3.5 Air Quality

One of the purposes of the proposed State Route (SR) 167 project is to maintain or improve air quality in the corridor to ensure compliance with the current State Implementation Plan (SIP) and all requirements of the federal Clean Air Act (see Section 1.1.1). The Tier I Environmental Impact Statement (EIS) covered the air quality standards and the requirement for the project to conform to these standards, but did not conduct any detailed studies. By agreement with U.S. Environmental Protection Agency (EPA) and the Puget Sound Clean Air Agency (PSCAA), the Washington State Department of Transportation (WSDOT) and Puget Sound Regional Council (PSRC) conducted a project level conformity analysis during the Tier II NEPA process. In addition, the Tier II studies would provide more accurate data on the existing air quality problem areas, or "hot spots," within the study area. These generally coincide with locations where traffic is not free flowing.

This section includes the project-level conformity analysis called for in the Tier I FEIS and an analysis of air quality problem areas. For the conformity analysis, the discussion is not specific to the mainline or the intersection options. This type of analysis is made on a regional basis. For this reason, the environmental screening criterion on air quality cannot distinguish amongst the options. The "hot spot" analysis examines three specific locations associated with the project. Both the conformity and "hot spot" analyses are under Section 3.5.4. In addition, this section includes a general discussion of the impacts of transportation related "air toxic emissions."

3.5.1 Studies Performed and Coordination Conducted

This section incorporates information from the *SR 167 Air Quality Discipline Report* (Parsons 2001). WSDOT coordinated with the PSRC in conducting the project level conformity analysis. The potential substantial air quality impacts for this project relate to carbon monoxide (CO), ozone, and particulate matter. Predictions of existing and future (year 2030) localized air pollution concentrations in the project vicinity for this and most other roadway air quality studies are made for CO only. Most other pollutants must be monitored and dealt with regionally.

Concentrations of CO were predicted for existing conditions (year 2000) and forecast scenario years 2015, 2030 No Build, and 2030 Build Alternative using the Mobile and CAL3QHC models. The intersections modeled include the intersections most affected as a result of the proposed project.

Ozone concentrations were not modeled at a project level because ozone is a secondary pollutant that is generated by a complex series of chemical reactions. Conformity analysis for ozone is done at a regional level by the PSRC.

Particulate emissions during construction were estimated from the EPA AP-42 emission values. EPA has yet to recommend any models or procedures to accurately model particulate concentrations along individual roadways. Particulate emissions are best controlled by mitigation measures during construction. A fugitive dust plan will be prepared to mitigate construction impacts.

3.5.2 Affected Environment

The EPA, Washington State Department of Ecology (Ecology), and PSCAA regulate air quality in the study area. Under the Clean Air Act, EPA has established the National Ambient Air Quality Standards (NAAQS), which specify maximum concentrations for CO, particulate matter less than 10 micrometers in size (PM_{10}), particulate matter less than 2.5 micrometers in size ($PM_{2.5}$), ozone, sulfur dioxide, lead, and nitrogen dioxide (Table 3.5-1). The eight-hour CO standard of nine parts per million (ppm) is the standard most likely to be exceeded as the result of transportation projects (Parsons 2001). All projects funded by the Federal Highway Administration (FHWA) must demonstrate conformity with the NAAQS prior to receiving federal approval.

Table 3.5-1: Summary of Ambient Air Quality Standards

Pollutant	National Primary Standard	Washington State Standard	PSCAA Regional Standard
Carbon Monoxide (CO)			
1-Hour Average (not to be exceeded more than once per year)	35 ppm	35 ppm	35 ppm
8-Hour Average (not to be exceeded more than once per year)	9 ppm	9 ppm	9 ppm
PM_{10}			
Annual Arithmetic Mean	50 µg/m^3	50 µg/m^3	50 µg/m^3
24-Hour Average Concentration (not to be exceeded more than once per year)	150 µg/m^3	150 µg/m^3	150 µg/m^3
$PM_{2.5}$			
Annual Arithmetic Mean	15 µg/m^3		
24-Hour Average Concentration (not to be exceeded more than once per year)*	65 µg/m^3		
Total Suspended Particulates			
Annual Arithmetic Mean		60 µg/m^3	60 µg/m^3
24-Hour Average Concentration (not to be exceeded more than once per year)		150 µg/m^3	150 µg/m^3
Ozone			
1-Hour Average (not to be exceeded more than once per year)	0.12 ppm	0.12 ppm	0.12 ppm
8-Hour Average (not to be exceeded more than once per year)	0.08 ppm		

Notes: ppm=parts per million
µg/m^3 =micrograms per cubic meter
* The $PM_{2.5}$ standard has not yet been implemented by EPA.

