Chapter 12: Air Quality

12.1 Introduction

This chapter describes the air quality impacts associated with the Mountain View Corridor (MVC). Air quality in an area is a function of the area itself (size and topography), the prevailing weather patterns (meteorology and climate), and the pollutants released in the area. Air quality is described in terms of the concentrations of various pollutants in a given area of atmosphere (for example, micrograms per cubic meter).

Air Quality Impact Analysis Area. The MVC would be located within Salt Lake and Utah Counties, so these counties make up the impact analysis area for the air quality analysis.

12.2 Regulatory Setting

12.2.1 National Ambient Air Quality Standards (NAAQS) Requirements

National Ambient Air Quality Standards include primary national standards to protect public health and secondary standards to protect public welfare (such as protecting property and vegetation from the effects of air pollution). These standards, which are set by the U.S. Environmental Protection Agency (EPA), have been established as the official ambient air quality standards for Utah. For the pollutants addressed in this section, the primary and secondary standards are the same. The current NAAQS are listed in Table 12.2-1.

Table 12.2-1. National Ambient Air Quality Standards (NAAQS)

	National (EPA) Standard[a]	
Pollutant	**Primary**	**Secondary**
Lead (Pb)		
Quarterly average	1.5 μg/m^3	1.5 μg/m^3
Particulate Matter (PM_{10})		
24-hour average	150 μg/m^3	150 μg/m^3
Particulate Matter ($PM_{2.5}$)		
Annual arithmetic mean	15 μg/m^3	15 μg/m^3
24-hour average	35 μg/m^3	35 μg/m^3
Sulfur Dioxide (SO_2)		
Annual average	0.03 ppm	(no standard)
24-hour average	0.14 ppm	(no standard)
3-hour average	(no standard)	0.50 ppm
Carbon Monoxide (CO)		
8-hour average	9 ppm	(no standard)
1-hour average	35 ppm	(no standard)
Ozone (O_3)		
8-hour average	0.075 ppm	0.075 ppm
Nitrogen Dioxide (NO_2)		
Annual average	0.053 ppm	0.053 ppm

Annual standards are never to be exceeded. Short-term standards are not to be exceeded more than 1 day per calendar year unless noted otherwise.

μg/m^3 = micrograms per cubic meter

ppm = parts per million

PM_{10} = particulate matter 10 microns in diameter or less

$PM_{2.5}$ = particulate matter 2.5 microns in diameter or less

[a] Primary standards are set to protect public health. Secondary standards are based on other factors (for example, protecting crops and materials or avoiding nuisance conditions).

Source: EPA 2007b

If an area meets the NAAQS for a given air pollutant, the area is called an *attainment area* for that pollutant (because the standards have been attained). If an area does not meet the NAAQS for a given air pollutant, the area is called a *non-attainment area*. A *maintenance area* is an area that was previously a non-attainment area and has subsequently been redesignated as an attainment area. To be redesignated as a maintenance area, the area must both meet air quality standards and have a 10-year plan for continuing to meet and maintain air quality standards and other requirements of the Clean Air Act.

The pollutants in Table 12.2-1 above—that is, the pollutants that have associated NAAQS—are referred to as *criteria pollutants*.

12.2.2 National Environmental Policy Act Requirements

The guidance from the Federal Highway Administration (FHWA) (T6640.8A) and the Federal Transit Administration (FTA) for preparing environmental documents under the National Environmental Policy Act (NEPA) identifies the requirement to evaluate air quality in terms of mesoscale and microscale impacts. Mesoscale evaluations look at regional air quality impacts, while microscale evaluations look at localized air quality impacts, primarily at the road or intersection level.

12.2.3 Transportation Conformity Requirements and Project-Level Conformity

Salt Lake City, Salt Lake County, and Utah County are either non-attainment or maintenance areas for carbon monoxide (CO) or particulate matter (PM_{10}). In Utah County, the city of Provo is a maintenance area for CO but is outside the air quality study area for the MVC. Specifically, Salt Lake County is a non-attainment area for PM_{10}, Salt Lake City is a maintenance area for CO, and Utah County is a non-attainment area for PM_{10}.

The Clean Air Act and its amendments require that all new regionally significant highway and transit projects (such as the MVC) that are located in non-attainment and maintenance areas must be part of a “conforming” transportation plan[1] and Transportation Improvement Program. The northernmost section of the MVC in Salt Lake City between Interstate 80 (I-80) and State Route (SR) 201 is in the CO maintenance area, and the entire project is in the Salt Lake and Utah County PM_{10} non-attainment area (for which redesignations to maintenance areas are pending). For the MVC project, these requirements mean that (1) the MVC must be included in the Wasatch Front Regional Council’s (WFRC) and

[1] A transportation plan lists important transportation projects that are planned for the future.

Mountainland Association of Government's (MAG) regional transportation plan, and (2) this transportation plan must conform to the State Implementation Plan. A transportation plan conforms to the State Implementation Plan if the pollutant levels generated by the projects in the transportation plan are within the associated emission budgets in the State Implementation Plan.

In order to determine whether a transportation plan and Transportation Improvement Program conform to the State Implementation Plan, the metropolitan planning organization for the non-attainment or maintenance area in question performs a regional conformity analysis (sometimes called a *mesoscale* analysis) and meets all of the conformity requirements of 40 Code of Federal Regulations (CFR) 93. For the MVC project, the metropolitan planning organizations are WFRC for Salt Lake County and MAG for Utah County. An individual transportation project such as the MVC "conforms" to the State Implementation Plan if, by itself and in combination with the other planned transportation projects in the regional transportation plan and Transportation Improvement Program, the project would not result in any of the following conditions:

- New violations of the NAAQS
- Increases in the frequency or severity of existing violations of the NAAQS
- Delays in attaining the NAAQS

Section 12.4, Environmental Consequences, discusses the results of the regional air quality analyses and shows that the MVC project would conform to the emission budgets in the State Implementation Plan. A more detailed discussion of project-level conformity can be found in Appendix 12A, Project-Level Conformity Determination for CO and PM_{10}.

In addition, if a project is located in a non-attainment or maintenance area for carbon monoxide or particulate matter, the project sponsors must meet the requirements of a project-level, "hot-spot" analysis (sometimes called a *microscale* analysis), as part of the project-level conformity determinations, to demonstrate that the project would not cause the NAAQS to be exceeded at the local level. Project-level analyses evaluate localized emissions from the project to demonstrate that the project will not create new violations of the NAAQS, worsen existing violations, or delay attainment of the NAAQS. Quantitative project-level hot-spot analyses are required for CO, and qualitative analyses, consistent with guidance published by EPA and FHWA, are required for PM_{10}.

Because Salt Lake City (a maintenance area for CO), Salt Lake County (a non-attainment area for PM_{10}), and Utah County (a non-attainment area for PM_{10}) are non-attainment or maintenance areas, NEPA-level analyses were performed for the proposed MVC alternatives for each of these pollutants in accordance with applicable guidance such as FHWA's Guidance for Preparing and Processing Environmental and Section 4(f) Documents (FHWA 1987), the Transportation Conformity Reference Guide (FHWA 2006a), and the Transportation Conformity Guidance for Qualitative Hot-Spot Analysis in $PM_{2.5}$ and PM_{10} Non-attainment and Maintenance Areas (FHWA 2006b). Section 12.4, Environmental Consequences, discusses the results of the local air quality analyses. This Final Environmental Impact Statement (EIS) contains a draft project-level conformity analysis for the project. This conformity analysis addresses both CO and PM_{10}. FHWA invites comments on this analysis. A final conformity determination will be included in the Record of Decision for the project.

The conformity determination for the MVC project evaluates the non-tolled option for the Preferred Alternatives in Salt Lake and Utah Counties (see Appendix 12A, Project-Level Conformity Determination for CO and PM_{10}), reflecting regional modeling and regional emissions analyses prepared by WFRC in Salt Lake County and by MAG in Utah County. If a tolling option is implemented for the MVC, revised regional modeling and a regional conformity determination would be required; revised hot-spot analyses would be required for CO, PM_{10}, and all other applicable pollutants; and a revised project-level conformity determination would be required prior to project approval.

12.2.4 Major Pollutants of Concern for Transportation Projects

The major air pollutants of concern for transportation projects are carbon monoxide (CO), particulate matter (PM_{10} and $PM_{2.5}$), and ozone (O_3).

- **CO**, which is emitted by engines, is a colorless, odorless, poisonous gas that reduces the amount of oxygen carried in the bloodstream by forming carboxyhemoglobin, which prevents oxygenation of the blood. CO is emitted directly into the atmosphere from automobiles with the highest emissions occurring at slow speeds, in stop-and-go traffic, and at colder temperatures. Since it disperses to non-harmful levels fairly rapidly, CO is considered a localized hot-spot pollutant and is the primary pollutant analyzed at the project level.
- **Particulate matter** generally falls into one of two categories: particulate matter with a diameter of 10 microns or less (PM_{10}) or particulate matter with a diameter of 2.5 microns or less ($PM_{2.5}$). The primary source of particulate matter is vehicle emissions. The principal health effects of airborne particulate matter are on the respiratory system.

- **O_3** is a secondary pollutant formed when precursor emissions, nitrogen oxides (NO_x) and volatile organic compounds (VOCs), react in the presence of sunlight. O_3 is a major component of photochemical smog. O_3 irritates the eyes and respiratory tract and increases the risk of respiratory and heart diseases.

12.2.5 Other Pollutants

12.2.5.1 Hazardous Air Pollutants

In addition to the NAAQS, EPA has also established a list of 33 hazardous air pollutants called *urban air toxics* (64 Federal Register 38706). Urban air toxics are pollutants that can cause cancer or other serious health effects. Most air toxics originate from human-made sources, including mobile sources (such as road and aircraft emissions) and stationary sources (such as factories or refineries).

Air toxics are in the atmosphere as a result of industrial activities and motor-vehicle emissions. Research has shown that the health risks to people exposed to urban air toxics at sufficiently high concentrations or lengthy durations include an increased risk of cancer, damage to the immune system, and neurological, reproductive, and/or developmental problems (EPA 2000).

To better understand the effects that urban air toxics have on human health, EPA developed a list of 21 mobile-source air toxics (MSATs). Of these 21, EPA identified six as priority pollutants: acetaldehyde, benzene, formaldehyde, diesel exhaust, acrolein, and 1,3-butadiene (66 Federal Register 17230). EPA assessed the risks of various kinds of exposures to these pollutants (FHWA 2006c).

In July 1999, EPA published a strategy to reduce urban air toxics, and, in March 2001, EPA issued regulations for automobile and truck manufacturers to decrease the amounts of these pollutants by target dates in 2007 and 2020. Under the March 2001 regulation, between 1990 and 2020, highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde will be reduced by 67% to 76% and on-highway diesel particulate matter emissions will be reduced by 90%. These reductions will be achieved by implementing source-control programs including the reformulated gasoline program, a new cap on the toxics content of gasoline, the national low-emission vehicle standards, the Tier 2 motor-vehicle emission standards and gasoline sulfur-control requirements, the heavy-duty engine and vehicle standards, and the on-highway diesel fuel sulfur-control requirements (EPA 2000).

In February 2007, EPA issued a final rule to reduce hazardous air pollutants from mobile sources. The final standards will lower emissions of benzene and other air toxics in three ways: (1) by lowering the benzene content in gasoline, (2) by reducing exhaust emissions from passenger vehicles operated at cold temperatures, and (3) by reducing emissions that evaporate from, and permeate through, portable fuel containers.

Under this rule, EPA is requiring that, beginning in 2011, refiners must meet an annual average gasoline benzene content standard of 0.62% by volume on all gasoline (the national benzene content of gasoline today is about 1.0% by volume). In addition, EPA is adopting new standards to reduce non-methane hydrocarbon (NMHC) exhaust emissions from new gasoline-fueled passenger vehicles at colder temperatures below 75 °F (degrees Fahrenheit). Non-methane hydrocarbons include many mobile-source air toxics, such as benzene. Finally, the February 2007 rule establishes standards that will limit hydrocarbon emissions that evaporate or permeate through portable fuel containers such as gas cans.

EPA expects that the new fuel benzene standard and hydrocarbon standards for vehicles and gas cans will together reduce total emissions of mobile-source air toxics by 330,000 tons in 2030, including 61,000 tons of benzene. As a result of this rule, new passenger vehicles will emit 45% less benzene, gas cans will emit 78% less benzene, and gasoline will have 38% less benzene overall.

In addition, the hydrocarbon reductions from the vehicle and gas can standards will reduce volatile organic compound (VOC) emissions (which are precursors to ozone and can be precursors to $PM_{2.5}$) by over 1 million tons in 2030. The vehicle standards will reduce direct $PM_{2.5}$ emissions by 19,000 tons in 2030 and could also reduce secondary formation of $PM_{2.5}$. Once the regulation is fully implemented, EPA estimates that these PM reductions will prevent nearly 900 premature deaths annually.

MSATs are discussed in more detail in the section titled Mobile-Source Air Toxics on page 12-34.

12.2.5.2 Greenhouse Gases

See Section 12.4.3.2, 5800 West Freeway Alternative, for a discussion of greenhouse gases.

12.3 Affected Environment

12.3.1 Climate

Weather directly influences air quality. Important meteorological factors that affect weather patterns include wind speed and direction, atmospheric stability, temperature, sunlight intensity, and mixing height. The air quality impact analysis area is located along the Wasatch Front at an elevation of about 4,222 feet above sea level. The Great Salt Lake, and to a lesser extent Utah Lake, contribute to weather conditions in both winter and summer. In the winter, the water in the lakes is warmer than the air. This increases the moisture content of the air, which creates the thermal instability that causes "lake effect" storms. As a result, areas surrounding the lakes receive more snowfall than more distant areas. In the summer, the Great Salt Lake has a high evaporation rate, which humidifies the air and causes thunderhead clouds to develop.

The lowest average daily temperatures (28 °F) occur in January, and the highest average daily temperatures (78 °F) occur in July. The highest amount of precipitation generally occurs during April, when the average precipitation is about 2.6 inches. Average annual precipitation is about 15.6 inches. The area receives an annual snowfall of about 63 inches (National Weather Service 1997).

Temperature inversions occur when warmer air overlies cooler air. During temperature inversions, which typically occur between November and February, particulates and CO from wood stoves, fireplaces, and vehicles can be trapped close to the ground, which can lead to violations of the NAAQS. In Salt Lake and Utah County, no-burn days are implemented during inversion periods.

12.3.2 Regional Air Quality Status

The Clean Air Act and its amendments require that all areas with recorded violations of the NAAQS be designated as non-attainment areas. A State Implementation Plan must be developed for non-attainment areas that identifies control strategies for bringing the region back into compliance with the NAAQS. Maintenance areas are areas that were previously non-attainment areas and have subsequently been redesignated as attainment areas.

Table 12.3-1 below shows the air quality attainment status for transportation-related pollutants in the air quality impact analysis area.

Table 12.3-1. Air Quality Attainment Status for Transportation-Related Pollutants in the Air Quality Impact Analysis Area

Non-attainment Area	Status	Pollutant
Areas in Salt Lake County		
Salt Lake City	Maintenance area	Carbon monoxide (CO)
Salt Lake County	Maintenance area	1-hour ozone (O_3)[a]
Salt Lake County	Non-attainment area (redesignation to maintenance area is pending)	Particulate matter (PM_{10})
Areas in Utah County		
Provo	Maintenance area	Carbon monoxide (CO)
Utah County	Non-attainment area (redesignation to maintenance area is pending)	Particulate matter (PM_{10})

[a] As of June 15, 2005, EPA revoked the 1-hour ozone standard in all areas except for 8-hour ozone non-attainment Early Action Compact areas. Salt Lake County is not a designated Early Action Compact area; therefore, transportation conformity no longer applies in Salt Lake County.

Source: Utah Division of Air Quality 2006a

As shown in Table 12.3-1 above, Salt Lake City and Provo are maintenance areas for CO, and both Salt Lake and Utah Counties are non-attainment areas for PM_{10} (with pending redesignations to maintenance areas). In addition, Salt Lake County is a maintenance area for 1-hour ozone (O_3), though transportation conformity no longer applies.

According to the Utah Division of Air Quality (2006b), mobile emission sources (such as cars, trains, and aircraft) and area sources (such as agricultural burning and harvesting, home heating, construction, commercial energy generation, and wildfires) account for about 84% of all PM_{10} emissions and 65% of all CO emissions in the state. Because a large part of the project area in Salt Lake County and Utah County is undeveloped land interspersed with urban development, the air pollutants in the impact analysis area are most likely wind-blown dust and particulates from exposed soils and agricultural tilling practices and vehicle emissions (primarily CO) from traffic on existing highways in the area.

The Utah Division of Air Quality maintains a network of air quality monitoring stations throughout the state. In general, these monitoring stations are located where there are known air quality problems, so they are usually in or near urban areas or close to specific emission sources. Other stations are located in remote areas to provide an indication of regional air pollution levels.

Table 12.3-2 through Table 12.3-4 below show monitoring results for transportation-related criteria pollutants from 2002 through 2006 at the monitoring stations in Salt Lake and Utah Counties. The monitoring results show that, in general, air quality is improving along the Wasatch Front.

On December 18, 2006, EPA revised the 24-hour $PM_{2.5}$ standard from 65 $\mu g/m^3$ (micrograms per cubic meter) to 35 $\mu g/m^3$. An area will meet the revised 24-hour standard if the 98th percentile of 24-hour $PM_{2.5}$ concentrations in a year (averaged over 3 years) is less than or equal to the 35 $\mu g/m^3$ standard. On December 18, 2007, Utah submitted its $PM_{2.5}$ non-attainment recommendations to EPA. Utah has recommended three areas that should be designated as non-attainment areas for $PM_{2.5}$: a northern Wasatch Front area, a Utah Valley area, and a Cache Valley area. The MVC study area is within the proposed northern Wasatch Front and Utah Valley areas. EPA intends to make official attainment and non-attainment designations by December 2008, and those designations would become effective in early 2009. The conformity requirements would apply to FHWA 1 year after the effective date (early 2010).

If these areas are designated as non-attainment areas for $PM_{2.5}$, WFRC and MAG will need to demonstrate that projects such as the MVC meet the $PM_{2.5}$ project-level conformity requirements 1 year after the effective date of non-attainment designations (that is, they are included in a conforming long-range transportation plan and Transportation Improvement Program and they have met the hot-spot requirements).

