6. AIR QUALITY

This section assesses the potential effect of each alternative on air quality in accordance with the guidelines set forth by 23 CFR Part 771, 49 CFR Part 622, the Clean Air Act (CAA), and NEPA.

6.1 Existing Conditions

Specifically presented in this section are the applicable National Ambient Air Quality Standards (NAAQS) and a discussion of representative ambient air quality monitoring data collected from ambient air quality monitoring stations located throughout Maryland. The air quality monitoring data was obtained from the U.S. EPA Air Data Database (http://www.epa.gov/airdata/).

National Ambient Air Quality Standards

The CAA, last amended in 1990, requires the U.S. EPA to set NAAQS for air pollutants considered harmful to public health and the environment. NAAQS have been established for the following criteria air pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter (including particulate matter equal to or less than 10 microns in diameter (PM_{10}) and particulate matter equal to or less than 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb). The CAA also identifies two types of NAAQS, primary and secondary. Primary NAAQS provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary NAAQS provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

Table 6-1 presents the primary and secondary NAAQS applicable to the Midcounty Corridor Project. Areas where concentrations of criteria pollutants are below the NAAQS are designated as being in “attainment” (A) and areas where a criteria pollutant level exceeds the NAAQS are designated as “non-attainment” (N). Maintenance (M) areas are areas that are in attainment but were formerly designated nonattainment, and have implemented plans to maintain their attainment status. An unclassifiable (U) area designation indicates that no representative ambient air monitoring data is available to designate the area as either attainment or nonattainment. Ozone nonattainment areas are categorized based on the severity of pollution: marginal, moderate, serious, severe, or extreme.

The Midcounty Corridor Project is located in Montgomery County, Maryland. Montgomery County, Maryland is classified as a moderate nonattainment area for 8-hour O_3, a nonattainment area for annual $PM_{2.5}$, and a maintenance area for 1-hour and 8-hour CO. Montgomery County, Maryland is classified as being in attainment for all other criteria air pollutants and averaging times (http://epa.gov/airquality/greenbook/anay_md.html).

**Table 6-1: National Ambient Air Quality Standards
Representative Ambient Air Quality Monitoring Data**

Pollutant	Averaging Time	Standard Concentration	Attainment Status
Carbon Monoxide (CO)	8-Hour	9 ppm	**M**
	1-Hour	35 ppm	**M**
Lead (Pb)	Rolling 3-Month Avg.	0.15 µg/m^3	**U**
Nitrogen Dioxide (NO_2)	Annual	53 ppb	**A**
	1-Hour	100 ppb	**A**
Ozone (O_3)	8-Hour (4th Highest)	0.075 ppm	**A**
Particulate Matter (PM_{10})	24-Hour	150 µg/m^3	**A**
Particulate Matter ($PM_{2.5}$)	24-Hour	35 µg/m^3	**A**
	Annual	15 µg/m^3	**N**
Sulfur Dioxide (SO_2)	1-Hour	75 ppb (99th Percentile)	**A**
	3-Hour	0.5 ppm	**A**

A = Attainment
M = Maintenance
N = Nonattainment
U = Unclassified

ppb = parts per billion
ppm = parts per million
µg/m3 = microgramper cubic meter

The Maryland Department of the Environment (MDE) currently operates 26 air monitoring sites around the State of Maryland which measure ground-level concentrations of criteria air pollutants, air toxics, meteorology, and other research-oriented measurements. Of these, only four MDE monitoring stations measure SO_2, 1-hour NO_2, and CO. The closest and most representative MDE monitoring station for these air pollutants and the specified averaging time is from the monitoring station located in Beltsville, Maryland in Prince Georges County. For annual NO_2, only two monitoring sites, Essex, Maryland and Baltimore, Maryland had annual NO_2 data available for 2011. The Essex, Maryland site was chosen to be used to the most representative of annual NO_2 background for the Midcounty Corridor Project. No Pb ambient air monitoring data is measured in Maryland. For O_3 and $PM_{2.5}$, the MDE operates a rural monitoring station located in Rockville, Maryland in Montgomery County which is considered to be representative of the background O_3 and $PM_{2.5}$ ambient air quality of the Midcounty Corridor Project. For 24-hour PM_{10}, Glen Burnie, Maryland monitoring site was used to be representative of the background 24-hour PM_{10}. **Table 6-2** presents a summary of the ambient air quality monitoring data available from these sites for the regulated criteria air pollutants.