Sources: PSCAA Regulation 1 (1994)
40 CFR Part 50 (1997) WAC chapters: 173-470, 173-474, 173-175 (1987)

EPA has mapped all areas of the United States where the air quality standards are either met or not met. Nonattainment areas are geographical regions where air pollutant concentrations exceed the NAAQS for a pollutant. Maintenance areas are regions that previously had air quality problems, but currently comply with the NAAQS. The proposed SR 167 project lies within the former one-hour ozone area and current CO maintenance area. It borders the Tacoma Tideflats nonattainment area for PM_{10}, but the study area is in attainment for PM_{10}.

Ozone and CO emissions in the Puget Sound Region are currently managed under the provisions of Air Quality Maintenance Plans (AQMPs). The plans were developed by PSCAA and Ecology and approved by the EPA in 1996 and updated in 2004. Since the revocation of the one-hour ozone standard in 2005, the ozone maintenance plan is currently undergoing revision with the Puget Sound Clean Air Agency. Regional conformity evaluations are no longer required in former one-hour ozone areas. Regionally significant transportation projects in the Puget Sound Air Quality Maintenance areas must conform to the CO AQMP. The SR 167 extension meets the definition of a regionally significant transportation project (40 CFR 93).

The evaluation of existing air quality is based on data collected and published by Ecology and PSCAA from air quality monitoring stations located throughout the Puget Sound Region. When a monitoring station records a pollutant concentration above the standards listed in Table 3.5-1, it is called an "exceedance." There have been no exceedances of the NAAQS for CO at the nearest monitoring station in downtown Tacoma since 1991. There were two exceedances of the ozone standard at the nearest monitoring station in Enumclaw in 1998 and one possible exceedance in Enumclaw in May 2006. Ozone concentrations are likely to be lower in the study area than at this monitoring station due to prevailing weather conditions. Emissions of ozone precursors from transportation sources in the study area contribute to ozone concentrations measured at the Enumclaw station. There have not been any exceedances of the PM_{10} standard at Tacoma since 1990 nor at Kent since the 1980's. These are the two nearest monitoring stations. Measurement of the $PM_{2.5}$ standard has recently begun in Tacoma, but no data on exceedances are currently available.

In addition to the NAAQS, EPA has also established a list of 33 urban air toxic emissions that pose the greatest potential health threat. EPA controls a total of 188 Air Toxic emissions, out of which 21 are mobile source air toxic (MSAT) pollutants. Air toxic pollutants, also known as hazardous air pollutants, are those pollutants that cause or may cause cancer or other serious health effects or adverse environmental and ecological effects. Most air toxic emissions originate from human-made sources, including road mobile sources (e.g., cars, trucks, buses), non-road mobile sources (e.g., airplanes, lawnmowers, etc.), and stationary sources (e.g., factories, refineries, power-plants), as well as indoor sources (e.g., building materials). Some air toxic emissions are also released from natural sources such as volcanic eruptions and forest fires. Section 3.5.5 discusses MSATs.

3.5.3 Impacts of Construction

No Build Alternative

Under the No Build Alternative, construction impacts would only occur from other planned projects. Completion of SR 509 and the regional HOV lane projects represent the only major changes to the regional highway system with the No Build Alternative. Several changes to the surface street system are planned by local jurisdictions: widening Pacific Highway (SR 99), 54th Avenue East and Valley Avenue within the city of Fife; widening Valley Avenue between North Meridian and 82nd Avenue East; and the completion of Canyon Road which has yet to be funded.