Table 12.3-2. Summary of CO Monitoring Data for Salt Lake and Utah Counties

Station	Parameter	2002	2003	2004	2005	2006
Salt Lake County						
Hawthorne (1675 South 600 East, Salt Lake City)	Peak 1-hour value (ppm)[a]	6.3	8.7	6.3	5.8	6.5
	Peak 8-hour value (ppm)[b]	3.7	4.3	3.5	3.8	3.0
	Days above standard	0	0	0	0	0
Cottonwood (5715 South 1400 East, Salt Lake City)	Peak 1-hour value (ppm)	5.0	5.8	4.5	3.9	4.1
	Peak 8-hour value (ppm)	3.5	3.2	2.3	2.6	2.4
	Days above standard	0	0	0	0	0
West Valley City (3275 West 3100 South, West Valley City)	Peak 1-hour value (ppm)	6.0	7.1	5.9	5.4	7.1
	Peak 8-hour value (ppm)	4.3	5.2	4.0	4.3	3.2
	Days above standard	0	0	0	0	0
Utah County						
North Provo (1355 North 200 West, Provo)	Peak 1-hour value (ppm)	5.1	4.9	3.3	3.9	4.7
	Peak 8-hour value (ppm)	3.6	3.0	2.7	2.7	2.4
	Days above standard	0	0	0	0	0
University Avenue (363 N. University Avenue, Provo)	Peak 1-hour value (ppm)	6.9	6.9	5.4	4.9	5.1
	Peak 8-hour value (ppm)	5.0	4.1	3.6	3.2	3.7
	Days above standard	0	0	0	0	0

[a] 1-hour CO standard = 35 ppm

[b] 8-hour CO standard = 9 ppm

Source: EPA 2008

Table 12.3-3. Summary of PM_{10} Monitoring Data for Salt Lake and Utah Counties

Station	Parameter	2002	2003	2004	2005	2006
Salt Lake County						
Cottonwood (5715 South 1400 East, Holladay)	Annual average ($\mu g/m^3$)[a]	32	28	32	27	25
	Peak 24-hour value ($\mu g/m^3$)[b]	119	92	145	114	82
	Days above standard	0	0	0	0	0
Hawthorne (1675 South 600 East, Salt Lake City)	Annual average ($\mu g/m^3$)	29	26	29	24	24
	Peak 24-hour value ($\mu g/m^3$)	130	360	129	139	88
	Days above standard	0	2	0	0	0
Magna (2935 South 8560 West, Magna)	Annual average ($\mu g/m^3$)	25	26	24	22	20
	Peak 24-hour value ($\mu g/m^3$)	87	421	88	177	80
	Days above standard	0	1	0	1	0
North Salt Lake (1795 North 1000 West, Salt Lake City)	Annual average ($\mu g/m^3$)	41	40	42	37	41
	Peak 24-hour value ($\mu g/m^3$)	121	358	189	153	188
	Days above standard	0	3	1	0	2
Utah County						
Lindon (30 N. Main Street, Lindon)	Annual average ($\mu g/m^3$)	32	25	29	25	25
	Peak 24-hour value ($\mu g/m^3$)	288[c]	150	159	86	116
	Days above standard	0	0	1	0	0
North Provo (1355 North 200 West, Provo)	Annual average ($\mu g/m^3$)	29	23	25	21	22
	Peak 24-hour value ($\mu g/m^3$)	82	76	100	68	123
	Days above standard	0	0	0	0	0

[a] Annual PM_{10} standard = 50 $\mu g/m^3$ (annual standard revoked by EPA on December 18, 2006)

[b] 24-hour PM_{10} standard = 150 $\mu g/m^3$ (standard allows for three exceedances over a 3-year period)

[c] Natural event such as fire or dust storm; second highest reading at this monitor was 105 $\mu g/m^3$

Source: EPA 2008

Table 12.3-4. Summary of $PM_{2.5}$ Monitoring Data for Salt Lake and Utah Counties

Station	Parameter	2002	2003	2004	2005	2006
Salt Lake County						
Cottonwood (5715 South 1400 East, Holladay)	Annual average (ppm)[a]	14.1	10.5	14.3	11.1	10.2
	Peak 24-hour value (ppm)[b]	84	57	69	63	44
	(98th percentile)	(65)	(32)	(66)	(42)	(39)
Herriman (5600 West 12950 South, Herriman)	Annual average (ppm)	8.3	7.0	10.9	7.8	7.3
	Peak 24-hour value (ppm)	60	28	62	40	29
	(98th percentile)	(38)	(25)	(48)	(27)	(22)
Hawthorne (1675 South 600 East, Salt Lake City)	Annual average (ppm)	12.7	9.6	14.2	11.0	9.7
	Peak 24-hour value (ppm)	90	60	94	61	49
	(98th percentile)	(56)	(34)	(64)	(43)	(38)
North Salt Lake (1795 North 1000 West, Salt Lake City)	Annual average (ppm)	15.5	12.3	17.8	14.1	13
	Peak 24-hour value (ppm)	92	55	86	63	55
	(98th percentile)	(56)	(46)	(57)	(44)	(40)
West Valley City (3275 West 3100 South, West Valley City)	Annual average (ppm)	13.4	11.1	13.9	12.0	10.6
	Peak 24-hour value (ppm)	86	55	74	63	47
	(98th percentile)	(58)	(45)	(61)	(40)	(39)
Utah County						
Highland (10865 North 6000 West, Provo)	Annual average (ppm)	9.1	7.1	10.7	8.1	8.5
	Peak 24-hour value (ppm)	47	36	75	43	48
	(98th percentile)	(30)	(23)	(50)	(34)	(24)
Lindon (30 N. Main Street, Lindon)	Annual average (ppm)	10.9	8.6	12.8	10.0	9.3
	Peak 24-hour value (ppm)	66	61	82	60	49
	(98th percentile)	(43)	(29)	(64)	(37)	(32)
North Provo (1355 North 200 West, Provo)	Annual average (ppm)	11.6	9.2	11.1	9.8	9.1
	Peak 24-hour value (ppm)	58	42	67	46	44
	(98th percentile)	(40)	(28)	(54)	(36)	(26)

From 2001 to 2004, the 24-hour $PM_{2.5}$ standard was 65 $\mu g/m^3$. This was revised to 35 $\mu g/m^3$ in 2006.

Nearly all Wasatch Front monitoring sites in Salt Lake and Utah Counties would show a violation of the revised 24-hour $PM_{2.5}$ standard.

[a] Annual $PM_{2.5}$ standard = 15 $\mu g/m^3$

[b] 24-hour $PM_{2.5}$ standard = 35 $\mu g/m^3$; violations determined from 98th-percentile concentrations

Source: EPA 2008

12.4 Environmental Consequences

This section describes the air quality impacts associated with the Mountain View Corridor. Air quality impacts were evaluated using guidelines and procedures from EPA, FHWA, and the Utah Department of Transportation (UDOT). The impacts of construction activities would be temporary and are discussed in Chapter 21, Construction Impacts. The operational impacts of the MVC alternatives would be long-term and would be directly due to the operation of transit vehicles on 5600 West and freeway traffic and vehicle speeds on the roadway alternatives. Section 12.2.4, Major Pollutants of Concern for Transportation Projects, describes the criteria pollutants that were evaluated in this EIS. A detailed discussion of project-level conformity can be found in Appendix 12A, Project-Level Conformity Determination for CO and PM_{10}.

12.4.1 Methodology

The FHWA publication *Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (FHWA 1987) identifies the requirements for evaluating air quality impacts associated with transportation projects and provides guidance on completing mesoscale and microscale air quality evaluations.

Mesoscale evaluations look at regional air quality impacts and are typically conducted by the local metropolitan planning organization. For the proposed MVC project, the metropolitan planning organizations responsible for completing the mesoscale evaluations are WFRC in Salt Lake County and MAG in Utah County. *Microscale evaluations* look at localized (hot-spot) air quality impacts, primarily at the road or intersection level. The mesoscale and microscale air quality evaluations were used to determine whether the MVC project would cause the NAAQS to be exceeded and would conform to the approved State Implementation Plans.

In addition, FHWA's Easy Mobile Inventory Tool (EMIT) was used to develop *emission estimates* of transportation-related MSATs in the air quality impact analysis area for each of the proposed alternatives.

Each of these evaluations is described in more detail below.

The impact analysis has been updated since the Draft EIS based on refinements to the action alternatives as described in Section 2.1.7.3, Design Options Incorporated in the Final EIS, and Section 2.1.7.4, Additional Changes to the Alternatives between the Draft EIS and Final EIS. The air quality impacts analysis has also been updated since the Draft EIS to reflect Version 6.0 of the travel demand model and updated land-use forecasts. For more information, see Section 2.1.7.1, Revised Travel Demand Modeling for the Final EIS.

12.4.1.1 Mesoscale Evaluations for Regional Air Quality

Regional conformity analyses are conducted by the appropriate metropolitan planning organization (in this case, WFRC for Salt Lake County and MAG for Utah County) as part of the conformity determinations of the transportation plans and transportation improvement programs. Both WFRC and MAG have included the MVC project as a "regionally significant" project in their most recent transportation conformity analyses. Regionally significant projects are those classified as principal arterials or higher and include interstate highways, freeways, expressways, principal arterials, light rail, and commuter rail projects.

Salt Lake County. The most recent mesoscale evaluation for Salt Lake County is the *Conformity Analysis for the WFRC 2030 Regional Transportation Plan* (WFRC 2007). This conformity analysis found that the regionally significant transportation projects included in the analysis would conform to the CO and PM_{10} emission budgets in the State Implementation Plan. The plan included the 5800 West Freeway Alternative (the Preferred Roadway Alternative in Salt Lake County), and the conformity determination was made by FHWA and FTA on June 27, 2007.

Utah County. The most recent mesoscale evaluation for Utah County is the *Conformity Determination Report: Mountainland MPO [Metropolitan Planning Organization] 2030 Regional Transportation Plan* (MAG 2007). This conformity analysis found that the regionally significant projects included in the analysis would conform to the PM_{10} emission budgets in the State Implementation Plan. The plan included a freeway alignment for the MVC project alternative (a north-south alignment from the Salt Lake County line to SR 73) (Regional Transportation Plan Project No. 12) and an east-west alignment from Saratoga Springs to Lehi (Regional Transportation Plan Project No. 13). These two projects make up the 2100 North Freeway Alternative, the Preferred Roadway Alternative in Utah County. The conformity determination for the MAG 2030 Regional Transportation Plan was made by FHWA and FTA on June 27, 2007.

Full build-out of the MVC in 2030 is reflected in the most recent regional analyses prepared by WFRC and MAG. It is recognized that construction of the MVC will be phased as described in Chapter 36, Project Implementation, and that, at present, the most recent regional conformity determinations do not coincide with the project phasing described in Chapter 36. WFRC and MAG intend to adopt amended transportation plans to reflect phased implementation of the MVC before a Record of Decision is issued for the MVC project.

12.4.1.2 Microscale Evaluations for Local Air Quality (CO and PM_{10})

For the MVC project, a microscale (hot-spot) analysis was conducted for CO and PM_{10}. Final project-level conformity determinations for the MVC Preferred Alternatives will be made before the Record of Decision for the project is issued.

Carbon Monoxide (CO) Methodology

To comply with air quality conformity requirements in non-attainment or maintenance areas for CO, a microscale (hot-spot) analysis is required. FHWA and UDOT determined that a project-level CO analysis would be conducted at the following two locations in the air quality impact analysis area:

- The 1300 South/5800 West interchange (in the Salt Lake City CO maintenance area between I-80 and SR 201)
- The 9000 South/5800 West interchange (the interchange in the project corridor with the highest traffic volume outside the Salt Lake City CO maintenance area)

With the exception of the freeway segment from I-80 to SR 201, the mainline traffic volumes on the 5800 West Freeway Alternative would be higher than those on the 7200 West Freeway Alternative and would be higher than those on all of the Utah County alternatives (see Table 12.4-1). For this reason, detailed modeling was required for interchanges on the 5800 West Freeway Alternative only. This analysis assumes that, if the NAAQS for CO would not be exceeded at the highest-volume interchanges on the 5800 West Freeway Alternative, then the CO concentrations along the 7200 West Freeway Alternative and the Utah County alternatives would likewise not be exceeded because these alternatives have lower traffic volumes.

Table 12.4-1. Average Daily Traffic Volumes for the Salt Lake County Roadway Alternatives in 2030

MVC Segment	5800 West Freeway Alternative (with tolling)	7200 West Freeway Alternative (with tolling)
I-80 to SR 201	54,000 (18,000)	59,000 (22,000)
SR 201 to 13400 South	151,000 (52,000)	140,000 (47,000)
13400 South to Utah County line	96,000 (28,000)	96,000 (28,000)

CO impacts were evaluated using the CAL3QHC line source dispersion model. The CAL3QHC model uses free-flow and idling vehicle emission rates in conjunction with roadway geometry, wind direction, and other meteorological factors to estimate 1-hour CO concentrations at receptor locations near the roadway. Eight-hour CO concentrations were estimated by applying a persistence factor of 0.7 to 1-hour concentrations using procedures recommended by EPA.

Consistent with recommendations included in UDOT's *Air Quality Hot-Spot Manual* (UDOT 2003), the critical assumptions and configuration parameters used in the modeling included a 1,000-meter mixing height, low wind speed (1 meter per second), and 2030 1-hour and 8-hour background CO concentrations of 4.7 ppm and 2.8 ppm, respectively. In addition, the modeling assumed a very stable (Class E) atmosphere to simulate adverse wintertime air quality conditions when CO violations are more likely to occur. The modeling evaluated 36 wind directions to ensure that the worst-case CO concentration was determined for each receptor location. Interchange configurations and traffic movements, as well as traffic volumes and travel speeds, were derived from the traffic models. Vehicle emission rates were obtained from UDOT's *Air Quality Hot-Spot Manual* (UDOT 2003) and are more conservative (that is, higher) than those used by WFRC and MAG for regional modeling, an approach that results in worst-case emission estimates. Estimated CO concentrations under worst-case meteorological conditions represent the highest CO levels that could result from vehicle emissions.

Receptors are locations where the maximum total CO concentration is likely to occur and where the general public is likely to have continuous access and exposure to vehicle emissions. For the MVC project, most individual exposure to vehicle emissions would be at locations adjacent to the roadway, including the freeway mainline and interchange ramp intersections (for example, sidewalks) where people would be likely to spend more time. For each of the two modeled interchanges, 34 to 38 receptors were included in the model (including mainline segments). The results of this analysis are shown in Section 12.4.3.2, 5800 West Freeway Alternative, the Preferred Roadway Alternative in Salt Lake County.

Particulate Matter (PM) Methodology

Under the transportation conformity rule, PM_{10} and $PM_{2.5}$ hot-spot analyses are required for "projects of air quality concern." A new highway project could be considered a "project of air quality concern" if it is expected to carry traffic volumes of at least 125,000 vehicles per day (vpd) with 8% or more truck traffic (that is, at least 10,000 trucks per day). If the MVC is implemented as a non-tolled facility, some segments of the MVC would likely exceed this threshold, including both the 5800 West Freeway and 7200 West Freeway Alternatives from SR 201 to 13400 South (see Table 12.4-1 above, Average Daily Traffic Volumes for the Salt Lake County Roadway Alternatives in 2030).

There are currently no EPA-approved quantitative methods for conducting a hot-spot analysis for PM_{10} or $PM_{2.5}$. Therefore, for projects of air quality concern, EPA requires a qualitative hot-spot analysis. The methodology for this qualitative analysis is described in the March 29, 2006, EPA and FHWA guidance, *Transportation Conformity Guidance for Qualitative Hot-Spot Analysis in* $PM_{2.5}$ *and* PM_{10} *Non-attainment and Maintenance Areas*.

***PM_{10}*.** PM_{10} comes from direct PM_{10} sources such as dust that is stirred up by vehicle tires as well as secondary reactions of NO_x and sulfur oxides (SO_x) that form PM_{10} in the atmosphere. The MVC project is located in a PM_{10} non-attainment area in both Salt Lake and Utah Counties. Therefore, this chapter includes a qualitative PM_{10} hot-spot analysis for the MVC project. The qualitative analysis was conducted by (1) comparing average daily traffic volumes in the air quality impact analysis area to those on Interstate 15 (I-15) in North Salt Lake, and (2) reviewing air quality monitoring data adjacent to I-15 in North Salt Lake to determine if similar traffic volumes on the MVC would be likely to cause the NAAQS for PM_{10} to be exceeded.

***$PM_{2.5}$*.** The MVC study area is within the northern Wasatch Front and Utah Valley proposed $PM_{2.5}$ non-attainment areas. EPA intends to make official attainment and non-attainment designations by December 2008, and those designations would become effective in early 2009. The conformity requirements would apply to FHWA 1 year after the effective date (early 2010). A project-level conformity determination is required for the first federal approval action after the 1-year grace period for new non-attainment areas expires, which is expected to be in April 2010 for $PM_{2.5}$ (project-level conformity requirements already apply in the MVC project area for CO and PM_{10}, and the Record of Decision for the MVC will include a project-level conformity determination for these two pollutants). Since additional federal approvals for this project are expected after April 2010, project-level conformity will eventually apply to this project (assuming that the area is designated non-attainment for $PM_{2.5}$), and the U.S. Department of Transportation will comply with whatever $PM_{2.5}$ conformity requirements apply at that time.

Even though transportation conformity does not currently apply for the 2006 $PM_{2.5}$ standards, and the U.S. Department of Transportation will not be making a conformity determination for the 2006 $PM_{2.5}$ standards as part of this EIS, the discussion in Section 12.4.3.2, 5800 West Freeway Alternative, generally follows the approach described in the March 29, 2006, EPA and FHWA guidance, *Transportation Conformity Guidance for Qualitative Hot-Spot Analysis in* $PM_{2.5}$

and PM_{10} Non-attainment and Maintenance Areas. At this time, FHWA has not released guidance on how to address the revised $PM_{2.5}$ standard in NEPA documents.

12.4.1.3 Emissions Methodology for Criteria Pollutants and Mobile-Source Air Toxics

MSAT analyses were conducted using FHWA guidelines (FHWA 2006c). Criteria pollutant emissions associated with the MVC were provided by WFRC and MAG based on regional modeling conducted by those agencies using traffic data specific to the MVC project. FHWA's Easy Mobile Inventory Tool modeling program was used to derive annual estimates of MSATs associated with the MVC project alternatives.

The traffic data used in the MSAT analyses were taken from the regional travel demand model used in the transportation analysis. That data included link distances and geometry, lane capacity, average daily traffic, and travel speeds for major freeways, collectors, and principal arterials in Salt Lake and Utah Counties. The WFRC input parameters for the regional conformity analysis, such as the distribution of vehicle ages, inspection-maintenance parameters, and local fuel parameters, were also used in the model.

12.4.2 No-Action Alternative

12.4.2.1 Regional Air Quality

Under the No-Action Alternative, the MVC project would not be built. However, other regionally significant transportation projects identified in the WFRC and MAG long-range plans and by the local communities would be constructed, and these projects would contribute to localized CO and PM_{10} air quality impacts throughout the area.

The most recent transportation conformity analyses conducted for the Salt Lake County and Utah County non-attainment and/or maintenance areas indicate that, in 2030 with all regionally significant transportation projects in UDOT's regional transportation plan (including the MVC Preferred Alternatives) constructed, both counties would be within the CO and PM_{10} emission budgets established in the State Implementation Plan (WFRC 2007; MAG 2007). More than 50% of the CO and PM_{10} emission budgets (the allowed level of emissions for each type of pollutant) in the State Implementation Plan would remain in 2030 if all regionally significant projects are completed. As a result, the No-Action Alternative (which includes all of these regionally significant projects minus the MVC) would not result in new violations of the NAAQS, increase the frequency or severity of existing violations of the NAAQS, or delay the attainment of the NAAQS for the criteria pollutants of concern for the microscale evaluation (CO and PM_{10}).

12.4.3 Salt Lake County Alternatives

In Salt Lake County, two roadway alternatives and a transit alternative which would be implemented as part of the roadway alternatives are under consideration: the 5600 West Transit Alternative, the 5800 West Freeway Alternative (the Preferred Roadway Alternative in Salt Lake County), and the 7200 West Freeway Alternative. Under the 5600 West Transit Alternative, there is a dedicated right-of-way option and a mixed-traffic option. In addition, a tolling option was considered for each freeway alternative. Impacts under each combination of alternatives and options are discussed in the following sections.