Table 6-2: Representative Ambient Air Quality Monitoring Data

Pollutant	Averaging Time	Air Quality Concentration	Monitoring Station and Year
Carbon Monoxide (CO)	8-Hour (Second Highest)	1.0 ppm	Beltsville, MD 2010
	1-Hour (Second Highest)	1.3 ppm	
Lead (Pb)	Rolling 3-Month Avg.	N/A	N/A
Nitrogen Dioxide (NO_2)	Annual (1^{st} Highest)	26.7 ppb	Essex, MD 2011
	1-Hour (98^{th} Percentile)	47 ppb	Beltsville, MD 2010
Ozone (O_3)	8-Hour (4^{th} Highest)	0.077 ppm	Rockville, MD 2010
Particulate Matter (PM_{10})	24-Hour (Second Highest)	24 $\mu g/m^3$	Glenburnie, MD 2009
Particulate Matter ($PM_{2.5}$)	24-Hour (Second Highest)	25 $\mu g/m^3$	Rockville, MD 2009-2011 (Avg.)
	Annual (1^{st} Highest)	13 $\mu g/m^3$	Rockville, MD 2009-2011 (Avg.)
Sulfur Dioxide (SO_2)	1-Hour (99^{th} Percentile)	10 ppb	Beltsville, MD 2010
	3-Hour (Second Highest)	N/A	N/A

N/A = Not Available

The State Implementation Plan of the Clean Air Act

As authorized by the CAA, the U.S. EPA has delegated responsibility for ensuring compliance with NAAQS to the states and local agencies. As such, each state must develop air pollutant control programs and promulgate regulations and rules that focus on meeting NAAQS and maintaining healthy ambient air quality levels. These programs are detailed in State Implementation Plans (SIPs) that must be developed by each state or local regulatory agency and approved by the U.S. EPA. A SIP is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS. Any changes to the compliance schedule or plan (e.g., new regulations, emissions budgets, controls) must be incorporated into the SIP and approved by the U.S. EPA.

The MDE is the agency that is responsible for and prepares the SIP which covers the Midcounty Corridor Project. The SIP provides an inventory of existing air emissions and accounts for planned projects within the region that have the potential to increase pollutant emissions. The SIP accounts for general increases in vehicular travel throughout the region and anticipated changes in land use and demographic/employment patterns.

Greenhouse Gases and Climate

Greenhouse gases (GHGs) are components of the atmosphere that trap heat relatively near the surface of the earth, and therefore, contribute to the greenhouse effect and global warming. Most GHGs occur naturally in the atmosphere, but increases in their concentration result from human activities such as the burning of fossil fuels. Global temperatures are expected to continue to rise as human activities continue to add carbon dioxide, methane, nitrous oxide, and other greenhouse (or heat-trapping) gases to the atmosphere. Most of the United States is expected to experience an increase in average temperature. Precipitation changes, which are also very important to consider when assessing climate change effects, are more difficult to predict. The potential for rainfall to increase or decrease remains difficult to project for specific regions (*http://www.epa.gov/climatechange/effects/index.html* & IPCC, 2007).

Carbon dioxide (CO_2) is, by far, the most significant GHG emitted by transportation sources. CO_2 is emitted in direct proportion to the amount of fuel consumed. In determining the amount of fuel consumed under each alternative, the most important factors are the vehicle miles traveled (VMT), and the fuel economy of the vehicles using the alternative. Fuel economy is based on the type of vehicles in the fleet, average model year of the vehicles, vehicle maintenance such as tire pressure and catalytic converters, air conditioner usage, and vehicle operating characteristics such as speed, acceleration, travel time, and intersection delay. All of the fuel economy factors can be assumed to be relatively constant between alternatives, with the exception of acceleration, travel time, and intersection delay, since these are affected by the number of intersections along each alternative. However, VMT would be expected to have the greatest effect on the comparison of GHG emissions between alternatives.

