# DEIS Reasonable Alternatives Air Quality Technical Report

## SH 68 from I-2/US 83 to I-69C/US 281
## CSJs: 3629-01-001, -002, -003
## Hidalgo County, Texas

Texas Department of Transportation - Pharr District

February 2018

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated December 16, 2014, and executed by FHWA and TxDOT.

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# 1.0 INTRODUCTION

## 1.1 Overview

The Pharr District of the Texas Department of Transportation (TxDOT) proposes to construct State Highway (SH) 68, a new highway facility from Interstate (I)-2/U.S. Highway (US) 83 to I-69C/US 281, located in eastern Hidalgo County. The new highway facility corridor would begin at I-2/US 83 and travel north then west to connect to I-69C/US 281. The total length of the new highway facility is approximately 22 miles.

The purpose of this technical report is to describe air quality issues and assess potential impacts for the three reasonable alternatives and the No Build Alternative. This document would serve as support for *Section 4: Affected Environment and Environmental Consequences* of the SH 68 Draft Environmental Impact Statement (DEIS).

## 1.2 Project Description

SH 68, as currently described in the Metropolitan Transportation Plan (MTP) and the Statewide Transportation Improvement Program (STIP), is a proposed four-lane divided rural highway facility with future mainlanes and overpasses.

SH 68 would be constructed in several phases, as funding becomes available. Funding has been secured for Phase I. Funding for future phases has not yet been determined.

Phase I would construct a new four-lane divided rural highway facility from I-2/US 83 to Farm-to-Market (FM) 1925, which is also known as Monte Cristo Road. The four-lane divided facility would serve as frontage roads for the ultimate facility and consist of two lanes in each direction with shoulders, separated by a grassy median. Future phases would extend the four-lane divided rural highway from FM 1925 to I-69C/US 281, and eventually would complete the ultimate facility by constructing the mainlanes and overpasses. The new highway facility is being developed as a non-tolled facility.

The ultimate, controlled-access facility would be contained within a 350-foot typical right-of-way (ROW) width, with up to 400 feet of ROW needed at proposed grade separations. The proposed frontage roads would consist of two 12-foot wide lanes in each direction, with 4-foot wide inside shoulders and 8-foot wide outside shoulders. The frontage roads would include curb and gutter to accommodate drainage requirements. The proposed mainlanes would consist of two 12-foot wide lanes in each direction, with 4-foot wide inside shoulders and 10-foot wide outside shoulders. Mainlanes would be separated by a grassy median. Mainlane overpasses are assumed to be provided at major roadway crossings. Proposed future entrance and exit ramps would consist of 14-foot wide lanes, with 2-foot wide inside shoulders

and 8-foot wide outside shoulders. The termini at I-2/US 83 and I-69C/US 281 would include proposed connections to existing frontage roads and proposed direct connector ramps to and from existing mainlanes.

As part of the alternatives analysis and public involvement process for SH 68, study corridors and preliminary alternatives were developed within the approximately 179 square-mile study area for the new highway facility. The preliminary alternatives were analyzed and evaluated to identify three reasonable alternatives. The three reasonable alternatives, as well as the No Build Alternative, are being advanced for more detailed analysis in order to identify a recommended preferred alternative. For more information about the development of the three reasonable alternatives and alternatives analysis methodology, refer to the **SH 68 Alternatives Analysis Technical Report**.

The three reasonable alternatives are shown in **Exhibits 1** and **2** in **Attachment A**, which are described below along with the No Build Alternative. The alternatives are presented in order geographically, from west to east. All alternatives would have the same ultimate typical section, as described above.

### 1.2.1 2014 Modified 2 Alternative

The 2014 Modified 2 Alternative (light purple route in **Exhibits 1** and **2** in **Attachment A**) is approximately 21.7 miles in length and would require an estimated 1,057 acres of ROW. The 2014 Modified 2 Alternative is almost entirely on new location.

This alternative connects to I-2/US 83 approximately 7 miles east of I-69C/US 281, between the FM 1423 (Val Verde Road) overpass and the North Hutto Road overpass, near the existing intersection of the I-2/US 83 westbound frontage road and Valley View Road. From I-2/US 83, the 2014 Modified 2 Alternative would travel northwest on new location for approximately 3 miles to near Minnesota Road before turning generally northward for approximately 7 miles through the communities of Muniz and San Carlos, continuing north of SH 107.

Approximately 1 mile north of SH 107, near Mile 17 ½ Road, the 2014 Modified 2 Alternative would curve to the west for approximately 2 miles, crossing FM 1925 (Monte Cristo Road) and Davis Road. North of Davis Road, the 2014 Modified 2 route would run parallel to the west side of Brushline Road for approximately 5 miles. The proposed roadway would then curve to the northwest for approximately 2 miles before running along the north side of the existing FM 490 for approximately 3 miles and connect to I-69C/US 281 near the South Texas International Airport at Edinburg.

Future mainlane overpasses are assumed to be provided at Ferguson Road, Sioux Road, East Nolana Loop/Earling Road, Owassa Road, Alberta Road, Trenton Road, Wisconsin Road, Canton Road, SH 107, FM 1925, FM 2812, Brushline Road, and Air Cargo Drive.

### 1.2.2 2014 PSM Alternative

Like the 2014 Modified 2 Alternative, the 2014 Public Scoping Meeting (PSM) Alternative (orange route in **Exhibits 1** and **2** in **Attachment A**) is almost entirely on new location. The 2014 PSM Alternative is approximately 22.4 miles in length and would require an estimated 1,076 acres of ROW. The 2014 PSM Alternative follows the same new location route as the 2014 Modified 2 Alternative from its intersection with I-2/US 83 to SH 107, a distance of approximately 8 miles, and continues generally northward for another 2 miles to cross FM 1925.

