CDOT

WB I-70 Peak Period Shoulder Lane

AIR QUALITY TECHNICAL REPORT

October 26, 2018

Categorical Exclusion

AIR QUALITY TECHNICAL REPORT

WESTBOUND I-70
PEAK PERIOD SHOULDER LANE

Prepared for:

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October 26, 2018

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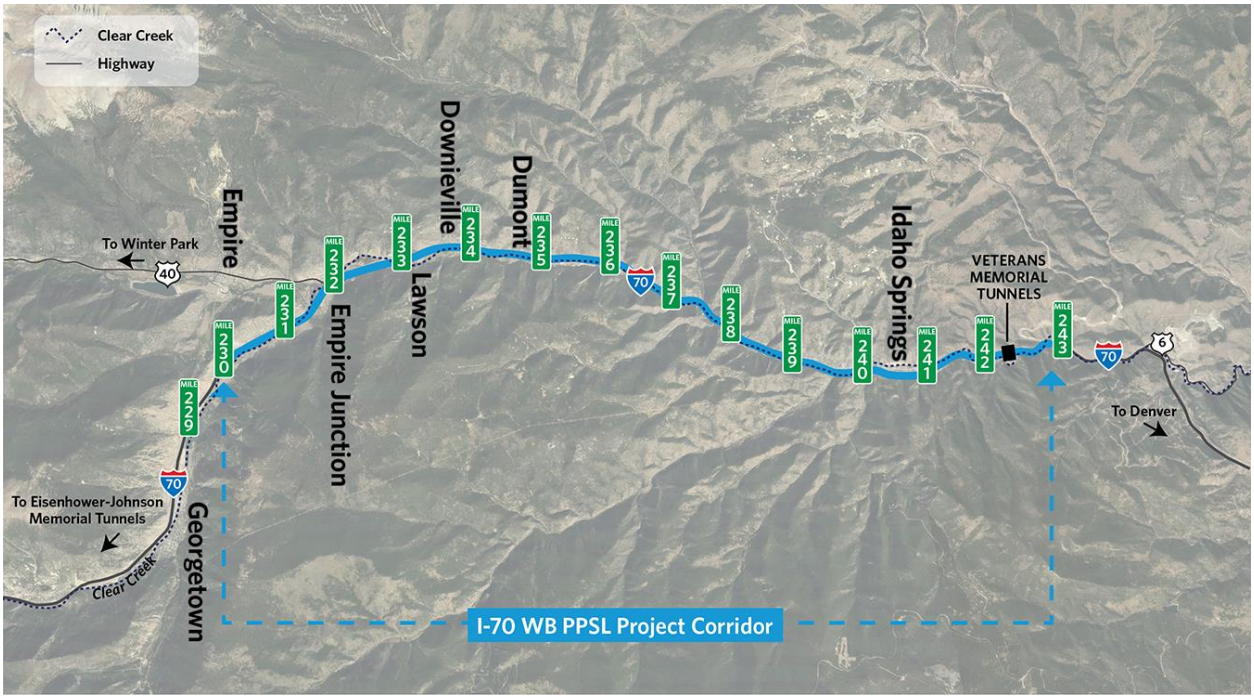
Acronyms and Abbreviations

AADT	Annual average daily traffic
APEN	Air Pollution Emission Notice
CAA	Clean Air Act of 1970
CDPHE	Colorado Department of Public Health and Environment
CFR	Code of Federal Regulations
CH_4	Methane
CDOT	Colorado Department of Transportation
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CR	County Road
CSS	Context Sensitive Solutions
DPM	diesel particulate matter plus diesel exhaust organic gases
EA	Environmental Assessment
EB	eastbound
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
GHG	Greenhouse Gas
I-70	Interstate 70
IRIS	Integrated Risk Information System
MOVES2014a	Motor Vehicle Emissions Simulator
$\mu g/m^3$	micrograms per cubic meter
MP	Milepost
MSATs	Mobile Source Air Toxics
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
N_2O	Nitrous Oxide
NO_2	Nitrogen Dioxide
NOx	Nitrogen oxide
O_3	Ozone
PEIS	Programmatic Environmental Impact Statement
PM_{10}	particulate matter less than 10 microns
$PM_{2.5}$	particulate matter less than 2.5 microns
ppm	parts per million
PPSL	Peak Period Shoulder Lane
ROD	Record of Decision
SH	State Highway
SO_2	sulfur dioxide
US 40	US Highway 40
VMT	vehicle miles traveled
WB	westbound

Section 1. Purpose of the Report

The Federal Highway Administration (FHWA), in cooperation with the Colorado Department of Transportation (CDOT), is preparing a Categorical Exclusion for proposed changes to the westbound (WB) lanes of Interstate 70 (I-70) between approximately milepost (MP) 230 and MP 243, in Clear Creek County, Colorado (Proposed Action; Figure 1). The Proposed Action includes the addition of a 12-mile Westbound (WB) tolled Peak Period Shoulder Lane (PPSL) between east Idaho Springs and the U.S. Highway 40 (US 40)/I-70 interchange in the WB direction and improvements to the State Highway (SH) 103 interchange. The Proposed Action improves operations and travel time reliability in the WB direction of I-70 in the study area. Additionally, the improvements are consistent with the *I-70 Mountain Corridor Programmatic Environmental Impact Statement* (PEIS; CDOT 2011a), PEIS Record of Decision (ROD; FHWA 2011), Context Sensitive Solutions (CSS) on the I-70 Mountain Corridor (CDOT 2009) process, and other commitments of the PEIS and ROD. The Proposed Action fits within the definition of "expanded use of existing transportation infrastructure in and adjacent to the corridor" included in the "Non-Infrastructure Related Components" element within the Preferred Alternative's Minimum Program of Improvements.