12.4.3.1 5600 West Transit Alternative (Both Options)

As described in Chapter 2, Alternatives, two transit options are under consideration along 5600 West in Salt Lake County. One option, the Dedicated Right-of-Way Option, would incorporate a transit system running down the center of the roadway, and the other, the Mixed-Traffic Option, would incorporate a transit system running alongside the roadway. The air quality impacts from either transit option would be similar and are combined for this section.

Regional Air Quality

The MVC project is included in the most recent regional transportation conformity analysis for Salt Lake County (see Section 12.4.1.1, Mesoscale Evaluations for Regional Air Quality). In that 2030 analysis, all regionally significant transportation and transit projects were determined to be in compliance with the CO and PM_{10} emission budgets in the State Implementation Plan with more than 50% of the emissions budget remaining in 2030 following construction of all regionally significant projects, including the MVC. The MVC would increase regional CO and PM_{10} emissions by about 4% and less than 1%, respectively, in 2030 compared to the No-Action Alternative without the MVC (see Table 12.4-6, Regional Mesoscale Air Quality with the Salt Lake County Roadway Alternatives in 2030, on page 12-30). Under these conditions, the 5600 West Transit Alternative would be a relatively minor source of CO and PM_{10} at the regional level.

Local Air Quality (CO and PM_{10})

Depending on the freeway alternative that is implemented, average daily traffic volumes in 2030 on 5600 West would range from 15,700 to 27,500 vehicles per day (with the 5800 West Freeway Alternative) to 23,900 to 37,400 vehicles per day (with the 7200 West Freeway Alternative).

A localized CO hot-spot analysis for intersections that might serve transit stations on 5600 West was conducted using the intersection screening tools in UDOT's *Air Quality Hot Spot Manual* (UDOT 2003). The analysis was conducted using the following steps:

- Daily traffic volumes for 2005 and 2030 for the most heavily traveled intersection on 5600 West were compared with UDOT's CO hot-spot intersection screening look-up tables.
- If the future-year traffic volumes at the most heavily traveled intersection were less than the screening volumes in UDOT's look-up tables, it was concluded that the future CO emissions at that intersection (and other, lower-volume intersections) would be less than the NAAQS.

As shown in Table 12.4-2, the average daily traffic volumes in the vicinity of the most heavily traveled intersection on 5600 West (at 3500 South) would not exceed the UDOT screening thresholds under any of the project alternatives. Carbon monoxide impacts at intersections serving transit stations on 5600 West are not expected.

Table 12.4-2. Localized CO Hot-Spot Impacts at 5600 West Transit Station Locations

	2005			5800 West (with Tolling)			7200 West (with Tolling)		
Intersection	Daily Traffic Volume (vpd)	UDOT Screening Threshold	ADT Exceed Screening Threshold?	Daily Traffic Volume (vpd)	UDOT Screening Threshold	ADT Exceed Screening Threshold?	Daily Traffic Volume (vpd)	UDOT Screening Threshold	ADT Exceed Screening Threshold?
5600 West at 3500 South	11,700	25,000	No	25,100 (41,300)	45,000	No (No)	33,500 (42,100)	45,000	No (No)

Mobile-Source Air Toxics

Similar to criteria pollutant emissions, MSAT emissions are proportional to traffic volumes and vehicle-miles traveled. A transit system would be a minor source of MSATs compared to vehicle-generated emissions on 5600 West.

The vehicle-miles traveled in the impact analysis area under the MVC alternatives range from about 12.5 million miles per day to 15.2 million miles per day, and the vehicle-miles traveled on 5600 West make up less than 2% of this total. The MSAT emissions associated with a transit alternative would make up a small component of overall regional MSAT emissions.

12.4.3.2 5800 West Freeway Alternative

As described in Chapter 2, Alternatives, this alternative would consist of a freeway extending from I-80 to the Utah County line.

Regional Air Quality

The MVC project is included in the most recent regional transportation conformity analysis for both Salt Lake County and Utah County (see Section 12.4.1.1, Mesoscale Evaluations for Regional Air Quality). For Salt Lake County, WFRC's most recent plan includes the 5800 West Freeway Alternative. For Utah County, the most recent plan includes a north-south freeway alignment from the Salt Lake County line to SR 73 and an east-west alignment from Saratoga Springs to Lehi (these two projects together make up the 2100 North Freeway Alternative in Utah County). In that 2030 analysis, all regionally significant transportation and transit projects were determined to be in compliance with the CO and PM_{10} emission budgets in the State Implementation Plan with more than 50% of the regional emissions budget remaining in 2030. The MVC would increase regional CO and PM_{10} emissions by about 4% and less than 1%, respectively, in 2030 compared to the No-Action Alternative without the MVC (see Table 12.4-6, Regional Mesoscale Air Quality with the Salt Lake County Roadway Alternatives in 2030, on page 12-30). Under these conditions, the 5800 West Freeway Alternative would not be a substantial source of CO and PM_{10} at the regional level.

Local Air Quality (CO)

The local CO impacts described below are operational impacts that would occur after the MVC project is completed. The highest modeled CO concentrations associated with the MVC project are shown in Table 12.4-3.

Table 12.4-3. Highest Modeled Concentrations of Carbon Monoxide along the MVC

Roadway Segment or Interchange	1-Hour Concentration (ppm)			8-Hour Concentration (ppm)		
	Existing Conditions[a]	5800 West Freeway Alternative (2030)[b]	NAAQS	Existing Conditions[a]	5800 West Freeway Alternative (2030)[c]	NAAQS
1300 South/5800 West interchange (northbound on ramp to MVC)	4.7	8.8[d]	35	2.8	5.6[d]	9
1300 South/5800 West (MVC mainline)	4.7	8.3[d]	35	2.8	5.2[d]	9

ppm = parts per million

[a] Under the existing conditions, the MVC has not been built. There are currently no vehicle emissions associated with the MVC at these locations. The 1-hour and 8-hour concentrations are average background concentrations from air quality monitors near the proposed alignment.

[b] Includes 1-hour background concentration of 4.7 ppm.

[c] Includes 8-hour background concentration of 2.8 ppm.

[d] Highest modeled CO concentration shown for all scenarios.

1300 South/5800 West Interchange. Under the 5800 West Freeway Alternative, the highest modeled 1-hour CO concentration at the 1300 South/5800 West interchange (in the Salt Lake City CO maintenance area) was 8.8 ppm, which was below the 1-hour NAAQS of 35 ppm. The highest modeled CO concentration was adjacent to the northbound on ramp to the MVC mainline. The highest modeled 8-hour concentration at the 1300 South/5800 West interchange was 5.6 ppm, which was below the 8-hour NAAQS of 9 ppm.

1300 South/5800 West Mainline. Under the 5800 West Freeway Alternative, the highest modeled 1-hour CO concentration on the MVC mainline near the 1300 South/5800 West mainline was 8.3 ppm, which was below the 1-hour NAAQS of 35 ppm. The highest modeled 8-hour concentration on the mainline was 5.2 ppm, which was below the 8-hour NAAQS of 9 ppm.

At both locations, it is unlikely that people would spend extended periods of time (for example, 8 hours) standing adjacent to the MVC mainline or standing adjacent to the interchange on and off ramps, so the actual concentrations of CO that people would be exposed to would likely be much lower.

Detailed CO modeling for the 1300 South/5800 West interchange indicates that CO concentrations would be below the NAAQS for both the 1-hour and 8-hour

CO standards. No localized CO impacts are expected in the Salt Lake City CO maintenance area or in Salt Lake County outside the maintenance area. Historical data from regional monitoring stations also indicate that CO emissions are decreasing throughout the region, despite an increase in population and vehicle-miles traveled (see Table 12.3-2 above, Summary of CO Monitoring Data for Salt Lake and Utah Counties).

Local Air Quality (Qualitative PM_{10} Hot-Spot Analysis)

PM_{10} concentrations in the environment come from direct sources such as dust stirred up by vehicle tires as well as secondary reactions of NO_x and SO_x that form PM_{10} in the atmosphere. Traffic volumes and the corresponding traffic congestion have less of an impact on PM_{10} concentrations than do the larger regional trends in emission rates and industrial pollution controls (UDOT 2003). Therefore, PM_{10} in Salt Lake and Utah County will likely remain a regional issue related to prolonged temperature inversions and a gradual build-up of PM_{10}-related pollutants.

In the 2030 regional conformity analysis, all regionally significant transportation and transit projects were determined to be in compliance with the PM_{10} emission budgets in the State Implementation Plan with more than 50% of the regional emissions budget remaining in 2030. Regional emissions are shown in Table 12.4-6, Regional Mesoscale Air Quality with the Salt Lake County Roadway Alternatives in 2030, on page 12-30.

Emission Sources of PM_{10}

There are two categories of particulate emissions from transportation sources: primary and secondary.

- **Primary particulate emissions** are those emitted from vehicle tailpipes, brake wear, decomposition of rubber tires, and road dust stirred up by moving vehicles.
- **Secondary particulate emissions** result from chemical reactions in the atmosphere and include SO_x and NO_x that are emitted from vehicle tailpipes as gaseous pollutants.

Due to the geography along the Wasatch Front, atmospheric inversions are relatively common during the winter when cold air is trapped near the ground for several days. Under these conditions, air pollutants are trapped close to the ground and are prevented from dispersing.

Project-Related PM_{10} Emissions

PM_{10} emissions from construction activities are usually localized and short-term and last only for the duration of the construction period. Construction emissions are minimized through good construction practices such as watering exposed surfaces, minimizing the amount of exposed and disturbed surfaces, minimizing construction equipment and vehicle speeds, and properly maintaining vehicle engines.

PM_{10} monitors are generally located in or near areas with known PM_{10} problems. The nearest PM_{10} monitors to the proposed MVC alignments are in Magna (about 2 miles west of the 7200 West Freeway Alternative) and in Lindon (about 2.5 miles east of I-15). Neither of these monitors is close to a high-volume road such as the MVC would be. However, the monitoring station in North Salt Lake is located about 350 feet from I-15 and reflects PM_{10} contributions from high-volume roads as well as several industrial facilities nearby.

For this analysis, the North Salt Lake monitor was used as a surrogate for PM_{10} contributions from the Mountain View Corridor. Ambient PM_{10} monitoring data are shown in Table 12.4-4 below. As shown in the table, there have been no violations of the annual PM_{10} standard at the North Salt Lake monitor since 2000, and the annual average PM_{10} concentrations have declined over the same period.

Table 12.4-4. PM_{10} Monitoring Data for Salt Lake and Utah Counties

Location	Year	Annual Average (µg/m³)	Number of Annual Exceed-ances[a]	24-hour High (µg/m³)	Number of 24-Hour Exceed-ances[b]
Salt Lake County					
Cottonwood (5715 South 1400 East, Holladay)	2002	32	0	119	0
	2003	28	0	92	0
	2004	32	0	145	0
	2005	27	0	114	0
	2006	25	0	82	0
Hawthorne (1675 South 600 East, Salt Lake City)	2002	29	0	130	0
	2003	26	0	360	2
	2004	29	0	129	0
	2005	24	0	139	0
	2006	24	0	88	0
Magna (2935 South 8560 West, Magna)	2002	25	0	87	0
	2003	26	0	421	1[c]
	2004	24	0	88	0
	2005	22	0	177	1[c]
	2006	20	0	80	0
North Salt Lake (1795 North 1000 West, Salt Lake City)	2002	41	0	121	0
	2003	40	0	358	3[c]
	2004	42	0	189	1[c]
	2005	37	0	153	0
	2006	41	0	188	2[c]
Utah County					
Lindon (30 North Main Street, Lindon)	2002	32	0	288	1[d]
	2003	25	0	150	0
	2004	29	0	159	1[d]
	2005	25	0	86	0
	2006	25	0	116	0
North Provo (1355 North 200 West, Provo)	2002	29	0	82	0
	2003	23	0	76	0
	2004	25	0	100	0
	2005	21	0	68	0
	2006	22	0	123	0

[a] The annual standard is attained if the 3-year average of individual annual averages is less than 50 µg/m³. Three consecutive years of PM_{10} monitoring data must show that violations of the 24-hour and annual standards are no longer occurring in order for an area to be considered to attain the NAAQS. The annual standard for PM_{10} was revoked by EPA on December 18, 2006.

[b] The 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m³ is equal to or less than 1. Each monitoring site is allowed up to three expected exceedances of the 24-hour standard within a period of 3 calendar years. More than three expected exceedances in that 3-year period is a violation of the NAAQS.

[c] Exceedances due to high winds as reported by UDEQ (2005a, 2005b, 2006).

[d] Exceedances due to high winds as reported by UDEQ (2005a, 2005b).

There were three days in 2003 (February 1, April 1, and April 2), one day in 2004 (May 10), and one day in 2005 (September 10) when the 24-hour standard was exceeded due to unusually high winds. In each instance, the Salt Lake Valley experienced very dusty winds because a dry weather front passed through the area, and elevated concentrations of PM_{10} were observed at other monitoring locations throughout the region. These events have been described in the PM_{10} maintenance plan as natural events for which regional control measures are not expected to work (Utah Air Quality Board 2005). Such unusual weather events are not indicators of overall air quality trends in the region.

According to Utah traffic volume data, average annual daily traffic volumes on I-15 near the North Salt Lake monitoring station have increased from about 99,700 vehicles per day (vpd) in 2000 to about 133,400 vpd in 2007, an increase of nearly 34%. In addition, truck volumes on I-15 in the vicinity of the North Salt Lake monitor are about 8% according to Utah traffic volume data. Therefore, as the annual traffic volumes have increased on I-15 since 2000, average annual PM_{10} concentrations have declined overall at an air monitor close to the freeway that includes other nearby industrial sources (UDOT 2007).

Combined with the data in Table 12.4-4 above, this information shows that, as the annual traffic volumes have increased, average annual PM_{10} concentrations have declined at an air monitor close to the freeway.

Table 12.4-5 shows the average daily traffic volumes for individual segments of the MVC in 2030 and difference in traffic compared to the I-15 segment nearest to the North Salt Lake monitoring station. As shown in Table 12.4-5, two of the three MVC segments in Salt Lake County would have less traffic than I-15 adjacent to the North Salt Lake monitoring station.

Table 12.4-5. Comparison of Average Daily Traffic on the 5800 West Freeway Alternative and I-15 in North Salt Lake

MVC Segment	Average Daily Traffic on MVC Segment in 2030 (vpd)	Percent Change from Average Daily Traffic on I-15 in 2005[a]
I-80 to SR 201	54,000	–59.5%
SR 201 to 13400 South	151,000	+13.2%
13400 South to Utah County line	96,000	–28.0%

[a] Traffic on I-15 in 2005 was 127,000 vehicles per day.

At full build-out, the average daily traffic volume on the MVC in Salt Lake County between SR 201 and 13400 South would be about 13% (17,600 vpd) higher than the recorded volume on I-15 in 2006 near the North Salt Lake monitoring station. For comparison purposes, this difference (17,600 vpd) is less than the average daily traffic volume on 5600 West, the nearest principal arterial to the MVC. The expected truck volume on the MVC is expected to be the same as on I-15 at 8%. The increased traffic volumes on this segment of the MVC are not expected to cause or contribute to a new PM_{10} violation, or increase the frequency or severity of existing violations, for the following reasons:

- Traffic volumes on I-15 near the North Salt Lake monitoring station have increased by about 34% between 2000 and 2007, but the average annual PM_{10} concentration has decreased by about 12% at this monitoring station and there have been no exceedances of the PM_{10} NAAQS at this location since 2000.
- Source apportionment analyses prepared for the PM_{10} State Implementation Plan (SIP) attributed nearly 46% of all PM_{10} emissions at the North Salt Lake monitor to industrial point sources in the area (UDEQ 2002).
- The peak year of PM_{10} emissions for the MVC project is expected in 2030, by which time total PM_{10} emissions in the Salt Lake County non-attainment area will have decreased by 44% over those in 2006. Since there have been no exceedances of the PM_{10} NAAQS since 2000 and since PM_{10} emissions are expected to decrease further by 2030, exceedances of the PM_{10} NAAQS are not expected in the year of peak emissions.
- For all other PM_{10} monitoring stations in Salt Lake County that are in suburban residential areas without industrial sources, the average annual PM_{10} concentrations have decreased by 17% to 20% over the 2000-to-2006 timeframe.
- Land uses near the North Salt Lake monitoring station are more intense than in other parts of the Salt Lake Valley and include several oil refineries, a sand and gravel quarry, and other industrial land uses that are not present near the MVC.
- Regional conformity emissions modeling by WFRC shows declines in vehicle emissions rates over time that largely reflect national trends. When growth in regional vehicle-miles traveled (VMT) is taken into account, PM_{10} emissions remain well below the applicable emission

budgets established in the SIP to prevent violations of the PM_{10} air quality standards.

- EPA's MOBILE6.2 emissions model predicts that, relative to 2005, diesel particulate emission rates will decline by 80% by 2015 and by 95% by 2030. That is, 100,000 vehicles in 2005 would have the same diesel particulate emissions as 500,000 vehicles in 2015 or 2,000,000 vehicles in 2030.
- Vehicles are expected to emit less PM_{10} in the future. WFRC regional modeling shows that emission rates for most PM_{10} constituents would decrease by substantially more than 50% between now and 2030.

Despite the evidence discussed above suggesting that PM_{10} emissions would not be an issue for the MVC, there are no assurances that land uses (that is, the mix of commercial, residential, and industrial emission sources) in the vicinity of the project area would be sufficiently similar to those in the vicinity of the North Salt Lake monitoring station to ensure this outcome. Nonetheless, the area around the MVC project is not expected to develop as a heavy industrial corridor like that in North Salt Lake. See Chapter 4, Land Use, for a discussion of land uses in the vicinity of the MVC.

Regional Mesoscale Air Quality with the 5800 West Freeway Alternative in 2030

Table 12.4-6 below shows the pollutant emissions expected from the Salt Lake County alternatives for those pollutants for which the county is either a non-attainment area or maintenance area (PM_{10} and its precursors, NO_x). The vehicle-miles traveled in the region under the 5800 West Freeway Alternative would be about 38.6 million miles per day, or an increase of about 1.3 million miles per day over the No-Action Alternative. The total regional emissions of criteria pollutants under the 5800 West Freeway Alternative would be about 46.73 tons per day, an increase of about 0.29 ton per day over the No-Action Alternative.

Table 12.4-6. Regional Mesoscale Air Quality with the Salt Lake County Roadway Alternatives in 2030

Parameter	Existing Conditions (2006)	No-Action Alternative		5800 West Alternative		7200 West Alternative	
		Alternative	Percent Change from Existing Conditions	Alternative (with tolling)	Percent Change from No-Action (with tolling)	Alternative (with tolling)	Percent Change from No-Action (with tolling)
VMT (million miles/day)	23.4	37.3	59.4%	38.6 (38.0)	3.49% (1.88%)	38.5 (38.0)	2.95% (1.88%)
CO (tons/day)	627.8	212.9	–65.7%	220.9 (216.9)	3.76% (1.88%)	220.5 (216.4)	3.57% (1.64%)
Particulate Matter							
NO_x (tons/day)[a]	58.24	9.45	–83.8%	9.80 (9.63)	3.70% (1.90%)	9.78 (9.61)	3.49% (1.69%)
Direct PM (tons/day)	1.24	1.19	–4.0%	1.23 (1.21)	3.36% (1.68%)	1.23 (1.21)	3.34% (1.68%)
Fugitive dust (tons/day)	22.6	35.80	58.4%	35.70 (36.07)	–0.28% (0.75%)	35.72 (36.08)	–0.22% (–0.78%)
Total PM emissions (tons/day)	82.1	46.44	–43.4%	46.73 (46.91)	0.62% (0.10%)	46.73 (46.90)	0.62% (0.99%)

[a] NO_x to PM_{10} conversion is not 100%. Therefore, NO_x overestimates total PM_{10} emissions.

