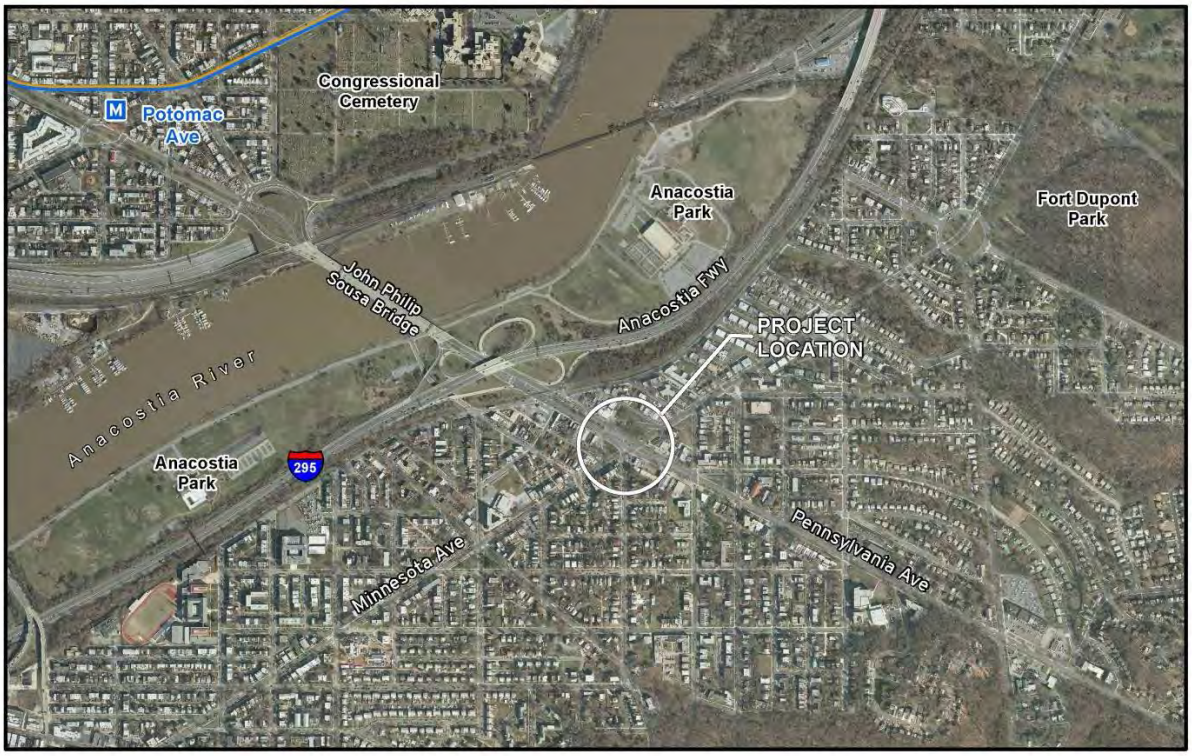

Figure 1
Project Location

The study area, shown in Figure 2, consists of medium-density residential, limited retail services, and recreational uses. The intersection contains four NPS reservations that are divided by roadways. The roadways split the reservations into areas that effectively function as traffic islands for pedestrians while crossing the street; the pieces of parkland are too small to function as "true" open space or green space as currently configured.

Figure 2
Existing Conditions/No Build

Legend
Air Receptor Location

CO HOTSPOT ANALYSIS
Pennsylvania Avenue/Minnesota Avenue
Great Streets Improvements
Washington DC

Currently, two alternatives, the Revised Square Alternative and the Conventional Intersection Alternative, are being considered for the Pennsylvania and Minnesota Avenues, SE Intersection Improvements EA.

The Revised Square Alternative, shown in Figure 3, would improve the intersection to create a "traffic square" concept, which would require all vehicles, with the exception of through-movements on Pennsylvania Avenue, to go around the expanded center islands. This alternative improves the roadway alignment and configuration to promote traffic-calming circulation to improve safety for pedestrians and vehicles at the intersection. Under this alternative, the traffic signal configuration is simplified and the left-turning conflict is removed.

Pennsylvania Avenue would bisect the center of the "square," and turning movements would be directed around the perimeter of the "square." This perimeter route acts to calm the traffic, similar to how a traffic circle works by allowing vehicles to enter and exit the square at locations identified by the intersecting streets. It would also reduce vehicular speeds by

providing short straight distances between tight radius turns, at the presumed four corners of the square. The Revised Square Alternative would reduce the interaction between pedestrians and vehicles, and would also improve the existing and new crosswalk facilities, which would be re-surfaced and re-painted to make them highly visible to motorists and pedestrians. The crosswalk alignments and refuge areas for pedestrians would be significantly enhanced and improved sidewalks and green space frontage would be provided for local residences and businesses.

