South Mountain Transportation Corridor Study

Citizens Advisory Team
Technical Report Summary

Draft Air Quality

Why study air quality in the Environmental Impact Statement (EIS)?

Air pollution can make people sick, damage the environment, damage property, dirty buildings and other structures, create haze, and reduce visibility. In response, the Clean Air Act (CAA) was created, and as amended in 1970 implemented a national effort to maintain healthy air quality by controlling air pollution. The CAA provides the principal framework for national, state, and local efforts to protect air quality. The 1990 amendments to the CAA renewed and intensified national efforts to reduce air pollution in the United States. Air pollution comes from many different sources: stationary sources such as factories, power plants, and even dry cleaners; mobile sources such as cars, planes, trucks, and even lawn mowers; and naturally occurring sources such as windblown dust. Air quality can be affected in many ways by the pollution emitted from these sources. And further, these sources can emit a wide variety of pollutants. Consequently, the 1990 CAA is a lengthy, complex law--about 800 pages--because air pollution-related issues are difficult and complicated. For detailed information regarding the provisions of the CAA, the reader is referred to the Environmental Protection Agency (EPA) website (www.epa.gov).

The effects on air quality are studied in the EIS pursuant to the provisions set forth in the CAA and related guidance. The construction and operation of a freeway such as the proposed South Mountain Freeway could cause adverse impacts on the ambient (existing) air quality in the Study Area. Background information is provided below to assist the reader in understanding the parameters under which air quality impacts are assessed for a project like the South Mountain Freeway.

Some information about the analysis of air quality impacts

Discussion of Pollutants

While there is an abundance of air pollutants known to the EPA, certain pollutants are found throughout the United States. These pollutants are called ‘criteria’ air pollutants because the EPA has regulated them by first developing health-based criteria (science-based guidelines) as the basis for setting permissible levels. The permissible levels are known as the National Ambient Air Quality Standards, or NAAQS. One set of limits (primary standard) protects health; another set of limits (secondary standard) is intended to prevent environmental and property damage. Put another way, the exposure to people and the environment from these criteria pollutants at certain concentrations over a given period of time can be detrimental (most known air pollutants do not have such standards established). These pollutants are monitored by the EPA, as well as state and local organizations. In Maricopa County, the Maricopa County Air Quality Department (MCAQD) and Arizona Department of Environmental Quality (ADEQ) maintain a network of air quality monitoring sites – most of which are located in Phoenix and its surrounding communities operating 24 hours a day. The six regulated criteria pollutants are carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$)[1], and sulfur dioxide (SO_2). Three of these six pollutants are invisible gases that may

[1] PM_{10} refers to particles that measure less than or equal to 10 micrometers in diameter. $PM_{2.5}$ refers to particles that measure less than or equal to 2.5 micrometers in diameter.

be present in the atmosphere on both clear and hazy days. The other three pollutants directly contribute to haze. The pollutants, health effects and visual effects are summarized below.

Summary of Criteria Pollutant Characteristics[1]

Pollutant	Health Effect	Visual Effect	Status in Study Area[2]
Carbon monoxide	Reduced blood oxygen, angina aggravation	Invisible gas	attainment
Lead	Neurological impairments	Minimal	attainment
Nitrogen dioxide	Lung irritant	Brown gas	attainment
Ozone	Decreased lung function, lung damage	Invisible gas	nonattainment
Particulate matter	Premature mortality, disease aggravation	Haze particulates	nonattainment
Sulfur dioxide	Respiratory illness	Invisible gas	attainment

Notes:

1 The reader should refer to the EPA website for additional information pertaining to criteria pollutants.

2 Maricopa County Air Quality Department and Arizona Department of Environmental Quality maintain a network of air quality monitoring stations throughout the County.

A geographic area that meets or does better than the primary standard is called an attainment area; areas that don't meet the primary standard are called nonattainment areas. Many urban areas across the country are classified as nonattainment for at least one criteria air pollutant and as a result, millions of Americans live in non-attainment areas. The Study Area lies within nonattainment for two of the criteria pollutants, ozone and particulate matter.

In addition to the criteria pollutants, there are Hazardous Air Pollutants (HAPs), which are a range of compounds known or suspected of having serious health or environmental impacts. There are nearly 200 HAPs regulated by the CAA (EPA lists nearly 3,000 chemicals to be evaluated for pollution prevention and more than 10,000 chemicals that will require such evaluation). Sources include indoor sources such as cooking, home supplies, or building materials, and outdoor sources such as refineries, chemical plants, gasoline stations, and vehicle emissions. EPA listed 21 of the HAPs as Mobile Source Air Toxics (MSATs), of which a subset of six were considered to have the greatest risk on human health. According to EPA, motor vehicles are substantial contributors to the national emissions. However, unlike the criteria pollutants, there are no NAAQS established for MSATs at the current time. MSATs will be discussed in a separate section later in the summary.