North of FM 1925, the 2014 PSM Alternative would curve to the east for approximately 1 mile, approaching Mile 19 N Road, where it would then run parallel to the west side of Val Verde Road for approximately 4 miles. The corridor would then curve to the northwest for approximately 4 miles before running along the north side of the existing FM 490 for approximately 3 miles and connect to I-69C/US 281 near the South Texas International Airport at Edinburg.

This alternative would also pass through the communities of Muniz and San Carlos. Future mainlane overpasses are assumed to be provided at Ferguson Road, Sioux Road, East Nolana Loop/Earling Road, Owassa Road, Alberta Road, Trenton Road, Wisconsin Road, Canton Road, SH 107, FM 1925, FM 2812, Brushline Road, and Air Cargo Drive.

### 1.2.3 FM 1423 PSM Alternative

The FM 1423 PSM Alternative (dark pink route in **Exhibits 1** and **2** in **Attachment A**) is approximately 21.6 miles in length and would require an estimated 1,061 acres of ROW. This alternative would connect to I-2/US 83 approximately 6 miles east of I-69C/US 281.

This alternative would generally follow FM 1423 (also known as Val Verde Road) northward for approximately 7.5 miles from the intersection with I-2/US 83 to SH 107 in the community of San Carlos. From SH 107, the alternative would continue northward along Val Verde Road approximately 2 miles to FM 1925 (Monte Christo Road). Approximately 1.5 miles north of FM 1925, between Mile 19 N Road and Davis Road, the route would then follow the 2014 PSM Alternative route for approximately 11 miles north and west to I-69C/US 281 near the South Texas International Airport at Edinburg.

This alternative would pass through the City of Donna and the community of San Carlos. Future mainlane overpasses are assumed to be provided at FM 495 (Kansas Road), Sioux

Road, East Nolana Loop/Earling Road, Roosevelt Road, Alberta Road, Trenton Road, Wisconsin Road, Canton Road, SH 107, FM 1925, FM 2812, Brushline Road, and Air Cargo Drive.

### 1.2.4 No Build Alternative

The No Build Alternative means that the proposed improvements associated with the SH 68 project would not occur. Under this alternative, the existing facilities would operate as they currently do and there would be no new roadway constructed. There would be no relocations or conversion of land to transportation uses, and no adverse environmental or economic impacts with this alternative would occur. However, the No Build Alternative would not address the purpose and need for the new highway facility because it would not improve north-south mobility, increase travel capacity for local and regional traffic, or provide an alternate north-south evacuation route during emergency events.

## 2.0 METHODOLOGY

To satisfy compliance with applicable federal, state, and local laws and regulations, including the Clean Air Act (CAA) of 1970, Clean Air Act Amendments (CAAA) of 1977 and 1990, the National Environmental Policy Act (NEPA) of 1969, and the Federal-Aid Highways Code, an assessment of the potential effects on the region's air quality was conducted in accordance with the rules and procedures established by TxDOT in their *Environmental Handbook for Air Quality* (TxDOT 2017a), *Standard Operating Procedure for Preparing Air Quality Statements* (TxDOT 2017b), and other general publications provided through TxDOT's online Air Quality Toolkit. Using projected traffic data and current air quality conditions, the three reasonable alternatives and the No Build Alternative were evaluated for compliance with the following air quality regulatory and analysis requirements:

- Transportation Conformity;
- Hot-spot Analysis;
- Carbon Monoxide (CO) Traffic Air Quality Analysis;
- Congestion Management Process Analysis; and
- Mobile Source Air Toxics (MSAT) Analysis.
- Construction-related Emissions

Projected traffic volumes for the design year 2035 were obtained from the *SH 68 Traffic Forecasting Technical Memo* (TxDOT 2015). The technical memo identified the projected traffic data for a single corridor extending from I-2/US 83 between the Cities of Donna and Alamo to I-69C/US 281 at FM 490, which is presented in **Table 2-1**. Since the *SH 68 Traffic Forecasting Technical Memo* only provides traffic data for a single corridor, and not the three reasonable alternatives, the single corridor traffic data was used to measure the anticipated

air quality impacts for all three reasonable alternatives. The worst-case daily traffic across all three segments is 48,700 vehicles per day (VPD), which represents the traffic data used to perform the air quality analysis for this technical report.

**Table 2-1. 2035 SH 68 Highway Design Forecast Data**

| Corridor Segment | Average Annual Daily Traffic[1] | Design Hour Volume (K-Factor)[2] | Directional Distribution[3] | Peak Period Level of Service[4] |
|---|---|---|---|---|
| I-2/US 83 to SH 107 | 48,700 | 0.13 | 0.57 | C |
| SH 107 to FM 1925 | 30,100 | 0.11 | 0.55 | B/C |
| FM 1925 to I-69C/US 281 | 20,400 | 0.10 | 0.50 | B |

Source: TxDOT 2015

Notes:

(1) Average annual daily traffic is the total volume of vehicle traffic of a highway or road for a year divided by 365 days, which is a used to measure how busy the road is.

(2) Design hour volume is the proportion of annual average daily traffic occurring in an hour. This factor is used for designing and analyzing the flow of traffic on highways and for weighting average annual daily traffic.

(3) Directional distribution is the split of traffic during the design hour commonly expressed as percent in the peak and off-peak flow directions.

(4) Level of service is a qualitative measure used to relate the quality of traffic flow.

The *SH 68 Traffic Forecasting Technical Memo* does not provide traffic data for the No Build Alternative comparable to **Table 2-1** above because the three reasonable alternative are a new highway facility. However, the memo does provide design year 2035 average annual growth rates for the north/south parallel facilities and the east/west crossing facilities to assist with gauging the impact of the No Build Alternative. Average annual growth rates range from -0.5 to 5.9 percent, with an average annual growth rate of 2.4 percent, for the north/south parallel facilities. Average annual growth rates range from -1.2 to 6.8 percent, with an average annual growth rate of 2.5 percent (TxDOT 2015).