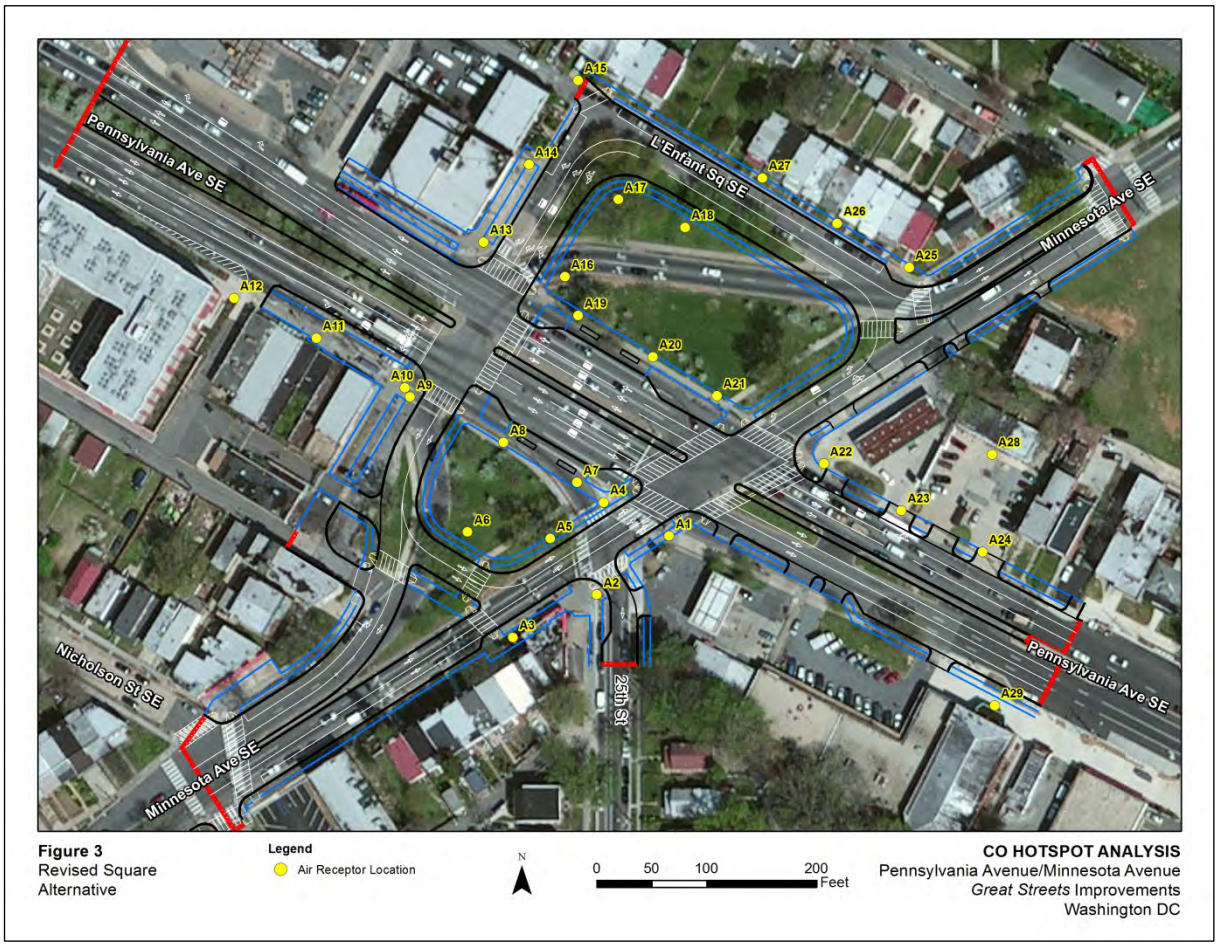

Figure 3
Revised Square Alternative

The Conventional Intersection Alternative, shown in Figure 4, would be redesigned into a conventional at-grade intersection with all vehicle turning movements permitted for all approaches, with the exception of 25th Street, which would remain one-way southbound. The design would improve the existing split roadway system that currently contains two complex intersections by reducing the multiple traffic movements into one signalized intersection. This alternative would provide for left-turn movements in all directions and increases the left-turn bay storage length for vehicles. Under this alternative, the median across L'Enfant Square would be enclosed to eliminate commute cut-through traffic. This alternative increases the available street parking along L'Enfant Square SE to the north of the "square" and would reduce the traffic volume adjacent to those residences. As a whole, this alternative changes the intersection operationally, but does not improve safety at the intersection or improve the interaction between pedestrians and vehicles.