Pollutant levels emitted are different by the type of vehicle

Different concentrations of the six criteria pollutants are emitted into the atmosphere depending on vehicle type, weather and traffic conditions. The EPA developed a model for state and local governments to estimate pollutant levels emitted by vehicle type. The model, Mobile6 (more on Mobile6 and its later versions are described later), establishes eight different types of vehicles, which are described below.[2]

- Light Duty Gas Vehicles (LDGV) – these include gasoline fueled two or four-door passenger cars such as sedans, coupes, and station wagons.
- Light Duty Gas Trucks Weighing equal to or less than 6,000 pounds (LDGT1) – these include gasoline fueled pickup trucks, minivans, passenger vans, and sport-utility vehicles weighing equal to or less than 6,000 pounds.
- Light Duty Gas Trucks Weighing over 6,000 pounds (LDGT2) – these include gasoline fueled pickup trucks, minivans, passenger vans, and sport-utility vehicles weighing more than 6,000 pounds.
- Heavy Duty Gas Vehicles (HDGV) – these include gasoline fueled vehicles that weigh over 8,500 pounds with two or more axles and six or more tires, such as large pick-ups, buses, delivery trucks, recreational vehicles (RVs), and semi trucks.
- Light Duty Diesel Vehicles (LDDV) – these include diesel fueled two or four-door passenger cars such as sedans, coupes, and station wagons.
- Light Duty Diesel Trucks (LDDT) – these include diesel fueled pick-up trucks, vans and sport utility vehicles weighing equal to or less than 8,500 pounds.
- Heavy Duty Diesel Vehicles (HDDV) – these include diesel fueled vehicles that weigh over 8,500 pounds with two or more axles and six or more tires, such as large pick-ups, buses, delivery trucks, recreational vehicles (RVs), and semi trucks.
- Motorcycles (MC) – two or three wheeled vehicles designed for on-road use.

Of these vehicle types, as estimated in 2002, heavy duty diesel vehicles contributed the most to particulate matter, nitrogen dioxide, and sulfur dioxide emissions. Light duty gas trucks weighing more than 6,000 pounds contributed the most to carbon monoxide emissions and motorcycles contributed the most to ozone precursor emissions. Generally, diesel vehicles accounted for the majority of particulate matter, nitrogen dioxide and sulfur dioxide emissions. Gas vehicles accounted for the majority of carbon and ozone precursor emissions. More detailed and technical information can be found in the periodic emissions inventory reports for each of the pollutants, which are published by the Maricopa County Environmental Science Division.

[2] Vehicle classifications and definitions obtained from the Environmental Protection Agency website. "Mobile Source Emissions – Past, Present, and Future." http://www.epa.gov/otaq/inventory/overview/examples.htm.

A word about the brown cloud

General perceptions about air quality stem mostly from visual indicators. Clarity is commonly perceived to be an indication of good air quality and haziness is perceived to be an indication of poor air quality. These perceptions can be somewhat misconstrued. In many cases, clear skies may indicate good air quality. Conversely, the brown cloud may occur on days that are not unhealthy. However, other factors such as weather, pollutant sources and the combination of pollutants in the air may reduce air quality even on clear days. Basically poor air quality can occur on both clear and hazy days. The difference is that certain pollutants emitted into the air absorb and scatter light, which causes haziness. Urban areas often experience a brown-colored haze, or ‘brown cloud’, which impairs visibility and can reduce air quality. This haze is experienced mostly in urban areas, including Maricopa County. (The Maricopa Association of Governments (MAG) conducted a study about brown clouds and published findings in a report titled *The 1999 Brown Cloud Project for the Maricopa County Area*). The report provides general information about brown clouds, details about brown clouds in Maricopa County, pollutants that contribute to the brown cloud and recommended brown cloud control measures. The report is available on the MAG website[3].

In 2003, ADEQ and the Visibility Index Oversight Committee developed an index to measure visibility conditions throughout the Phoenix metropolitan region. The index characterizes daily visibility conditions as excellent, good, fair, poor, or very poor. The figure below illustrates the range of visibility conditions experienced in the South Mountain area. Under excellent conditions, South Mountain can be seen clearly. Under very poor conditions, the hazy brown cloud restricts views of South Mountain.