Build Alternative (Preferred)

For the Build Alternative, construction impacts will not differ depending on which interchange options are selected. There are no unique features within the project construction zone that would increase or decrease construction related air quality impacts. The following analyses of construction impacts are not broken into mainline and interchange options of the Preferred Build Alternative.

PM_{10} emissions will be associated with demolition, land clearing, ground excavation, cut-and-fill operations, and construction of the roadway and the interchanges. Construction emissions will be greatest during the earthwork phase because most emissions will be associated with the movement of dirt on the site.

PM_{10} emissions will vary from day to day, depending on level of activity, specific operations, and weather conditions. PM_{10} emissions will depend on soil moisture, silt content of soil, wind speed, and amount and type of equipment operating. Larger dust particles will settle near the source, while fine particles will be dispersed over greater distances from the construction site.

The quantity of particulate emissions will be proportional to the area of the construction operations and the level of activity. Based upon field measurements of suspended dust emissions from construction projects, an approximate emission factor for construction operations will be 1.2 tons per acre of construction per month of activity (EPA 1999). Emissions will be reduced if less of the site is disturbed or mitigation is performed.

PM_{10} from construction activities will be noticeable if uncontrolled. Mud and particulates from trucks also will be noticeable if construction trucks will be routed through residential neighborhoods. Construction will require mitigation measures to comply with PSCAA's regulations that require the control of dust during construction and preventing deposition of mud on paved streets (PSCAA Rule 1, Article 6).

In addition to particulate emissions, heavy trucks and construction equipment powered by gasoline and diesel engines will generate CO and ozone precursors in exhaust emissions. If construction traffic were to reduce the speed of other vehicles in the area, emissions from traffic will increase slightly while those vehicles are delayed. These emissions will be temporary, limited to the immediate area surrounding the construction site. They will contribute a small amount compared with automobile traffic in the project area because construction traffic will be a very small fraction of the total traffic in the area.

Localized concentrations of air toxic emissions along SR 167 will likely occur; however, as pointed out in section 3.5.4, the specific localized impacts cannot be identified. These impacts will be temporary.

Certain receptors, such as schools, are considered particularly sensitive to changes in air quality. The closest school is a considerable distance (0.4 mile) from the Build Alternative alignment (see figure 3.10-1). However, there are other sensitive receptors, such as the Puyallup Recreation Center within 500 feet of the alignment and residences adjacent to the alignment.

Some phases of construction, particularly paving operations using asphalt, will result in short-term odors. Odors might be detectable to some people near the project site, and will be diluted as distance from the site increases.

3.5.4 Impacts of Operation

The air quality impacts of operation for both the No Build and Preferred Build Alternatives are directly related to traffic volumes. The volumes for both the existing (2000) and design years are discussed in detail in Section 3.14. This section (Impacts of Operation) discusses the conformity and hot spot analyses for both the No Build and Build Alternatives. It also includes a general discussion of the impacts of air toxic emissions.

Conformity Analysis

Conformity is demonstrated by showing that the project would not cause or contribute to any new violation of any NAAQS, nor increase the frequency or severity of any existing violation of any NAAQS, nor delay timely attainment of the NAAQS. In accordance with 40 CFR Part 93, the criteria listed in Table 3.5-2 must be met when determining project conformity. A brief summary of the project's conformity to the SIP is discussed with each criterion.

The Build Alternative is included in the PSRC's Master Transportation Plan (MTP) and Transportation Improvement Plan (TIP), which have been demonstrated to conform to the SIP; therefore, it meets the regional conformity requirements. The Build Alternative also meets the local hot-spot conformity requirements. The Build Alternative meets all requirements of 40 CFR Part 93 and WAC 173-420 and conforms to the SIP.

Hot -Spot Analysis

Project hot spot analysis was done only for CO for four reasons:

- Total CO emissions from automobiles are greater than the emissions for all other pollutants combined;
- Motor vehicles are the greatest source of CO emissions, accounting for more than 90 percent of total CO emissions in urban areas;

- The complex reactive natures of some of the other pollutants cannot be accurately modeled;
- CO emissions from motor vehicles may be high enough to affect individuals in the immediate area while most other pollutants are not.