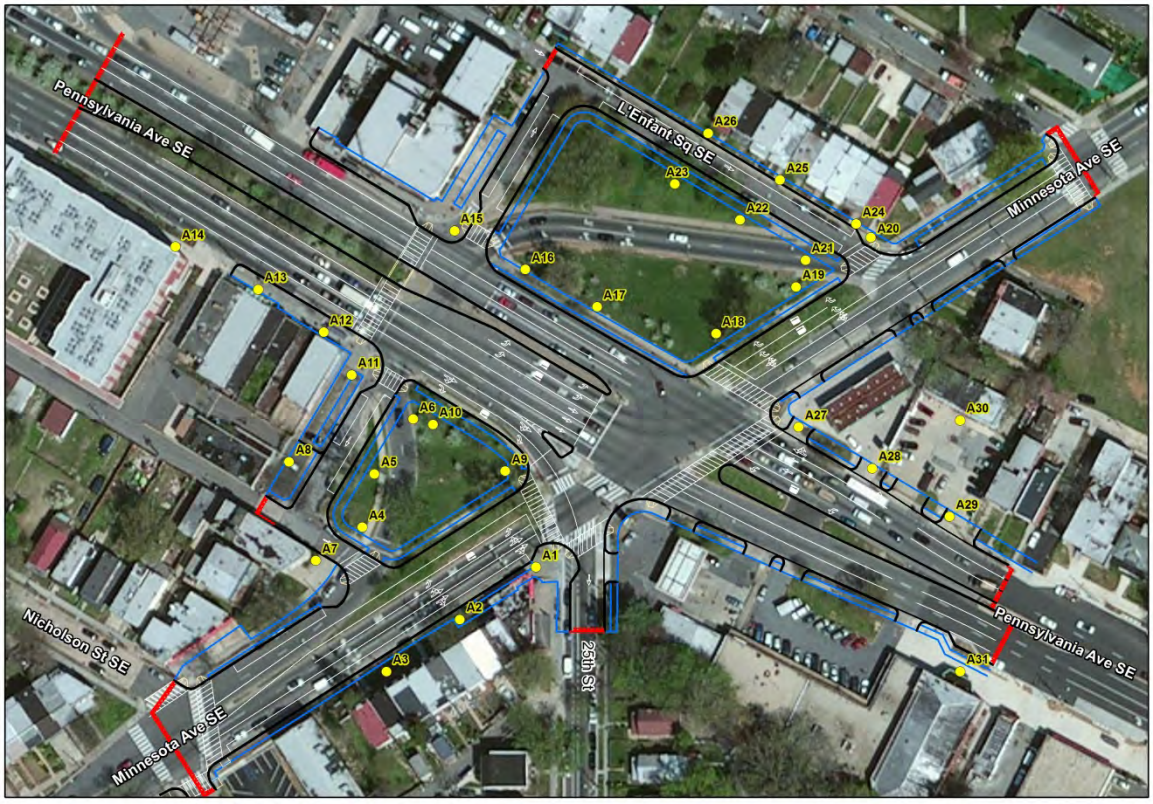

Figure 4
Conventional Intersection Alternative

Legend
Air Receptor Location

N

0 50 100 200 Feet

CO HOTSPOT ANALYSIS
Pennsylvania Avenue/Minnesota Avenue
Great Streets Improvements
Washington DC

The Conventional Intersections has two options for the movement of one-way traffic to the north and west of the “square” on L’Enfant Square SE. Either one-way movement would work operationally: If traffic flows one-way to the west and south on L’Enfant Square SE, commuter traffic could cut-through the “square” to avoid the Pennsylvania/Minnesota intersection and the right-turning vehicle/pedestrian conflict to the west of the square would remain. If traffic flows one-way to the north and east on this roadway, cut-through traffic would not be an issue and the vehicle/pedestrian conflict would be greatly reduced.

2.0 PURPOSE OF THE REPORT

This report evaluates the potential air quality impacts of the proposed Revised Square and the Conventional Intersection Alternatives for the Pennsylvania and Minnesota Avenues, SE Intersection Improvements EA. It was prepared in compliance with the Clean Air Act (CAA) and its amendments, related Federal regulations, FHWA and DDOT Guidance and addresses regional and project level conformity in accordance with 40 CFR Part 93. The report presents the results of a CO-hot-spot analysis for the existing condition (2012) and No-Build (2015 and 2040) along with both Build Alternatives (2015 and 2040) comparing the results to the National Ambient Air Quality Standards (NAAQS). The proposed opening year is 2015 and the design year is 2040. The report also discusses project level conformity for ozone and fine particulate matter ($PM_{2.5}$) along with information on Mobile Source Air Toxics (MSATs). The document serves as the supporting technical data for the Pennsylvania Avenue/Minnesota Avenue Intersection Improvements Environmental Assessment.