Source: Billings 2008

$PM_{2.5}$

Localized Impacts. Vehicle emission rates are expected to decline by about 59% between 2005 and the expected project opening year of 2015, with an additional 25% reduction between 2015 and 2030. In other words, assuming the same national average ratio of light- and heavy-duty vehicles, 100,000 vehicles in 2005 would have the same $PM_{2.5}$ emissions as 244,000 vehicles in 2015 or 326,000 vehicles in 2030. EPA's MOBILE6.2 emissions model predicts that, relative to 2005, diesel particulate emissions rates will decline by 80% by 2015 and 95% by 2030. That is, 100,000 vehicles in 2005 would have the same diesel particulate emissions as 500,000 vehicles in 2015 or 2,000,000 vehicles in 2030.

The relative contribution of regional and localized sources to total ambient $PM_{2.5}$ concentrations in the Wasatch Front is currently unclear. However, it is worth noting that traffic volumes on I-15 increased by more than 28% between 2000 and 2005, but the average annual PM_{10} concentration at a nearby monitor decreased by nearly 22% during this period, which suggests that localized impacts from vehicle traffic might be a minor contributor to overall PM concentrations (see Section 12.4.3.2, 5800 West Freeway Alternative, for further discussion). In addition, $PM_{2.5}$ monitoring data collected between 2002 and 2006 indicate that annual average $PM_{2.5}$ concentrations have been decreasing (see Table 12.3-4 above, Summary of $PM_{2.5}$ Monitoring Data for Salt Lake and Utah Counties).

Even though the contribution of localized sources of $PM_{2.5}$ might be minor, construction of any of the MVC alternatives would likely result in some increase in localized $PM_{2.5}$ concentrations along the new alignment compared to the No-Action Alternative. As shown in Table 12.4-7 below, since MVC would draw traffic from I-15 and most parallel arterials (such as Bangerter Highway), total daily traffic volumes on these other roads would be reduced compared to the No-Action Alternative, and there would be a corresponding reduction in $PM_{2.5}$ emissions. Shaded cells in the table indicate locations where 2030 daily traffic volumes would be higher than those under the No-Action Alternative.

Table 12.4-7. 2030 Daily Traffic Volumes on Roadways Parallel to the MVC

Alternative	SR 111	5600 West	Bangerter Highway	I-215	I-15
Salt Lake County Alternatives					
No-Action	49,100	34,900	90,200	167,800	282,800
5800 West Freeway	34,700	24,600	66,000	153,400	261,500
5800 West Freeway with Tolling	45,300	35,600	74,800	165,600	275,000
7200 West Freeway	29,500	30,000	60,600	153,700	263,300
7200 West Freeway with Tolling	45,600	38,900	75,,600	165,200	274,500
Alternative	**Redwood Road**	**Lehi Main Street**	**1000 South**	**I-15**	
Utah County Alternatives					
No-Action	37,000	21,000	52,000	219,000	
Southern Freeway	20,000	18,000	20,000	190,000	
Southern Freeway with Tolling	36,000	20,600	46,000	213,000	
2100 North Freeway	15,000	18,000	37,000	219,000	
2100 North Freeway with Tolling	33,200	19,800	46,200	219,900	
Arterials	16,000	18,000	40,000	213,000	
Arterials with Tolling	32,300	18,300	41,000	214,600	

Shading indicates a road with 2030 traffic volumes that are higher than those under the No-Action Alternative.

Changes in travel speeds could also have an impact on $PM_{2.5}$ emissions. EPA's MOBILE6.2 model does not predict how PM emission rates change with speed, but it is reasonable to assume that, to the extent that congestion relief provided by the MVC would reduce stop-and-go traffic conditions and vehicle idling, it would reduce $PM_{2.5}$ emissions on the affected roads. Also, in cases where the MVC reduces traffic volumes on arterial roads with signalized intersections, it would reduce $PM_{2.5}$ emissions from vehicles idling at those intersections.

The PM_{10} emission impacts of the tolling and transit options are discussed later in this chapter. To the extent that tolling and the presence of transit would reduce traffic volumes on the MVC roadway alignments, they would also tend to reduce localized concentrations of $PM_{2.5}$.

Regional Impacts. Elevated concentrations of $PM_{2.5}$ generally occur during periods of prolonged temperature inversions along the Wasatch Front. Elevated $PM_{2.5}$ concentrations can also occur in response to natural events during non-inversion seasons, such as wildfires or periods of prolonged high winds. $PM_{2.5}$ comes from both regional background and local sources and is both a regional and localized air quality concern under specific circumstances.

While secondary formation from $PM_{2.5}$ precursors is an important component to the regional $PM_{2.5}$ air quality problem, directly emitted $PM_{2.5}$ from local sources can cause or contribute to elevated localized $PM_{2.5}$ concentrations. The relative contributions of localized impacts, regional background impacts, and airborne transport of $PM_{2.5}$ from other states will not be known until Utah completes the technical analysis for a revision of the State Implementation Plan that addresses $PM_{2.5}$.

At the national level, EPA has established several control programs that will reduce emissions from most major sources of $PM_{2.5}$ and its precursor pollutants. EPA's Tier 2 light-duty vehicle regulations and 2007 heavy-duty vehicle standards, along with control of the sulfur content of fuels, are expected to reduce motor vehicle emission rates by 59% between 2005 and an assumed opening year of 2015, with an additional 25% reduction between 2015 and 2030. EPA's May 2004 nonroad engine regulations (EPA 2004) will take effect in 2008 and will reduce particulate matter and NO_x emissions from these vehicles by 90% by 2030.

In March 2007, EPA proposed new regulations to reduce locomotive emissions of particulate matter by 90% and NO_x by 80% (EPA 2007a). Finally, regional programs to reduce visible air pollution, which are being coordinated by an interstate planning group known as the Western Regional Air Partnership, will also have beneficial impacts on ambient $PM_{2.5}$ concentrations.

Regional PM_{10} modeling for conformity by WFRC and MAG shows declines in vehicle emissions rates over time that largely reflect national trends (WFRC 2007; MAG 2007). When growth in regional VMT is taken into account, NO_x emissions decline throughout the planning period, while PM_{10} emissions increase slightly between 2015 and 2030 (although levels remain well below the applicable emission budgets set to prevent violations of the PM_{10} air quality standards).

With respect to alternative-specific regional impacts, the PM_{10} emissions analysis performed for the MVC provides some guidance as to likely emissions of $PM_{2.5}$. Table 12.4-6, Regional Mesoscale Air Quality with the Salt Lake County Roadway Alternatives in 2030, and Table 12.4-11, Regional Mesoscale Air Quality with the Utah County Alternatives in 2030, below, provide regional emissions estimates for direct PM_{10} emissions (from vehicle tailpipe exhaust, brake wear, and tire wear), PM_{10} road dust, and NO_x. These same pollutants contribute in varying degrees to $PM_{2.5}$ concentrations. Nearly all PM_{10} vehicle exhaust, and nitrate particles formed from gaseous NO_x emissions, are in the $PM_{2.5}$ and smaller size range, while only a small fraction of brake wear, tire wear, and road dust are in the $PM_{2.5}$ size range. A large decline in total emissions is expected between the base year (that is, existing conditions) and the project design year, which will contribute to reduced concentrations, and there are small differences in total regional emissions between the various alternatives (less than 1%).

Mobile-Source Air Toxics

In addition to the criteria pollutants for which there are NAAQS, EPA also regulates air toxics. Most air toxics originate from human-made sources including on-road mobile sources, non-road mobile sources (such as airplanes), area sources (such as dry cleaners), and stationary sources (such as factories or refineries).

MSATs are a subset of the 188 air toxics defined by the Clean Air Act. MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

EPA is the lead federal agency for administering the Clean Air Act and has specific responsibilities for determining the health effects of MSATs. On March 29, 2001, EPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources (66 Federal Register 17229). In its rule, EPA examined the impacts of existing and newly promulgated mobile-source control programs, including its reformulated gasoline program, its national low-emission vehicle standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur-control requirements, and its proposed heavy-duty engine and vehicle standards and on-highway diesel fuel sulfur-control requirements. Between 2000 and 2020, FHWA projects that, even with a 64% increase in vehicle-miles traveled, these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57% to 65% and will reduce on-highway diesel particulate emissions by 87%.

In February 2007, EPA issued a final rule to reduce hazardous air pollutants from mobile sources. The final standards will lower emissions of benzene and other air toxics in three ways: (1) by lowering the benzene content in gasoline, (2) by reducing exhaust emissions from passenger vehicles operated at cold temperatures under 75 °F, and (3) by reducing emissions that evaporate from, and permeate through, portable fuel containers.

Under this rule, EPA expects that new fuel benzene and hydrocarbon standards for vehicles and gas cans will reduce total emissions of mobile-source air toxics by 330,000 tons in 2030, including 61,000 tons of benzene. As a result, new passenger vehicles will emit 45% less benzene, gas cans will emit 78% less benzene, and gasoline will have 38% less benzene overall.

Unavailable Information for Project-Specific MSAT Impact Analysis

This section includes a basic analysis of the likely MSAT emission impacts associated with the proposed MVC project. The available technical tools do not allow FHWA and UDOT to predict the project-specific health impacts of the MSAT emissions associated with the MVC. Due to these limitations, the following discussion is included in accordance with the regulations of the Council on Environmental Quality (40 CFR 1502.22[b]) regarding incomplete or unavailable information.

Information That Is Unavailable or Incomplete

Evaluating the environmental and health impacts of MSATs from a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling to estimate ambient concentrations resulting from the estimated emissions, exposure modeling to estimate human exposure to the estimated concentrations, and then a final determination of health impacts based on the estimated exposure. Each of these steps is limited by technical short-comings or scientific uncertainty that prevents a more complete determination of the health impacts of MSATs from the MVC project.

Emissions. The EPA tools for estimating MSAT emissions from motor vehicles are not sensitive to key variables needed to determine the emissions from highway projects. Although the MOBILE6.2 model is used to predict emissions at a regional level, it has limited applicability at the project level. MOBILE6.2 emission factors are based on a typical trip length of about 7.5 miles, with average speeds for such typical trips. As a result, MOBILE6.2 does not have the ability to predict emission rates for a specific vehicle operating condition at a specific location at a specific time. Because of this limitation, MOBILE6.2 can only approximate the operating speeds and levels of congestion likely to be present on large-scale projects and cannot adequately capture the emissions effects of smaller projects. In its discussions of particulate matter under the conformity rule, EPA has identified problems with MOBILE6.2 as a general impediment to quantitative analysis.

These deficiencies compromise the ability of MOBILE6.2 to accurately estimate MSAT emissions. MOBILE6.2 is an adequate tool for projecting emission trends and performing relative analyses between alternatives for very large projects, but it is not sensitive enough to capture the effects of travel changes tied to smaller projects or to predict emissions near specific roadside locations.

Dispersion. The tools to predict how MSATs disperse in the environment are also limited. Current regulatory models (for example, CAL3QHC) were developed and validated more than 10 years ago for predicting episodic concentrations of carbon monoxide to determine compliance with the NAAQS.

The performance of dispersion models is more accurate for predicting maximum concentrations that can occur at a specific time and location in a geographic area. This limitation makes it difficult to predict accurate exposure patterns at specific times at specific highway project locations across an urban area to assess the potential health risk. The National Cooperative Highway Research Program is conducting research on best practices in applying models and other technical methods to assist in the analysis of MSATs. This work also will focus on identifying appropriate methods of documenting and communicating MSAT impacts in the NEPA process and to the general public. Along with these general limitations of dispersion models, there is also a lack of monitoring data in most areas for use in establishing project-specific MSAT background concentrations.

Exposure Levels and Health Effects. Finally, even if emission levels and concentrations of MSATs could be accurately predicted, limitations in current techniques for exposure assessment and risk analysis prevent FHWA from reaching meaningful conclusions about project-specific health impacts. Exposure assessments are difficult because it is difficult to accurately calculate annual concentrations of MSATs near roads and to then determine the portion of a year that people are actually exposed to those concentrations at a specific location. These difficulties are compounded for determining 70-year cancer assessments, especially because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over a 70-year period. There are also considerable uncertainties associated with the existing estimates of toxicity of the various MSATs, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population. Because of these shortcomings, any calculated difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with calculating the impacts. Consequently, the results of such assessments would not be useful to decision-makers, who would need to weigh this information against other project impacts that are better suited for quantitative analysis.

Summary of Existing Credible Scientific Evidence Relevant to Evaluating the Impacts of MSATs

Research into the health impacts of MSATs is ongoing. For different emissions, there are a variety of studies indicating that some emissions are either statistically associated with adverse health outcomes (frequently based on emission levels found in occupational settings) or indicating that laboratory animals demonstrate adverse health outcomes when exposed to large doses.

Exposure to air toxics has been the focus of a number of EPA efforts. Most notably, the agency conducted the National Air Toxics Assessment (NATA) in 1996 to evaluate modeled estimates of human exposure applicable at the county level. While not intended for use as a measure of or benchmark for local exposure, the modeled estimates in the NATA database best illustrate the levels of various toxics when aggregated to a state or national level.

EPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The EPA Integrated Risk Information System (IRIS) is a database of human health effects that could result from exposure to various substances found in the environment. The following toxicity information for the six prioritized MSATs was taken from the IRIS database Weight of Evidence Characterization summaries (www.epa.gov/iris). This information represents EPA's most current assessments of the potential hazards and toxicology of these chemicals or mixtures.

- **Benzene** is characterized as a known human carcinogen. Non-cancer effects include anemia and other blood disorders.
- **Acrolein's** potential carcinogenicity cannot be determined because the existing data are inadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure. Acrolein is thought to account for most of the non-cancer respiratory effects associated with air toxics, including upper respiratory tract irritation.
- **Formaldehyde** is a probable human carcinogen based on limited evidence in humans and sufficient evidence in animals. Non-cancer effects include eye, nose, and throat irritation.
- **1,3-butadiene** is characterized as carcinogenic to humans by inhalation. It also has non-carcinogenic reproductive and developmental effects.
- **Acetaldehyde** is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure.
- **Diesel exhaust** is likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust is the combination of diesel particulate matter and diesel exhaust organic gases. Diesel exhaust also represents chronic respiratory effects, possibly the primary non-cancer hazard from MSATs. Prolonged exposures could impair pulmonary function and could produce symptoms such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.

There have been other studies that address MSAT health impacts in proximity to roadways. The Health Effects Institute, a non-profit organization funded by EPA, FHWA, and industry, has undertaken a major series of studies to research near-roadway MSAT hot spots, the health implications of the entire mix of mobile-source pollutants, and other topics. The final summary of the series is not expected for several years. A workshop sponsored by the Johns Hopkins School of Public Health (2004) concluded that residences close to roadways with high traffic density are associated with an increased risk of a broad spectrum of health outcomes in adults and children, including mortality, lung function, and lung cancer in adults, as well as respiratory symptoms including asthma/wheezing and lung function in children. Recent studies also support a finding of increased risk from exposure in proximity to transportation facilities. Two recent studies (McConnell and others 2006; Gauderman and others 2007) both observed a statistically significant association of increasing childhood asthma rates with decreasing distance to freeways in several California towns. A recent study (ICF International 2007) summarizes information and guidelines on available analytical models and techniques to assess MSAT impacts and how such information can be communicated in the environmental process.

Relevance of Unavailable or Incomplete Information to Evaluating Reasonably Foreseeable Significant Adverse Impacts on the Environment, and Evaluation of Impacts Based on Theoretical Approaches or Research Methods Generally Accepted in the Scientific Community

Because of the uncertainties discussed above, a quantitative assessment of the effects of air toxic emissions impacts on human health cannot be made at the project level. Although available tools do allow FHWA to reasonably predict relative emission changes between alternatives for large projects, the amount of MSAT emissions from each of the project alternatives and MSAT concentrations or exposures created by each of the project alternatives cannot be predicted with enough accuracy to be useful in estimating health impacts. (As noted above, the current emissions model is not capable of serving as a meaningful emissions analysis tool for smaller projects.) Therefore, the relevance of the unavailable or incomplete information is that it is not possible to determine whether any of the MVC alternatives would have “significant adverse impacts on the human environment.”

A quantitative evaluation of MSAT emissions from the MVC alternatives is presented below. This evaluation acknowledges that the MVC alternatives could cause increased exposure to MSATs, although the concentrations and duration of these exposures are uncertain. Because of this uncertainty, the health effects from these emissions cannot be estimated.

MSAT Modeling Results

Table 12.4-8 shows the MSAT modeling results for the Salt Lake County roadway alternatives. Annual MSAT emissions for each individual MSAT would decrease under the No-Action Alternative over existing conditions due to EPA's ongoing programs to control hazardous air pollutants from mobile sources. Despite an increase of more than 70% in VMT between existing conditions and the No-Action Alternative, MSAT emissions would decrease by about 44% to 86% depending on the individual constituent.

The vehicle-miles traveled in the impact analysis area under the 5800 West Freeway Alternative would be about 15.2 million miles per day, compared to about 12.5 million miles per day under the No-Action Alternative (an increase of 21.6% over the No-Action Alternative). As shown in Table 12.4-8, MSAT emissions under the 5800 West Freeway Alternative would increase over the No-Action Alternative due to the increased VMT under the 5800 West Freeway Alternative, with increases ranging from about 19% to about 22% over the No-Action Alternative.

Table 12.4-8. Mobile-Source Air Toxics Emissions from the Salt Lake County Roadway Alternatives in 2030

		Tons per Year					
Alternative	**Daily VMT (millions)**	**Acet-aldehyde**	**Acrolein**	**Benzene**	**1,3-Butadiene**	**Diesel Particulate Matter**	**Form-aldehyde**
Existing conditions	7.3	12.3	1.42	110.0	14.4	44.9	31.9
No-Action	12.5	6.76	0.798	58.1	5.97	6.22	17.4
5800 West Freeway (with tolling)	15.2 (14.6)	8.08 (7.79)	0.953 (0.920)	69.6 (67.1)	7.28 (6.94)	7.59 (7.25)	20.7 (20.0)
7200 West Freeway (with tolling)	15.1 (14.4)	8.01 (7.75)	0.944 (0.915)	68.9 (66.6)	7.2 (6.87)	7.51 (7.16)	20.5 (19.9)

Greenhouse Gases and Climate Change

The issue of global climate change is an important national and global concern that is being addressed in several ways by the federal government. The transportation sector is the second-largest source of total greenhouse gases in the United States and the largest source of carbon dioxide (CO_2) emissions, the predominant greenhouse gas. In 2004, the transportation sector was responsible for 31% of all CO_2 emissions produced in the United States. The principal anthropogenic (human-made) source of carbon emissions is the combustion of fossil fuels, which account for about 80% of anthropogenic emissions of carbon worldwide. Almost all (98%) of transportation-related greenhouse gas emissions result from the consumption of petroleum products such as motor gasoline, diesel fuel, jet fuel, and other residual fuels.

Recognizing this concern, FHWA is working with other modal administrations through the U.S. Department of Transportation Center for Climate Change and Environmental Forecasting to develop strategies to reduce transportation's contribution to greenhouse gases—particularly CO_2 emissions—and to assess the risks to transportation systems and services from climate changes.