Table 3.5-2: Project Conformity Criteria and Responses

CRITERION	CONFORMITY RESPONSE
The conformity determination must be based on the latest planning assumptions.	The project hot-spot analysis was completed using the latest version (February 2001) of the Puget Sound Region MOBILE 5b emission files used by PSRC at the time. The Build Alternative is included in the PSRC's current MTP and TIP, which were also modeled for conformity to the SIP using the latest planning assumptions.
The conformity determination must be based on the latest emission estimation model available.	Emissions to determine conformity to the MTP and TIP were calculated using MOBILE 5b, the emission model used to model conformity to the current Puget Sound Air Quality Maintenance Plans at the time of the air quality evaluation in 2001.
The Metropolitan Planning Organization (MPO) must make the conformity determination according to the consultation procedures of this rule and the implementation plan revision required by Section 51.396.	The Build Alternative is included in the PSRC's MTP and TIP.
There must be a current conforming plan and a current conforming TIP at the time of project approval.	There is a current conforming MTP (Destination 2030 adopted May 2001) and TIP (August 2001).
The project must come from a conforming transportation plan and program.	The Build Alternative is included in the PSRC's MTP and TIP.
The FHWA project must not cause or contribute to any new localized CO or PM_{10} violation in CO and PM_{10} nonattainment or maintenance areas.	The study area is in a CO maintenance area. The Build Alternative would not create any new regional violations or contribute to the frequency or severity of any existing violations of the NAAQS. Under the Build Alternative, CO violations in the project area would be reduced in 2030. The project area is in conformity for PM_{10}.
The FHWA project must comply with PM_{10} control measures in the applicable implementation plan.	The area is in conformity for PM_{10}, so no implementation plan is required.

Within the SR 167 study area, the analysis examined three groups of intersections with the worst level of service and highest traffic volumes.

- 54th Avenue East and SR 99, I-5, and 20th Street East
- North Meridian and Valley Avenue, SR 167, and N. Levee Road East
- Valley Avenue and SR 167

Predicted CO concentrations under the Build and No Build Alternatives would be somewhat lower than existing conditions at most locations in both 2015 and 2030 because of reductions in vehicle emissions as newer vehicles replace older more polluting vehicles. No exceedances of the one-hour average NAAQS for CO of 35 ppm were predicted at any location under the No Build Alternative in either 2000 or 2030 (Table 3.5-3). Exceedances of the eight-hour average NAAQS for CO of 9 ppm were predicted at several locations for Existing Conditions in 2000, but none predicted for 2030.

Table 3.5-3: Maximum One-Hour Average CO Concentrations

Scenario	54th and 99th	54th and I-5	54th and 20th	Meridian and Valley	Meridian and SR 167	Meridian and Levee	Valley and SR 167
2000 Existing	14.8	13	13.7	17.4	12.2	11.4	N/A
2015 Build	7.2	6.1	7	7.3	8.5	6.9	5.8
2015 No Build	12.0	10.5	10.4	11.6	10.2	9.0	N/A
2030 Build	6.9	6.1	6.5	7.5	8	7.5	5.3
2030 No Build	9.4	10.3	11.1	10	8.6	8.6	N/A

Note: Values are in ppm. The one-hour NAAQS for CO is 35 ppm.

The predicted maximum eight-hour CO concentration from vehicle emissions under the No Build Alternative was 7.8 ppm for the year 2030. For the Build Alternative, the predicted maximum eight-hour CO concentration from vehicle emissions ranged between 4.3 and 6.0 ppm for the year 2015 and between 4.3 and 5.6 ppm for the year 2030 (Table 3.5-4).

Table 3.5-4: Maximum Eight-Hour Average CO Concentrations

Scenario	54th and 99th	54th and I-5	54th and 20th	Meridian and Valley	Meridian and SR 167	Meridian and Levee	Valley and SR 167
2000 Existing	10.4	9.1	9.6	12.2	8.5	8	N/A
2015 Build	5	4.3	4.9	5.1	6	4.8	5
2015 No Build	9.3	8.3	8.2	9.0	8.0	7.2	N/A
2030 Build	4.8	4.3	4.6	5.3	5.6	5.3	6.6
2030 No Build	6.6	7.2	7.8	7	6	6	N/A

Note: Values are in ppm. The one-hour NAAQS for CO is 35 ppm.