It is assumed that the traffic associated with the three reasonable alternatives would be slightly higher than that for the No Build Alternative because the new highway facility increases the efficiency of the overall roadway network within the study area and attracts trips from elsewhere in Hidalgo County because of the ability to bypass roadways such as I-2/US 83, SH 107, FM 1925, I-69C/US 281, and FM 1423. However, since the average annual growth rates for the north/south parallel facilities and the east/west crossing facilities are less than 6.8 percent for the 2035 design year, it is anticipated that there would be no appreciable difference between the three reasonable alternatives and the No Build Alternative regarding vehicles per day in the study area. Therefore, potential impacts associated with the No Build Alternative are qualitatively discussed in this technical report.

## 2.1 Transportation Conformity

All three reasonable alternatives are located in Hidalgo County, which is an area designated as attainment or unclassifiable for all National Ambient Air Quality Standards (NAAQS) by the U.S. Environmental Protection Agency (EPA) (TxDOT 2016). Therefore, the transportation conformity rules do not apply, a transportation conformity analysis is not required for the three reasonable alternatives or No Build Alternative.

## 2.2 Hot Spot Analysis

All three reasonable alternatives are not located within a CO or particulate matter (PM) nonattainment or maintenance area, as designated by the EPA. Therefore, a project level hot-spot analysis is not required for the three reasonable alternatives or No Build Alternative.

## 2.3 Carbon Monoxide Traffic Air Quality Analysis

Anticipated average annual daily traffic (AADT) for the design year 2035 is 48,700 VPD (TxDOT 2015). A prior TxDOT modeling study and previous TxDOT analyses of similar projects demonstrated that it is unlikely that the CO standard would ever be exceeded as a result of any transportation action with an AADT below 140,000 VPD. Since the three reasonable alternative's anticipated AADT does not exceed the 140,000 VPD threshold, a CO Traffic Air Quality Analysis is not required for the three reasonable alternatives or No-Build Alternative.

## 2.4 Congestion Management Process Analysis

All three reasonable alternatives are within an attainment or unclassifiable area for ozone ($O_3$) and CO designated by the EPA. Therefore, a project level Congestion Management Process Analysis is not required for the three reasonable alternatives or No Build Alternative.

## 2.5 Mobile Source Air Toxics (MSAT) Analysis

Added capacity projects with Federal Highway Administration (FHWA) involvement and an AADT exceeding 140,000 VPD require a quantitative MSAT analysis. While the three reasonable alternatives are identified as an added capacity project with FHWA involvement, the projected AADT for the 2035 design year is less than 140,000 VPD. In accordance with TxDOT's *Standard Operating Procedure for Complying with MSAT Analysis Requirements* (TxDOT 2017c), air quality analysis details were coordinated with the TxDOT–Environmental Affairs Division and TxDOT-Pharr District representatives on February 22, 2017. Based on TxDOT's review of the available data, a qualitative MSAT analysis was identified as the appropriate methodology for addressing MSATs in accordance with FHWA's latest interim MSAT guidance (TxDOT 2017d; FHWA 2016).

## 2.6 Construction-Related Emissions

Construction-related emissions would be typically associated with earthwork and civil construction activities. Earthwork activities can include, but not be limited to, site preparation/land clearing and the use of construction equipment (e.g. bull dozers, graders, excavators, truck hauling, etc.). Civil construction activities can include, but not be limited to, concrete pouring, asphalt paving, and erecting bridge structures. During the construction phase of the three reasonable alternatives, temporary increases in PM and MSAT emissions would likely occur as a result of construction activities. The primary construction-related constituent of PM is fugitive dust from site preparation. The primary construction-related constituent of MSAT is diesel PM emitted from diesel-powered equipment and vehicles. Construction-related emissions are qualitatively assessed in this technical report.

# 3.0 RESOURCES IN STUDY AREA

## 3.1 National Ambient Air Quality Standards and Regulatory Setting

In compliance with the requirements of the CAA and the CAAA, the EPA promulgated and adopted the NAAQS to protect public health, safety, and welfare from known or anticipated effects of six criteria air pollutants, with a reasonable margin of safety (40 Code of Federal Regulations Part 50). The six criteria air pollutants are $O_3$, CO, nitrogen dioxide ($NO_2$), sulphur dioxide ($SO_2$), particulate matter with a diameter less than or equal to 10 micrometers ($PM_{10}$), particulate matter with a diameter less than or equal to 2.5 micrometers ($PM_{2.5}$), and lead (Pb). The NAAQS define the allowable concentrations of air pollutants that may not be exceeded during a given period of time. The primary standards provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. The CAA and CAAA requires that all states attain compliance through adherence to the NAAQS, as demonstrated by the comparison of locally-measured pollutant concentrations with the NAAQS. Transportation conformity is the mechanism by which the NAAQS are addressed at the project level under the CAA (EPA 2017). The NAAQS primary and secondary standards are shown in **Table 3-1**.

## Table 3-1. National Ambient Air Quality Standards

| Pollutant | Averaging Period | Threshold for Standard | Primary NAAQS | Secondary NAAQS |
|---|---|---|---|---|
| Carbon Monoxide (CO) | 1 Hour | Not to be exceeded more than once per year. | 35 ppm | -- |
| | 8 Hours | Not to be exceeded more than once per year. | 9 ppm | -- |
| Lead (Pb) | Rolling 3-Month Average | Not to be exceeded. | 0.15 µg/m³ (1) | 0.15 µg/m³ (1) |
| Nitrogen Dioxide ($NO_2$) | 1 Hour | 98th percentile of 1-hour daily maximum concentrations, averaged over three years. | 100 ppb | -- |
| | 1 Year | Annual Mean. | 53 ppb(2) | 53 ppb(2) |
| Particulate Matter ($PM_{10}$) | 24 Hours | Not to be exceeded more than once per year on average over three years. | 150 µg/m³ | 150 µg/m³ |
| Particulate Matter ($PM_{2.5}$) | 24 Hours | 98th percentile, averaged over three years. | 35 µg/m³ | 35 µg/m³ |
| | 1 Year | Annual mean, averaged over three years | 12 µg/m³ | 15 µg/m³ |
| Ozone ($O_3$) | 8 Hours | Annual fourth-highest daily maximum 8-hour concentration, averaged over three years. | 0.070 ppm(3) | 0.070 ppm(3) |
| Sulfur Dioxide ($SO_2$) | 1 Hour | The 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed this level. | 75 ppb(4) | -- |
| | 3 Hours | Not to be exceeded more than once per year. | -- | 0.5 ppm |

Source: EPA 2017

Notes:

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which the implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m³ as a calendar quarter average) also remain in effect.