Figure 1. Project Corridor



Source: HDR, 2018.

This document discusses the regulatory setting, and describes the affected environment and the impacts of the Proposed Action on air quality within the study area. This document also identifies mitigation measures, including applicable measures identified in the I-70 Mountain Corridor PEIS, which reduce impacts during construction and operation.

Section 2. Summary of Air Quality from Previous NEPA Analyses

2.1 How was Air Quality Treated in the I-70 Mountain Corridor PEIS and ROD (Tier 1)?

The FHWA and CDOT prepared the I-70 Mountain Corridor PEIS and ROD (CDOT 2011a) to present the major findings of the I-70 Mountain Corridor National Environmental Policy Act (NEPA) process. The I-70 Mountain Corridor PEIS Climate and Air Quality Technical Report (CDOT 2011b) supports the PEIS by identifying:

- Description of air quality conditions in the corridor.
- Overview of issues and regulations in the corridor.
- Methods used to identify climate and air quality conditions and to determine potential impacts of alternatives, including changes in air quality regulations and future (2050) implications.
- Coordination with local, state, and federal agencies.
- Consequences of the Action and No Action Alternatives evaluated in the I-70 Mountain Corridor PEIS, including impacts on climate and air quality conditions resulting from changes in operations.
- Considerations for Tier 2 Processes.
- Proposed mitigation for air quality.

The portion of the I-70 Mountain Corridor studied in the PEIS extended between Glenwood Springs on the west and the Denver metropolitan area on the east; the WB PPSL study area is located within these boundaries.

Direct impacts on air quality conditions were compared between alternatives by calculating the emissions of various pollutants. Emissions of criteria pollutants and Mobile Source Air Toxics (MSATs) are directly related to the vehicle miles traveled in the corridor. The No Action alternative was predicted to have the lowest overall emissions; however, emissions of criteria pollutants and MSATs were predicted to be less in 2035 than current-day emissions, even though traffic volumes are higher. The Preferred Alternative had slightly higher emissions than the No Action Alternative because of increases in traffic volumes; however, emissions were predicted to be lower than current-day emissions. Future emissions are assumed to be lower as older, higher-polluting vehicles are replaced by newer low-polluting vehicles and strict regulatory controls continue to be effective in reducing emissions.

Unlike criteria pollutants and MSATS, however, re-entrained dust from winter roadway sanding operations was found to increase as traffic volumes increase. Therefore, re-entrained dust in 2035 was anticipated to be higher than present emissions under all alternatives because 2035 traffic volumes are projected to be higher. Greenhouse gases are also likely to be higher in 2035 than current emissions.

2.2 How was Air Quality Treated in the Twin Tunnels Expansion Projects (Tier 2)?

The FHWA, in cooperation with CDOT, prepared an Environmental Assessment (EA) and Section 4(f) Evaluation, and Finding of No Significant Impact (FONSI) for proposed changes to the eastbound (EB)

lanes of I-70 and the eastbound bore of the Twin Tunnels between MP 241 and MP 244 in Clear Creek County, Colorado (CDOT 2012a). Capacity improvements extended from MP 241.1 on the west to MP 244.5 on the east, and the project limits extended to MP 238.5 on the west side with the addition of signage. The Twin Tunnels Proposed Action limits were partially within the WB PPSL Proposed Action limits, which extend to just past MP 243. Overlap between the two Proposed Actions runs from MP 238.5 on the west side to MP 243 on the east side.

CDOT prepared a Categorical Exclusion for the Twin Tunnels for proposed changes to the WB lanes of I-70, which is the same study area as the (EB) Twin Tunnels EA and FONSI. Findings from this study were similar to the findings from the (EB) Twin Tunnels EA and FONSI completed for the EB direction.

Impacts of the Proposed Action were projected to be as follows:

Because of the differences in emissions rates resulting from vehicle speeds, the Proposed Action with managed lanes was expected to slightly reduce carbon monoxide and oxides of nitrogen compared to the 2035 No Action Alternative. No changes in fine particulate matter, sulfur dioxide or tailpipe PM_{10} (particulate matter less than 10 microns) were anticipated. These results represent a substantial reduction from emissions for the 2010 existing conditions, because of improvements in vehicle and fuel technology, Once again, however, future PM_{10} emissions of re-entrained road dust would be greater than 2010 PM_{10} emissions because of increased design-day vehicle miles traveled (VMT) (CDOT 2012b).

Indirect effects of the Proposed Action included increased pollutant concentrations, especially PM_{10}, at nearby air quality receptors including several residences and the Scott Lancaster Memorial Trail, both during construction and throughout future years, as widening I-70 increased the amount of traffic that is able to pass through the area. The same persistent downwind conditions that disperse carbon monoxide, sulfur dioxide, oxides of nitrogen, and other exhaust pollutants, exacerbate PM_{10} conditions due to wind entrainment of loose dust particles (CDOT 2012b).

2.3 How was Air Quality Treated in the Eastbound (EB) I-70 Peak Period Shoulder Lane Categorical Exclusion (Tier 2)?

The FHWA, in cooperation with CDOT, prepared the *Eastbound I-70 Peak Period Shoulder Lane Categorical Exclusion* for proposed changes to the EB lanes of I-70 between approximately MP 230 and MP 243, in Clear Creek County, Colorado (CDOT 2014). The Air Quality technical memorandum discussed the regulatory setting and described the affected environment and the impacts of the Proposed Action on air quality within the identified study area. The WB PPSL (Proposed Action) study area is located within the boundaries of the EB PPSL Categorical Exclusion.

For the EB PPSL project, the same decreasing trends as described in the I-70 Mountain Corridor PEIS and Twin Tunnels EA were expected to hold true, with emissions of most criteria pollutants decreasing substantially for both the Proposed Action and No Action Alternatives, with the exception of PM_{10} (particulate matter less than 10 microns), which were likely to increase under either alternative.