3.5.5 Cumulative Impacts

Cumulative impacts to air quality are not discussed because the proposed transportation project is not likely to contribute, either positively, negatively, nor is it likely to alter the magnitude of other foreseeable impacts.

3.5.6 Mobile Source Air Toxic (MSAT) Emissions

Detailed quantitative analysis for MSAT emissions is required when the Annual Average Daily Traffic (AADT) is projected to be in the range of 140,000 vehicles per day (vpd) or greater by the design year. (FHWA Guidance Feb. 2006 page 5). By the SR 167 Extension project design year (2030), there is forecasted to be approximately 100,000 vpd traveling the project corridor, well below the 140,000 vpd required to conduct further detailed studies. Based on this criteria and other information provided in the FHWA MSAT Guidance, no detailed quantitative analysis was conducted for this project. The FHWA Guidance on MSAT Emissions is described below.

FHWA MSAT Guidance

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 toxic pollutants 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 2000).

EPA is the lead Federal Agency for administering the Clean Air Act and has certain responsibilities regarding the health effects of MSATs (EPA 1994). More recently EPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources (66 FR 17229, March 29, 2001). This rule was issued under the authority in Section 202 of the Clean Air Act, and the rule preamble provides information regarding the effects and control of MSATs. EPA listed 21 compounds emitted from motor vehicles that are known or suspected to cause cancer or other serious health effects. Between 1990 and 2020 EPA projects these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 67 to 76 percent, and will reduce on-highway diesel PM emissions by 90 percent. These reductions are due to the impacts of national mobile 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 emissions standards and gasoline sulfur control requirements, and the heavy-duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. These are net emission reductions, that is, the reductions that will be experienced even after growth in vehicle miles traveled (VMT) is taken into account.

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 may result from exposure to various substances found in the environment. The IRIS database is located at http://www.epa.gov/iris. The following toxicity information for the six prioritized MSATs was taken from the IRIS database *Weight of Evidence Characterization* summaries. This information is taken verbatim from EPA's IRIS database and represents the Agency's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures.

- Under the proposed revised Carcinogen Risk Assessment Guidelines (EPA 1996), **benzene** is characterized as a known human carcinogen.

- Under the Draft Revised Guidelines for Carcinogen Risk Assessment (EPA 1999), the potential carcinogenicity of **acrolein** 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.

- **Formaldehyde** is a probable human carcinogen, based on limited evidence in humans, and sufficient evidence in animals.
- Under EPA's 1999 Guidelines for Carcinogen Risk Assessment (EPA 1999), **1,3-butadiene** is characterized as carcinogenic to humans by inhalation.
- **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.
- Under EPA's revised draft 1999 Guidelines for Carcinogen Risk Assessment (EPA 1999), **diesel exhaust** is likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust as reviewed in this document is the combination of diesel particulate matter and diesel exhaust organic gases.

The PSCAA recently issued a study that indicated that diesel exhaust accounts for up to 85 percent of the Seattle Tacoma areas cancer risk from air pollution. The majority of cancer risk estimated in the study is due to diesel soot. The study is based on conclusions drawn from State of California risk estimate calculations. The agency's goal is to make use of ultra low sulfur fuel and reduction of diesel emissions widespread in this region by 2006 and 2007. This goal has largely been accomplished, and per US EPA regulations, ultra low sulfur diesel is mandated for all on-road vehicles by September 2006. Off-road vehicles, equipment, locomotives, and applicable marine vessels are required to use low sulfur diesel by 2007. Off-road vehicles and equipment are required to use ultra low sulfur diesel by 2010, and locomotives and applicable marine vessels are required to use it by 2012.