3.0 AIR QUALITY – BACKGROUND INFORMATION

3.1 Criteria Pollutants

The Federal Clean Air Act of 1970 established the NAAQS (Table 1). These standards were established by the United States Environmental Protection Agency (EPA) to protect public health, safety, and welfare from known or anticipated effects of sulfur dioxide (SO_2), particulate matter (PM_{10}, 10-micron in diameter and smaller along with $PM_{2.5}$, 2.5 micron in diameter and smaller), carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), and lead (Pb). EPA refers to these pollutants as the “criteria” pollutants.

TABLE 1
National Ambient Air Quality Standards (NAAQS)

Pollutant	Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)	Primary	8 – Hour	9 ppm	Not to be exceeded more than once per year
		1 – Hour	35 ppm	
Lead (Pb)	Primary and secondary	Rolling 3-Month Average	0.15 µg/m^3 (1)	Not to be exceeded
Nitrogen Dioxide (NO_2)	Primary	1 – Hour	100 ppb[5)]	98th percentile, averaged over 3 years
	Primary and secondary	Annual Mean	53 ppb (2)	Annual Mean
Ozone (O_3)	Primary and secondary	8 – Hour	0.075 ppm (3)	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particulate Matter ($PM_{2.5}$)	Primary	Annual	12 µg/m^3	annual mean, averaged over 3 years
	Secondary	Annual	15 µg/m^3	annual mean, averaged over 3 years
	Primary and secondary	24-hour	35 µg/m^3	98th percentile, averaged over 3 years
Particulate Matter (PM_{10})	Primary and secondary	24-hour	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxides (SO_2)	Primary	1-hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

(1) Final rule signed October 15, 2008. The 1978 lead standard (1.5 µg/m3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

(2) The official level of the annual NO2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard.

(3) Final rule signed March 12, 2008. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place. In 1997, EPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ("anti-backsliding"). The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.

(4) Final rule signed June 2, 2010. The 1971 annual and 24-hour SO2 standards were revoked in that same rulemaking. However, these standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

Source: http://www.epa.gov/air/criteria.html, accessed May 29, 2013

The primary pollutants from motor vehicles are unburned hydrocarbons, NO_x, CO, and particulates. Hydrocarbons (HC) and nitrogen oxides (NO_x) can combine in a complex series of reactions catalyzed by sunlight to produce photochemical oxidants such as ozone and NO_2. Because these reactions take place over a period of several hours, maximum concentrations of photochemical oxidants are often found far downwind of the precursor sources. Ozone and NO_2 are regional problems.

Carbon monoxide is a colorless and odorless gas which is the product of incomplete combustion, and is the major pollutant from gasoline fueled motor vehicles. CO is a localized air quality issue.

Particulate matter includes both airborne solid particles and liquid droplets. These liquid particles come in a wide range of sizes. PM_{10} particulates are coarse particles, such as windblown dust from fields and unpaved roads. $PM_{2.5}$ particulates are fine particles generally emitted from activities such as industrial and residential combustion and from vehicle exhaust. Particulates from transportation can be a localized issue when a project is determined to be a project of air quality concern for either PM_{10} or $PM_{2.5}$ emissions.

An exceedance of the NAAQS pollutant level does not necessarily constitute a violation of the standard. Some of the criteria pollutants (including CO) are allowed one exceedance of the maximum level per year, while for other pollutants criteria levels cannot be exceeded. Violation criteria for other pollutants are based on past recorded exceedances. Table 1 lists the allowable exceedances for the EPA criteria pollutants.

3.1.1 Attainment Designation

The Clean Air Act Amendments (CAAA) of 1977 and 1990 required all states to submit to the EPA a list identifying those air quality regions, or portions thereof, which meet or exceed the NAAQS or cannot be classified because of insufficient data. Portions of air quality control regions which are shown by monitored data or air quality modeling to exceed the NAAQS for any criteria pollutant are designated “nonattainment” areas for that pollutant. The CAAA also established time schedules for the states to attain the NAAQS.

States that have nonattainment areas are required to prepare State Implementation Plans (SIP) that lay out a plan to show how the state will improve the air quality to attain the NAAQS. Both new and improvement highway projects must be contained in the area’s Long Range-Plan (LRP) and the Transportation Improvement Program (TIP). The Metropolitan Washington Council of Governments (MWCOG) along with the District of Columbia and the states of Maryland and Virginia are responsible for preparing the LRP and TIP. Once the MPO has completed the LRP and TIP, they are submitted to the FHWA for review and approval according to the requirements of the CAAA and related implementation regulations.