In Utah, the Governor's Blue Ribbon Advisory Council on Climate Change identified measures that the state could take to minimize the impacts of transportation-related greenhouse gas emissions. The recommended measures include reducing VMT through developing and encouraging the use of mass transit, ridesharing, and telecommuting. Other strategies outlined in the report include promoting alternative fuels and hybrid vehicles and vehicle technologies resulting in greater fuel efficiency. In addition, the report encourages an idle-reduction program for school buses and heavy-duty trucks.

Because climate change is a global issue and the emission changes due to project alternatives are very small compared to global totals, greenhouse gas emissions were not estimated for individual alignments. Since greenhouse gas emissions are directly related to energy use, the changes in those emissions would be similar to the changes in energy consumption discussed in Chapter 20, Energy.

The relationship of current and projected Utah highway CO_2 emissions to total global CO_2 emissions is presented in Table 12.4-9. This analysis assumed that the MVC was a non-tolled facility. Utah highway CO_2 emissions are expected to decrease by 6.2% between 2006 and 2030. The UDOT Planning Division predicts that statewide VMT will increase by 58% between 2006 and 2030. Table 12.4-9 also illustrates the size of the MVC study area relative to total Utah travel activity (statewide VMT).

Table 12.4-9. Greenhouse Gas Emissions (All Alternatives)

Global CO_2 Emissions, 2006 (MMT)[a]	Utah Highway CO_2 Emissions, 2006 (MMT)	Projected Utah 2030 Highway CO_2 Emissions (MMT)	Utah Highway Emissions, Percent of Global Total, 2006 (%)	Project Study Area VMT, Percent of Statewide VMT, 2006 (%)
27,578	16.2	15.2	0.06%	23%

MMT = million metric tons

[a] EIA 2007

Combined Impacts of the 5800 West Freeway and 5600 West Transit Alternatives (Both Options)

The 5800 West Freeway Alternative would be implemented with one of the two 5600 West Transit Alternative options.

Because the air quality impacts from either of the transit options would be minor compared to the existing vehicle emissions on 5600 West and those from the 5800 West Freeway Alternative, the combined impacts of the 5800 West Freeway Alternative and either of the two transit options would be virtually the same as those from the 5800 West Freeway Alternative by itself.

5800 West Freeway Alternative with Tolling Option

The daily vehicle-miles traveled under the 5800 West Freeway Alternative with Tolling Option would be about 600,000 miles per day less than the non-tolled 5800 West Freeway Alternative. The decrease in traffic volumes and vehicle-miles traveled would result in slightly lower emissions than the 5800 West Freeway Alternative by itself.

As shown in Table 12.4-6 above, Regional Mesoscale Air Quality with the Salt Lake County Roadway Alternatives in 2030, the daily PM_{10} emissions under this alternative would be about 46.91 tons per day, or about 0.47 ton per day more than the No-Action Alternative.

As shown in Table 12.4-8 above, Mobile-Source Air Toxics Emissions from the Salt Lake County Roadway Alternatives, the annual MSAT emissions under this alternative would be about 15% greater than under the No-Action Alternative.

12.4.3.3 7200 West Freeway Alternative

As described in Chapter 2, Alternatives, this alternative would consist of a freeway extending from I-80 to the Utah County line.

Regional Air Quality

The regional air quality impacts from the 7200 West Freeway Alternative would be nearly the same as those from the 5800 West Freeway Alternative.

Local Air Quality (CO and PM_{10})

Traffic volumes on the 7200 West Freeway Alternative would be less than those predicted on the 5800 West Freeway Alternative. Therefore, it is expected that the CO and PM_{10} impacts from the 7200 West Freeway Alternative would be less than those modeled for the 5800 West Freeway Alternative and would be within all applicable standards for CO and PM_{10}.

Regional Mesoscale Air Quality with the 7200 West Freeway Alternative in 2030

The vehicle-miles traveled under the 7200 West Freeway Alternative would be about 38.5 million miles per day, or about 1.2 million miles per day more than under the No-Action Alternative. As shown in Table 12.4-6 above, Regional Mesoscale Air Quality with the Salt Lake County Roadway Alternatives in 2030, the daily emissions of pollutants from this alternative would be about 46.73 tons per day, the same as the 5800 West Freeway Alternative and about 0.29 ton per day more than the No-Action Alternative.

$PM_{2.5}$

See the section titled $PM_{2.5}$ on page 12-31 for a discussion of $PM_{2.5}$.

Mobile-Source Air Toxics

The vehicle-miles traveled in the impact analysis area under the 7200 West Freeway Alternative would be about 15.1 million miles per day, compared to about 12.5 million miles per day under the No-Action Alternative (an increase of about 20.8% over the No-Action Alternative). As shown in Table 12.4-8 above, Mobile-Source Air Toxics Emissions from the Salt Lake County Roadway Alternatives, MSAT emissions under the 7200 West Freeway Alternative would increase over the No-Action Alternative due to the increased VMT under the 7200 West Freeway Alternative, with increases for individual constituents ranging from about 17% to 20% over the No-Action Alternative.

Greenhouse Gases and Climate Change

See the section titled Greenhouse Gases and Climate Change on page 12-39 for a discussion of the impacts of the 7200 West Freeway Alternative on greenhouse gases and climate change.

Combined Impacts of the 7200 West Freeway and 5600 West Transit Alternatives (Both Options)

As with the 5800 West Freeway Alternative, the 7200 West Freeway Alternative would be implemented with one of the two 5600 West Transit Alternative options.

Traffic volumes on the 7200 West Freeway Alternative would be less than those predicted on the 5800 West Freeway Alternative. Therefore, the combined impacts of the 7200 West Freeway Alternative and the 5600 West Transit

Alternative (both options) would be slightly less than those from the 5800 West Freeway Alternative by itself.

7200 West Freeway Alternative with Tolling Option

The daily vehicle-miles traveled under the 7200 West Freeway Alternative with Tolling Option would be less than those under the non-tolled 7200 West Freeway Alternative. The decrease in traffic volumes and vehicle-miles traveled would result in lower emissions than the 7200 West Freeway Alternative by itself.

As shown in Table 12.4-6 above, Regional Mesoscale Air Quality with the Salt Lake County Roadway Alternatives in 2030, the daily PM_{10} emissions under this alternative would be about 46.90 tons per day, or about 0.46 ton per day more than the No-Action Alternative.

As shown in Table 12.4-8 above, Mobile-Source Air Toxics Emissions from the Salt Lake County Roadway Alternatives, the annual MSAT emissions under this alternative would increase over the No-Action Alternative with increases ranging from about 14% to 16% depending on the individual MSAT.

12.4.4 Utah County Alternatives

In Utah County, three alternatives are under consideration: the Southern Freeway Alternative, the 2100 North Freeway Alternative, and the Arterials Alternative. In addition, a tolling option was evaluated for each Utah County alternative. Impacts under each combination of alternatives and options are discussed in the following sections.

The roadway alternatives in Utah County would not meet the daily traffic volume threshold of 125,000 vehicles per day and, because of the surrounding land uses, are not likely to have the 8% heavy truck volume that would make the MVC a "project of air quality concern" requiring a conformity analysis. Nonetheless, a PM_{10} conformity determination for Utah County is included in Appendix 12A, Project-Level Conformity Determination for CO and PM_{10}.

12.4.4.1 Southern Freeway Alternative

As described in Chapter 2, Alternatives, this alternative would consist of a freeway extending from the Utah County line to I-15 at Lindon.

Regional Air Quality

The MVC project, a north-south alignment from the Salt Lake County line to SR 73 (Regional Transportation Plan Project No. 12) and an east-west alignment from Saratoga Springs to Lehi (Regional Transportation Plan Project No. 13), is included in the most recent regional transportation conformity analysis for Utah County (see Section 12.4.1.1, Mesoscale Evaluations for Regional Air Quality). In that 2030 analysis, all regionally significant transportation and transit projects were determined to be in compliance with the CO and PM_{10} emission budgets in the State Implementation Plan. The MVC would reduce regional PM_{10} emissions by less than 1 ton per day in 2030 compared to the No-Action Alternative without the MVC (see Table 12.4-11, Regional Mesoscale Air Quality with the Utah County Alternatives in 2030, on page 12-45). Under these conditions, the Southern Freeway Alternative would be a minor source of CO and PM_{10} at the regional level.

Local Air Quality (CO and PM_{10})

As shown in Table 12.4-10, the highest traffic volumes for the Utah County alternatives (which would occur on the 2100 North Freeway Alternative) would be about 35% less than those predicted on the 5800 West Freeway Alternative. Therefore, the CO and PM_{10} impacts from the Southern Freeway Alternative would be less than those modeled for the 5800 West Freeway Alternative and would be within all applicable standards for CO and PM_{10}.

Table 12.4-10. Average Daily Traffic Volumes for the Utah County Alternatives in 2030

MVC Segment	Southern Freeway Alternative (with tolling)	2100 North Freeway Alternative (with tolling)	Arterials Alternative (with tolling)
Utah County line to SR 73	99,000 (28,000)	98,000 (37,000)	93,000 (35,000)
SR 73 to I-15	83,000 (20,000)	NA	NA
2100 North Freeway (MVC to I-15)	NA	102,000 (33,800)	NA

NA = not applicable

Regional Mesoscale Air Quality with the Southern Freeway Alternative in 2030

Table 12.4-11 below shows the pollutant emissions expected from the Utah County alternatives for those pollutants for which Utah County is either a non-attainment area or a maintenance area (PM_{10} and its precursors, NO_x). The vehicle-miles traveled in the region under the Southern Freeway Alternative would be about 18.3 million miles per day, or an increase of about 300,000 miles per day over the No-Action Alternative. The total regional emissions of criteria pollutants under the Southern Freeway Alternative would be about 9.13 tons per day, a decrease of about 0.14 ton per day from the No-Action Alternative.

Table 12.4-11. Regional Mesoscale Air Quality with the Utah County Alternatives in 2030

		No-Action Alternative		Southern Freeway Alternative		2100 North Freeway Alternative		Arterials Alternative	
	Existing Conditions (2006)	Alternative	Percent Change from Existing Conditions	Alternative (with tolling)	Percent Change from No-Action (with tolling)	Alternative (with tolling)	Percent Change from No-Action (with tolling)	Alternative (with tolling)	Percent Change from No-Action (with tolling)
VMT (million miles/day)	10.1	18.0	78.2%	18.3 (18.1)	1.7% (0.6%)	18.4 (18.2)	2.2% (1.1%)	18.0 (18.0)	0.0% (0.0%)
Particulate Matter									
NO_x (tons/day)[a]	15.5	3.88	–75.0%	3.79 (3.77)	–2.3% (–2.8%)	3.85 (3.80)	–0.8% (–2.1%)	3.79 (3.77)	–2.3% (–2.8%)
Direct PM (tons/day)	0.351	0.4639	32.2%	0.4596 (0.4550)	–1.51% (–1.92%)	0.4657 (0.4605)	0.4% (–0.73%)	0.4567 (0.4558)	–1.55% (–1.75%)
Fugitive dust (tons/day)	4.06	4.927	21.4%	4.881 (4.832)	–0.93% (–1.93%)	4.947 (4.891)	0.4% (–0.73%)	4.851 (4.842)	–1.54% (–1.73%)
Total PM emissions (tons/day)	19.91	9.271	–53.4%	9.131 (9.057)	–1.51% (–2.31%)	9.262 (9.152)	-0.10% (–1.28%)	9.097 (9.067)	–1.88% (–2.20%)

[a] NO_x to PM_{10} conversion is not 100%. Therefore, NO_x overestimates total PM_{10} emissions.

Source: Hardy 2008

$PM_{2.5}$

See the section titled $PM_{2.5}$ on page 12-31 for a discussion of $PM_{2.5}$.

Mobile-Source Air Toxics

Table 12.4-12 shows the MSAT modeling results for the Utah County alternatives. Annual MSAT emissions for each MSAT would decrease under the No-Action Alternative over existing conditions due to EPA's ongoing programs to control hazardous air pollutants from mobile sources. Despite an increase of more than 112% in VMT between existing conditions and the No-Action Alternative, MSAT emissions would decrease by about 26% to more than 85% depending on the constituent.

Table 12.4-12. Mobile-Source Air Toxics Emissions from the Utah County Alternatives in 2030

Alternative	Daily VMT (millions)	Tons per Year					
		Acet-aldehyde	Acrolein	Benzene	1,3-Butadiene	Diesel Particulate Matter	Form-aldehyde
Existing conditions	2.4	3.62	0.448	37.0	3.83	18.8	9.24
No-Action	5.1	2.68	0.316	23.1	2.41	2.54	6.87
Southern Freeway (with tolling)	5.7 (5.4)	2.97 (2.80)	0.350 (0.330)	25.6 (24.2)	2.72 (2.53)	2.83 (2.66)	7.62 (7.17)
2100 North Freeway (with tolling)	5.6 (5.4)	2.94 (2.82)	0.346 (0.332)	25.4 (24.3)	2.68 (2.54)	2.81 (2.68)	7.52 (7.22)
Arterials (with tolling)	5.5 (5.3)	2.93 (2.77)	0.346 (0.327)	25.4 (24.0)	2.64 (2.50)	2.74 (2.64)	7.52 (7.10)

The vehicle-miles traveled in the impact analysis area under the Southern Freeway Alternative would be about 5.7 million miles per day, compared to about 5.1 million miles per day under the No-Action Alternative (an increase of 11.8% over the No-Action Alternative). As shown in Table 12.4-8 above, Mobile-Source Air Toxics Emissions from the Salt Lake County Roadway Alternatives in 2030, MSAT emissions under the Southern Freeway Alternative would increase over the No-Action Alternative due to the increased VMT under the Southern Freeway Alternative, with increases ranging from about 11% to about 13% over the No-Action Alternative.

Greenhouse Gases and Climate Change

See the section titled Greenhouse Gases and Climate Change on page 12-39 for a discussion of the impacts of the Southern Freeway Alternative on greenhouse gases and climate change.

Southern Freeway Alternative with Tolling Option

The daily vehicle-miles traveled under the Southern Freeway Alternative with Tolling Option would be about 300,000 miles per day less than the Southern Freeway Alternative by itself. The decrease in traffic volumes and vehicle-miles traveled would result in lower emissions than the Southern Freeway Alternative by itself.

As shown in Table 12.4-11 above, Regional Mesoscale Air Quality with the Utah County Alternatives in 2030, the daily pollutant emissions under this alternative would be about 9.05 tons per day, or about 0.2 ton per day less than the No-Action Alternative or the Southern Freeway Alternative by itself.

As shown in Table 12.4-12 above, Mobile-Source Air Toxics Emissions from the Utah County Alternatives, the annual MSAT emissions under this alternative would increase slightly over the No-Action Alternative with increases ranging from about 4% to 5% depending on the individual MSAT.

12.4.4.2 2100 North Freeway Alternative

As described in Chapter 2, Alternatives, this alternative would consist of a freeway extending from the Utah County line to SR 73 in Saratoga Springs and a lateral freeway extending east along 2100 North to I-15 in Lehi.

Regional Air Quality

The regional air quality impacts from the 2100 North Freeway Alternative would be virtually the same as those from the Southern Freeway Alternative.

Local Air Quality (CO and PM_{10})

The highest traffic volumes on the 2100 North Freeway Alternative would be about 35% less than those predicted on the 5800 West Freeway Alternative. Therefore, the CO and PM_{10} impacts from the 2100 North Freeway Alternative would be less than those modeled for the 5800 West Freeway Alternative and would be within all applicable standards for CO and PM_{10}.

Regional Mesoscale Air Quality with the 2100 North Freeway Alternative in 2030

As shown in Table 12.4-11 above, Regional Mesoscale Air Quality with the Utah County Alternatives in 2030, the vehicle-miles traveled in the impact analysis area under the 2100 North Freeway Alternative would be about 18.4 million miles per day, compared to about 18.0 million miles per day under the No-Action Alternative. The total regional emissions of criteria pollutants under the 2100 North Alternative would be about 9.3 tons per day, or about the same as the No-Action Alternative.

$PM_{2.5}$

See the section titled $PM_{2.5}$ on page 12-31 for a discussion of $PM_{2.5}$.

Mobile-Source Air Toxics

The vehicle-miles traveled in the impact analysis area under the 2100 North Freeway Alternative would be about 5.6 million miles per day, compared to about 5.1 million miles per day under the No-Action Alternative (an increase of 9.8% over the No-Action Alternative). As shown in Table 12.4-12 above, Mobile-Source Air Toxics Emissions from the Utah County Alternatives in 2030, MSAT emissions under the 2100 North Freeway Alternative would increase over the No-Action Alternative due to the increased VMT under the 2100 North Freeway Alternative, with increases ranging from about 9.5% to about 11% over the No-Action Alternative.

Greenhouse Gases and Climate Change

See the section titled Greenhouse Gases and Climate Change on page 12-39 for a discussion of the impacts of the 2100 North Freeway Alternative on greenhouse gases and climate change.

2100 North Freeway Alternative with Tolling Option

The daily vehicle-miles traveled under the 2100 North Freeway Alternative with Tolling Option would be about 200,000 miles per day less than the 2100 North Freeway Alternative by itself. The decrease in traffic volumes and vehicle-miles traveled would result in slightly lower emissions than the 2100 North Freeway Alternative by itself.

As shown in Table 12.4-11 above, Regional Mesoscale Air Quality with the Utah County Alternatives in 2030, the pollutant emissions under this alternative would be about 9.2 tons per day, or about 0.1 ton per day less than the No-Action Alternative.

As shown in Table 12.4-12 above, Mobile-Source Air Toxics Emissions from the Utah County Alternatives, the annual MSAT emissions under this alternative would increase over the No-Action Alternative with increases ranging from about 5% to 5.5% depending on the individual MSAT.

12.4.4.3 Arterials Alternative

As described in Chapter 2, Alternatives, this alternative would consist of a series of arterial roadways throughout northern Utah County. The combination of arterials includes a freeway segment from the Utah County line to SR 73 and arterial roadways at Porter Rockwell Boulevard, 2100 North, and 1900 South.

Regional Air Quality

The regional air quality impacts from the Arterials Alternative would be essentially the same as those from the Southern Freeway Alternative.

Local Air Quality (CO and PM_{10})

The highest traffic volumes on the Arterials Alternative would be about 38% less than those predicted on the 5800 West Freeway Alternative. Therefore, the CO and PM_{10} impacts from the Arterials Alternative would be less than those modeled for the 5800 West Freeway Alternative and would be within all applicable standards for CO and PM_{10}.

Regional Mesoscale Air Quality with the Arterials Alternative in 2030

As shown in Table 12.4-11 above, Regional Mesoscale Air Quality with the Utah County Alternatives in 2030, the vehicle-miles traveled under the Arterials Alternative would be about 18.0 million miles per day, the same as under the No-Action Alternative. The total regional emissions of criteria pollutants under the Arterials Alternative would be about 9.1 tons per day, nearly the same as the No-Action Alternative.

$PM_{2.5}$

See the section titled $PM_{2.5}$ on page 12-31 for a discussion of $PM_{2.5}$.

Mobile-Source Air Toxics

The vehicle-miles traveled in the impact analysis area under the Arterials Alternative would be about 5.5 million miles per day, compared to about

5.1 million miles per day under the No-Action Alternative (an increase of 7.8% over the No-Action Alternative). As shown in Table 12.4-12 above, Mobile-Source Air Toxics Emissions from the Utah County Alternatives in 2030, MSAT emissions under the Arterials Alternative would increase over the No-Action Alternative due to the increased VMT under the Arterials Alternative, with increases ranging from about 8% to 10% over the No-Action Alternative.

Greenhouse Gases and Climate Change

See the section titled Greenhouse Gases and Climate Change on page 12-39 for a discussion of the impacts of the Arterials Alternative on greenhouse gases and climate change.