PSCAA is encouraging businesses to retrofit trucks and buses with soot traps and oxidation catalysts in the exhaust system. The agency says using ultra low sulfur fuel and retrofitting exhaust systems could be expected to reduce diesel pollution by 90 percent or more. Efforts to reduce construction equipment idling can also help cut down on emissions. PSCAA is recommending a voluntary program in the state of Washington, whereas California is responding to mandatory low-sulfur diesel fuel use and engine retrofits under certain circumstances. The use of ultra low sulfur diesel fuel at the time of construction will be considered for this project depending upon sufficient availability and comparable cost with other diesel.

In February 2006, the Federal Highway Administration issued an interim national policy which provides guidance for how to address MSATs for transportation projects in a broad way. To date, National Ambient Air Quality Standards for MSATs have not been developed. The lack of NAAQS make the study of MSAT concentrations, exposures, and health impacts difficult and uncertain. Thus, accurate and reliable estimates of actual human health or environmental impacts from transportation projects and MSATs are not scientifically possible at this time. EPA has also not established toxicity factors for diesel particulate matter, although one study asserts that this pollutant accounts for a large portion of MSAT health risk in certain situations, using a toxicity factor that is unique to California.

The EPA has not yet determined how best to evaluate the impact of future roads and intersections on the ambient concentrations of urban air toxic emissions. There are no standards for MSATs and there are no tools to determine the significance of localized concentrations or of increases or decreases in emissions. Without the necessary standards and tools, the localized impacts of this project cannot be analyzed in any meaningful way. With the information currently available, the only localized conclusions are that (1) there are likely to be localized concentrations of air toxics along the new alignment of SR 167 that are similar to those experienced by existing residences at similar distances from other similar corridors, and (2) regardless of the alternative chosen, emissions in the project area will decrease over time due to EPA's national control programs.

Project Level MSAT Discussion

The analysis of air toxic emissions is an emerging field. The U.S. Department of Transportation and EPA are currently working to develop and evaluate the technical tools necessary to perform air toxic emission analysis, including improvements to emissions models and air quality dispersion models. Limitations with the existing modeling tools preclude performing the same level of analysis that is typically performed for other pollutants, such as CO. FHWA's ongoing work in air toxic pollutants includes a research program to determine and quantify the contribution of mobile sources to air toxic emissions, the establishment of policies for addressing air toxics in environmental reports, and the assessment of scientific literature on health impacts associated with motor vehicle toxic emissions.

Even though reliable quantitative methods do not exist to accurately estimate the health impacts of MSATs, it is possible to qualitatively assess future MSAT emissions under the project alternatives and quantitatively evaluate broad level emissions for the build and no build scenarios expressed in total weight of emissions only. For each alternative in this FEIS, the amount of MSATs emitted is proportional to the daily traffic volumes or Average Daily Traffic Volume (ADT), assuming that other variables such as fleet mix are the same for each alternative. Based on the changing emission rates from 2006 vehicles to the cleaner vehicles in 2030, the project area is likely to experience a reduction of over 50 percent in MSATs in the future. Although, when comparing the emissions from the 2030 ADT from no build to build, using 2030 emission factors, the Build Alternative will emit about four tons more of the six priority MSATs spread over the extended project affect area than the No Build Alternative (an approximate 14 percent increase).

Reasons for the substantial decrease in emissions from 2006 to 2030 are a result of EPA's national control programs that are projected to reduce MSAT emissions by 67 to 90 percent. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA projected reductions are so great (even after accounting for VMT growth) that they demonstrate why MSAT emissions in the study area are anticipated to be lower in the future compared to today.

Because of the specific characteristics of the project alternative, under the build scenario there may be localized areas where ADT would increase, and other areas where ADT would decrease. Therefore it is possible that localized increases and decreases in MSAT emissions may occur. The localized increases in MSAT emissions would likely be most pronounced along the new roadway sections that would be built. However, as discussed above, the magnitude and the duration of these potential increases cannot be accurately quantified because research is still being conducted on health effects and modeling techniques. Further, even if these increases do occur, they too will be substantially reduced in the future due to implementation of EPA's vehicle and fuel regulations.