Figure 3-9 provides a graphic depiction of the projected peak hour VMT along north-south roads throughout the study area under existing conditions, under the No Build scenario, and under each build alternative. Alternative 2 and Alternative 5 would be expected to result in a slight reduction in GHG emissions compared to the No Build scenario, since VMT under Alternatives 2 and 5 would remain similar to VMT under the No Build scenario, and intersection operation relative to the No Build would be improved under both alternatives. The other three build alternatives would be expected to result in increased GHG emissions due to their projected increase in VMT throughout the study area.

The extent of climate change effects, and whether these effects prove harmful or beneficial, will vary by region, over time, and with the ability of different societal and environmental systems to adapt to or cope with the change. Human health, agriculture, natural ecosystems, coastal areas, and heating and cooling requirements are examples of climate-sensitive systems. Rising average temperatures are already affecting the environment. Some observed changes include the shrinking of glaciers, thawing of permafrost, later freezing and earlier break-up of ice on rivers and lakes, lengthening of growing seasons, shifts in plant and animal ranges, and earlier flowering of trees (*http://www.epa.gov/climatechange/effects/index.html* & IPCC, 2007).

Baseline Condition

The baseline condition represents air emission and air quality impacts from mobile sources associated with the "No Build" alternative. Specifically, existing CO, $PM_{2.5}$, and NO_2 mobile source emissions for the geographic area of the Midcounty Corridor Project were assessed. The baseline condition mobile source analysis was prepared in accordance with U.S. EPA guidance, *A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersection* (U.S. EPA, 1995).

The U.S. EPA CAL3QHCR air quality dispersion model was used to predict the maximum 1-hour and 8-hour CO concentration, 24-hour and annual $PM_{2.5}$ concentration, and 1-hour and annual NO_2 concentration for the "No Build" alternative. **Table 6-3** presents the results of the CO modeling analysis which assessed the maximum morning (a.m.) and afternoon (p.m.) peak traffic volumes for specific locations which represent the Midcounty Corridor Project area. The maximum one-hour predicted CO concentration, including background, for the a.m. peak traffic period was 2.1 ppm and for the p.m. peak traffic period was 1.9 ppm, both of which are compliant with the 1-hour CO NAAQS of 35 ppm. The maximum 8-hour predicted CO concentration, including background, for the a.m. peak traffic period was 1.6 ppm and for the p.m. peak traffic period was 1.4 ppm, both of which are compliant with the 8-hour CO NAAQS of 9 ppm.

Table 6-3: Modeled Maximum Existing Peak CO Concentrations in the Vicinity of the Midcounty Corridor Project

Averaging	CO Concentration (ppm)					NAAQS (ppm)	NAAQS Exceeded?
	Background	A.M. Peak Period		P.M. Peak Period			
		Modeled	Total	Modeled	Total		
1-Hour	1.3	0.8	2.1	0.6	1.9	35.0	**No**
8-Hour	1.0	0.6	1.6	0.4	1.4	9.0	**No**

Table 6-4 presents the results of the $PM_{2.5}$ modeling analysis which assessed the maximum a.m. and p.m. peak traffic volumes for specific locations which represent the Midcounty Corridor Project area. The maximum 24-hour predicted $PM_{2.5}$ concentration, including background, for the a.m. peak traffic period was 30.7 $\mu g/m^3$ and for the p.m. peak traffic period was 30.6 $\mu g/m^3$, both of which are compliant with the 24-hour $PM_{2.5}$ NAAQS of 35 $\mu g/m^3$. The maximum annual $PM_{2.5}$ concentration, including background, for the a.m. peak traffic period was 11.2 $\mu g/m^3$ and for the p.m. peak traffic period was 11.2 $\mu g/m^3$, both of which are compliant with the annual $PM_{2.5}$ NAAQS of 15 $\mu g/m^3$.