(2) The level of the annual $N0_2$ standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

(3) Final rule signed October 1, 2015 and effective December 28, 2015. The previous (2008) $O_3$ standards additionally remain in effect in some areas. Revocation of the previous (2008) $O_3$ standards and transitioning to the current (2015) standards would be addressed in the implementation rule for the current standards.

(4) The previous $SO_2$ standards (0.14 ppm 24-hour and 0.03 ppm annual) would additionally remain in effect in certain areas: (1) any area for which it is not yet one year since the effective date of designation under the current (2010) standards, and (2) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous $SO_2$ standards or is not meeting the requirements of a SIP call under the previous $SO_2$ standards (40 Code of Federal Regulations 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.

Abbreviations: ppm, parts per million; ppb, parts per billion; µg/m³, micrograms per cubic meter.

## 3.2 Regional Air Quality and Attainment Status

Ambient air quality is influenced by a number of factors, including climate, topography, wind conditions, and the production of airborne pollutants by natural or artificial sources. Hidalgo County has a humid subtropical climate. On average, monthly high temperatures range from 70 degrees Fahrenheit (°F) in January to 97°F in August. From May through September, daily high temperatures average above 90°F and daily low temperatures average above 70°F. Hidalgo County receives approximately 24 inches of rainfall annually, with the majority occurring between May and September. Wind is typically out of the south-southeast, with an average speed of 11 miles per hour (NOAA 2017).

Outdoor air quality in a given location is described by the concentration of various pollutants in the atmosphere. Air quality is a function of several factors, including the quantity and dispersion rates of pollutants in the region, temperature, the presence or absence of meteorological inversions, and topographic features within the region. The EPA has delegated authority for monitoring and enforcing air quality regulations to the Texas Commission on Environmental Quality (TCEQ) Office of Air Quality. The TCEQ may adopt other, more stringent, air quality standards than those of the EPA. However, the TCEQ observes the same air quality standards as the EPA.

The EPA designates geographic areas in a state with respect to meeting the NAAQS as attainment, nonattainment, or unclassifiable. Areas transitioning from nonattainment to attainment are termed maintenance areas. The nonattainment areas are designated based on the degree of violation of the NAAQS. For $O_3$, the designations are marginal, moderate, serious, severe, and extreme. For each nonattainment area, the EPA requires a separate local plan detailing how NAAQS levels would be met. These plans are incorporated into a State Implementation Plan (SIP). Transportation projects in nonattainment areas are coordinated with the SIP under what is called the transportation conformity process.

The three reasonable alternatives are located in Hidalgo County, which the EPA has determined is an area in attainment or unclassifiable for all NAAQS (TxDOT 2016).

The TCEQ established the Air Pollutant Watch List for areas of the state where air toxics are monitored at a level of a potential health concern. The purpose of the list is to reduce ambient air toxic concentrations below levels of concern by focusing TCEQ resources and heightening awareness for interested parties in areas of concern. TCEQ monitors and evaluates ambient air concentrations of air toxics, such as certain sulfur compounds, metals, volatile organic compounds (VOCs), carbonyls, and polycyclic aromatic hydrocarbons. Texas has the most extensive network of ambient air toxics monitors in the country, collecting data on approximately 150 different air toxics from approximately 80 stationary monitoring sites.

While there are 11 active list areas throughout the state, none are located in or near Hidalgo County (TCEQ 2012).

# 4.0 ASSESSMENT OF ALTERNATIVES

## 4.1 2014 Modified 2 Alternative

### 4.1.1 Mobile Source Air Toxics

The qualitative MSAT analysis was performed for the three reasonable alternatives and is included as **Attachment B**. Based on the qualitative MSAT analysis, 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-location sections of the 2014 Modified 2 Alternative, with localized decreases occurring along existing north-south corridors. However, because of the limitations in the methodologies for forecasting these health impacts for transportation projects, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting impacts. As a result of this uncertainty, the health effects from these emissions cannot be accurately estimated. However, even if localized increases in MSAT emissions do occur, they would be substantially reduced in the future because of the implementation of EPA's vehicle and fuel regulation.

### 4.1.2 Construction-Related Emissions

During the construction phase of the 2014 Modified 2 Alternative, temporary increases in PM and MSAT emissions may occur from construction activities. The primary construction-related emissions of PM would be fugitive dust from site preparation. The primary construction-related emissions of MSAT would be diesel PM from diesel powered construction equipment and vehicles.

The potential impacts of PM emissions would be minimized by using fugitive dust control measures contained in standard specifications, as appropriate. The Texas Emissions Reduction Plan (TERP) provides financial incentives to reduce emissions from vehicles and equipment (TCEQ 2017). TxDOT encourages construction contractors to use this and other local and federal incentive programs to the fullest extent possible to minimize diesel PM emissions. Information about the TERP program can be found at: http://www.tceq.state.tx.us/implementation/air/terp/.

However, considering the temporary and transient nature of construction-related emissions, the use of fugitive dust control measures, the encouragement of the use of the TERP, and compliance with applicable regulatory requirements, it is not anticipated that emissions from construction of the 2014 Modified 2 Alternative would have an adverse impact on air quality in the study area.