In summary, under the Build Alternative in the design year it is expected there would be higher MSAT emissions in the larger study area, relative to the No Build Alternative, due to changes in ADT, but those higher levels are not as high as they could be and due to EPA's MSAT reduction programs over the next 20 years. There could be slightly elevated but unquantifiable increases in MSATs to residents and others in a few localized areas where ADT increase, which may be important particularly to any members of sensitive populations. However, there will likely be decreases in MSAT emissions in locations where ADT are reduced. In general, MSAT levels are likely to decrease over time due to nationally mandated cleaner vehicles and fuels.

Unavailable Information for Project Specific MSAT Impact Analysis

The science and modeling of project localized MSAT impacts has not developed to the point where there is certainty or scientific community acceptance. According to the recently released FHWA MSAT interim MSAT policy, only broad level project related calculations are appropriate, as described above. When this is the case, 40 CFR 1502.22(b) requires FHWA and WSDOT to address four provisions: (1) A statement that such information is incomplete or unavailable; (2) A statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment; (3) A summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment; and (4) The agency evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community. These provisions are addressed as follows:

1. Localized/detailed MSAT analysis is an emerging field and the science has not been fully developed and is therefore unavailable. FHWA and WSDOT are aware that MSAT releases to the environment may cause some level of pollution. What is not scientifically definable is an accurate level of human health or environmental impacts that will result from the construction of new transportation facilities or modification of existing facilities. Project-level MSAT risk assessment involves four major steps: emissions modeling, dispersion modeling in order to estimate ambient

concentrations resulting from the estimated emissions, exposure modeling in order to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure. Each of these steps is currently encumbered by technical shortcomings that prevent a formal determination of the MSAT impacts of this project. The emissions model (MOBILE6.2) is based on limited data raising concerns over the accuracy of the final estimates. Further the particulate emissions rates from MOBILE6.2 are not sensitive to vehicle speed, which is an important determinant of emissions rates (this is a shortcoming for diesel particulate matter, but not the remaining priority MSATs) or acceleration. Given uncertainties in the emissions estimation process, subsequent calculated concentrations would be equally uncertain. But beyond this, the available dispersion models have not been successfully validated for estimating ambient concentrations of particulate matter or reactive organic MSATs. Available exposure models are not well designed to simulate roadside environments. Finally, the toxicity value of at least one of the priority MSATs, that of diesel particulate matter, has not been nationally established, which would prevent the determination of health impacts of this pollutant even if the other necessary tools were available. Thus, current scientific techniques, tools, and data make it impossible to accurately estimate actual human health or environmental impacts from MSATs that would result from a transportation project.

2. Without this project specific MSATs analysis, it is impossible to quantitatively evaluate the air toxic impacts at the project level. Therefore, this unavailable or incomplete information is very relevant to understanding the "significant adverse impacts on the human environment," since the significance of the likely MSAT levels cannot be assessed.

3. Research into the health impacts of MSATs is ongoing. For different emission types, there are a variety of studies that show that some either are statistically associated with negative health outcomes through epidemiological studies (frequently based on emissions levels found in occupational settings) or that animals demonstrate negative health outcomes when exposed to large doses. There have been other studies and papers that suggest MSATs have health impacts. However, noting that unresolved issues still remain, the Health Effects Institute, a non-profit organization jointly funded by EPA and industry, has undertaken a major series of studies to determine whether MSAT hot spots exist and what the health implications are if they do. The final summary of these studies is not expected to be completed for several more years.

   Recent studies have been reported to show that close proximity to roadways is related to negative health outcomes – particularly respiratory problems[1]. Yet these studies are often not specific to MSATs. Instead

[1] South Coast Air Quality Management District, Multiple Air Toxic Exposure Study-II (2000); Highway Health Hazards, The Sierra Club (2004) summarizing 24 Studies on the relationship between health and air quality); NEPA's Uncertainty in the

they have encompassed the full spectrum of both criteria pollutants and other pollutants. Thus it is impossible to determine whether MSATs are responsible for the health outcomes or the criteria pollutants or a combination of both.