Visibility Index

Source: South Mountain photos from ADEQ Phoenix Visibility Index 2005 (www.phoenixvis.net/gall-somt.html).

Pollutants that indirectly and directly contribute to brown clouds are emitted into the atmosphere by a number of activities (such as electric power generation, various industrial and manufacturing processes, truck and auto emissions, burning related to agriculture, etc.). When

[3] The 1999 Brown Cloud Project for the Maricopa County Area can be accessed on the MAG website: www.mag.maricopa.gov/archive/PUB/Document/Draft%20Brown%20Cloud%20Report.pdf.

sulfur oxide and nitrogen oxide gases are emitted into the air, secondary particles can form as they are carried downwind. The secondary particles including sulfate, formed from sulfur dioxide, and nitrates, formed from nitrogen dioxide, can contribute to haze.

Lead, nitrogen dioxide and particulate matter are pollutants that directly contribute to brown clouds. Of the three direct contributors to brown clouds, lead contributes the least. The introduction of unleaded gasoline in 1975 has since substantially decreased lead concentrations in the atmosphere. Nitrogen dioxide is a brown gas that contributes to the brown appearance of the haze in the atmosphere. The pollutant most responsible for brown clouds is particulate matter.

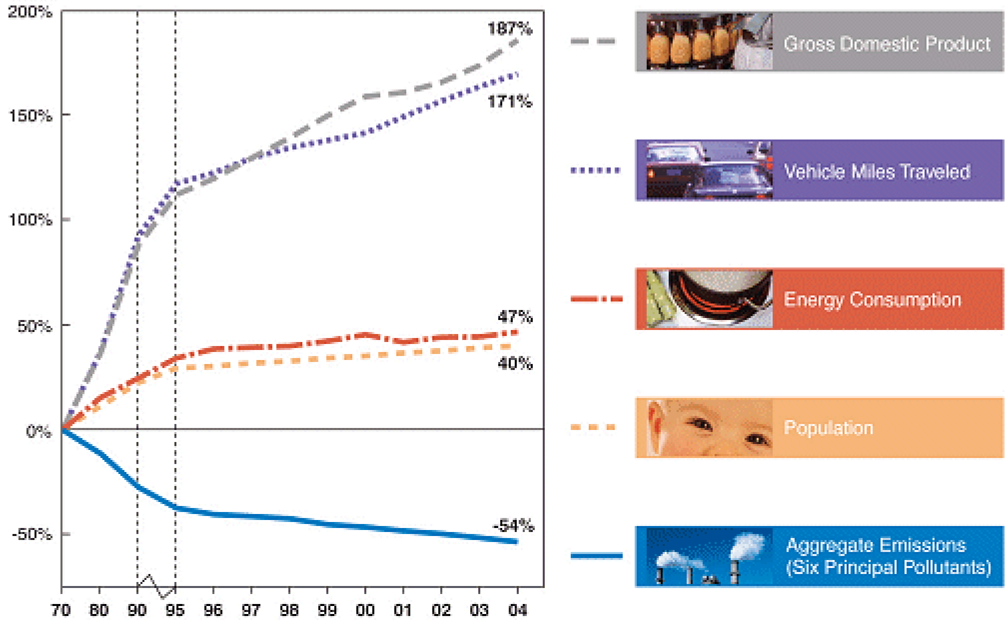
Particulate matter (PM) includes both solid particles and liquid droplets found in the air. Many manmade and natural sources emit PM directly or emit other pollutants that react in the atmosphere to form PM. These solid and liquid particles come in a wide range of sizes. Particles equal to or less than 10 micrometers in diameter (PM_{10}) pose a health concern because they can be inhaled into and accumulate in the respiratory system. Particles equal to or less than 2.5 micrometers in diameter ($PM_{2.5}$) are referred to as fine particles and are believed to result in larger health risks. Because of their small size, fine particles can lodge deeply into the lungs. Of the two, $PM_{2.5}$ is the dominant cause of haze.

Sources of PM_{10} and $PM_{2.5}$ emissions fall into four major categories including point sources, area sources, non-road mobile sources and on-road mobile sources. Point sources are stationary and include major industrial facilities or power plants. Area sources are also stationary and include small commercial, industrial, and residential facilities or wind blown dust from unpaved roads, construction sites, and agricultural fields (also referred to as fugitive dust). Non-road mobile sources are vehicles that operate off roads such as airplanes, trains and tractors. On-road mobile sources are vehicles that operate on streets or highways such as cars, commercial vehicles or motorcycles.