Section 3. What Process was Followed to Analyze Air Quality?

3.1 Methodology

For NEPA purposes only, a qualitative discussion of criteria pollutants is provided in this document. While not required under the transportation conformity regulation, a qualitative discussion of criteria pollutants may inform the comparison of alternatives by showing whether there are notable differences among the alternatives in their emissions of criteria pollutants (CDOT 2017). With regard to MSATs, the FHWA guidance describes situations that may require quantitative analysis. The threshold volume of 140,000 to 150,000 annual average daily traffic (AADT) in a populated area is one criterion. As volumes in the study area are much lower than this threshold, a qualitative MSAT analysis is included in this technical memorandum. Finally, a discussion is provided of greenhouse gas (GHG) emissions from Colorado highway projects that may contribute to global climate change, and statewide strategies for mitigation.

For this analysis, the No Action Alternative is considered to be traffic conditions in the year 2035 with no transportation improvements made to I-70. The year 2035 was used because of CDOT's commitment that the PPSL would no longer be in operation past 2035

3.2 Study Area

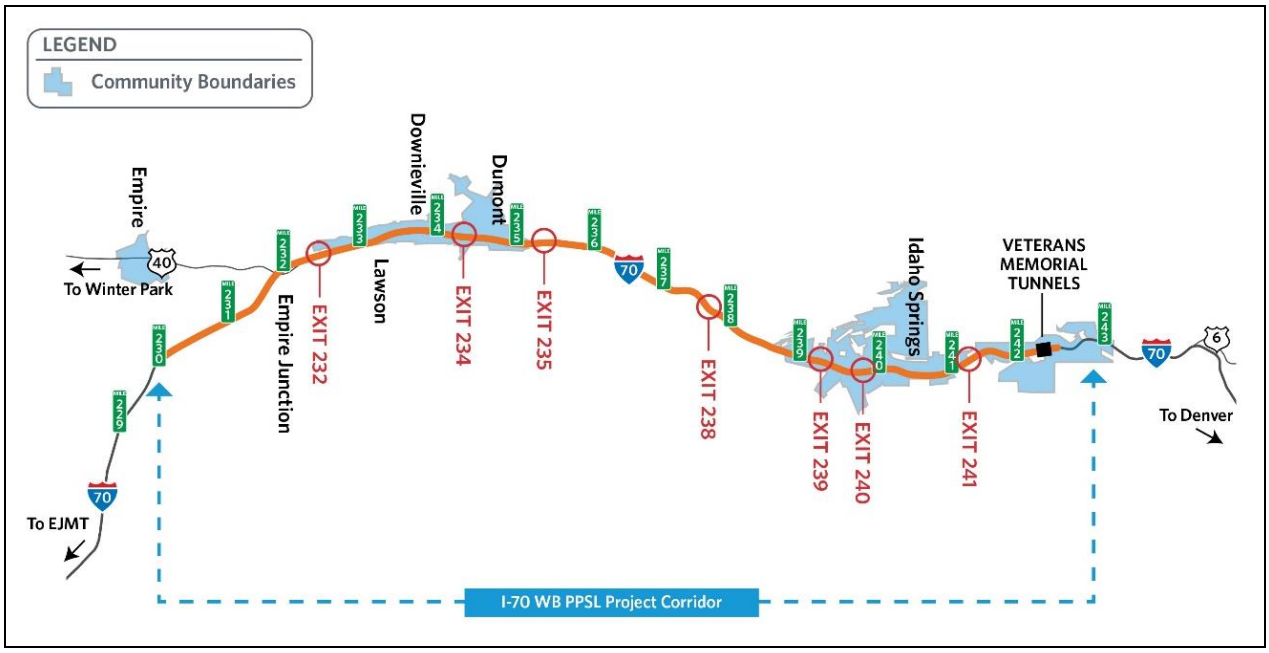
The study area for the WB PPSL project encompasses CDOT right-of-way along I-70 in both directions from MP 243 to MP 230 and areas immediately adjacent to the right-of-way. This study area was used to evaluate the **direct** effects of the Proposed Action.

For transportation and socioeconomic impacts, the study area for **indirect** effects includes Clear Creek County and the communities of Idaho Springs, Downieville-Lawson-Dumont, and the town of Empire. This area is broadly defined and includes the communities and other areas that would be **indirectly** affected by the Proposed Action. The indirect effects study area includes the communities shown in Figure 2.

For the remaining resources, the study area for **indirect** effects generally includes a 0.25-mile buffer around the study area. This area encompasses the communities and other areas that would be indirectly affected by the Proposed Action.

The indirect study area accounts for potential temporary and permanent direct and indirect air quality impacts that are incurred by residents, business owners, interstate travelers, bicyclists and pedestrians as a result of constructing the Proposed Action. The indirect study area is large enough to account for these impacts as it captures the influence of the Proposed Action on the local air shed.

Figure 2. Study Area Communities



3.3 Regulations

3.3.1 National Ambient Air Quality Standards Overview

The CAA of 1970, last amended in 1990, requires the EPA to set National Ambient Air Quality Standard (NAAQS) for seven criteria pollutants: carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), PM_{10}, $PM_{2.5}$ (particulate matter less than 2.5 microns in diameter), and lead (Table 1). NAAQS for each criteria pollutant were determined based on the effects of the pollutant on public health and welfare, and are updated periodically to reflect the current state of scientific understanding. Compliance with the NAAQS in the state of Colorado is enforced by the Colorado Department of Public Health and Environment (CDPHE), and transportation projects are expected to conform to these standards.