There is also considerable literature on the uncertainties associated with the emissions modeling process. The most significant of these is an assessment conducted by the National Research Council of the National Academy of Sciences, entitled *Modeling Mobile-Source Emissions* (2000). This review noted numerous problems associated with then current models, including the predecessor to the current MOBILE 6.2 model. The review found that, "significant resources will be needed to improve mobile source emissions modeling." The improvements cited include model evaluation and validation, and uncertainty analysis to raise confidence in the model's output. While the release of MOBILE 6.2 represents an improvement over its predecessor, the MSAT emission factors have not been fully validated due to limits on dispersion modeling and monitoring data. The MOBILE 6.2 model is currently being updated and its results will not be evaluated and validated for several years.

4. Even though there is no accepted model or accepted science for determining the impacts of project specific MSATs, as noted above, EPA predicts that its national control programs will result in meaningful future reductions in MSAT emissions, as measured on both a per vehicle mile and total fleet basis. FHWA and WSDOT believe that these projections are credible, because the control programs are required by statute and regulation. Also, since the Build Alternative results in reduced ADT in the project area relative to the No Build Alternative, FHWA and WSDOT are confident that MSAT emissions will also be lower in many locations within the project area in the design year under those scenarios. As this project involves new alignments, there could be slightly elevated but unquantifiable increases in MSATs to residents and others in a few localized areas where ADT increases, which may be important particularly to any members of sensitive populations. However, there will likely be decreases in MSAT emissions in locations where ADT are reduced. Because MSAT emissions on a per ADT basis are expected to decline due to EPA's control program, and because the Build Alternative would result in a nearly equal reduction in ADT relative to the No Build Alternative, FHWA and WSDOT do not believe that there will be significant adverse impacts on the human environment.

3.5.7 Mitigation Measures

Construction

Particulate emissions (in the form of fugitive dust during construction activities) are regulated by PSCAA. The operator of a source of fugitive dust shall take

Federal Legal Scheme Controlling Air Pollution from Motor Vehicles, Environmental Law Institute, 35 ELR 10273 (2005) with health studies cited therein.

reasonable precautions to prevent fugitive dust from becoming airborne and shall maintain and operate the source to minimize emissions. Construction impacts will be minimized by incorporating mitigation measures per the WSDOT standard specifications into the construction specifications for the project. A Fugitive Dust Plan will be prepared by the contractor prior to construction to comply with PSCAA regulations. This plan will include mitigation measures to control PM_{10}, deposition of particulate matter, emissions of CO and ozone precursors, as well as other MSATs during construction. Specific mitigation measures include:

- Spraying exposed soil with water or other dust palliatives;
- Covering all trucks transporting materials, wetting materials in trucks, or providing adequate freeboard (space from the top of the material to the top of the truck);
- Removing particulate matter deposited on paved, public roads;
- Minimizing delays to traffic during peak travel times;
- Placing quarry spall aprons where trucks enter public roads;
- Graveling or paving haul roads;
- Planting of vegetative cover as soon as possible after grading;
- Minimizing unnecessary idling of on-site diesel construction equipment;
- Locating diesel engines, motors, or equipment as far away as possible from existing residential areas;
- Locating staging areas away from school buildings and playgrounds;
- Utilizing efficient street sweeping equipment at site access points and all adjacent streets used by haul trucks;
- Minimizing hours of operation near sensitive receptor areas and rerouting the diesel truck traffic away from sensitive receptor areas;
- Coordinating construction activities with the Puyallup Recreation Center and other sensitive receptor locations.

Other construction phase emission reduction measures may also be considered on a case-by-case basis, including:

- Educating vehicle operators to shut off equipment when not in active use to reduce idling;
- Developing streamlined staging/work zone areas to minimize construction equipment back-ups and idling;
- Using cleaner fuels as appropriate.

Operation

Because no exceedances of the NAAQS are predicted, no design or operational changes will be required. There may be marginal increases in air toxic emissions under the Build scenario compared to the no build scenario on a broad scale, with some locations experiencing higher emissions and some locations experiencing lower emissions, depending on the changes in ADT. If EPA develops standards for MSATs and tools are developed to determine impacts of localized concentrations of air toxic emissions, additional efforts will be identified to mitigate for above-standard air toxic emissions impacts.

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