Pollutants from vehicle emissions is trending downward

National air quality trends and local air quality statistics are documented in the EPA's *National Air Quality and Emissions Trends Report, 1999*. Legislative efforts to improve air quality began in 1970 with the introduction of the CAA. The CAA started by setting automobile emissions standards that have become more stringent over time. In 1970, the CAA required a 90 percent reduction in emissions from new automobiles by 1975. The figure below depicts the national reduction in criteria pollutant emissions from 1970 to 2004 compared to growth areas, such as gross domestic product, vehicle miles traveled, energy consumption and population.

Comparison of Growth Areas and Emissions



Source: Environmental Protection Agency website. "Air Emissions Trends: Continued Progress through 2004." http://www.epa.gov/airtrends/2005/econ-emissions.html. Accessed January 4, 2006.

Meeting the 90 percent emissions reduction standard by 1975 proved extremely difficult. The EPA delayed the attainment standard in 1974 for several pollutants until 1978 and continued to delay the attainment standard for certain pollutants on several occasions until 1981. In 1981, new cars met the air quality standards for the first time. The EPA continued to introduce new criteria and solutions for reducing emissions, including the introduction of diesel vehicle regulation in 1985 and the 1986 phase out of lead in gasoline. The CAA was last amended in 1990, requiring further reductions in pollutant emissions and introducing the regulation of non-road emissions. The continued implementation of emission reduction standards is expected to result in continued improvements in air quality as a result.

Yet, simply put, if each of today's cars produces 60 to 80 percent less pollution than cars in the 1960s, why aren't we seeing substantial improvements in air quality? Really it is because most improvements are invisible. There have been noticeable improvements despite dramatic increases in vehicle miles traveled. For example, Maricopa County went from numerous violations in the 8-hour CO standards to zero violations in 1996 (which has since been maintained). Similarly, the 1-hour ozone standard has also been met since 1996. More dramatic improvements may have been achieved during this time period because motor vehicle emission control devices have dramatically reduced pollutant emissions per vehicle during the past 20 years. But this has been somewhat offset because the number of cars and trucks on the road, and the number of miles they are driven, has doubled. In 2000, vehicles were driven more than a trillion miles each year in the United States.

What do future trends look like?

EPA has issued final rules that will further reduce vehicle emissions. These programs included reformulated gasoline (RFG), national low emission vehicle program (NLEV), and Tier II motor vehicle emissions standards and gasoline sulfur control program and heavy duty diesel engine and on-highway diesel sulfur control programs. Two examples are cited below.

Heavy Duty Diesel Emission Standards

In December 2000, EPA issued the final rule for a two part strategy to reduce diesel emissions from heavy-duty trucks and buses. The standards pertain to diesel engines found in such vehicles (weighing over 8,500 pounds) beginning in the model year 2004. Additional standards and procedures will begin in 2007. EPA is also is requiring diesel fuel refiners to produce diesel fuels (for highway vehicle use) that have a sulfur content of no more than 15 ppm effective June 2006. This represents a 97 percent reduction (from the current 500 ppm). Phased in between 2006 and 2010, the rules are predicted to reduce NO_x and PM_{10} from heavy-duty diesel engines by 88 percent and 64 percent respectively during the time period from 2007 to 2030.

Tier II Emissions Standards

In December 1999, EPA announced what are known as Tier II new engine and gasoline standards designed to reduce emissions from new passenger cars and light trucks. Effective 2004, gasoline refiners and importers have been required to manufacture gasoline with sulfur levels not exceeding 300 ppm. By 2006, sulfur levels will meet a 30 ppm average not to exceed a cap of 80 ppm. As a result of these regulations, NO_x emissions are predicted to be reduced by 61 percent – volatile organic compound emissions by 24 percent between 2004 and 2030.

These types of rulings implemented by EPA also have reduction benefits pertinent to MSATs (as presented later). Important in considering the reductions is the timing of construction of the proposed action relative to rule implementation – the proposed action is planned for construction completion in 2012 – well into the timeframes for rule enactment.

What is the method used to analyze air quality impacts from a freeway project like the South Mountain Freeway?