Table 1. National Ambient Air Quality Standards—Primary Standards

Pollutant	Averaging Time	NAAQS	Units[1,2]
Carbon Monoxide (CO)	1-hour	35	ppm
	8-hour	9	
Ozone (O_3)	8-hour	0.070	ppm
Nitrogen dioxide (NO_2)	1-hour	0.100	ppm
	annual	0.053	
Sulfur dioxide (SO_2)	1-hour	0.075	ppm
Particulate matter less than 2.5 microns ($PM_{2.5}$)	1-year	12	µg/m^3
	24-hour	35	
Particulate matter less than 10 microns (PM_{10})	24-hour	150	µg/m^3
Lead (Pb)	Rolling 3 month average	0.15	µg/m^3

Source EPA 2017.
1ppm = parts per million; 2µg/m3 = micrograms per cubic meter

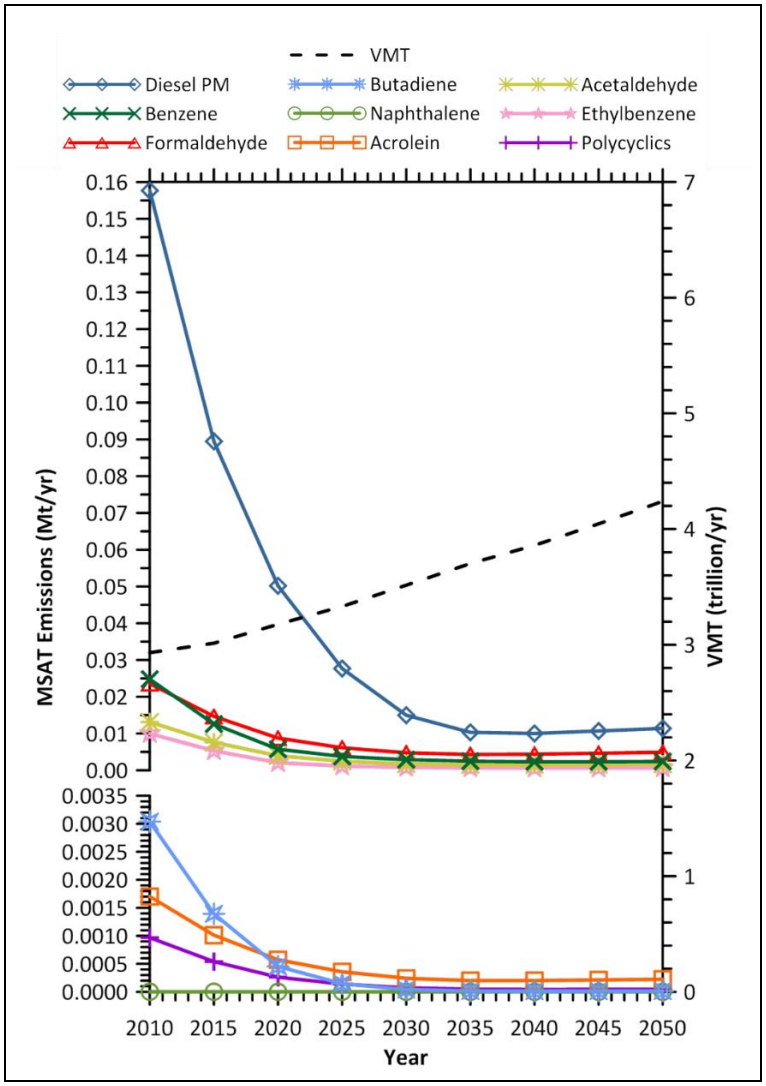
3.3.2 Mobile Source Air Toxics

FHWA guidelines recommended methodology for assessing MSATs for a project with traffic volumes found in the I-70 WB PPSL study area is a qualitative discussion. On October 18, 2016, FHWA released updated interim guidance on when and how to analyze MSATs in NEPA documents for highway projects (FHWA 2016). The interim guidance reflects the current list of priority MSATs.

Controlling air toxic emissions became a national priority with the passage of the CAA Amendments of 1990, whereby Congress mandated that the Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. EPA assessed this expansive list in their Final Rule on Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (EPA 2017a). In addition, FHWA has identified nine compounds with noteworthy contributions from mobile sources that are among the national and regional-scale cancer risk drivers from the EPA's 2011 National Air Toxics Assessment (EPA 2011):

1. Acetaldehyde
2. Acrolein
3. Benzene
4. Butadiene
5. Diesel particulate matter plus diesel exhaust organic gases (DPM)
6. Ethylbenzene
7. Formaldehyde
8. Naphthalene
9. Polycyclic organic matter

Figure 3. FHWA-Predicted National MSAT Trends 2010-2050 for Vehicles Operating on Roadways



While FHWA considers these the priority MSATs, the list is subject to change and may be adjusted in consideration of future EPA rules. Based on an FHWA analysis using EPA'S MOVES2014a (Motor Vehicle Emissions Simulator) model, as shown on Figure 3, even if VMT increases by 45 percent by 2050, as assumed, a combined reduction of 91 percent in the total annual emissions for the priority MSATs is projected from 2010 to 2050 (FHWA 2016). Figure 3 illustrates the predicted trends for MSAT levels.

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 project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how the potential health risks posed by MSAT exposure should be factored into project-level decision-making within the context of NEPA.

Nonetheless, air toxics concerns continue to be raised on highway projects during the NEPA process. Even as the science emerges, the public and other agencies expect the lead agencies to address MSAT impacts in environmental documents. FHWA, EPA, Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. FHWA will continue to monitor the developing research in this emerging field.

3.3.3 Climate Change

Climate change is an important national and global concern. While the earth has gone through many natural changes in climate in its history, there is general agreement that the earth's climate is currently changing at an accelerated rate and will continue to do so for the foreseeable future. Anthropogenic (human-caused) GHG emissions contribute to this rapid change. Carbon dioxide (CO_2) makes up the largest component of these GHG emissions. Other prominent transportation-related GHGs include methane (CH_4) and nitrous oxide (N_2O).