The Pennsylvania Avenue/Minnesota Avenue *Great Streets* Improvements project is located within the National Capital Interstate Air Quality Control Region (AQCR #47). This AQCR includes the District of Columbia, Maryland, and Virginia Intrastate Air Quality Control Region. The District of Columbia is currently in attainment status for 4 of the 7 criteria pollutants, Pb, NO_2, PM_{10} and SO_2, re-classified from nonattainment to maintenance for CO, and has been classified as being in nonattainment for the 1997 and 2008 8-hour ozone, and the 1997 $PM_{2.5}$ standards.

4.0 REGIONAL CONFORMITY

Regional level transportation conformity is addressed through the approval of the LRP and the TIP. *The Air Quality Conformity Update of The 2012 Constrained Long Range Plan and The Fy2013-2018 Transportation Improvement Program* for the Washington Metropolitan Region was published on March 20, 2013. The Pennsylvania Avenue/Minnesota Avenue *Great Streets* Improvements project is identified as TIP ID: 2743 in the Constrained Long

Range Plan. The project does not appear in the *Air Quality Conformity Update* since only projects that are "regionally significant" are listed and specifically modeled.[1] However, emissions from all projects are included in the regional emissions analysis.[2]

The FHWA and the Federal Transit Administration (FTA) reviewed the *The 2012 Constrained Long Range Plan and The Fy2013-2018 Transportation Improvement Program* for the Washington Metropolitan Region. The FHWA and FTA found that the "2012 CLRP and 2013-2018 TIP conform to the region's State Implementation Plans, and that the conformity determination has been performed in accordance with the Transportation Conformity Rule (40 CFR Part 93), as amended."[3]

5.0 PROJECT LEVEL CONFORMITY

Project level conformity analysis evaluate whether there are air quality impacts on a smaller scale than an entire nonattainment or maintenance area. It relates a project to the NAAQS on a more localized basis. The project level analyses addresses the results of a CO hot-spot analysis for the existing condition (2012) and No-Build (2015 and 2040) along with the Revised Square and Conventional Intersection Build Alternatives (2015 and 2040) comparing the results to the National Ambient Air Quality Standards (NAAQS). The proposed opening year is 2015 and the design year is 2040. The analysis also presents a discussion on ozone, and $PM_{2.5}$.

5.1 CO Hot-Spot (Microscale) Analysis

CO emissions are greatest from vehicles operating at low speeds and prior to complete engine warm-up (within approximately eight minutes of starting). Congested urban roads, therefore, tend to be the principal problem areas for CO. Because the averaging times associated with the CO standards are relatively short (1 and 8 hours), CO concentrations can be modeled using simplified "worst-case" meteorological assumptions. Modeling is also simplified considerably by the stable, non-reactive nature of CO.

5.1.1 Methodology

The CO hot-spot analysis followed the modeling guidelines presented in EPA's "Guideline for Modeling Carbon Monoxide from Roadway Intersections"[4] and EPA's "Using MOVES in Project-Level Carbon Monoxide Analyses"[5]. The EPA's MOVES2010b (MOVES) and EPA's approved CAL3QHC 2.0 (CAL3QHC)[6] computer models were used to analyze vehicular emissions and the hourly dispersion of CO adjacent to the intersection of Pennsylvania and Minnesota Avenues. Traffic and emissions for the existing (2012) condition, No-Build (2015

[1] Elena Constantine (econstantine@mwcog.org), "Penn Ave/Minn Ave *Great Street* Improvements", e-mail message, May 28, 2013.
[2] Emily Biondi (FHWA), telephone conversation with John Jaeckel (HNTB), September 30, 2013.
[3] Brigid Hynes-Cherin, letter, addressed to Scott York, May 24, 2013.
[4] "Guidelines for Modeling Carbon Monoxide from Roadway Intersections", U.S. Environmental Protection Agency, EPA-454/R-92-005, November 1992.
[5] "Using MOVES in Project-Level Carbon Monoxide Analyses", U.S. Environmental Protection Agency, EPA-420-B-10-041, December 2010.
[6] "User's Guide to CAL3QHC Version 2.0: A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections", U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC, September 1995.

and 2040), and the anticipated first year of operation (2015) and design year (2040) for the 2 Build alternatives were modeled. EPA's MOVES2010b was used to develop vehicular emission rates. MWCOG provided District of Columbia specific input variables for MOVES.[7]