Table 6-4: Modeled Maximum Existing Peak $PM_{2.5}$ Concentrations in the Vicinity of the Midcounty Corridor Project

Averaging	$PM_{2.5}$ Concentration ($\mu g/m^3$)					NAAQS ($\mu g/m^3$)	NAAQS Exceeded?
	Background	A.M. Peak Period		P.M. Peak Period			
		Modeled	Total	Modeled	Total		
24-Hour	30.0	0.7	30.7	0.6	30.6	35.0	**No**
Annual	11.0	0.2	11.2	0.2	11.2	15.0	**No**

Table 6-5 presents the results of the NO_2 modeling analysis which assessed the maximum a.m. and p.m. peak traffic volumes for specific locations which represent the Midcounty Corridor Project area. The maximum 1-hour predicted NO_2 concentration, including background, for both the a.m. peak traffic period and the p.m. peak traffic period was below the detection limit for CAL3QHCR. Therefore, it was assumed to be compliant with the 1-hour NO_2 NAAQS of 100 ppb. The maximum annual NO_2 concentration, including background, for the a.m. peak traffic period was 34.5 ppb and for the p.m. peak traffic period was 37.2 ppb, both of which are compliant with the annual NO_2 NAAQS of 53 ppb.

Table 6-5: Modeled Maximum Existing Peak NO_2 Concentrations in the Vicinity of the Midcounty Corridor Project

Averaging	NO_2 Concentration (ppb)					NAAQS (ppb)	NAAQS Exceeded?
	Background	A.M. Peak Period		P.M. Peak Period			
		Modeled	Total	Modeled	Total		
1-Hour	47.0	0.0	47.0	0.0	47.0	100.0	**No**
Annual	26.7	9.2	35.9	11.6	38.3	53.0	**No**

6.2 Air Quality Impacts

The local and regional air quality impacts associated with a proposed action such as the Midcounty Corridor Project are determined based on projected increases of regulated air pollutant emissions and the existing ambient air quality of the area. This section assesses changes in mobile source air emissions for the No Build Alternative, Alternative 4 Modified, Alternative 5, Alternative 8, and Alternative 9 transportation improvement alternatives.

Mobile Source Air Quality Analysis

The purpose of the mobile source air quality analyses were to determine whether there are any predicted local increases in CO, $PM_{2.5}$, and NO_2 emissions associated with each of the alternatives retained for detailed study and to determine if the predicted air quality impacts of CO, $PM_{2.5}$, and NO_2 were in compliance with their applicable NAAQS. The mobile source air quality analyses were performed for the study area intersection that would be most congested under each alternative, to demonstrate the "worst case" impact.

The U.S. EPA CAL3QHCR air quality dispersion model was used to perform the mobile source air quality analyses. Specifically, the U.S. EPA CAL3QHCR air quality dispersion model was used to predict the maximum 1-hour and 8-hour CO concentration, 24-hour and annual PM2.5 concentration, and 1-hour and annual NO2 concentration.

Modeling Results for CO

Table 6-6 presents the results of the 1-hour CO modeling NAAQS analysis which assessed both maximum a.m. and maximum p.m. peak traffic volumes for the worst case intersection for each of the alternatives retained for detailed study. The maximum 1-hour predicted CO concentration for all alternatives assessed, including background, for the a.m. peak traffic period was 2.1 ppm and for the p.m. peak traffic period was 1.9 ppm. These results show compliance with the 1-hour CO NAAQS of 35 ppm.

Table 6-7 presents the results of the 8-hour CO modeling NAAQS analysis which assessed both maximum a.m. and maximum p.m. peak traffic volumes for the worst case intersection for each of the alternatives retained for detailed study. The maximum 8-hour predicted CO concentration for all alternatives assessed, including background, for the a.m. peak traffic period was 1.6 ppm and for the p.m. peak traffic period was 1.4 ppm. These results show compliance with the 8-hour CO NAAQS of 9 ppm.