Many GHGs occur naturally. Water vapor is the most abundant GHG and makes up approximately two-thirds of the natural greenhouse effect. However, the burning of fossil fuels and other human activities are adding to the concentration of GHGs in the atmosphere. Many GHGs remain in the atmosphere for time periods ranging from decades to centuries. GHGs trap heat in the earth's atmosphere. Because atmospheric concentration of GHGs continues to climb, our planet will continue to experience climate-related phenomena. For example, warmer global temperatures can cause changes in precipitation and sea levels.

To date, no national standards have been established regarding GHGs, nor has EPA established criteria or thresholds for ambient GHG emissions pursuant to its authority to establish motor vehicle emission standards for CO_2 under the CAA. However, there is a considerable body of scientific literature addressing the sources of GHG emissions and their adverse effects on climate, including reports from the Intergovernmental Panel on Climate Change, the U.S. National Academy of Sciences, and EPA and other federal agencies. GHGs are different from other air pollutants evaluated in federal environmental reviews because their impacts are not localized or regional because of their rapid dispersion into the global atmosphere, which is characteristic of these gases. The affected environment for CO_2 and other GHG emissions is the entire planet. In addition, from a quantitative perspective, global climate change is the cumulative result of numerous and varied emissions sources (in terms of both absolute numbers and types), each of which makes a relatively small addition to global atmospheric GHG concentrations. In contrast to broad-scale actions, such as actions involving an entire industry sector or very large geographic areas, it is difficult to isolate and understand the GHG emissions impacts for a particular transportation project. Presently there is no scientific methodology for attributing specific climatological changes to a particular transportation project's emissions.

3.4 Public Involvement

In August 2017 a concept development process was completed for the Top of Floyd Hill to Empire Junction I-70 segment. Two Tier 2 NEPA projects came out of this process: Floyd Hill and WB PPSL.

Individuals from local jurisdictions, communities, state and federal agencies and special interest groups were a part of a team that guided the concept development process.

Many suggestions and concerns were identified during the Concept Development Process, including neighborhood and business concerns (from Idaho Springs, Downieville, Dumont and Lawson neighborhoods, from businesses throughout the corridor and others). These were forwarded to the NEPA WB PPSL team for their consideration during the ongoing NEPA process.

The initial stakeholder concerns from the concept development process and July 2016 public meeting included:

- More vehicles traveling on I-70 will increase the amount of air pollution in the area.
- There could be deteriorating air quality during construction.

Public involvement is continuing throughout the NEPA process with scheduled public meetings and posted online updates and information. A public scoping meeting for this project was conducted in July 2017, and internal CDOT/FHWA scoping has been conducted. A second public meeting was held September 13, 2018, to describe the Proposed Action, project impacts and mitigation.

3.5 Agency Coordination Conducted

CDOT consulted with the CDPHE on current air quality conditions in the study area and historical monitoring data collected along the corridor.[1] This information is described in Section 5 of this document.

Section 4. Description of the Proposed Action

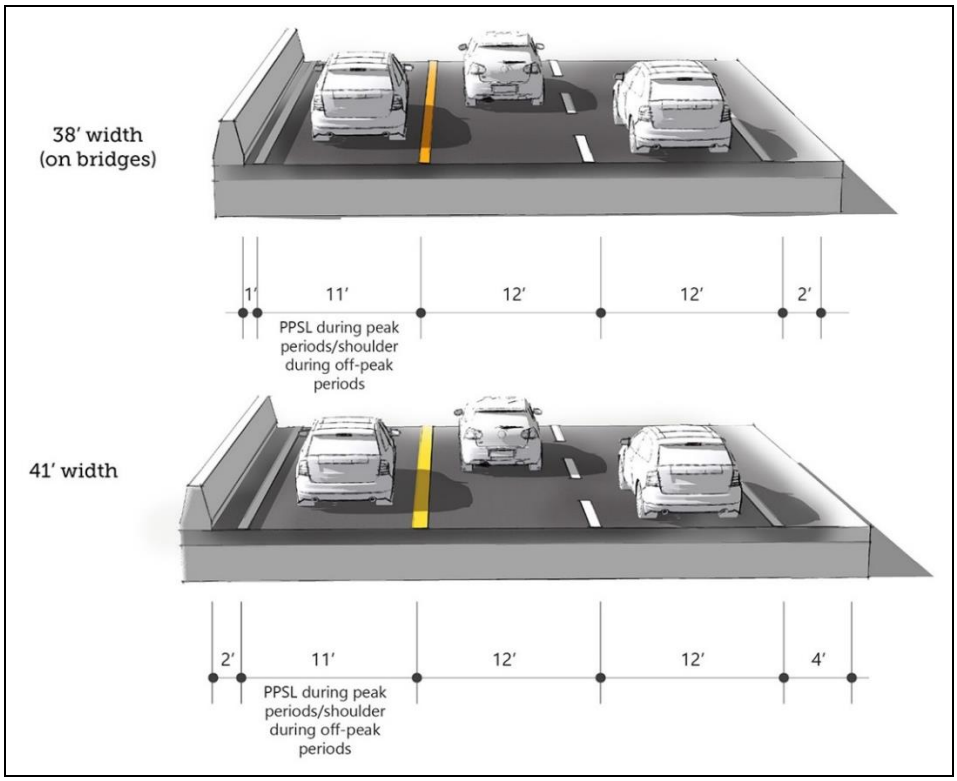
The WB PPSL project adds an approximate 12-mile tolled PPSL on WB I-70 between the Veterans Memorial Tunnels (just west of MP 243) and the US 40/I-70 interchange (MP 232). The lane entrance begins approximately 500 feet east of the Veterans Memorial Tunnels portal. The WB PPSL maximizes the use of the existing alignment and infrastructure in order to minimize any new impacts within the study area. The 11-foot lane is open for use only during peak periods, and otherwise serves as the shoulder of the interstate. Use of the WB PPSL is prohibited for trucks, buses, or any vehicle over 25 feet long. Overhead signs showing the lane status and toll rate are located throughout the corridor and at the entrance point.