Two computer models are used to analyze air quality impacts that could occur from vehicle exhaust along a freeway project. One model, Mobile6.2, calculates the emission levels coming from vehicles on the freeway once in operation in the design year. The other model, CAL3QHC Version 2 calculates the dispersion of the pollutants once they have left the vehicles. Both models are considered the ‘industry standard’ and the ‘best available’ – Mobile6.2 is a version of the first Mobile model (MOBILE 1) that was released in 1978; and CAL3QHC Version 2 is the second generation of the EPA-developed CAL3Q model first used in 1985. Both models are used to conduct a microscale (project level) analysis focused on vehicle emissions of carbon monoxide. Other criteria pollutants are also components of emissions; however, carbon monoxide accounts for the majority of emissions and only its impact on the ambient air quality is required by the EPA. Ozone, oxides of nitrogen, and hydrocarbons are pollutants that are regional in nature; meaningful evaluation at the project level is not possible. Regional emissions analyses are being done for these by MAG for conformity analysis. The EPA is in the process of developing procedures for analyzing microscale PM_{10} impacts, but federal rules state that requirements for such a quantitative analysis will not take effect until EPA develops these procedures.

The quantitative analysis of carbon monoxide concentrated on the local impact estimated during 2004 (existing), 2030 (No Action), and 2030 (Action Alternatives). In summary, the components of the analyses included calculation of vehicle emissions for various speeds and volumes, understanding of freeway alignments and characteristics, determinations of receptor locations and conditions (affecting pollutant 'behavior'), analysis, and review of results.

What were the results of the modeling analysis?

To address the modeling results, it is important to understand the ambient concentrations of carbon monoxide in the Study Area today. As described above, in Maricopa County, a network of air quality monitoring sites – most of which are located in Phoenix and its surrounding communities operating 24 hours a day. Monitoring from four of those stations presented in the table below illustrates the maximum concentrations of carbon monoxide (in parts per million) for 1-hour and 8-hour readings (the number in parenthesis to the right reflects the percentage of the NAAQS). All concentrations are well below NAAQS.

Ambient Concentrations, Carbon Monoxide Maximum Concentrations: 2004 (in parts per million)		
Station	**1- Hour**	**8-Hour**
Frye Road/Ellis Street	2.9 (8.3)	2.1 (23.3)
1845 East Roosevelt Street	5.0 (14.3)	3.4 (37.8)
4208 West Pecos Road	7.6 (21.7)	4.9 (54.4)
6180 West Encanto Boulevard	5.8 (16.6)	4.2 (46.7)
(#) represents the percentage towards the NAAQS for CO		

Predicted maximum 1-hour and 8-hour concentrations were calculated for receptors at various distances from the roadway centerline for the current traffic conditions and roadway configuration for Interstate 10 (I-10); for major arterial street intersections near the proposed alternatives; and for receptors located at the proposed alternative interchanges. Concentrations were determined for present conditions, future (2030) conditions for No Action, and future conditions (2030) for the action alternatives.

In all, over 700 receptor locations were modeled. Predicted concentrations of carbon monoxide with the action alternatives are low with most predicted concentrations for any of the action alternatives less than 6.0 parts per million (ppm) (17 percent of the 1-hour standard). Predicted concentrations at receptors located at arterial intersections near I-10 and arterial streets/I-10 interchanges generally exhibited a small decrease from the existing conditions to the action alternatives scenario. Those receptors located at the arterial intersections and freeway interchanges south of I-10 exhibited small increases. These predicted increases associated with the action alternatives were less than 3 ppm. In summary, the predicted concentrations for 1-hour and 8-hour are well below the NAAQS.

The following table illustrates maximum predicted 1-hour concentrations the action alternatives being below the 35 ppm NAAQS for 1-hour CO.

Summary: Maximum Predicted One-Hour CO Concentrations At Intersections / Interchanges