Arterials Alternative with Tolling Option

The daily vehicle-miles traveled under the Arterials Alternative with Tolling Option would be the same as the No-Action Alternative (about 18.0 million miles per day). As shown in Table 12.4-11 above, Regional Mesoscale Air Quality with the Utah County Alternatives in 2030, emissions under the Arterials Alternative with Tolling Option would be about the same as under the No-Action Alternative (9.1 tons per day).

As shown in Table 12.4-12 above, Mobile-Source Air Toxics Emissions from the Utah County Alternatives, the annual MSAT emissions under this alternative would increase over the No-Action Alternative with increases ranging from about 3% to 4% depending on the individual MSAT.

12.4.5 Mitigation Measures

The MVC project conforms to applicable State Implementation Plans for CO and PM_{10}, the two pollutants for which this project is required to meet air quality conformity requirements under the Clean Air Act. Because the project meets the air quality conformity requirements, mitigation measures have not been adopted to address those pollutants.

In response to public comments received on the Draft EIS, the following mitigation measures have been incorporated into the project to address near-roadway air quality impacts from the emission of MSATs, fine particulate matter ($PM_{2.5}$), and other pollutants. The decision to incorporate these mitigation commitments does not represent a determination by FHWA or UDOT that the MVC project or any other road will cause measurable adverse health effects on populations near roads. These commitments have been incorporated in recognition of the potential for adverse health effects and in an effort to be responsive to public concerns.

For air quality mitigation for construction-related impacts, see Section 27.18.1, Air Quality Mitigation.

12.4.5.1 Air Quality Working Group

UDOT and UTA will facilitate the establishment and continued operation of an air quality working group (AWG) for the MVC study area in accordance with the following conditions.

Purpose

The purpose of the AWG will be to provide a forum for appropriate government agencies, experts, and stakeholders with an interest in roadway-related air quality issues in the MVC study area to collect and analyze air quality monitoring data and make recommendations as set forth in the following sections. Specifically, the AWG will review the collection of data on MSATs and other relevant pollutants, examine those and other available data and research regarding the health effects of roadway pollution as such information applies to each phase of the roadway, and make recommendations based on their conclusions.

Establishing the AWG

The members of the AWG will be appointed as soon as possible after the release of the Record of Decision, but in no event more than 3 months after such date, and will continue as long as necessary to fulfill its functions.

Membership of the AWG

The AWG will be made up of eight members and one facilitator appointed as follows:

- Four members appointed jointly by the Utah Moms for Clean Air, the Utah Chapter of the Sierra Club, and Utahns for Better Transportation, or their successor organizations.
- Four members appointed jointly by UDOT and UTA, including at least one member from a state or local agency with expertise in air quality monitoring, and at least one representative of a local government.
- One facilitator, chosen jointly by all the members of the AWG, whose fees will be paid from the Monitoring Fund.
- At least one member of the AWG will have expertise in air quality modeling, and at least one member of the AWG will have medical expertise.

Convening Meetings

The members of the AWG, at the first meeting, will choose two co-conveners from among the members. The co-conveners will be responsible for setting the meeting location and times, communicating with the other members of the AWG about the meetings, and keeping notes of the meetings as necessary, or supervising the facilitator in keeping notes. The AWG will determine the frequency of meetings.

Removing and Replacing Members

Members of the AWG may be removed and replaced only by the group/agency by whom they were appointed. The facilitator may be removed and replaced only by mutual agreement of all the members of the AWG.

Voting and Decision-making

Decisions of the AWG will be made by simple majority vote. The facilitator will not have a voting role within the AWG.

Technical Support

UDOT will provide technical support for the AWG including, where appropriate, the services of UDOT staff and/or consultants with the appropriate expertise to collect, analyze, and document traffic and air quality data. This support may include attendance at meetings, preparation of reports, and such other activities as may be needed to enable the AWG to function effectively. UTA also may provide technical support to the AWG.

12.4.5.2 Air Quality Monitoring Program

In consultation with the AWG, UDOT and UTA will establish an air quality monitoring program (Monitoring Program) in the MVC study area, focused on near-roadway air pollution, in accordance with the following conditions.

Monitors

The AWG will determine the type and location of the air quality monitors, and the MSATs and other pollutants to be monitored, as part of the Monitoring Program. The monitors will be located at two or more locations in the MVC study area, provided that such locations are near the roadway and near one or more public school facilities in the MVC study area. The monitors will be in place at least 1 year prior to construction of Phase 1 of the MVC roadway in order to establish baseline air quality. Monitoring also will be conducted at other intervals after construction as deemed necessary by the AWG, subject to the availability of funds in the escrow account.

Data Analysis and Distribution

The Monitoring Program will include the development and distribution of air quality monitoring reports. The reports will, on a regular basis, compile and analyze data obtained from the air quality monitors. The reports will be prepared by consultants selected by the AWG. The State of Utah procurement process will be used in the selection of the consultant. The final reports will be made available to the general public via the Internet.

Recommendations for Reducing Exposure

The Monitoring Program will include the development of recommendations for reducing human exposure to near-roadway air pollution. These recommendations will be developed by the AWG and presented to UDOT and UTA. The AWG's recommendations also will be made available to the general public via the Internet.

UDOT will provide $1,000,000 in funding in an escrow account (Monitoring Fund) for the Monitoring Program and will spend up to that amount for monitoring expenditures recommended by the AWG.

12.4.5.3 Air Quality Mitigation Program

UDOT will provide $3,100,000 in funding for air filters in the following schools: Hunter High, Hillside Elementary, Whittier Elementary, West Valley Elementary, and Hunter Junior High. Pending approval by the Granite School District, filters will be placed before construction of the Phase 1 project in the area adjacent to these schools. The AWG may make recommendations on prioritizing placement of filters in the schools closest to the roadway. The AWG may also make recommendations on filtration systems and/or different filter technologies (such as gas phase filters) that may be more appropriate in the schools closest to the roadway. Funds are to cover placement of filtration systems and ongoing maintenance until the funds are depleted.

12.4.6 Cumulative Impacts

Regional modeling conducted by WFRC and MAG for the 2030 regional transportation conformity analyses demonstrated that all regionally significant transportation projects (including the Mountain View Corridor) would be in compliance with the NAAQS for CO and PM_{10}. In addition, Salt Lake City and the Provo/Orem metropolitan areas have been redesignated as CO maintenance areas. Finally, PM_{10} maintenance plans for Salt Lake and Utah Counties have been submitted to EPA for approval. Once the plans are approved by EPA, both counties will then be considered maintenance areas for PM_{10}.

Population growth in the air quality impact analysis area has had little effect on overall air quality as demonstrated by the continuing improvement in air quality throughout the region. Air pollutant emissions from the MVC alternatives would increase slightly due to increased growth and, consequently, increased vehicle-miles of travel in the future. This growth is expected to occur with or without the MVC project.

Overall, the growth in the area by 2030 would likely be the same with or without the MVC project. However, the project would help to reduce regional traffic congestion and improve travel times, which would help maintain compliance with air quality standards. Improved travel times throughout the region would reduce idling emissions of CO and volatile organic compounds. As a result, the project is expected to have minor cumulative impacts on regional emissions of air pollutants.

Construction-Related Fugitive Dust. During construction of the project and other developments in the corridor, fugitive-dust-control measures (such as watering roads) would be needed in certain areas to protect disturbed soils from wind erosion until permanent, stabilized cover is established. After the construction phase is completed, the soil would have a lower potential for wind erosion compared to its undeveloped state.

Vehicle Emissions. Vehicle emissions have continued to decrease substantially over time as EPA has imposed a series of tighter emission-control requirements on engine emissions. As the region's vehicle fleet becomes newer and the older, high-emitting vehicles are replaced, it is expected that the more stringent emission standards will substantially offset the regional growth in vehicle-miles traveled. Although it is difficult to predict fleet-average emissions 20 to 30 years in the future, it is expected that the more stringent federal regulation of motor vehicle emissions will continue to drive vehicle emissions even lower, thus helping to offset the growth in vehicle-miles traveled.

Mobile-Source Air Toxics (MSATs). Most air toxics originate from human-made sources including on-road mobile sources, non-road mobile sources (such as airplanes), area sources (such as dry cleaners), and stationary sources (such as factories or refineries).

MSATs are a subset of the 188 air toxics defined by the Clean Air Act. MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

EPA is the lead federal agency for administering the Clean Air Act and has specific responsibilities for determining the health effects of MSATs. On March 29, 2001, EPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources (66 Federal Register 17229). In its rule, EPA examined the impacts of existing and newly promulgated mobile-source control programs, including its reformulated gasoline program, its national low-emission vehicle standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur-control requirements, and its proposed heavy-duty engine and vehicle standards and on-highway diesel fuel sulfur-control requirements. Between 2000 and 2020, FHWA projects that, even with a 64% increase in vehicle-miles traveled, these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57% to 65% and will reduce on-highway diesel particulate emissions by 87%.

In February 2007, EPA issued a final rule to reduce hazardous air pollutants from mobile sources. The final standards will lower emissions of benzene and other air toxics in three ways: (1) by lowering the benzene content in gasoline, (2) by reducing exhaust emissions from passenger vehicles operated at cold temperatures under 75 °F, and (3) by reducing emissions that evaporate from, and permeate through, portable fuel containers.

Under this rule, EPA expects that new fuel benzene and hydrocarbon standards for vehicles and gas cans will reduce total emissions of mobile-source air toxics by 330,000 tons in 2030, including 61,000 tons of benzene. As a result, new passenger vehicles will emit 45% less benzene, gas cans will emit 78% less benzene, and gasoline will have 38% less benzene overall.

12.4.7 Summary of Impacts

The combined impacts of the Salt Lake and Utah County alternatives will have a minor impact on overall regional air quality for the following reasons:

- Regional modeling conducted by WFRC and MAG for the 2030 transportation conformity analyses showed that all regionally significant transportation projects (including the Mountain View Corridor) would be in compliance with the NAAQS.
- The project-level analyses for CO and PM_{10} did not indicate that the NAAQS would be exceeded at the local level.
- The MSAT emission inventories for all alternatives in both counties showed minor emission differences between the action alternatives and the No-Action Alternative.
- Technological improvements in future years are expected to reduce vehicle emission rates, despite the increased vehicle-miles of travel.

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APPENDIX 12A

Draft Project-Level Conformity Determination for the Preferred Alternatives

Appendix 12A: Project-Level Conformity Determination for CO and PM_{10}

12A.1 Purpose of This Document

The Clean Air Act and its amendments require that federally funded highway and transit projects be consistent with state air quality goals as set forth in the applicable State Implementation Plan (SIP). The process to ensure this consistency is referred to as *transportation conformity*. Conformity to the SIP ensures that transportation projects will not cause new violations of the National Ambient Air Quality Standards (NAAQS), worsen existing violations of the standard, or delay timely attainment of the relevant standard.

Transportation conformity is required for all federally funded transportation projects in areas that have been designated by the U.S. Environmental Protection Agency (EPA) as not meeting an NAAQS. Areas that have not met the NAAQS are called *non-attainment areas* if they currently violate the standards or *maintenance areas* if they have previously violated the standards but now meet them and have an approved maintenance plan in place.

For the Mountain View Corridor (MVC) project, Salt Lake City, Salt Lake County, and Utah County are either non-attainment or maintenance areas for carbon monoxide (CO) and particulate matter (PM_{10}). Specifically, Salt Lake County is a non-attainment area for PM_{10}, Salt Lake City is a maintenance area for CO, and Utah County is a non-attainment area for PM_{10}.

Transportation conformity requires that all new "regionally significant" highway and transit projects that would be located in non-attainment and maintenance areas must be part of a "conforming" regional transportation plan and Transportation Improvement Program (TIP). The regional conformity demonstration is accomplished by meeting the criteria of the transportation conformity regulations (40 Code of Federal Regulations [CFR] 93), which are based on the latest planning assumptions, the latest emissions models, and appropriate agency consultation.

Transportation conformity also requires that a currently conforming regional long-range transportation plan and a regional TIP must be in place at the time of project approval, and the proposed project must come from the conforming plan and TIP. In addition to the regional conformity determination, the project must also meet the requirements for localized CO and PM_{10} project-level conformity (also known as hot-spot analyses).

This document addresses the project-level transportation conformity requirements for the Preferred Roadway Alternatives for the MVC project, including project-level hot-spot analyses for CO and PM_{10}, where appropriate.

12A.2 Description of the Mountain View Corridor Project

12A.2.1 Need for the Project

The transportation needs for the MVC are the result of a rapidly growing population in the region, especially in the Salt Lake Valley west of Interstate 15 (I-15). The existing roadway network in the area mostly consists of arterial streets that are not intended to accommodate a high volume of long-distance through trips and freight movements. In addition, the existing transit network consists primarily of local and express bus service.

These conditions have resulted in the following deficiencies that are more fully described in Chapter 1, Purpose of and Need for Action:

- Lack of adequate north-south transportation capacity in western Salt Lake County
- Lack of adequate transportation capacity in northwest Utah County
- Increased travel time and lost productivity
- Lack of transit availability
- Reduced roadway safety due to increased congestion

The most recent regional transportation plans prepared by the Wasatch Front Regional Council (WFRC) and the Mountainland Association of Governments (MAG) further document the need for additional transportation capacity in the study area and recommend a multimodal approach to accommodate the long-term projected traffic in the region (MAG 2007; WFRC 2007).

12A.2.2 Preferred Roadway Alternatives for the Project

When completed, the MVC would be a multi-lane, north-south freeway linking existing and planned development between Interstate 80 (I-80) in Salt Lake City and I-15 in Utah County, a distance of about 44 miles. The MVC Draft Environmental Impact Statement (EIS) was issued in November 2007. This conformity determination evaluates the non-tolled option for the Preferred Alternatives in Salt Lake and Utah Counties, reflecting regional modeling and regional emissions analyses prepared by WFRC in Salt Lake County and by MAG in Utah County. If a tolling option is implemented for the MVC, revised regional modeling and a regional conformity determination would be required; revised hot-spot analyses would be required for CO, PM_{10}, and all other applicable pollutants; and a revised project-level conformity determination would be required prior to project approval.

12A.2.2.1 Salt Lake County

As described in Chapter 2, Alternatives, the 5800 West Freeway Alternative has been identified as the Preferred Roadway Alternative in Salt Lake County. The 5800 West Freeway Alternative would begin with a collector-distributor system and a freeway-to-freeway interchange at I-80 and a freeway for the length of the alignment in Salt Lake County.

The lane configurations for the 5800 West Freeway Alternative are shown in Table 12A.2-1 below.

Table 12A.2-1. Salt Lake County Lane Configuration – 5800 West Freeway Alternative

Freeway Segment	Lanes in Each Direction: General-Purpose	Lanes in Each Direction: HOV	Total Lanes[a]
I-80 to State Route (SR) 201	2	1	6
SR 201 to 13400 South	3	1	8
13400 South to Utah County line	3	0	6

[a] Auxiliary lanes would be required at certain locations to allow traffic to merge onto and off of the freeway. Between 4100 South and 6200 South, an additional lane would be required in the south direction for a total of nine lanes plus auxiliary lanes. The additional lane functions primarily as an auxiliary lane in this area.

12A.2.2.2 Utah County

The Preferred Roadway Alternative in Utah County is the 2100 North Freeway Alternative as described in Chapter 2, Alternatives. This alternative consists of a freeway that extends from the Utah County line south to SR 73 in Lehi, plus a freeway along 2100 North from the MVC to the 1200 West interchange at I-15. In addition to the two freeway components of this alternative, two one-way frontage roads would extend from SR 68 to just past the commuter rail tracks west of I-15.

The 2100 North Freeway Alternative would have varying lane configurations as shown in Table 12A.2-2.

Table 12A.2-2. Utah County Lane Configuration – 2100 North Freeway Alternative

Freeway Segment	Lanes in Each Direction: General-Purpose	Lanes in Each Direction: HOV	Total Lanes[a]
Utah County line to SR 73 (1000 South)	3	0	6
2100 North Freeway MVC to I-15	3	0	6

[a] Auxiliary lanes would be required at certain locations to allow traffic to merge onto and off of the freeway.

The Preferred Roadway Alternatives for Salt Lake and Utah Counties are shown in Figure 12A-1, 5800 West Freeway Alternative – Salt Lake County, and Figure 12A-2, 2100 North Freeway Alternative.

The regional and project-level modeling results discussed in this conformity determination, as well as in Chapter 12, Air Quality, are based on a full build-out of the MVC in 2030 as a non-tolled facility to reflect worst-case conditions for air quality impacts.

Full build-out of the MVC in 2030 is reflected in the most recent regional analyses prepared by WFRC and MAG. It is recognized that construction of the MVC will be phased as described in Chapter 36, Project Implementation (Phasing), and that, at present, the most recent regional conformity determinations do not coincide with the project phasing described in Chapter 36. WFRC and MAG intend to adopt amended transportation plans to reflect phased implementation of the MVC before a Record of Decision is issued for the MVC project.

12A.3 Transportation Conformity Process

12A.3.1 Pollutants of Concern for Transportation Projects

The air pollutants of concern for the purpose of this transportation conformity determination are carbon monoxide (CO) and particulate matter less than 10 microns in diameter (PM_{10}).

- **CO** is a colorless, odorless, poisonous gas that reduces the amount of oxygen carried in the bloodstream. CO is emitted directly into the atmosphere from automobiles, with the highest emissions occurring under congested conditions at slow speeds and in stop-and-go traffic. Since it disperses to non-harmful levels fairly rapidly, CO is considered a localized pollutant and is the primary pollutant quantitatively analyzed at the project level. The NAAQS for CO are a 1-hour average of 35 parts per million (ppm) and an 8-hour average of 9 ppm.
- **PM_{10}** is the term for particles and liquid droplets suspended in the air. Motor vehicles directly emit PM_{10} from tailpipes. PM_{10} also includes particles from normal brake and tire wear. In addition, gases in vehicle exhaust, such as nitrogen oxides (NO_x), can react in the atmosphere to form PM_{10}. The principal health effects of airborne particulate matter are on the respiratory system. The 24-hour NAAQS for PM_{10} is 150 micrograms per cubic meter ($\mu g/m^3$).

12A.3.2 Statutory Requirements for Transportation Conformity

The statutory basis for transportation conformity is found in the Clean Air Act Amendments of 1990. In addition, the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, the Transportation Equity Act for the 21st

Century (TEA-21), and the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) have reinforced the need for coordinated transportation and air quality planning through the metropolitan planning organization (MPO) provisions. For the MVC, the MPO for Salt Lake County is the Wasatch Front Regional Council (WFRC), and the MPO for Utah County is the Mountainland Association of Governments (MAG).

The transportation conformity requirements are established through a series of regulations that set out the procedures and criteria for compliance. The regulations governing implementation requirements are included in EPA's transportation conformity rule as well as the relevant MPO planning regulations.

Transportation conformity is a way to ensure that federal funding and approval are provided to those transportation activities that are consistent with air quality goals. The conformity process ensures that transportation activities do not worsen air quality or interfere with the overall purpose of the SIP, which is to meet the NAAQS.

Under transportation conformity, transportation plans, programs, and projects cannot:

- Create new violations of the NAAQS,
- Increase the frequency or severity of existing NAAQS violations, or
- Delay attainment of the NAAQS.