An ingress/entrance point for traffic coming onto WB I-70 from Idaho Springs is provided approximately 2,500 feet west of Exit 239. An egress point for traffic exiting to Downieville is provided about 4,400 feet east of Exit 235, and an egress point for traffic exiting to US 40 is provided approximately 4,400 feet east of Exit 232.

The WB PPSL ends approximately 1/2 mile west of Exit 232. Figure 4 illustrates the typical cross sections of the Proposed Action.

[1] Gordon Pierce, Colorado Department of Public Health and Environment, email message to Vanessa Henderson, November 21, 2017.

Figure 4. WB PPSL Proposed Action Typical Cross Sections



Source: HDR 2018.

Improvements include:

I-70 Modifications. The general purpose lanes and shoulder of WB I-70 are resurfaced and widened in select locations on the existing alignment between approximately MP 241.5 and MP 232 to accommodate a lane on the shoulder during peak travel periods. Drainage enhancements include a storm system for minor and major storm events and water quality facilities. At SH 103, I-70 is slightly realigned to enhance safety and improve drainage.

SH 103 Interchange Improvements. Ramp improvements address sight distance problems. The pedestrian sidewalk is improved by adding lighting and a decorative paving buffer adjacent to the existing sidewalk on the SH 103 bridge over I-70. This sidewalk connects to a new sidewalk buffered from 13th Avenue between the interchange ramp and Idaho Street in Idaho Springs.

Safety Pull-Outs. A total of seven new safety pull-outs are built—five along WB I-70 and two along EB I-70. One existing safety pull-out on EB I-70 is improved. The intention of these is to provide a space for vehicles to use if they experience a break down and for law enforcement to use.

Rockfall Mitigation. Rockfall mitigation measures are added at five locations to reduce the chance of rocks or other debris from falling on travel lanes or shoulders and reduce the potential for crashes and travel disruptions. Rockfall mitigation measures are included in the WB direction at MP 239, MP 238.4, MP 237.1, and MP 236.4, and in the EB direction at MP 240.3.

Active Traffic Management. Dynamic signage informs drivers so the WB PPSL is appropriately used to reduce congestion. This innovative design improves mobility.

Fiber Optic Upgrades. Fiber optics are designed to accommodate future emerging technologies for autonomous and connected vehicles, improving driver information and emergency response capabilities.

Dumont Port-of-Entry Interchange. Merge area improvements to the Dumont interchange acceleration lane includes restriping of I-70 to reduce merge conflicts between truck traffic and the general-purpose lane traffic.

Dynamic signage

Section 5. What are the Air Quality Resources in the Study Area?

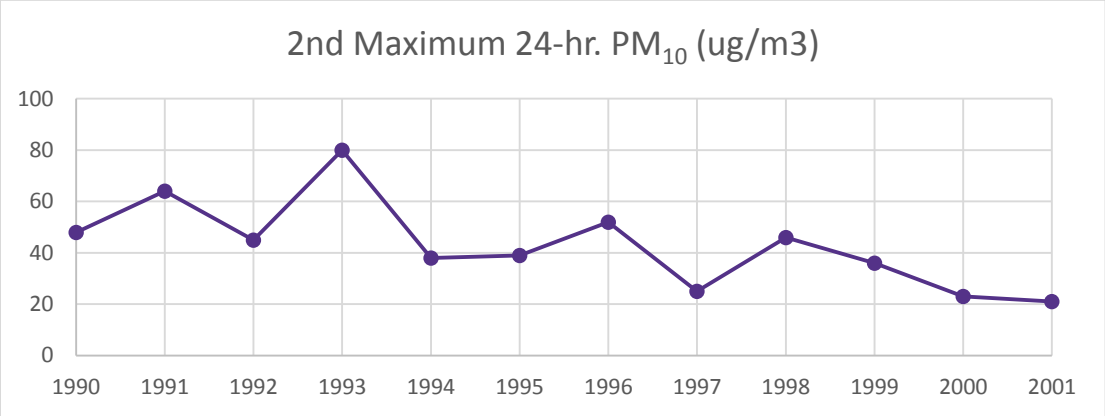
5.1 Current Conditions

Currently, this area is designated as attainment/unclassified by EPA (EPA, 2018). There are no ambient air quality monitors in the vicinity of the WB PPSL project, or within Clear Creek County. Monitoring has not been conducted in the Clear Creek County area by CDPHE since 1980. From 1971 to 1980 CDPHE monitored for particulate matter in Clear Creek County and concentrations observed did not show any cause for air quality concerns. From 1990 to 2001 CDPHE monitored for PM_{10} in Vail, Colorado. This monitoring location was also in a valley (similar to the study area) and no concerns/exceedances were observed there and observed concentrations indicated a downward trend in ambient levels of this pollutant as shown in Figure 5.

CDPHE also collects near-road monitoring data at two locations in Denver, Colorado for CO, PM_{10} and NO_2, which have shown no exceedances of the NAAQS. These monitoring locations have substantially higher traffic volumes, as well as contributions from other sources (e.g., industrial) than are found in Clear Creek County. Furthermore, during construction of the Veterans Memorial Tunnels, extensive monitoring for PM_{10} was conducted. This monitoring showed no cause for concern even during blasting operations, when no violations of the NAAQS were observed.