## 4.2 2014 PSM Alternative

Since specific traffic data is not available for the 2014 PSM Alternative, it is assumed the MSAT discussion above for the 2014 Modified 2 Alternative would apply to this alternative. The construction-related emissions for the 2014 PSM Alternative would be the same as those described for the 2014 Modified 2 Alternative. Therefore, the health effects associated MSAT emissions and construction-related PM emissions are anticipated to have no adverse impact on air quality in the study area under the 2014 PSM Alternative.

## 4.3 FM 1423 PSM Alternative

Since specific traffic data is not available for the FM 1423 PSM Alternative, it is assumed the MSAT discussion above for the 2014 Modified 2 Alternative would apply to this alternative. The construction-related emissions for the FM 1423 PSM Alternative would be the same as those described for the 2014 Modified 2 Alternative. Therefore, the health effects associated MSAT emissions and construction-related PM emissions are anticipated to have no adverse impact on air quality in the study area under the FM 1423 PSM Alternative.

## 4.4 No Build Alternative

Under the No Build Alternative, the proposed SH 68 facility would not be constructed. The existing roadway facilities would continue to operate under current and projected traffic conditions as outlined in TxDOT's 2015 *SH 68 Traffic Forecasting Technical Memo*. It is reasonable to assume that if the new highway facility (i.e., SH 68) is not constructed, the current and projected traffic on study area roadways such as I-2/US 83, SH 107, FM 1925, I-69C/US 281, and FM 1423 would have MSAT emissions similar to today.

Under the No Build Alternative, MSAT emissions would continue to be emitted in the same locations as they are today. Since the average annual growth rates for the north/south parallel facilities and the east/west crossing facilities are less than 6.8 percent for the 2035 design year, it is anticipated that there would be no appreciable difference between the three reasonable alternatives and the No Build Alternative regarding VPD in the study area (TxDOT 2015). In any event, MSAT emissions are likely to be lower than present levels in the 2035 design year because of the implementation of EPA's national control programs that are projected to reduce annual MSAT emissions by over 90 percent from year 2010 to 2050. Therefore, health effects associated MSAT emissions are anticipated to have adverse impact on air quality in the study area under the No Build Alternative.

Large scale construction-related emissions, similar to those associated with a new highway facility (i.e. SH 68), would not occur under the No Build Alternative. It is likely to assume that small-scale construction-related emissions would occur because of isolated roadway improvements in the study area, but would not be on the same order of magnitude. It is

expected the construction contractor would follow the fugitive dust control measures as identified in TxDOT's standard construction specifications and the incentives identified in the TERP administered by the TCEQ. Therefore, construction-related emissions are anticipated to have adverse impact on air quality in the study area under the No Build Alternative.

## 5.0 CONCLUSION

Based on an evaluation of the three reasonable alternatives and the No Build Alternative, no adverse impacts on air quality in the study area are identified. The current air quality conditions of the region are in attainment or unclassifiable for all NAAQS. Projected traffic volumes are not sufficient to result in adverse impacts to air quality with respect to MSATs or criteria pollutants.

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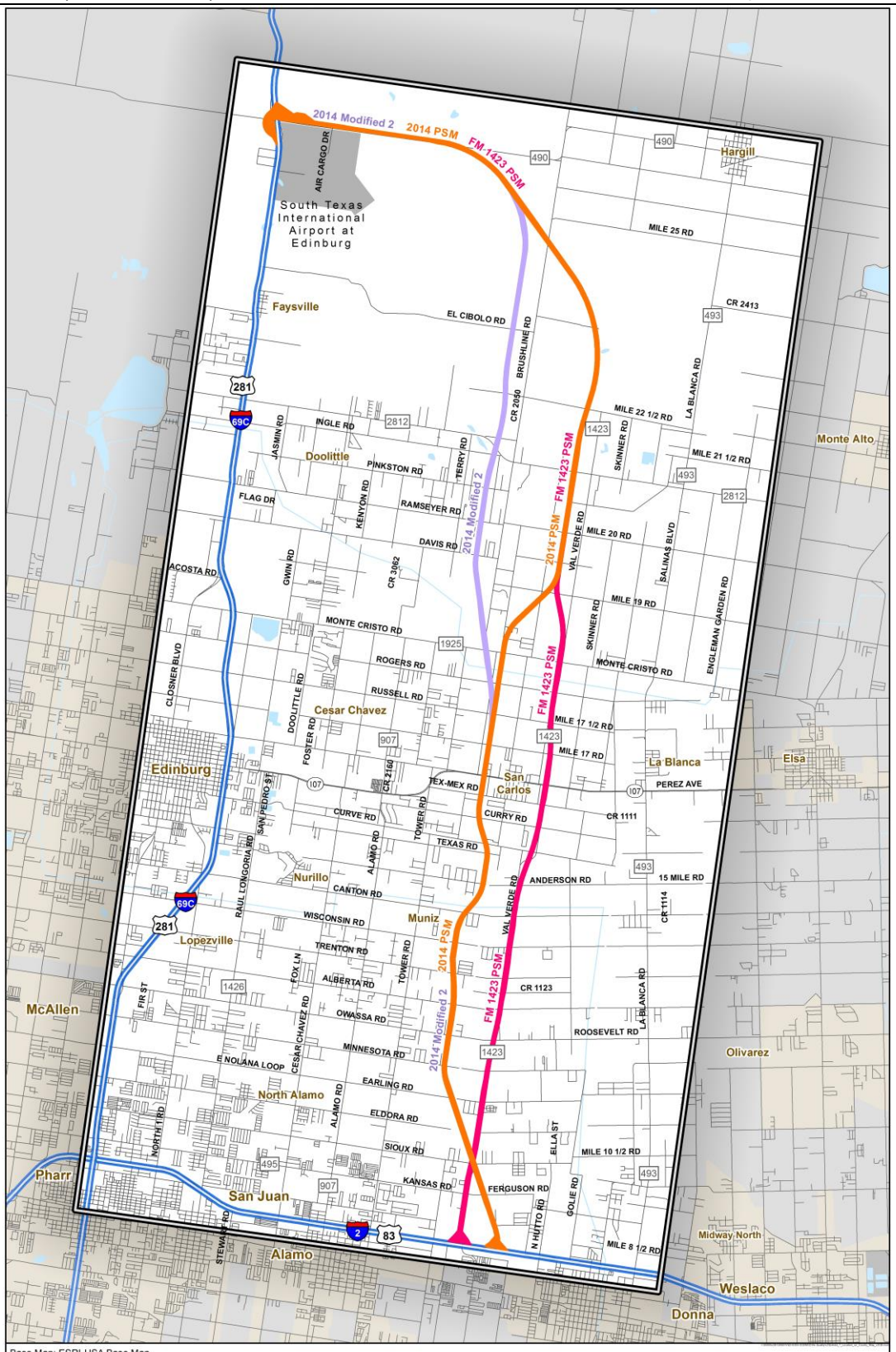
# ATTACHMENT A