Federally funded transportation projects must be found to conform before they are adopted, accepted, or approved for funding. With few exceptions (for example, certain kinds of safety projects, landscaping projects, and other projects known to have minimal air quality impacts), transportation projects must satisfy the following criteria:

- The project must come from a conforming transportation plan and TIP.
- The design concept and scope of the project in place at the time of the conformity finding must be maintained through implementation of the project.
- The project design concept and scope must be sufficiently defined to determine emissions at the time of the plan and the TIP conformity determination.

Air emissions from federally funded transportation projects (such as the MVC), when considered along with the emissions expected from other projects in the transportation plan and TIP, cannot cause the plan and TIP to exceed the emission budget established in the SIP. In addition, areas with known CO or

PM_{10} problems must also show that new localized violations (or “hot spots”) of those pollutants will not result from the project.

Transportation conformity applies in the following areas:

- EPA-designated non-attainment areas for transportation-related criteria pollutants (that is, those for which NAAQS have been established)
- Maintenance areas for transportation-related criteria pollutants

12A.3.3 Major Requirements of the Transportation Conformity Process

The major requirements of the transportation conformity process include the following:

- Interagency consultation
- Regional emissions analysis
- Project-level analysis

12A.3.3.1 Interagency Consultation

The interagency consultation process is the formal coordinating mechanism among transportation and air quality agencies and is key to the conformity process. The interagency consultation procedures apply to the development of the SIP, the regional transportation plan, the TIP, regionally significant projects, and regional conformity determinations. The interagency consultation process is tailored to each region and is documented and incorporated into the SIP as a conformity SIP revision.

12A.3.3.2 Regional Emissions Analysis

Regional emissions analyses are prepared by the MPOs to assess the regional impacts that transportation investments will have on emissions in the non-attainment or maintenance area. These analyses use the latest EPA-approved emissions models to estimate regional emissions and, in general, these estimates are derived from grams of pollutant per mile traveled and are based on an estimate of vehicle-miles traveled (VMT).

12A.3.3.3 Project-Level Analysis

In non-attainment and maintenance areas, federally funded projects must also conform at the project level before they are adopted, approved, or funded for construction. The transportation conformity requirements prohibit any project during the timeframe of the transportation plan (or regional emissions analysis) from causing or contributing to any new localized CO or PM_{10} violations or increasing the severity of existing violations.

For project-level conformity, transportation projects must satisfy the following criteria:

- The project must come from a conforming transportation plan and TIP.
- The design concept and scope of the project at the time of National Environmental Policy Act (NEPA) approval must be consistent with the regional conformity analysis.
- The project design concept and scope must be sufficiently defined at the time of the conformity determination on the transportation plan and/or TIP to determine project-level emissions.

12A.3.4 Areas Where Project-Level Conformity Analysis Applies

For the MVC, project-level conformity analysis is required for CO (for the northern portion of the MVC located in Salt Lake City—between I-80 and SR 201) and PM_{10} (for all of Salt Lake County and Utah County). For CO, a quantitative analysis using applicable EPA-approved air quality models (CAL3QHC) is required. At present, there are no EPA-approved quantitative methods for conducting a project-level analysis for PM_{10}. Therefore, EPA requires a qualitative project-level conformity determination for PM_{10}. The methodology for this qualitative analysis is described in the March 29, 2006, EPA and Federal Highway Administration (FHWA) guidance, *Transportation Conformity Guidance for Qualitative Hot-Spot Analysis in $PM_{2.5}$ and PM_{10} Non-attainment and Maintenance Areas*.

12A.4 Regional CO and PM_{10} Conformity Determinations

Regional conformity analyses are prepared by the appropriate MPO (WFRC for Salt Lake County and MAG for Utah County) as part of the conformity determinations of the transportation plans and transportation improvement programs. Both WFRC and MAG have included the MVC project in their transportation plans for the purpose of their most recent transportation conformity determinations.

12A.4.1 Salt Lake City CO Regional Conformity Determination

The CO maintenance plan for Salt Lake City was approved by EPA on October 26, 2005. The most recent CO regional conformity determination for Salt Lake City was issued by WFRC on June 18, 2007, and the conformity determination was made by FHWA and the Federal Transit Administration (FTA) on June, 27, 2007 (WFRC 2008). The conformity determination found that all regionally significant transportation projects included in the WFRC 2030 regional transportation plan would conform to the CO emission budget established in the SIP. Table 12A.4-1 shows the projected mobile-source emissions for CO in Salt Lake City and demonstrates that the emissions are within the emission budget established by the CO maintenance plan.

Table 12A.4-1. Salt Lake City CO – Regional Conformity Determination

Parameter	2012	2019	2025	2030
Emission budget (tons/day)	278.62	278.62	278.62	278.62
Emission rate (grams/mile)	14.33	11.43	10.67	10.48
Seasonal VMT	6,811,664	7,557,447	8,106,562	8,662,868
Projected emissions (tons/day)	107.65	95.25	95.38	100.06
Conformity determination (projected < budget?)	Pass	Pass	Pass	Pass

Source: WFRC 2007

12A.4.2 Salt Lake County PM_{10} Regional Conformity Determination

The PM_{10} SIP does not establish an emissions budget beyond 2003. Following transportation conformity procedures, regional conformity analyses after 2003 must meet the 2003 emission budgets for primary and secondary particulates.

Primary PM_{10} consists mostly of fugitive road dust but also includes particles from brake and tire wear as well as direct tailpipe emissions. Secondary PM_{10} consists of gaseous tailpipe emissions that form through chemical reactions in the atmosphere (nitrogen oxides are the main component of secondary PM_{10} emissions).

Table 12A.4-2 and Table 12A.4-3 below show that the projected mobile-source emissions for primary and secondary particulates in the Salt Lake County non-attainment area are within the 2003 emission budgets established in the PM_{10} SIP. The regional PM_{10} conformity determination concludes that the regional transportation plan conforms to the applicable controls and goals of the PM_{10} SIP in Salt Lake County.

Table 12A.4-2. Salt Lake County PM_{10} – Primary Particulates Conformity Determination[a]

Parameter	2015	2025	2030
Emission budget (tons/day)	40.30	40.30	40.30
VMT	30,580,921	35,977,839	38,246,955
Projected emissions	28.36	32.66	34.56
Conformity determination (projected < budget?)	Pass	Pass	Pass

[a] Includes road dust, elemental carbon, organic carbon, gasoline exhaust particles, tire wear, and break wear.

Source: WFRC 2008

Table 12A.4-3. Salt Lake County PM_{10} – Secondary Particulates (NO_x) Conformity Determination

Parameter	2015	2025	2030
Emission budget (tons/day)	32.30	32.30	32.30
VMT	30,580,921	35,977,839	38,246,955
Projected emissions (tons/day)	25.83	12.69	11.22
Conformity determination (projected < budget?)	Pass	Pass	Pass

Source: WFRC 2008

At the national level, EPA has established several control programs that will reduce particulate emissions from most major sources and the emissions' precursor pollutants. EPA's Tier 2 light-duty vehicle regulations and 2007 heavy-duty vehicle standards, along with control of the sulfur content of fuels, are expected to reduce motor vehicle emission rates by 59% between 2005 and 2015, with an additional 25% reduction between 2015 and 2030. EPA's May 2004 non-road engine regulations (EPA 2004) will take effect in 2008 and will reduce particulate matter and NO_x emissions from these vehicles by 90% by 2030.

12A.4.3 Utah County PM_{10} Regional Conformity Determination

The most recent PM_{10} regional conformity determination for the MAG 2030 regional transportation plan was made by FHWA and FTA on June 27, 2007.

Table 12A.4-4 and Table 12A.4-5 below show the expected emissions for primary and secondary particulates for the Utah County PM_{10} non-attainment areas and concludes that the projected mobile-source emissions are within the emission budgets established in the PM_{10} SIP for Utah County.

Table 12A.4-4. Utah County PM_{10} – Primary Particulates Conformity Determination[a]

Parameter	2010	2020	2030
Emission budget (tons/day)	7.74	10.34	10.34
VMT	11,247,506	14,256,296	17,891,706
Projected emissions (tons/day)	3.41	4.27	5.40
Conformity determination (projected < budget?)	Pass	Pass	Pass

[a] Includes road dust, elemental carbon, organic carbon, gasoline exhaust particles, tire wear, and break wear.

Source: Adapted from MAG 2007, Appendix B

Table 12A.4-5. Utah County PM_{10} – Secondary Particulates (NO_x) Conformity Determination

Parameter	2010	2020	2030
Emission budget (tons/day)	12.75	5.12	5.12
VMT	11,247,506	14,256,296	17,891,706
Projected emissions (tons/day)	11.63	4.32	3.30
Conformity determination (projected < budget?)	Pass	Pass	Pass

Source: Adapted from MAG 2007, Appendix B

12A.5 Project-Level CO Conformity Determination (Salt Lake City)

12A.5.1 Methodology

To comply with air quality transportation conformity requirements in non-attainment or maintenance areas for CO, a project-level (hot-spot) analysis is required for the Preferred Roadway Alternative in Salt Lake County (the 5800 West Freeway Alternative). For the CO conformity determination, FHWA and UDOT determined that a project-level analysis would be conducted at the following location in the air quality impact analysis area:

- The 1300 South/5800 West interchange, which is in the Salt Lake City CO maintenance area between I-80 and SR 201 and, therefore, is subject to a formal conformity determination.

CO impacts were evaluated using the EPA-approved CAL3QHC line source dispersion model. The CAL3QHC model uses free-flow and idling vehicle emission rates in conjunction with roadway geometry, wind direction, and other meteorological factors to estimate 1-hour CO concentrations at receptor locations near the road. Eight-hour CO concentrations were estimated by applying a persistence factor of 0.7 to 1-hour concentrations using procedures recommended by EPA.

Transportation conformity requires that project-level analyses evaluate emissions associated with the year of expected peak emissions from the project. For CO, the peak year of emissions at the project level will be after the project is completed in 2030 and the maximum number of vehicles is using the facility on a daily basis. While vehicle emission rates will be lower in 2030 than they are today (improving regional air quality), VMT on the MVC will be at its highest; therefore, the highest project-level CO emissions will be in 2030.

To ensure that the highest (that is, worst-case) project-level CO emissions were modeled in 2030 for the conformity determination, the following steps were incorporated into the modeling procedure:

- 2030 traffic volumes on the MVC at full build-out of the MVC as a freeway were used in the model.
- 2030 emission rates were obtained from UDOT's *Air Quality Hot-Spot Manual* (UDOT 2003).
- CO hot-spot modeling using 2030 traffic volumes and 2030 emission rates was conducted at the 1300 South/5800 West interchange (in the Salt Lake City CO maintenance area).

Consistent with other recommendations included in UDOT's *Air Quality Hot-Spot Manual* (UDOT 2003), the critical assumptions and configuration parameters used in the modeling included a 1,000-meter mixing height, low wind speed (1 meter per second), and 2030 1-hour and 8-hour background CO concentrations of 4.7 ppm and 2.8 ppm, respectively (derived from monitored CO data in the vicinity of the MVC). Background CO concentrations in 2030 are likely to be lower given the trends in regional emissions. In addition, the modeling assumed a very stable (Class E) atmosphere to simulate adverse wintertime air quality conditions when CO violations are more likely to occur in the Salt Lake Valley.

The modeling evaluated 36 wind directions to ensure that the worst-case CO concentration was determined for each receptor location. Interchange configurations and traffic movements, as well as traffic volumes and travel speeds, were derived from the traffic models. Vehicle emission rates were obtained from UDOT's *Air Quality Hot-Spot Manual* (UDOT 2003) and are more conservative (that is, higher) than those used by WFRC and MAG for regional modeling, an approach that results in worst-case emission estimates. Estimated CO concentrations under worst-case meteorological conditions represent the highest CO levels that could result from vehicle emissions.

Receptors are locations where the maximum CO concentration is likely to occur and where the general public could have continuous access and exposure to vehicle emissions. For the Preferred Roadway Alternative, most individual exposure to vehicle emissions would be at locations adjacent to the road, including the freeway mainline and interchange ramp intersections (for example, sidewalks) where people would be likely to spend more time.

12A.5.2 Modeled CO Concentrations

At the 1300 South/5800 West interchange, 34 receptors were included in the model (including mainline segments). The results of the CO impact analysis are shown in Table 12A.5-1.

Table 12A.5-1. Highest Modeled Concentrations of CO along the MVC

Roadway Segment or Interchange	1-Hour Concentration (ppm)			8-Hour Concentration (ppm)		
	Existing Conditions[a]	5800 West Freeway Alternative (2030)[b]	NAAQS	Existing Conditions[a]	5800 West Freeway Alternative (2030)[c]	NAAQS
1300 South/5800 West interchange (northbound on ramp to MVC)	4.7	8.8[d]	35	2.8	5.6[d]	9
1300 South/5800 West (MVC mainline)	4.7	8.3[d]	35	2.8	5.2[d]	9

[a] Under the existing conditions, the MVC has not been built. There are currently no vehicle emissions associated with the MVC at these locations. The 1-hour and 8-hour concentrations are average background concentrations from air quality monitors near the proposed alignment.

[b] Includes 1-hour background concentration of 4.7 ppm.

[c] Includes 8-hour background concentration of 2.8 ppm.

[d] Highest modeled CO concentration shown for all scenarios using 2030 emission rates and 2030 MVC VMT.

1300 South/5800 West Interchange. Under the Preferred Alternative, the highest modeled 1-hour CO concentration at the 1300 South/5800 West interchange (in the Salt Lake City CO maintenance area) was 8.8 ppm, which was below the 1-hour NAAQS of 35 ppm. The highest modeled CO concentration was adjacent to the northbound on ramp to the MVC mainline. The highest modeled 8-hour concentration at this interchange was 5.6 ppm, which was below the 8-hour NAAQS of 9 ppm.

1300 South/5800 West Mainline. Under the Preferred Alternative, the highest modeled 1-hour CO concentration on the MVC mainline near the 1300 South/ 5800 West mainline was 8.3 ppm, which was below the 1-hour NAAQS of 35 ppm. The highest modeled 8-hour concentration on the mainline was 5.2 ppm, which was below the 8-hour NAAQS of 9 ppm.

At both locations, it is unlikely that people would spend extended periods of time (for example, 8 hours) standing adjacent to the MVC mainline or the adjacent on and off ramps, so the actual concentrations of CO that people would be exposed to would likely be much lower.

Detailed CO modeling for the 1300 South/5800 West interchange under the Preferred Alternative indicates that CO concentrations would be below the NAAQS for both the 1-hour and 8-hour CO standards. No localized CO impacts are expected in the Salt Lake City CO maintenance area or in Salt Lake County outside the maintenance area.

12A.5.3 Conformity Determination for CO in Salt Lake City

The project-level analysis demonstrated that CO emissions from the Preferred Roadway Alternative in the Salt Lake City maintenance area would not result in a violation of the 1-hour CO NAAQS of 35.0 ppm or the 8-hour CO NAAQS of 9.0 ppm at any air quality receptor location in the 2030 analysis year (the year of peak emissions). The Preferred Roadway Alternative would not cause or contribute to any new localized violations of the CO NAAQS or increase the frequency or severity of any existing violations.

12A.6 Project-Level PM_{10} Conformity Determination (Salt Lake and Utah Counties)

Under the transportation conformity requirements, PM_{10} project-level analyses are required for "projects of air quality concern." A new highway project is considered a "project of air quality concern" if it is expected to carry traffic volumes of 125,000 vehicles per day with 8% or more truck traffic (that is, 10,000 trucks per day).

If the MVC is implemented as a non-tolled road, portions of the MVC Preferred Roadway Alternative in Salt Lake County would likely exceed this threshold. The Preferred Roadway Alternative in Utah County would not meet the daily traffic volume threshold of 125,000 vehicles per day and, because of the surrounding land uses, is not likely to have the 8% heavy truck volume that would make it a "project of air quality concern." Nonetheless, a PM_{10} conformity determination for the Preferred Roadway Alternative in Utah County is included in this analysis. Project-level PM_{10} conformity analyses were prepared that evaluated the worst-case traffic locations in Salt Lake County and Utah County.

12A.6.1 Methodology

Currently there are no EPA-approved quantitative methods for conducting project-level hot-spot analyses for PM_{10} or $PM_{2.5}$. Therefore, a qualitative analysis was prepared using methods in the EPA and FHWA March 29, 2006, guidance document, *Transportation Conformity Guidance for Qualitative Hot-Spot Analysis in $PM_{2.5}$ and PM_{10} Non-attainment and Maintenance Areas*.

The PM_{10} conformity determination was conducted by (1) comparing daily traffic volumes on the MVC under the Preferred Roadway Alternatives in Salt Lake and Utah Counties to those on segments of I-15 with similar operating characteristics and (2) reviewing air quality monitoring data from a monitor adjacent to I-15 to determine if similar traffic volumes on the MVC would likely cause the PM_{10} NAAQS to be exceeded, increase the frequency or severity of any existing violations, or delay the timely attainment of the PM_{10} NAAQS.

12A.6.2 Existing Conditions

This section discusses existing conditions related to air quality and traffic conditions in the Salt Lake and Utah County PM_{10} non-attainment areas to which transportation conformity applies.

12A.6.2.1 Air Quality Monitoring Data

There are four PM_{10} monitors in Salt Lake County and two PM_{10} monitors in Utah County (see Figure 12A-3, PM_{10} Monitoring Stations – Salt Lake and Utah Counties). A summary of the PM_{10} concentrations measured at these six monitors between 2002 and 2006 is shown in Table 12A.6-1 below.

Table 12A.6-1. Monitored PM_{10} Emissions for Salt Lake and Utah Counties (2002 to 2006)

Location	Year	Annual Average (μg/m³)	Number of Annual Exceed-ances[a]	24-hour High (μg/m³)	Number of 24-Hour Exceed-ances[b]
Salt Lake County					
Cottonwood (5715 South 1400 East, Holladay)	2002	32	0	119	0
	2003	28	0	92	0
	2004	32	0	145	0
	2005	27	0	114	0
	2006	25	0	82	0
Hawthorne (1675 South 600 East, Salt Lake City)	2002	29	0	130	0
	2003	26	0	360	2
	2004	29	0	129	0
	2005	24	0	139	0
	2006	24	0	88	0
Magna (2935 South 8560 West, Magna)	2002	25	0	87	0
	2003	26	0	421	1[c]
	2004	24	0	88	0
	2005	22	0	177	1[c]
	2006	20	0	80	0
North Salt Lake (1795 North 1000 West, Salt Lake City)	2002	41	0	121	0
	2003	40	0	358	3[c]
	2004	42	0	189	1[c]
	2005	37	0	153	0
	2006	41	0	188	2[c]
Utah County					
Lindon (30 North Main Street, Lindon)	2002	32	0	288	1[d]
	2003	25	0	150	0
	2004	29	0	159	1[d]
	2005	25	0	86	0
	2006	25	0	116	0
North Provo (1355 North 200 West, Provo)	2002	29	0	82	0
	2003	23	0	76	0
	2004	25	0	100	0
	2005	21	0	68	0
	2006	22	0	123	0

[a] The annual standard is attained if the 3-year average of individual annual averages is less than 50 μg/m³. Three consecutive years of PM_{10} monitoring data must show that violations of the 24-hour and annual standards are no longer occurring in order for an area to be considered to attain the NAAQS. The annual standard for PM_{10} was revoked by EPA on December 18, 2006.

[b] The 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 μg/m³ is equal to or less than 1. Each monitoring site is allowed up to three expected exceedances of the 24-hour standard within a period of 3 calendar years. More than three expected exceedances in that 3-year period is a violation of the NAAQS.

[c] Exceedances due to high winds as reported by UDEQ (2005a, 2005b, 2006).