CAL3QHC is a pollutant dispersion-modeling program for predicting pollutant concentrations from motor vehicles under free-flow conditions, or in the vicinity of roadway intersections. Peak traffic volumes and average operating speeds from the traffic analysis Synchro 8 Reports were used to analyze the intersection.[8] Thirty-one air quality receptors, A1 – A31, were placed 10 ft away from the edge of pavement, at the stop line paralleling the traffic lanes and at 82 foot intervals as shown in Figure 2, 3, and 4, on pages 2, 3, and 4, respectively. Two of the 31 receptors were located at the nearest entry doors to daycare facilities along Pennsylvania Avenue, southeast of the Pennsylvania Avenue, Minnesota Avenue intersection. In accordance with EPA procedure, average speeds for each link were used to develop the CO emission factors with MOVES. Worst-case meteorological variables and an urban background CO concentration obtained from U.S. EPA AirData for the monitoring site at 420 34th Street N.E. were used in the CAL3QHC model. The 1-hour and 8-hour background concentration were the highest second maximum values at the three CO monitoring sites in the District of Columbia for 2012. Variables used in CAL3QHC included:

- Meteorological conditions:
  Wind speed: 1 m/s (2.2 mph), worst case.
  Wind direction: Worst case for each receptor location, calculated every 10 degrees.
  Atmospheric stability class: Pasquill Class "E"

- Surface roughness: 175 cm (68.9 in.), study area is a mixture of industrial and single family residential.

- Mixing height: 0 m (0 ft).

- Background CO concentrations: 2.9 ppm 1-hour and 2.5 ppm 8-hour, (2012 data, second highest concentration).[9]

- Existing 2010 and future 2020 CO emission factors from MOBILE6.2.

- Persistence factor of 0.7 was used to develop the 8-hour concentrations.

5.1.2 Results

The results of the CO microscale air quality modeling are presented in Table 2 (1-Hour concentrations) and Table 3 (8-Hour concentrations). The maximum 1-hour CO concentrations were 4.8 ppm for existing conditions (2012), 4.4 ppm for the 2015 No-Build, 5.7 ppm for the 2015 Revised Square Alternative, 4.8 ppm for the 2015 Conventional Intersection Alternative, 5.7 ppm for the 2040 No-Build, 4.9 ppm for the 2040 Revised Square Alternative, and 5.8 ppm for the 2040 Conventional Intersection Alternative. The maximum 8-hour CO concentrations were 3.8 ppm for existing conditions (2012), 3.6 ppm for the 2015 No-Build, 4.5 ppm for the 2015 Revised Square Alternative, 3.8 ppm for the 2015

[7] Eulalie Gower-Lucas (elucas@mwcog.org), "Penn Ave/Minn Ave *Great Street* Improvements", e-mail message, May 22, 2013.
[8] Bo Yuan (byuan@hntb.com), "48934: Penn Ave Traffic", e-mail message, April 26, 2013.
[9] <http://www.epa.gov/airdata>, accessed May 29, 2013.

Conventional Intersection Alternative, 4.5 ppm for the 2040 No-Build, 3.9 ppm for the 2040 Revised Square Alternative, and 4.5 ppm for the 2040 Conventional Intersection Alternative. The 1-hour concentrations include a background concentration of 2.9 ppm and the 8-hour concentrations include a background concentration of 2.5 ppm. None of these concentrations exceed either the 1-hour (35 ppm) or 8-hour (9 ppm) NAAQS. Therefore, the project meets the project level conformity requirements in 40 CFR Part 93.

The MOVES and CAL3QHC input and output files have been provided to DDOT on a CD.

TABLE 2

MICROSCALE AIR QUALITY ANALYSIS
MAXIMUM 1-HOUR CO CONCENTRATIONS (ppm)*

Air Quality Receptor ID	2012	2015			2040		
	Existing	No Build	Revised Square	Conventional Intersection	No Build	Revised Square	Conventional Intersection
	1 hour	1 hour	1 hour	1 hour	1 hour	1 hour	1 hour
A1	3.9	3.6	4.0	3.9	4.1	3.6	3.9
A2	3.8	3.6	3.9	3.6	3.8	3.6	3.8
A3	3.8	3.6	3.8	3.7	3.7	3.5	3.7
A4	3.7	3.5	3.9	3.9	4.2	3.4	3.5
A5	3.8	3.6	4.0	3.6	3.7	3.4	3.6
A6	3.9	3.7	4.1	3.5	3.7	3.7	3.8
A7	4.0	3.8	4.1	4.0	4.2	3.3	3.4
A8	3.9	3.8	4.1	3.9	4.3	3.4	3.5
A9	4.0	3.7	4.1	3.9	4.6	3.7	3.9
A10	4.1	3.9	4.4	3.9	4.5	3.7	3.9
A11	3.7	3.5	3.9	3.8	4.5	3.6	3.9
A12	3.6	3.4	3.6	3.8	4.5	3.8	4.1
A13	4.3	4.1	4.3	4.1	4.9	3.8	4.1
A14	3.9	3.6	3.9	3.7	5.2	3.9	4.2
A15	4.5	4.1	4.3	3.6	4.6	4.9	5.8
A16	4.4	4.0	4.4	4.4	5.7	4.6	5.3
A17	4.5	4.1	4.6	3.9	5.2	4.4	4.9
A18	4.5	4.4	5.3	3.8	5.0	4.2	4.4
A19	4.6	4.4	5.0	4.8	5.4	4.1	4.2
A20	4.6	4.3	4.7	4.3	4.8	4.3	4.4
A21	4.8	4.4	5.7	4.2	4.4	3.9	4.1
A22	4.5	4.3	5.3	4.4	4.3	3.7	3.6
A23	4.6	4.4	5.1	4.2	4.2	3.6	3.6
A24	4.5	4.2	4.8	4.3	4.2	3.8	4.0
A25	4.3	4.0	4.4	3.9	5.5	3.5	3.6
A26	4.0	3.9	4.2	3.9	5.3	3.5	3.5
A27	4.4	4.0	4.5	3.8	5.2	4.2	4.6
A28	3.8	3.6	4.0	3.6	3.9	4.2	4.6
A29	3.7	3.5	3.7	3.7	3.8	4.4	4.7
A30	3.7	3.6	3.8	-	-	3.7	3.9
A31	3.7	3.6	3.9	-	-	3.6	3.8