At this time, CDPHE has no reason to monitor for air quality in Clear Creek County as there is no indication of a cause for concern. The Denver area is in attainment for all pollutants with a NAAQS except for O_3 and has many more sources contributing to emissions than in Clear Creek County. Air quality in the study area is assumed to meet the NAAQS because of the lack of large-scale emission sources in or near the area.

Figure 5. 1990–2001 Trends in Monitored PM_{10} Concentrations in Vail, Colorado



Source: CDPHE 2017.

5.2 Future Conditions

The air quality in the study area is expected to remain good in the future, due to technological improvements that will reduce vehicle emissions over time, even while traffic on I-70 increases.

Due to topographical constraints, substantial population growth is not expected within the study area or in Idaho Springs. A primary factor affecting emissions in the study area is increased traffic growth on I-70, as Colorado's population continues to grow and additional Denver metropolitan area residents use I-70 to access summer and winter recreational opportunities in the mountains. The PEIS indicated that traffic volumes throughout the entire I-70 Mountain Corridor are expected to increase 29 to 43 percent by the year 2035. In the WB PPSL study area, traffic volumes are expected to increase 15 to 19 percent by the year 2035. Technological improvements, explained below, will likely offset air quality impacts of traffic growth to some degree.

For the past several decades, Colorado's air quality nonattainment areas have experienced major increase in VMT but nonetheless have also seen reduced concentrations of vehicle-generated pollutants such as carbon monoxide. This apparent contradiction is explained by the fact that vehicle emissions technology has greatly improved, due to various regulatory requirements, such as federal regulations for light and heavy duty vehicles and state Air Quality Regulations, such as the vehicle inspection and maintenance program, lower volatility fuel in the summer and oxygenated fuels in the winter. It is expected that the number of lower-emitting advanced technology and alternative-fueled vehicles (e.g., electric and natural gas vehicles) will increase in Colorado. Continued improvement is expected in the future, but eventually it will be limited by diminishing returns. At some point in the foreseeable future, VMT growth will overtake emission improvements and total emissions will increase, thus increasing pollutant concentrations. The I-70 Mountain Corridor PEIS discussed this possibility with regard to the 2035 to 2050 timeframe.

Section 6. What are the Environmental Consequences?

6.1 How Does the Proposed Action Affect Air Quality Resources?

6.1.1 What Direct Effects are Anticipated?

Criteria Pollutants. As documented in the previous NEPA studies conducted along the I-70 Mountain Corridor, tailpipe emissions of criteria pollutants are expected to decrease from current levels through 2040 with the most significant decreases anticipated for CO, oxides of nitrogen and $PM_{2.5}$. These decreases are largely attributable to improvements in vehicle engines and fuels; however, improved speeds due to decreased congestion should also lead to a reduction in emissions. The decreased congestion reduces tailpipe emissions associated with congestion.

As the amount of VMT increases, PM_{10} emissions of re-entrained road dust are expected to increase proportionally with the increase in VMT. The increase in VMT between the Proposed Action and the No Action Alternative is 6 to 9 percent, which is a relatively small increase. This indicates that the Proposed Action does not adversely affect emissions of PM_{10} as compared to the No Action.

Mobile Source Air Toxics. A qualitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives* (FHWA 2016).

For the No Action and the Proposed Action, the amount of MSAT emitted is proportional to the VMT, assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for the Proposed Action (during the times in which the Managed Lane would be in use) is slightly higher than that for the No Action, because the additional traffic increase during peak periods only improves the efficiency of the roadway and may attract rerouted trips from elsewhere in the transportation network or from other times during the day. This slight increase in VMT could lead to temporary increases in MSAT emissions for the Proposed Action along the highway corridor, along with corresponding decreases in MSAT emissions along the parallel route (the frontage road). However, the potential emissions increase is offset by lower MSAT emission rates due to increased speeds and, therefore, decreased vehicle hours traveled. According to EPA's MOVES2014a model, all of the priority MSAT emissions decrease as speed increases. Thus, overall MSAT emissions are expected to be lower in 2035 for the Proposed Action compared to the No Action. Also, regardless of the alternative chosen, emissions are likely lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 90 percent between 2010 and 2050. 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 MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The additional travel lane (during peak period operations only) moves traffic closer to nearby homes in some locations. In most locations along the corridor, there is no additional pavement and the WB PPSL operations are on the inside shoulder, so traffic is not closer to nearby homes. Because the primary purpose of the WB PPSL is to use existing pavement, at most the traffic moves closer by a few feet. In the few areas where traffic is moved closer to homes, there may be localized areas where ambient concentrations of MSAT are higher, but only during peak periods. However, the magnitude and the

duration of these potential increases compared to No Action cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts. When a highway is widened, the localized level of MSAT emissions for the Proposed Action could be higher relative to the No Action, but this could be offset because of increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Since the WB PPSL is largely using existing pavement, this effect is negligible. Also, MSATs will be lower in other locations when traffic shifts away from them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

Climate Change. Under NEPA, a detailed environmental analysis should be focused on issues that are significant and meaningful to decision-making. Based on the nature of GHG emissions and the exceedingly small potential GHG impacts of the Proposed Action as compared to the No Action, the GHG emissions from the Proposed Action will not result in "reasonably foreseeable significant adverse impacts on the human environment" (40 Code of Federal Regulations [CFR] 1502.22(b)). The GHG emissions from the Proposed Action are insignificant and do not play a meaningful role in a determination of the environmentally preferable alternative or the selection of the Proposed Action. More detailed information on GHG emissions "is not essential to a reasoned choice among reasonable alternatives" (40 CFR 1502.22(a)) or to making a decision in the best overall public interest based on a balanced consideration of transportation, economic, social, and environmental needs and impacts (23 CFR 771.105(b)).