Table 6-6: Modeled Maximum 1-Hour CO Concentrations for Alternatives Retained for Detailed Study

Alternative	1-Hour CO Concentration (ppm)					NAAQS (ppm)	NAAQS Exceeded?
	Background	A.M. Peak Period		P.M. Peak Period			
		Modeled	Total	Modeled	Total		
No Build	1.3	0.6	1.9	0.6	1.9	35.0	**No**
4 Modified	1.3	0.5	1.8	0.3	1.6	35.0	**No**
5	1.3	0.6	1.9	0.6	1.9	35.0	**No**
8	1.3	0.6	1.9	0.4	1.7	35.0	**No**
9	1.3	0.8	2.1	0.3	1.6	35.0	**No**

Table 6-7: Modeled Maximum 8-Hour CO Concentrations for Alternatives Retained for Detailed Study

Alternative	8-Hour CO Concentration (ppm)					NAAQS (ppm)	NAAQS Exceeded?
	Background	A.M. Peak Period		P.M. Peak Period			
		Modeled	Total	Modeled	Total		
No Build	1.0	0.4	1.4	0.4	1.4	9.0	**No**
4 Modified	1.0	0.3	1.3	0.2	1.2	9.0	**No**
5	1.0	0.4	1.4	0.4	1.4	9.0	**No**
8	1.0	0.4	1.4	0.3	1.3	9.0	**No**
9	1.0	0.6	1.6	0.2	1.2	9.0	**No**

Modeling Results for $PM_{2.5}$

Table 6-8 presents the results of the 24-hour $PM_{2.5}$ modeling NAAQS analysis which assessed both maximum a.m. and maximum p.m. peak traffic volumes for the worst case intersection for each of the alternatives retained for detailed study. The maximum 24-hour $PM_{2.5}$ concentration for all alternatives assessed, including background, for the a.m. peak traffic period was 30.7 $\mu g/m^3$ and for the p.m. peak traffic period was 30.6 $\mu g/m^3$. These results show compliance with the 24-hour $PM_{2.5}$ NAAQS of 35 $\mu g/m^3$.

Table 6-9 presents the results of the annual $PM_{2.5}$ modeling NAAQS analysis which assessed both maximum a.m. and maximum p.m. peak traffic volumes for the worst case intersection for each of the alternatives retained for detailed study. The maximum annual $PM_{2.5}$ concentration for all alternatives assessed, including background, for the a.m. peak traffic period was 11.2 μg/m^3 and for the p.m. peak traffic period was 11.2 μg/m^3. These results show compliance with the annual $PM_{2.5}$ NAAQS of 15 μg/m^3.

Table 6-8: Modeled Maximum 24-Hour $PM_{2.5}$ Concentrations for Alternatives Retained for Detailed Study

Alternative	24-Hour $PM_{2.5}$ Concentration (μg/m^3)					NAAQS (μg/m^3)	NAAQS Exceeded?
	Background	A.M. Peak Period		P.M. Peak Period			
		Modeled	Total	Modeled	Total		
No Build	30.0	0.6	30.6	0.6	30.6	35.0	**No**
4 Modified	30.0	0.7	30.7	0.4	30.4	35.0	**No**
5	30.0	0.6	30.6	0.6	30.6	35.0	**No**
8	30.0	0.5	30.5	0.5	30.5	35.0	**No**
9	30.0	0.7	30.7	0.4	30.4	35.0	**No**

Table 6-9: Modeled Maximum Annual $PM_{2.5}$ Concentrations for Alternatives Retained for Detailed Study

Alternative	Annual $PM_{2.5}$ Concentration (μg/m^3)					NAAQS (μg/m^3)	NAAQS Exceeded?
	Background	A.M. Peak Period		P.M. Peak Period			
		Modeled	Total	Modeled	Total		
No Build	11.0	0.1	11.1	0.2	11.2	15.0	**No**
4 Modified	11.0	0.2	11.2	0.1	11.1	15.0	**No**
5	11.0	0.2	11.2	0.2	11.2	15.0	**No**
8	11.0	0.2	11.2	0.1	11.1	15.0	**No**
9	11.0	0.2	11.2	0.1	11.1	15.0	**No**