# EXHIBITS




Base Map: ESRI-USA Base Map

2014 Modified 2 Alternative
2014 PSM Alternative
FM 1423 PSM Alternative
Study Area

0 0.5 1 2
Miles

Exhibit 1
Project Location on County Map
SH 68 from
I-2/US 83 to I-69C/US 281
Hidalgo County, Texas
CSJs: 3629-01-001, 002, and 003

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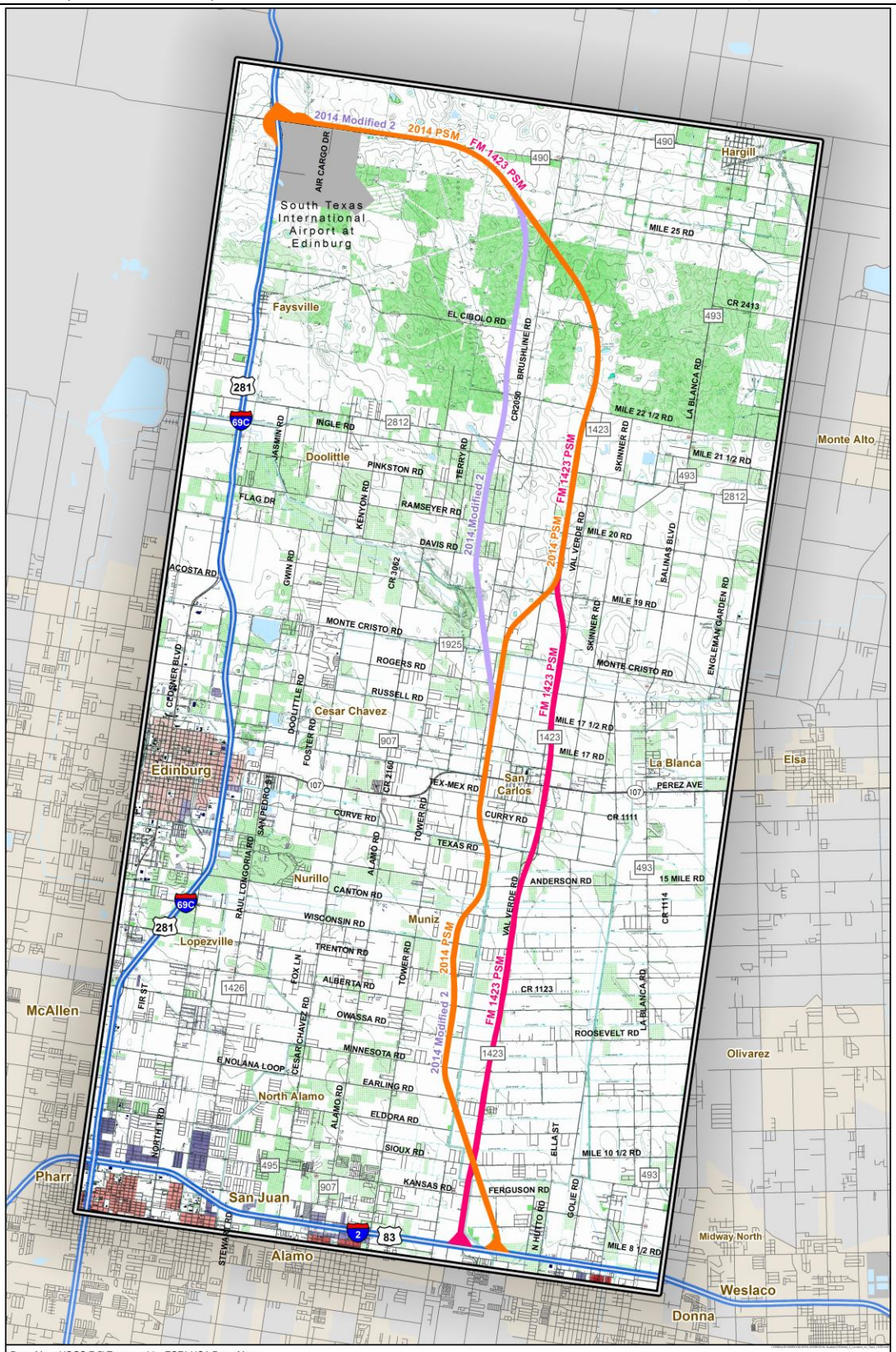


Exhibit 2
Project Location on
7.5' USGS Topographic
SH 68 from
I-2/US 83 to I-69C/US 281
Hidalgo County, Texas
CSJs: 3629-01-001, 002, and 003