[d] Exceedances due to high winds as reported by UDEQ (2005a, 2005b).

As shown above in Table 12A.6-1, prior to its revocation in December 2006, the annual PM_{10} standard had not been exceeded at any PM_{10} monitoring location in either Salt Lake or Utah Counties between 2002 and 2006 (exceedances due to high wind events are not considered violations of the standard), and the annual average PM_{10} concentrations have declined over the same period.

12A.6.2.2 MVC Transportation Needs

The MVC project was initiated to address the expected growth in western Salt Lake County and northwestern Utah County by improving regional mobility for automobile, transit, and freight trips. This improvement in regional mobility would be achieved by reducing roadway congestion and increasing transit opportunities in the MVC study area.

This growth is expected to affect roadway congestion, travel delay, and safety in the study area. Between 2005 and 2030, the total miles of major roads in the study area that operate at an unacceptable level of congestion will increase by 365%, resulting in travel delays, lost productivity, and safety concerns. Chapter 1, Purpose of and Need for Action, discusses the transportation needs in the MVC study area.

The major transportation needs in the MVC study area are a result of rapidly growing population and employment in the study area. The existing roadway network in the study area primarily consists of arterial streets that are not intended to accommodate a high volume of long-distance through trips and freight movements. These conditions have resulted in the following deficiencies:

- Lack of adequate north-south transportation capacity in western Salt Lake County
- Lack of adequate transportation capacity in northwest Utah County
- Increased travel time and lost productivity
- Lack of transit availability
- Reduced roadway safety due to increased roadway congestion

12A.6.3 Future Conditions

As shown in Table 12A.6-2, regional modeling for the Salt Lake County PM_{10} non-attainment area shows that VMT will increase by about 65% between 2006 and 2030, while annual PM_{10} emissions will decrease by about 43% during the same period even with the increased VMT. Similarly, for the Utah County PM_{10} non-attainment area, VMT will increase by about 82%, while annual PM_{10} emissions will decrease by about 53% during the same period.

Table 12A.6-2. Modeled PM_{10} Emissions for Salt Lake and Utah Counties (2030)

Parameter	2006	2015	2025	2030	Percent Change from 2006
Salt Lake County					
VMT (million miles traveled/day)	23.4	30.6	36.0	38.6	65.0
NO_x precursors (tons/day)	58.24	25.83	12.69	9.80	–83.2
Primary particulates[a]					
Direct PM_{10} (tons/day)	1.24	1.00	1.06	1.23	–0.81
Fugitive dust (tons/day)	22.6	27.35	31.6	35.7	58.0
Total PM emissions (tons/day)	82.1	54.18	45.35	46.73	–43.1
Parameter	**2006**	**2010**	**2020**	**2030**	**Percent Change from 2006**
Utah County					
VMT (million miles traveled/day)	10.1	11.2	14.3	18.4	82.2
NO_x precursors (tons/day)	15.5	11.63	4.32	3.85	–75.2
Primary particulates[a]					
Direct PM_{10} (tons/day)	0.351	0.350	0.370	0.4657	32.7
Fugitive dust (tons/day)	4.06	3.06	3.91	4.947	21.8
Total PM emissions (tons/day)	19.91	15.04	8.60	9.26	–53.5

[a] Includes road dust, elemental carbon, organic carbon, gasoline exhaust particles, tire wear, and break wear.

Sources: MAG 2007; WFRC 2008; MVC Final EIS, Table 12.4-6, Regional Mesoscale Air Quality with the Salt Lake County Roadway Alternatives in 2030, and Table 12.4-11, Regional Mesoscale Air Quality with the Utah County Alternatives in 2030

Based on PM_{10} regional conformity determinations, which are reliable indicators of emission trends, it is unlikely that the MVC would cause the PM_{10} NAAQS to be exceeded, increase the frequency or severity of any existing violations, or delay the timely attainment of the PM_{10} NAAQS in either Salt Lake or Utah Counties. In addition, Table 12A.6-2 above shows that the highest PM_{10}

emissions in both Salt Lake and Utah Counties are occurring under existing conditions and will decrease substantially in the future. Similar to the discussion in Section 12A.5, Project-Level CO Conformity Determination (Salt Lake City), transportation conformity determinations in PM_{10} non-attainment areas require that project-level analyses evaluate emissions associated with the year of expected peak emissions from the project. As with CO, the peak year of emissions at the project level for PM_{10} will be after the project is completed in 2030 and the maximum number of vehicles is using the facility.

12A.6.3.1 PM_{10} Comparative Analysis for Salt Lake County

Following the guidelines in the March 29, 2006, EPA and FHWA guidance, *Transportation Conformity Guidance for Qualitative Hot-Spot Analysis in $PM_{2.5}$ and PM_{10} Non-attainment and Maintenance Areas*, a comparison approach was used to qualitatively assess PM_{10} emissions at the project level for the Preferred Roadway Alternative in Salt Lake County.

As shown in Figure 12A-3, PM_{10} Monitoring Stations – Salt Lake and Utah Counties, with the exception of the North Salt Lake PM_{10} monitoring station, all PM_{10} monitors in Salt Lake and Utah Counties are more than 1 mile (and up to 5 miles) from a high-volume freeway (which the MVC would be when completed).

The Cottonwood and Hawthorne monitoring stations are located in suburban residential areas and are not representative of PM_{10} emissions adjacent to high-volume, free-flowing traffic such as what is expected on the MVC. The Magna monitoring station is also located in a suburban residential area about 1 mile south of SR 201, but it is often influenced by blowing dust from a large tailings impoundment associated with the Kennecott mining operation. PM_{10} emission data from these monitors would not have sufficiently similar traffic volumes to the MVC to provide a reasonable comparison to transportation-related PM_{10} emissions that could be associated with the MVC.

However, the North Salt Lake monitoring station is located about 350 feet from I-15 and reflects PM_{10} contributions from a high-volume freeway as well as several nearby industrial facilities, including refineries and sand and gravel operations. The PM_{10} monitoring data recorded at this station include not only high-volume traffic emissions from I-15 but other industrial emission sources and likely overestimates PM_{10} emissions associated with I-15 itself. Land uses surrounding the MVC in Salt Lake County have less intense industrial development than those surrounding the North Salt Lake monitor.

For these reasons, the North Salt Lake monitor, with its close proximity to I-15 and additional PM_{10} emission sources, was used as a comparison site for PM_{10} emissions associated with the MVC.

Ambient PM_{10} monitoring data for the North Salt Lake monitor (as well as all other PM_{10} monitoring stations in Salt Lake and Utah Counties) are shown in Table 12A.6-1 above, Monitored PM_{10} Emissions for Salt Lake and Utah Counties. As shown in the table, there have been no violations of the annual PM_{10} standard at any PM_{10} monitoring station since 2002 (except for anomalous, naturally occurring wind events), and, in general, the average annual PM_{10} concentrations have been declining over time. At the North Salt Lake monitoring station, the average annual PM_{10} concentration, which includes both industrial and on-road mobile sources, has remained about the same since 2002.

According to Utah traffic volume data, average annual daily traffic volumes on I-15 near the North Salt Lake monitoring station have increased from about 99,700 vehicles per day (vpd) in 2000 to about 133,400 vpd in 2007, an increase of nearly 34%. In addition, truck volumes on I-15 in the vicinity of the North Salt Lake monitor are about 8% according to Utah traffic volume data (UDOT 2007). Therefore, as the annual traffic volumes have increased on I-15 since 2000, average annual PM_{10} concentrations have shown an overall decline at an air monitor close to the freeway that includes other nearby industrial sources.

Table 12A.6-3 shows the average daily traffic volumes for individual segments of the MVC in 2030 and the percentage difference in traffic compared to the I-15 segment nearest to the North Salt Lake monitoring station. As shown in Table 12A.6-3, two of the three MVC segments in Salt Lake County would have less traffic than I-15 adjacent to the North Salt Lake monitoring station.

Table 12A.6-3. Comparison of Average Daily Traffic on the 5800 West Freeway Alternative and I-15 in North Salt Lake

MVC Segment	Average Daily Traffic on MVC Segment in 2030 (vpd)[a]	Percent Change from Average Daily Traffic on I-15 in 2006[b]
I-80 to SR 201	54,000	–59.5%
SR 201 to 13400 South	151,000	+13.2%
13400 South to Utah County line	96,000	–28.0%

[a] Traffic modeling for the MVC assumed 8% truck volume, the same as recorded on I-15 in North Salt Lake (Hooper 2008).

[b] Traffic on I-15 in 2007 was 133,400 vehicles per day.

At full build-out, the average daily traffic volume on the MVC for the Preferred Roadway Alternative in Salt Lake County between SR 201 and 13400 South would be about 13% (17,600 vpd) higher than the recorded volume on I-15 in 2006 near the North Salt Lake monitoring station. For comparison purposes, this difference (17,600 vpd) is less than the average daily traffic volume on 5600 West, the nearest principal arterial to the MVC. The expected truck volume on the MVC is expected to be the same as on I-15 at 8%. The increased traffic volumes on this segment of the MVC are not expected to cause or contribute to a new PM_{10} violation, or increase the frequency or severity of existing violations, for the following reasons:

- Traffic volumes on I-15 near the North Salt Lake monitoring station have increased by about 34% between 2000 and 2007, but the average annual PM_{10} concentration has decreased by about 12% at this monitoring station and there have been no exceedances of the PM_{10} NAAQS at this location since 2000.
- Source apportionment analyses prepared for the PM_{10} SIP attributed nearly 46% of all PM_{10} emissions at the North Salt Lake monitor to industrial point sources in the area (UDEQ 2002).
- The peak year of PM_{10} emissions for the MVC project is expected in 2030, by which time total PM_{10} emissions in the Salt Lake County non-attainment area will have decreased by 44% over those in 2006. Since there have been no exceedances of the PM_{10} NAAQS since 2000 and since PM_{10} emissions are expected to decrease further by 2030, exceedances of the PM_{10} NAAQS are not expected in the year of peak emissions.
- For all other PM_{10} monitoring stations in Salt Lake County that are in suburban residential areas without industrial sources, the average annual PM_{10} concentrations have decreased by 17% to 20% over the 2000-to-2006 timeframe.
- Land uses near the North Salt Lake monitoring station are more intense than in other parts of the Salt Lake Valley and include several oil refineries, a sand and gravel quarry, and other industrial land uses that are not present near the MVC.
- Regional conformity emissions modeling by WFRC shows declines in vehicle emissions rates over time that largely reflect national trends. When growth in regional VMT is taken into account, PM_{10} emissions remain well below the applicable emission budgets established in the SIP to prevent violations of the PM_{10} air quality standards.

- EPA's MOBILE6.2 emissions model predicts that, relative to 2005, diesel particulate emission rates will decline by 80% by 2015 and by 95% by 2030. That is, 100,000 vehicles in 2005 would have the same diesel particulate emissions as 500,000 vehicles in 2015 or 2,000,000 vehicles in 2030.
- Vehicles are expected to emit less PM_{10} in the future. WFRC regional modeling shows that emission rates for most PM_{10} constituents would decrease by substantially more than 50% between now and 2030.

Despite the evidence discussed above suggesting that PM_{10} emissions would not be an issue for the MVC, there are no assurances that land uses (that is, the mix of commercial, residential, and industrial emission sources) in the vicinity of the project area would be sufficiently similar to those in the vicinity of the North Salt Lake monitoring station to ensure this outcome. Nonetheless, the area around the MVC project is not expected to develop as a heavy industrial corridor like that in North Salt Lake. See Chapter 4, Land Use, for a discussion of land uses in the vicinity of the MVC.

12A.6.3.2 Conformity Determination for PM_{10} in Salt Lake County

The qualitative project-level analysis demonstrated that PM_{10} emissions from the Preferred Roadway Alternative in the Salt Lake County non-attainment area would not result in a violation of the PM_{10} NAAQS in the peak year of emissions (2030). The Preferred Roadway Alternative would not cause or contribute to any new localized violations of the PM_{10} NAAQS or increase the frequency or severity of any existing violations.

12A.6.3.3 PM_{10} Comparative Analysis for Utah County

As shown in Figure 12A-3, PM_{10} Monitoring Stations – Salt Lake and Utah Counties, there are two PM_{10} monitoring stations in Utah County (Lindon and Provo), both of which are located in suburban residential areas more than 2 miles from I-15. Traffic volumes on principal arterials in the vicinity of these two monitoring stations in 2006 were about 30,000 to 33,000 vehicles per day, respectively, and would not be representative of air quality in the vicinity of a high-volume freeway like the MVC in Utah County (UDOT 2007).

As discussed above in 12A.6.3.1, PM_{10} Comparative Analysis for Salt Lake County, the North Salt Lake monitoring station is most representative (and likely overestimates) PM_{10} emissions adjacent to a major freeway and is used in this section for the Utah County conformity analysis.

Ambient PM_{10} monitoring data for the North Salt Lake monitor and Utah County are shown above in Table 12A.6-1, Monitored PM_{10} Emissions for Salt Lake and Utah Counties (2002 to 2006). As shown in the table, there have been no violations of the annual PM_{10} standard at any Utah County PM_{10} monitoring station since 2002 (except for anomalous, naturally occurring wind events at the Lindon station in 2002 and 2004). In general, the average annual PM_{10} concentrations at the Lindon and Provo monitoring stations have decreased by about 22% and 24%, respectively, since 2002.

Table 12A.6-3 shows the average daily traffic volumes for individual segments of the MVC in Utah County (2030) and the percentage difference in traffic compared to the I-15 segment nearest to the North Salt Lake monitoring station. As shown in the table, the MVC segments in Utah County would carry about 23% to 27% less traffic than would I-15 adjacent to the North Salt Lake monitoring station. In addition, the highest traffic volume for the Preferred Roadway Alternative in Utah County is about 32% less than for the highest segment of the MVC in Salt Lake County.

Table 12A.6-4. Comparison of Average Daily Traffic on the 2100 North Freeway Alternative and I-15 in North Salt Lake

MVC Segment	Average Daily Traffic on MVC Segment in 2030 (vpd)[a]	Percent Change from Average Daily Traffic on I-15 in 2006[b]
Utah County line to SR 73	98,000	–26.5%
2100 North Freeway (MVC to I-15)	102,000	–23.5%

[a] Traffic modeling for MVC assumed 8% truck volume, the same as recorded on I-15 in North Salt Lake (Hooper 2008).

[b] Traffic on I-15 in 2007 was 133,400 vehicles per day.

Similar to the PM_{10} conformity determination for Salt Lake County, the Preferred Roadway Alternative in Utah County is not expected to cause or contribute to a new PM_{10} violation, or increase the frequency or severity of existing violations, for the following reasons:

- Traffic volumes on I-15 near the North Salt Lake monitoring station have increased by about 34% between 2000 and 2007, but the average annual PM_{10} concentration has decreased by about 12% at this monitoring station, and there have been no exceedances of the PM_{10} NAAQS at this location since 2000.
- Source apportionment analyses prepared for the PM_{10} SIP in Lindon attributed about 83% of all PM_{10} emissions to industrial and wood-burning sources. Of the industrial sources, 68% were attributable to the Geneva Steel facility, which is no longer in operation (UDEQ 2002).
- The peak year of PM_{10} emissions for the MVC project is expected in 2030, by which time total PM_{10} emissions in the Utah County non-attainment area will have decreased by about 56% below those in 2006. Since there have been no exceedances of the PM_{10} NAAQS since 2000 and since PM_{10} emissions are expected to decrease further by 2030, exceedances of the PM_{10} NAAQS are not expected in Utah County for the year of peak emissions (2030).
- For the other PM_{10} monitoring stations in Utah County that are in suburban residential areas without industrial sources, the average annual PM_{10} concentrations have decreased by 22% to 24% over the same period (2000 to 2006).
- Future land uses near the MVC in Utah County are expected to be less industrial than those in Salt Lake County based on the land-use plans from the local cities. The region is not expected to develop as a heavy industrial corridor like that in North Salt Lake.
- Regional conformity emission modeling by MAG shows declines in vehicle emission rates over time that largely reflect national trends. When growth in regional VMT is taken into account, PM_{10} emissions remain well below the applicable emission budgets established in the SIP to prevent violations of the PM_{10} air quality standards.

12A.6.3.4 Conformity Determination for PM_{10} in Utah County

The qualitative project-level analysis demonstrated that PM_{10} emissions from the Preferred Roadway Alternative in the Utah County non-attainment area would not cause or contribute to any new localized violations of the PM_{10} NAAQS or increase the frequency or severity of any existing violations.

12A.6.4 PM_{10} Construction Emissions (Salt Lake County and Utah County)

Air quality impacts during construction would be limited to temporary, short-term increases in fugitive dust, particulates, and localized pollutant emissions from construction equipment. The project would generate pollutant emissions from the following construction activities:

- Excavation related to cut-and-cover
- Mobile emissions from construction vehicles as they travel to and from the project site
- Mobile emissions from delivering and hauling construction supplies and debris to and from the project site
- Stationary emissions from onsite construction equipment
- Mobile emissions from vehicles whose speeds are slowed because of increased congestion caused by MVC construction activity

Because the MVC would be constructed as funding becomes available, it is unlikely that that construction activities would last 5 years or more in any one location. Also, since construction would last less than 5 years in any one location, the transportation conformity rules do not require a hot-spot analysis for PM_{10} construction emissions (40 CFR 93.123[c][5]). The proposed improvements would occur over an extended period, and construction would be localized and short-term.

12A.6.4.1 Construction-Related Air Quality Mitigation

Air emission mitigation measures for construction will be developed as part of the Emission Control Plan submitted to the State of Utah. Mitigation measures will include the following:

- **Fugitive Dust Emission-Control Plan.** The contractor(s) will be required to submit a fugitive dust emission-control plan to the Utah Department of Environmental Quality. The plan will outline project-specific activities for emission control and monitoring throughout construction in accordance with state and federal requirements. UDOT expects that strategies to control fugitive dust will include wetting excavation areas, unpaved parking and staging areas, and onsite stockpiles of debris, dirt, or dusty material; chemical stabilization; planting vegetative cover; providing synthetic cover and wind breaks; reducing construction equipment speed; covering loads; using conveyor systems; and washing haul trucks before leaving the loading site.
- **Street Sweeping.** The contractor will use street-sweeping equipment at paved site-access points.
- **Equipment Emissions.** The contractor will shut off construction equipment when it is not in direct use to reduce emissions from idling.

Other mitigation measures that could be implemented to minimize air quality impacts include the following:

- Use newer, cleaner-emitting construction equipment and properly maintain construction equipment.
- Install emission-control equipment on diesel construction equipment (such as particulate filters or traps, oxidizing soot filters, and oxidation catalysts) to the extent that is technically feasible.
- Reroute truck traffic away from schools and communities when possible.
- Evaluate the use of alternate engines and diesel fuels such as electric engines, engines that use liquefied or compressed natural gas, diesel engines that meet the U.S. Environmental Protection Agency’s 2007 regulations, diesel engines fueled with low-sulfur fuel, and diesel engines outfitted with catalyzed diesel particulate filters and fueled with low-sulfur fuel (less than 15 parts per million sulfur).

12A.7 Conformity Determination for PM_{10}

This conformity determination meets all the applicable Clean Air Act Section 176(c) requirements for federally funded or approved transportation projects. Specifically, the requirements for PM hot-spot analysis are codified at 40 CFR 93.116 and 93.123. By meeting these regulatory requirements as well as other requirements in the conformity regulations, this conformity determination demonstrates compliance with the requirements of CAA Section 176(c)(1).

12A.8 References

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