*The National Ambient Air Quality Standard for CO is 35 ppm for a one hour average.
Concentrations include an ambient background level of 2.9 ppm (1 hour)
Indicates maximum concentration for each alternative and year of analysis.
Source: HNTB Corporation, May 2013

TABLE 3

MICROSCALE AIR QUALITY ANALYSIS
MAXIMUM 8-HOUR CO CONCENTRATIONS (ppm)*

Air Quality Receptor ID	2012	2015			2040		
	Existing	No Build	Revised Square	Conventional Intersection	No Build	Revised Square	Conventional Intersection
	8 hour	8 hour	8 hour	8 hour	8 hour	8 hour	8 hour
A1	3.2	3.0	3.3	3.2	3.3	3.0	3.2
A2	3.1	3.0	3.2	3.0	3.1	3.0	3.1
A3	3.1	3.0	3.1	3.1	3.1	2.9	3.1
A4	3.1	2.9	3.2	3.2	3.4	2.9	2.9
A5	3.1	3.0	3.3	3.0	3.1	2.9	3.0
A6	3.2	3.1	3.3	2.9	3.1	3.1	3.1
A7	3.3	3.1	3.3	3.3	3.4	2.8	2.9
A8	3.2	3.1	3.3	3.2	3.5	2.9	2.9
A9	3.3	3.1	3.3	3.2	3.7	3.1	3.2
A10	3.3	3.2	3.6	3.2	3.6	3.1	3.2
A11	3.1	2.9	3.2	3.1	3.6	3.0	3.2
A12	3.0	2.9	3.0	3.1	3.6	3.1	3.3
A13	3.5	3.3	3.5	3.3	3.9	3.1	3.3
A14	3.2	3.0	3.2	3.1	4.1	3.2	3.4
A15	3.6	3.3	3.5	3.0	3.7	3.9	4.5
A16	3.6	3.3	3.6	3.6	4.5	3.7	4.2
A17	3.6	3.3	3.7	3.2	4.1	3.6	3.9
A18	3.6	3.6	4.2	3.1	4.0	3.4	3.6
A19	3.7	3.6	4.0	3.8	4.3	3.3	3.4
A20	3.7	3.5	3.8	3.5	3.8	3.5	3.6
A21	3.8	3.6	4.5	3.4	3.6	3.2	3.3
A22	3.6	3.5	4.2	3.6	3.5	3.1	3.0
A23	3.7	3.6	4.0	3.4	3.4	3.0	3.0
A24	3.6	3.4	3.8	3.5	3.4	3.1	3.3
A25	3.5	3.3	3.6	3.2	4.3	2.9	3.0
A26	3.3	3.2	3.4	3.2	4.2	2.9	2.9
A27	3.6	3.3	3.6	3.1	4.1	3.4	3.7
A28	3.1	3.0	3.3	3.0	3.2	3.4	3.7
A29	3.1	2.9	3.1	3.1	3.1	3.6	3.8
A30	3.1	3.0	3.1	-	-	3.1	3.2
A31	3.1	3.0	3.2	-	-	3.0	3.1

*The National Ambient Air Quality Standard for CO is 35 ppm for a one hour average.
Concentrations include an ambient background level of 2.5 ppm (8 hour)
Indicates maximum concentration for each alternative and year of analysis.
Source: HNTB Corporation, May 2013

5.2 Ozone

Ozone project level conformity is addressed through the approval of the LRP and the TIP. As stated in section 4.0 Regional Conformity, *The Air Quality Conformity Update of The 2012 Constrained Long Range Plan and The Fy2013-2018 Transportation Improvement Program* for the Washington Metropolitan Region was approved by the FHWA and FTA. Therefore, the Pennsylvania Avenue/Minnesota Avenue *Great Streets* Improvements project meets the project level conformity requirements in 40 CFR Part 93.