# ATTACHMENT B

# QUALITATIVE MOBILE SOURCE AIR TOXIC ANALYSIS

# Qualitative Mobile Source Air Toxics Analysis

## SH 68 from I-2/US 83 to I-69C/US 281
## CSJs: 3629-01-001, -002, -003
## Hidalgo County, Texas

Texas Department of Transportation - Pharr District
February 2018

THE ENVIRONMENTAL REVIEW, CONSULTATION, AND OTHER ACTIONS REQUIRED BY APPLICABLE FEDERAL ENVIRONMENTAL LAWS FOR THIS PROJECT ARE BEING, OR HAVE BEEN, CARRIED-OUT BY TXDOT PURSUANT TO 23 U.S.C. 327 AND A MEMORANDUM OF UNDERSTANDING DATED DECEMBER 16, 2014, AND EXECUTED BY FHWA AND TXDOT

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# 1.0 MSAT ANALYSIS REQUIREMENTS AND COORDINATION

Added capacity projects with involvement by the Federal Highway Administration (FHWA) and an AADT volume over 140,000 VPD are required to complete a quantitative MSAT analysis. While SH 68 is an added capacity project with federal involvement, the projected AADT in the design year 2035 is less than 140,000 VPD. Therefore, a quantitative MSAT analysis is not required.

The qualitative MSAT analysis discussed below was completed in accordance with TxDOT's *Environmental Handbook for Air Quality* (TxDOT 2017a), *Standard Operating Procedure for Preparing Air Quality Statements* (TxDOT 2017b), and *Standard Operating Procedure for Complying with MSAT Analysis Requirements* (TxDOT 2017c). Additionally, a conference call was conducted on February 22, 2017 with representatives from the TxDOT-Environmental Affairs Division and TxDOT-Pharr District to discuss the air quality analysis for the three reasonable alternatives. During the coordination conference call, it was determined that a qualitative MSAT analysis was sufficient to address the air quality issues regarding MSAT, and that a quantitative MSAT analysis was not required (TxDOT 2017d).

# 2.0 QUALITATIVE MSAT ANALYSIS

## 2.1 Background

Controlling air toxic emissions became a national priority with the passage of the CAAA, whereby Congress mandated that the EPA regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the *Control of Hazardous Air Pollutants from Mobile Sources* (i.e., MSAT rule) (2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS). In addition, EPA identified nine compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers or contributors and non-cancer hazard contributors from the EPA's 2011 *National Air Toxics Assessment*. These are 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel PM, ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority MSATs, the list is subject to change and may be adjusted in consideration of future EPA rules. Added capacity projects with FHWA involvement and an AADT exceeding 140,000 VPD require a quantitative MSAT analysis.

## 2.2 Motor Vehicle Emissions Simulator (MOVES)

According to the EPA, the MOVES2014 air quality emission model is a major revision to MOVES2010 air quality model and improves upon it in many respects. MOVES2014 includes new data, new emissions standards, and new functional improvements and features. It

incorporates substantial new data for emissions, fleet, and activity developed since the release of MOVES2010.

These new emissions data are for light- and heavy-duty vehicles, exhaust and evaporative emissions, and fuel effects. MOVES2014 also adds updated vehicle sales, population, age distribution, and vehicle miles travelled (VMT) data. MOVES2014 incorporates the effects of three new federal emissions standard rules not included in MOVES2010.

These new standards are all expected to impact MSAT emissions and include Tier 3 engine emissions and fuel standards starting in model year 2017 (79 Federal Register [FR] 60344), heavy-duty greenhouse gas regulations that phase in during model years 2014-2018 (79 FR 60344), and the second phase of light duty greenhouse gas regulations that phase in during model years 2017-2025 (79 FR 60344) (found at https://www.gpo.gov/fdsys/pkg/FR-2014-10-07/pdf/2014-23258.pdf)

Since the release of MOVES2014, EPA has released MOVES2014a. In the *MOVES2014a Questions and Answers Guide* (2015), EPA states that for on-road emissions, MOVES2014a adds new options requested by users for the input of local VMT, includes minor updates to the default fuel tables, and corrects an error in MOVES2014 brake wear emissions. The change in brake wear emissions results in small decreases in PM emissions, while emissions for other criteria pollutants remain essentially the same as MOVES2014.

Using EPA's MOVES2014a model, FHWA estimates that even if VMT increases by 45 percent from 2010 to 2050 as forecasted, a combined reduction of 91 percent in the total annual emissions for the priority MSAT is projected for the same time period (see **Figure 2-1**).

Diesel PM is the dominant component of MSAT emissions, making up 50 to 70 percent of all priority MSAT pollutants by mass, depending on calendar year. Users of MOVES2014a notice some differences in emissions compared with MOVES2010b. MOVES2014a is based on updated data on some emissions and pollutant processes compared to MOVES2010b, and also reflects the latest federal emissions standards in place at the time of its release. In addition, MOVES2014a emissions forecasts are based on lower VMT projections than MOVES2010b, consistent with recent trends suggesting reduced nationwide VMT growth compared to historical trends.

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing -specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how potential public health risks posed by MSAT exposure should be factored into project-level decision-making within the context of the NEPA. The FHWA, EPA, Health Effects Institute, and others have funded and

conducted research studies in an effort to more clearly define potential risks from MSAT emissions associated with highway projects. FHWA continues to monitor the developing research in this field.