Montgomery County, Maryland is classified as a nonattainment area for 24-hour $PM_{2.5}$. The area was designated as nonattainment for $PM_{2.5}$ on January 5, 2005 by the U.S. EPA. This designation became effective on April 5, 2005; 90 days after the U. S. EPA's published action in the Federal Register. On January 10, 2012, the U.S. EPA determined that Montgomery County has attained the 1997 annual $PM_{2.5}$ NAAQS; however, this determination of attainment is not equivalent to a re-designation, and the State of Maryland must still meet the statuary requirements for re-designation in order for Montgomery County to be re-designated to attainment.

Transportation conformity for the $PM_{2.5}$ standards became applicable on April 5, 2006, which is after the one-year grace period provided by the Clean Air Act (CAA). Projects that require hotspot analysis for $PM_{2.5}$ are those classified as Projects of Air Quality Concern, as provided in 40 CFR 93.123 (b)(l), as outlined below:

- New or expanded highway projects that have a significant number of or significant increase in diesel vehicles
- Projects affecting intersections that are at LOS D, E, or F with a significant number of diesel vehicles, or those that will change to LOS D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project
- New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location
- Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location
- Projects in or affecting locations, areas, or categories of sites which are identified in the PM_{10} or $PM_{2.5}$ applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

A $PM_{2.5}$ applicability analysis was performed to assess the alternatives retained for detailed study. The results of this analysis are provided in the following paragraphs.

The Midcounty Corridor Project and associated transportation improvements do not meet the criteria set forth in 40 CFR 93.123(b)(1) as amended to be considered a Project of Air Quality Concern, primarily because each of the alternatives, whether they are based on improvements to existing roadways or construction of a new roadway, would primarily be used by gasoline vehicles. The Midcounty Corridor Project is not expected to have a significant increase in diesel vehicles. In accordance with FHWA guidance, "40 CFR 93.123(b)(1)(i) should be interpreted as applying only to projects that would involve a significant increase in the number of diesel transit buses and diesel trucks on the facility[5]".

Section 17 6(c) of the CAA, Federal Conformity Rule, and State of Maryland Conformity Rule (COMAR 26.11.26) require that transportation plans and programs conform to the intent of the SIP through a regional emissions analysis in $PM_{2.5}$ nonattainment areas. Conformity to the SIP means that the transportation activity would not cause new air quality violations, worsen existing violations, or delay timely attainment of the relevant NAAQS. The Midcounty Corridor Project is not a federally funded project so the Federal Conformity Rule is not applicable. However, this section has demonstrated that "conformity", as related to the Maryland SIP, shows that none of the alternatives retained for detailed study will cause new air quality violations, worsen existing violations, or delay timely attainment of the national ambient air quality standards. Based on the preceding review and analysis, it is anticipated that each of the alternatives retained for detailed study would meet the CAA and 40 CFR 93.109 requirements and would not cause or contribute to a new violation of the $PM_{2.5}$ NAAQS, or increase the frequency or severity of a violation. These requirements are met for particulate matter without a project-level hot-spot analysis, since all the alternatives retained for detailed study have been found not to be a Project of Air Quality Concern as defined under 40 CFR 93.123(b)(1) because all the alternatives involve either a new highway, or an improvement of an existing highway, for which the primary vehicular usage would be gasoline-powered vehicles, as opposed to diesel-powered vehicles.

Modeling Results for NO_2

The 1-hour NO_2 modeling of the NAAQS is a relatively recent new regulatory requirement; therefore, the CAL3QHCR model has not been updated to account for its low level concentrations. **Table 6-10** presents the results of the annual NO_2 modeling NAAQS analysis which assessed both maximum a.m. and maximum p.m. peak traffic volumes for the worst case intersection for each of the alternatives retained for detailed study. The maximum predicted annual NO_2 concentration for all alternatives assessed, including background, for the a.m. peak traffic period was 35.9 ppb and for the p.m. peak traffic period was 38.2 ppb. These results show compliance with the annual NO_2 NAAQS of 53 ppb.