5.3 $PM_{2.5}$

The Pennsylvania Avenue/Minnesota Avenue *Great Streets* Improvements project, as stated in Section 3.1.1 – Attainment Designation, is located within a nonattainment area for $PM_{2.5}$. The transportation conformity rule, 40 CFR 93.123(b)(1) requires a PM hot-spot analysis only for projects of local air quality concern. The proposed project is an intersection improvement project at individual intersections that is being designed to improve traffic flow and operational efficiencies, does not involve any increases in idling, and the no-build and build volumes through the intersection are the same. The project would be expected to have a neutral or positive influence on $PM_{2.5}$ emissions. Therefore, the project is not one of local air quality concern and a hot-spot analysis is not required.

6.0 MSAT

In addition to the criteria air pollutants presented in Table 1, EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries).

"Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (http://cfcpub.epa.gov/ncea/iris/index.cfm). In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (http://www.epa.gov/ttn/atw/nata1999/). These are acrolein, benzene, 1,3-butidiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules. The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOBILE6.2 model, even if vehicle activity (vehicle-miles travelled, VMT) increases by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050…."[10]

[10] April Marchese, "Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents", Memorandum, addressed to FHWA Division Administrators, December 6, 2012, p. 2.

"The FHWA developed a tiered approach for analyzing MSAT in NEPA documents, depending on specific project circumstances:.

1. No analysis for projects with no potential for meaningful MSAT effects;
2. Qualitative analysis for projects with low potential MSAT effects; or
3. Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects…

(1) Projects with No Meaningful Potential MSAT Effects or Exempt Projects.

"The types of projects included in this category are:

> Projects qualifying as a categorical exclusion under 23 CFR 771.117(c) (subject to consideration whether unusual circumstances exist under 23 CFR 771.117(b));
>
> Projects exempt under the Clean Air Act conformity rule under 40 CFR 93.126; or
>
> Other projects with no meaningful impacts on traffic volumes or vehicle mix."[11]

The purpose of this project is to improve traffic flow and operating efficiencies through the intersection by redirecting traffic, improving pedestrian safety and in some cases eliminating left turn conflicts. "This project has been determined to generate minimal air quality impacts for CAAA criteria pollutants and has not been linked with any special MSAT concerns. As such, this project will not result in changes in traffic volumes, vehicle mix, basic project location, or any other factor that would cause an increase in MSAT impacts of the project from that of the no-build alternative.

"Moreover, EPA regulations for vehicle engines and fuels will cause overall MSAT emissions to decline significantly over the next several decades. Based on regulations now in effect, an analysis of national trends with EPA's MOVES model forecasts a combined reduction of over 80 percent in the total annual emission rate for the priority MSAT from 2010 to 2050 while vehicle-miles of travel are projected to increase by 100 percent. This will both reduce the background level of MSAT as well as the possibility of even minor MSAT emissions from this project."[12]

5.0 CONSTRUCTION MITIGATION

The Pennsylvania Avenue/Minnesota Avenue *Great Streets* Improvements project construction will take place over two construction seasons. During each construction season there would be localized increased emissions from construction equipment and particulate emissions from construction activities. Particulate emissions, whether from construction equipment diesel exhaust or dust from the construction activities, should be controlled as well as possible. Contractors should follow all DDOT Standard Construction Specification Sections that address the control of construction equipment exhaust or dust during construction.

[11] "Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents", p. 4.
[12] Ibid, Appendix A.

Even though construction mitigation measures are not required, there are several measures that could be considered to reduce engine activity or reduce emissions per unit of operating time. Operational agreements that reduce or redirect work or shift times to avoid community exposures can have positive benefits. Also, technological adjustments to construction equipment, such as off-road dump trucks and bulldozers, could be an appropriate strategy. The EPA recommends Best Available Diesel Retrofit Control Technology (BACT) to reduce diesel emissions. Typically, BACT requirements can be met through the retrofit of all diesel powered equipment with diesel oxidation catalysts or diesel particulate filters, and other devices that provide an after-treatment of exhaust emissions.

6.0 CONCLUSION

Based on the air quality analysis completed for the proposed improvements, this project has met the 40 CFR Part 93 requirements for project level transportation conformity for CO, ozone and $PM_{2.5}$, and will not contribute to any violation of the NAAQS or result in any increase in MSAT emissions.

7.0 REFERENCES

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