	51st Ave	Alt. W55	59th Ave	67th Ave	Alt. W71	75th Ave	83rd Ave	91st Ave	99th Ave	Alt. W101E	Alt. W101C	Alt. W101W
Thomas Road	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	7.1 6.3 5.1	**NA**
McDowell Road	[a]7.0 5.6 5.5	**NA**	8.4 5.5 5.2	7.2 6.1 5.9	**NA**	5.9 5.3 5.3	**NA**	**NA**	4.8 5.2 5.0	**NA**	4.0 5.3 4.4	**NA**
I-10	6.7 5.9 6.1	4.8 4.6 4.7	7.8 5.5 4.8	7.9 6.0 6.7/**6.7**	4.4 4.0 4.7	6.5 5.6 6.0	**NA**	**NA**	6.3 6.0 6.4	**NA**	6.3 5.2 5.4	**NA**
Van Buren Street	**NA**	3.1 3.1 3.2	6.0 5.1 5.1	4.8 4.9 4.7	3.6 3.9 4.8/**5.2**	4.6 4.9 4.8	**NA**	**NA**	4.0 5.2 5.1	**NA**	3.3 4.2 5.3/**5.4**	**NA**
Buckeye Road	**NA**	3.2 3.1 5.2/**5.2**	4.7 4.7 4.9	4.6 4.5 4.5	3.5 3.5 4.0	4.5 4.7 4.5	**NA**	4.2 4.7 5.2	4.4 4.9 5.0	**NA**	4.0 4.3 4.7	4.0 4.1 4.2
Lower Buckeye Road	**NA**	3.1 3.1 3.7	3.8 5.0 5.4	4.1 5.5 5.3	5.0 4.5 4.2	3.8 4.7 4.7	4.2 5.0 4.9	4.0 5.0 4.6	3.3 3.8 3.7	3.7 4.7 4.7	3.9 5.0 4.7	3.1 3.2 3.9
Broadway Road	**NA**	3.1 3.4 5.2	3.0 3.7 3.8	**NA**	3.4 3.3 4.1	3.4 3.7 3.6	3.2 3.8 4.2	3.5 4.4 4.4	**NA**	3.0 3.4 4.3	3.0 3.2 4.1	**NA**
91st Avenue	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	-[b] -[b] 3.7
Southern Avenue	**NA**	3.0 3.0 4.6	**NA**	**NA**	-[b] -[b] 4.1	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
Baseline Road	**NA**	3.0 4.1 4.7	3.0 3.9 4.1	**NA**	3.2 3.4 5.2/**5.4**	**NA**	**NA**	**NA**	**NA**	**NA**	3.3 3.7 4.5	**NA**
Dobbins Road	**NA**	3.0 3.6 4.5	3.0 4.1 3.8	**NA**	-[b] -[b] 3.8	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
Elliot Road	**NA**	3.0 3.6 4.0	3.0 3.5 3.6	**NA**	-[b] -[b] 3.9	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
Free Flow		3.0			-[b]					-[b]	-[b]	-[b]

	51st Ave	Alt. W55	59th Ave	67th Ave	Alt. W71	75th Ave	83rd Ave	91st Ave	99th Ave	Alt. W101E	Alt. W101C	Alt. W101W
	NA	3.0 5.6/**6.2**	**NA**	**NA**	-[b] 5.5/**6.2**	**NA**	**NA**	**NA**	**NA**	-[b] 5.0	-[b] 5.1	-[b] 4.5

	27th Avenue	19th Avenue	Desert Foothills Parkway	24th Street	32nd Street	40th Street	Free Flow
Pecos Road	**NA**	**NA**	3.4 4.0 -[c]	3.4 4.0 -[c]	3.4 4.6 -[c]	4.3 4.8 -[c]	**NA**
Alt. E-1	-[b] -[b] 4.1/**4.3**	-[b] -[b] 4.1/**4.3**	3.0 3.1 3.8/**4.2**	3.1 3.5 3.8/**4.0**	3.2 3.6 3.7/**4.0**	3.3 3.5 3.8/**4.2**	-[b] -[b] 6.2/**7.4**

[1-Hour Standard: 35 ppm]
NA – Not Applicable
[a] 7.0 – Existing Conditions
5.6 – No-build Scenario
5.5 – Build Scenario
#/# - highlighted numbers represent those locations where additional model runs were undertaken to address modifications to typical cross sections and projected increases in traffic volumes
-[b] No existing roadway near receptor
-[c] Receptor within the ROW

What are the issues surrounding MSATs?

Mobile source air toxics (MSATs) are part of a larger group of air pollutants labeled HAPs. HAPs refer to "a range of compounds that are known or suspected to have serious health or environmental impacts." According to the EPA, motor vehicles are major contributors to national emissions of several HAPs, notably benzene, formaldehyde, 1,3-butadiene, acetaldehyde, diesel particulate matter, and diesel exhaust organic gases.[4] In March 2001, EPA released a rule addressing emissions of HAPs from mobile sources. This rule identified the initial list of 21 compounds emitted from motor vehicles that are known or suspected to cause detrimental health effects. In the rulemaking, EPA noted that the methodology used to select the compounds for that list may be used in the future to add or remove compounds as new information becomes available. According to EPA, the agency has committed to another rulemaking to address MSATs, which it will propose (as reported) by February 28, 2006 and finalize in February 2007.