Table 6-10: Modeled Maximum Annual NO_2 Concentrations for Alternatives Retained for Detailed Study

Alternative	Annual NO_2 Concentration (ppb)					NAAQS (ppb)	NAAQS Exceeded?
	Background	A.M. Peak Period		P.M. Peak Period			
		Modeled	Total	Modeled	Total		
No Build	26.7	7.8	34.5	10.5	37.2	53.0	**No**
4 Modified	26.7	6.1	32.8	6.2	32.9	53.0	**No**
5	26.7	8.7	35.4	11.6	38.2	53.0	**No**
8	26.7	8.2	34.9	8.4	35.1	53.0	**No**
9	26.7	9.2	35.9	8.1	34.8	53.0	**No**

Mobile Source Air Toxics (MSAT) Analysis

The MSAT analysis, presented below, was prepared in accordance with U.S. EPA guidance, *A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections* (U.S. EPA, 1995).

In addition to the criteria air pollutants for which there is an established NAAQS, the U.S. EPA also regulates air toxic pollutants. Most air toxic pollutants originate from human-made sources, including road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries). Mobile source air toxics (MSATs) are a subset of the 188 air toxics regulated by Section 112(b) of the CAA. MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and others are emitted to the air when the fuel evaporates. Other MSATs are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal MSATs also result from engine wear or from impurities in oil or gasoline.

Technical shortcomings of emissions and dispersion models and uncertain science, with respect to health effects, currently prevent meaningful or reliable estimates of MSAT emissions and effects of a proposed action. Reliable methods do not exist to accurately estimate the health impacts of MSATs at the project level. However, it is possible to qualitatively assess the level of future MSATs emissions for a proposed action. A qualitative analysis cannot identify and measure health impacts from MSATs, but it provides a basis for identifying and comparing the potential differences among MSAT emissions for the alternatives retained for detailed study. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions among Transportation Project Alternative* (Clagett & Miller, 2006).

For the transportation improvement alternatives, the amount of MSATs emitted would be proportional to the annual average daily traffic (AADT) or vehicle miles traveled (VMT). **Table 6-11** presents the design year 2030 AADT associated with each of the alternatives retained for detailed study. The AADT value for each of the transportation improvement alternatives is anticipated to be slightly greater than that of the "No Build" alternative because each of the transportation improvement alternatives are expected to reduce congestion and increase efficiency of the roadways, and may attract additional trips from elsewhere in the transportation area. The expected slight increase in AADT is expected to result in slightly higher MSAT emissions. However, the expected emissions increase due to increased AADT may be offset by expected lower MSAT emission rates due to increased speeds. This is based on the U.S. EPA's MOVES emissions model, which demonstrates that emissions of all of the priority MSATs, except for diesel particulate matter, decrease as speed increases. The extent to which these speed-related emission decreases would be expected to offset AADT-related emission increases cannot be reliably projected due to the inherent deficiencies of technical models. Finally, MSAT concentrations both in the Midcounty Project study area and regionally would decrease in future years due to the U.S. EPA's vehicle emission and fuel regulations. According to the Federal Highway Administration, as a result of the U.S. EPA's national emissions control programs, MSAT emissions are projected to be reduced by 57 to 87 percent between 2000 and 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, AADT growth rates, and local control measures. However, the magnitude of the U.S. EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the Midcounty Project study area are likely to be lower in the future in nearly all cases. For these reasons, the effects of the transportation improvement alternatives would be minor with respect to MSATs.

Table 6-11: Annual Average Daily Traffic (Design Year 2030)

Alternative	Annual Average Daily Traffic (AADT)
No Build*	28,000 – 52,000
4 Modified	34,000 – 49,000
5	27,000 – 53,000
8	21,000 – 52,000
9	21,000 – 43,000

* Volume projected for MD 355 in the No Build scenario.

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