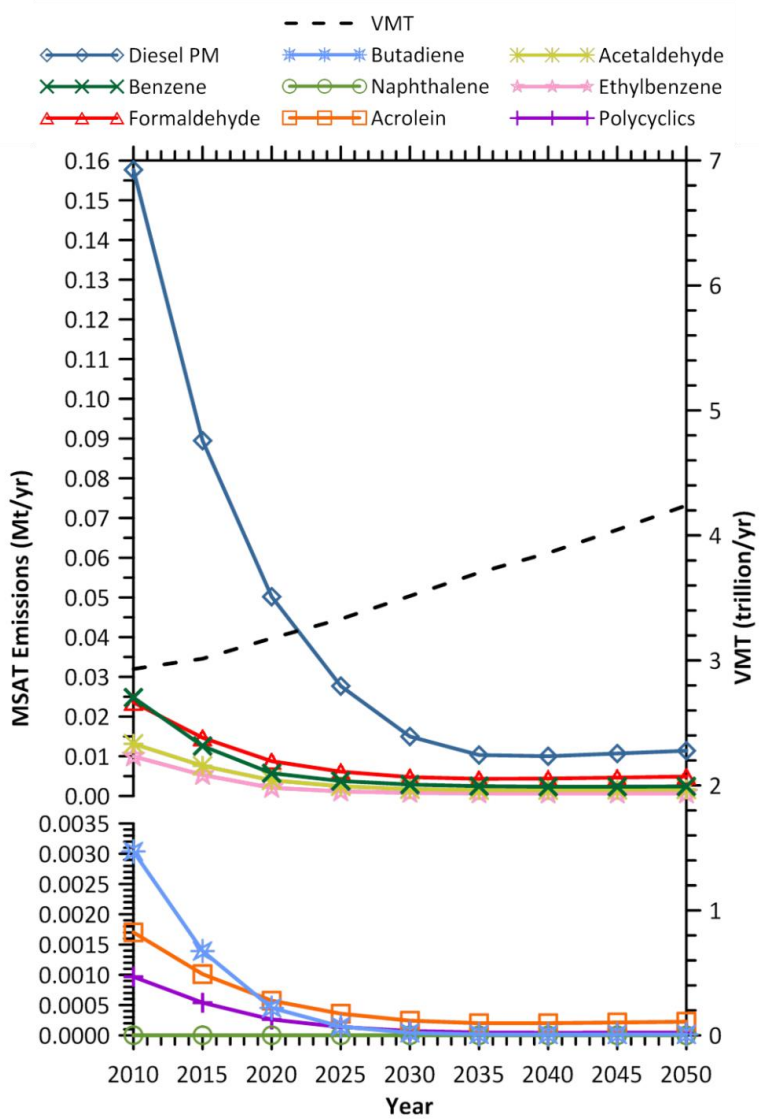


Figure 2-1. FHWA Projected National MSAT Emission Trends 2010-2050 for Vehicles Operating on Roadways Using EPA's MOVES2014a Model

Source: FHWA 2016

Note: Trends for specific locations may be different, depending on locally derived information representing VMT, vehicle speeds, vehicle mix, fuels, emission control programs, meteorological, and other factors.

## 2.3 Project-Specific MSAT Information

A qualitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the three reasonable alternatives. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives (*found at:

https://www.fhwa.dot.gov/environment/air_quality/air_toxics/research_and_analysis/methodology/msatemissions.pdf).

For each alternative in this document, the amount of MSAT emitted would be proportional to the VMT, assuming that other variables such as fleet mix are the same for each alternative. Because the VMT estimated for the No Build Alternative is higher than that for any of the three reasonable alternatives, higher levels of MSAT are not expected from any of the three reasonable alternatives compared to the No Build Alternative. Also, regardless of the alternative chosen, emissions would likely be lower than present levels in the design year 2035 as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 90 percent from 2010 to 2050 (*Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents, Federal Highway Administration*, October 12, 2016 found at https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/2016msat.pdf).

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 is so great (even after accounting for VMT growth) that future MSAT emissions in the study area are likely to be lower for virtually all locations.

Under each alternative, there may be localized areas where VMT would increase and other areas where VMT 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-location sections of the proposed SH 68 facility, with localized decreases occurring along existing north-south roadway corridors. However, even if these increases do occur, they too would be substantially reduced in the future because of the implementation of EPA's vehicle and fuel regulations.

In sum, under all three reasonable alternatives in the design year 2035 it is anticipated that there would be reduced MSAT emissions in the immediate area of the three reasonable alternatives, relative to the No Build Alternative, because of the reduced VMT associated with more direct routing, and because of EPA's MSAT reduction programs.

## 2.4 Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts because of changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and

speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The EPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the CAA and CAAA, and have specific statutory obligations with respect to hazardous air pollutants and MSAT emissions. The EPA is continually assessing human health effects, exposures, and risks posed by air pollutants. They maintain the IRIS, which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (found at https://www.epa.gov/iris). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute. A number of Health Effects Institute studies are summarized in Appendix D of FHWA's *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents* (found at: https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/msat/2016msat.pdf). Among the adverse health effects linked to MSAT compounds at high exposures are; cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI Special Report 16 found at: https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects), or in the future as vehicle emissions substantially decrease.

The methodologies for forecasting health impacts include emissions modeling, dispersion modeling, exposure modeling, and then final determination of health impacts, with each step in the process building on the model predictions obtained from the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways, to determine the portion of time that people are actually exposed at

a specific location, and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by Health Effects Institute (Special Report 16 found at https://www.healtheffects.org/publication/mobile-source-air-toxics-critical-review-literature-exposure-and-health-effects). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA states that with respect to diesel engine exhaust, "[t]he absence of adequate data to develop a sufficiently confident dose-response relationship from the epidemiologic studies has prevented the estimation of inhalation carcinogenic risk (EPA IRIS database, Diesel Engine Exhaust, Section II.C. found at: https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/0642_summary.pdf)."

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the CAA to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine an "acceptable" level of risk because of emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than one in a million because of emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than one in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two-step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable (found at: https://www.cadc.uscourts.gov/internet/opinions.nsf/284E23FFE079CD5985257800005 0C9DA/$file/07-1053-1120274.pdf).

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision- makers who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and

fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

## 2.5 Qualitative MSAT Analysis Conclusions

In this document, a qualitative MSAT assessment has been provided relative to the three reasonable alternatives and No Build Alternative for MSAT emissions. Although construction of any of the three reasonable alternatives may result in increased exposure to MSAT emissions at certain locations, the concentrations and duration of these exposures are uncertain. As a result of this uncertainty, the health effects from these emissions cannot be estimated at this time.

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