The rule notes that "among the 21 compounds that EPA has identified for inclusion on the list of MSATs…considering single chemical inhalation health hazards and exposure to MSAT

[4] Control of Emissions from Hazardous Air Pollutants. 66 FR 17230-272. March 29, 2001.

emissions from on-highway sources, diesel particulate matter and diesel exhaust organic gases (DPM + DEOG), benzene, 1,3-butaadiene, formaldehyde, acetaldehyde, and acrolein are likely to present the highest risk to public health and welfare."[5] These six "priority" MSATs are the focus of this air toxics assessment and analysis. As with the initial list of 21 compounds, the HAPs identified as a priority may also change in future EPA rulemakings.

Current Research Activities

As part of the 2001 rulemaking, EPA committed to a research action plan (Technical Analysis Plan) to increase the agency's understanding of MSATs, to identify data gaps about the risk associated with MSATs, to address the feasibility of control programs, and to further study the potential health effects of exposure to MSATs. The information resulting from this plan would allow EPA to evaluate future need and appropriateness of additional rulemakings for control of MSATs from on-highway and non-road sources and their fuels.[6]

EPA has also created a monitoring program (Hot Spot Exposure Assessment Program) to assist in the development of a model to "accurately identify and assess personal exposures to air toxics in microenvironment." This program includes the following studies: Fresno Asthmatic Children's Environmental Study (FACES), the Baltimore Traffic Study, and the Los Angeles School Bus Exposure Assessment.[7]

As part of a recent settlement, U.S. DOT is undertaking research at several project sites to garner additional information on the potential source and behavior of MSATs. Information from the studies is intended to enhance current understanding of MSATs.[8] FHWA has developed an integrated research program to address questions related to MSATs. The Air Toxics Research Workplan provides a direction for agency research efforts.

The FHWA Air Toxic Research program is a multi-year research effort; some of the results are not expected for several years. In coordination with EPA, FHWA is developing guidance on how to address MSATs within the NEPA process. This guidance is expected to discuss issues associated with MSAT analysis at the project level, including the current state of science and available technical tools.

Several research projects that are part of the Air Toxics Research Workplan include the following:

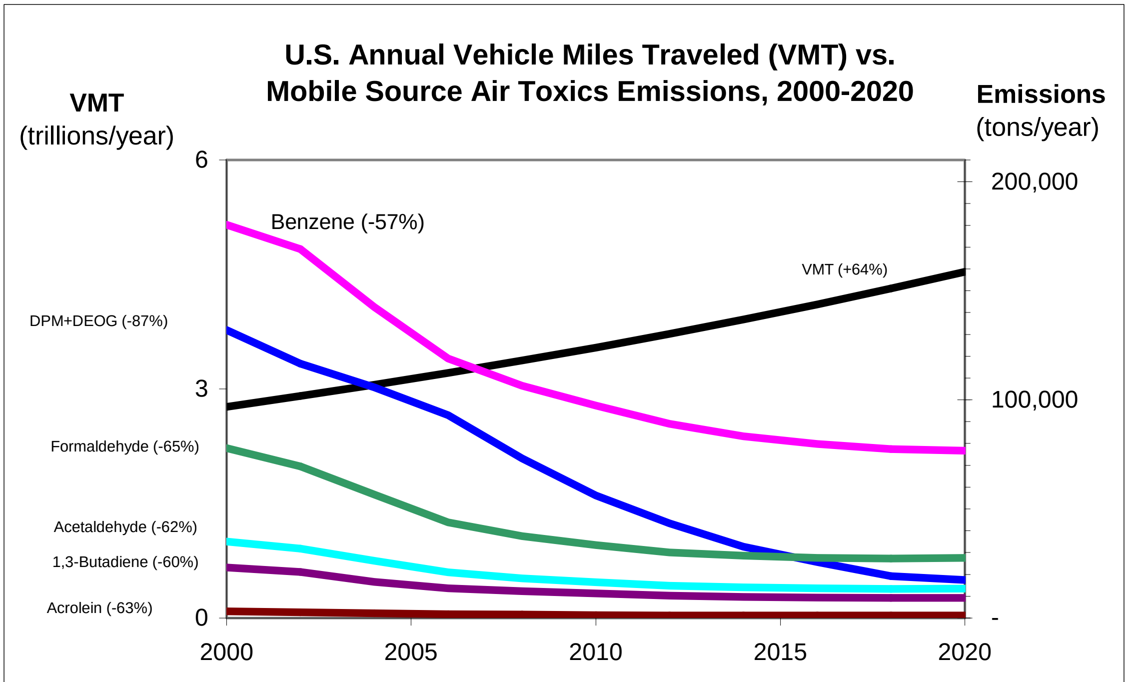
- Air Toxics Supersite Study designed to determine whether the contribution of vehicle-emitted air toxic compounds to ambient air concentrations can be measured.
- Air Toxics Monitoring and Modeling Study to determine the reliability of emission models in predicting ambient measured air toxic concentrations.
- Kansas City Study to determine the distribution of PM emissions in a randomly selected fleet as well as identify the percent of high emitters in the fleet. This Study is lead by the EPA.

[5] Control of Emissions from Hazardous Air Pollutants. 66 FR 17230-272. March 29, 2001. p. 17257
[6] Control of Emissions from Hazardous Air Pollutants. 66 FR 17230-272. March 29, 2001.
[7] Hot Spot Exposure Assessment Program, OTAQ, Air Toxics Center. Available at http://www.epa.gov/ttn/atw/wks/msathotspot.pdf.
[8] Sierra Club vs. US DOT, Settlement Agreement, CV-S-02-0578-PMP-RJJ.

- Multiple Air Toxics Exposure Study Science and Uncertainty Review (MATES-II) designed to evaluate the scientific techniques of this influential Southern California study to determine whether these techniques would be appropriate for use today, and the scientific uncertainties associated with the 1998 study.

As part of its 2001 rulemaking, EPA studied the effect of current programs on future expected MSATs emissions. These programs included reformulated gasoline (RFG), national low emission vehicle program (NLEV), and Tier 2 motor vehicle emissions standards and gasoline sulfur control program and heavy duty diesel engine and on-highway diesel sulfur control programs. While these programs were initially designed and intended to reduce pollutants with NAAQS, such as carbon monoxide, nitrogen oxides, and particulate matter, EPA estimates that these programs "have reduced and will continue to reduce on-highway emissions of air toxics significantly".

And per an FHWA analysis, reductions of 57 to 87 percent in MSATs are anticipated from 2000 to 2020 as a result of the rulemaking – even if vehicle miles traveled increases by 64 percent over that time. The chart below reflects the reductions.



Notes: For on-road mobile sources. Emissions factors were generated using MOBILE6.2. MTBE proportion of market for oxygenates is held constant, at 50%. Gasoline RVP and oxygenate content are held constant. VMT: *Highway Statistics 2000*, Table VM-2 for 2000, analysis assumes annual growth rate of 2.5%. "DPM + DEOG" is based on MOBILE6.2-generated factors for elemental carbon, organic carbon and SO4 from diesel-powered vehicles, with the particle size cutoff set at 10.0 microns.
Source: *Interim Guidance on Air Toxics Analysis in NEPA Documents,* FHWA, February 3, 2006.

How will MSATs be addressed in the EIS?

There remain many uncertainties in quantifying emissions estimates for MSATs. Current project-specific modeling is not designed to specifically estimate MSAT emissions, nor has it been validated for such. The health effects referenced earlier provide some information of the types of effects from MSATs under some level of exposure. However, inclusions of the pollutants as the 21 MSATs by EPA as part of its rulemaking is not itself a determination that emissions in fact present a risk to public health and welfare. While research is being conducted, EPA plans to provide an interpretation of the research and its implication in future rulemaking planned to be finalized in 2007. Also, any attempt to model exposure estimates are surrounded by substantial uncertainties that arise from a variety of sources and not just vehicles traveling along a freeway. It is encouraging however that MSATs are expected to decline over time.

As such, FHWA and ADOT continue to monitor research underway and further examine ways in which the issue of MSATs should be addressed in the EIS.

Are the conclusions presented in this summary final?

It is quite likely that quantitative findings relative to impacts are subject to change. The reasons for future changes which will be presented to the public during the Draft EIS, Final EIS and Final Design stages are based on the following:

- Refinement in design features through the design process.
- Updated aerial photography as it relates to rapid growth in the Western Section of the Study Area.
- On-going communications with the City of Phoenix regarding measures to minimize harm to South Mountain Park/Preserve.
- On-going communications with GRIC in regards to granting permission to study action alternatives on GRIC lands.
- Potential updates to traffic forecasts as updated regularly by MAG.
- Potential updates with regards to the special 2005 survey to augment the 2000 Census.
- As design progresses, cost estimates for construction, right-of-way acquisition, relocation and mitigation will be updated on a regular basis.

However, even with these factors affecting findings, it is anticipated the effects would be relatively the same among the alternatives and consequently impacts would be comparatively the same. This assumption would be confirmed if and when such changes were to occur.

As a member of the Citizens Advisory Team, how can you review the entire technical report?

The complete technical report is available for review by making an appointment with Mike Bruder or Ralph Ellis at 602-712-7545.