The transportation sector is the second largest source of total GHG emissions in the U.S., behind electricity generation. The transportation sector was responsible for approximately 27 percent of all anthropogenic (human-caused) GHG emissions in the U.S. in 2010 (EPA 2010). The majority of transportation GHG emissions are the result of fossil fuel combustion. CO_2 makes up the largest component of these GHG emissions. U.S. CO_2 emissions from the consumption of energy accounted for about 15 percent of worldwide energy consumption in 2015 (EIA 2015). U.S. transportation CO_2 emissions accounted for about 4 percent of worldwide CO_2 emissions (EPA 2017b).

While the contribution of GHGs from transportation in the U.S. as a whole is a large component of U.S. GHG emissions, as the scale of analysis is reduced, the GHG contributions become quite small. The relationship between projected Colorado highway CO_2 emissions in 2035 and total global CO_2 emissions is predicted to be 0.0612 percent (CDOT 2014). The number of vehicle miles traveled in the study area is predicted to account for less than 0.00003 percent of total statewide vehicle miles traveled in 2035, which indicates that the slight increase in vehicle miles traveled and resultant increase in CO_2 emissions associated with implementing the Proposed Action is not significant (CDOT 2014). Therefore, no adverse effects associated with GHG emissions are anticipated from implementation of the Proposed Action.

6.1.2 What Indirect Effects Are Anticipated?

Indirect effects are those that occur at a different time or place than the Proposed Action. The Proposed Action consists of construction activities which temporarily generate dust, construction equipment emissions, and other construction-related emissions. The temporary relocation of emissions for I-70 WB traffic, if there are periods of construction detours, is an indirect effect of the Proposed Action. Indirect effects of the Proposed Action include increased pollutant concentrations, especially PM_{10}, at nearby air quality receptors including several residences, parks and trails, both during construction and throughout future years, as the addition of a temporary travel lane on the shoulder of I-70 increases the amount of traffic that is able to pass through the area. The same persistent downwind conditions that disperse CO,

SO_2, nitrogen oxide (NO_x), and other exhaust pollutants exacerbate PM_{10} conditions because of wind entrainment of loose dust particles.

6.1.3 What Effects Would Occur During Construction?

The Proposed Action has several temporary impacts to air quality during construction because of the use of standard roadway construction techniques and equipment. Much of this equipment is diesel-powered. Virtually all construction techniques and equipment generate emissions of some kind. The use of construction techniques and equipment result in the release of diesel and dust emissions from construction equipment.

Emissions from the Proposed Action are not expected to be especially different from other roadway widening projects that occur throughout the state every year, in areas with much greater population density. In fact, the project generates less construction-related emissions than a normal highway capacity improvement project because the new WB PPSL is placed on the existing shoulder, which reduces the amount of paving and soil disturbances. Partially offsetting this, however, is that due to topographical constraints, this project requires construction of some retaining walls and other features that would not be necessary in flatter terrain.

6.1.4 Would there be Cumulative Effects?

The Council on Environmental Quality defines a cumulative impact as the impact on the environment that results from the combination of incremental impacts of the action and other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or nonfederal), entity, or person undertakes such other actions (40 CFR 1508.7). The Proposed Action is not expected to result in a measurable impact on air quality. Therefore, cumulative effects on air quality associated with the Proposed Action are unlikely.

One action local governments could take if there are concerns about emissions from idling trucks is adoption of the idle reduction ordinance. This was developed by the Colorado legislature and is available to local cities or counties to adopt.

Section 7. What Mitigation Is Needed?

7.1 Mitigation

The Proposed Action is expected to result in decreased congestion and improved operational efficiency during selected peak traffic hours. Although motor vehicle emissions in the study area may increase, they are unlikely to result in a violation of the NAAQS; therefore, no direct project air quality mitigation is required.

However, the construction phase of this project could have several localized diesel emitting sources, which temporarily affect air quality conditions during construction. Therefore, the project will need to follow the requirements of filing an Air Pollution Emission Notice (APEN) to fulfill EPA's concerns regarding air quality impacts. Additionally, preparation of a Fugitive Dust Control Plan will be required. This plan will specify mitigation methods to reduce dust emissions during construction. Adherence to this plan will reduce temporary air pollution resulting from construction.

The I-70 Mountain Corridor PEIS acknowledged that "some air quality issues, particularly emissions of greenhouse gases, are global issues that are difficult to affect on a project-specific level. As such, the lead agencies are committed to working on these broad issues, as described in Chapter 4 *Cumulative Impacts Analysis* of the PEIS, while also incorporating measures to control air pollutant emissions locally."

The I-70 Mountain Corridor PEIS recognized that fugitive dust was the air pollutant of primary concern along the I-70 Mountain Corridor. It stated, "Because project alternatives are not anticipated to cause or result in violations of any NAAQS, most mitigation measures for air quality will center on controlling fugitive dust during construction, operations, and maintenance."

The mitigation measures for air quality impacts are shown in Table 2.

Table 2. Mitigation Tracking

Mitigation Category	Impact from NEPA Document	Commitment From Mitigation Table In Source Document (Use Exact Wording from Table in Source Document)	Responsible Branch	Timing/Phase of Construction Mitigation to be Constructed
Air Quality	Dust during construction.	File an Air Pollution Emission Notice.	CDOT Engineering and Contractor	Pre-Construction
Air Quality	Dust during construction.	Prepare a Fugitive Dust Control Plan that specifies best management practices (BMPs) to reduce dust during construction.	CDOT Engineering and Contractor	Pre-Construction
Air Quality	Release of diesel emissions from construction equipment.	Use the cleanest fuels available at the time in construction equipment and vehicles to reduce exhaust emissions.	CDOT Engineering and Contractor	During Construction
Air Quality	Release of diesel emissions from construction equipment.	Keep construction equipment well-maintained to ensure that exhaust systems are in good working order.	CDOT Engineering and Contractor	During Construction

Section 8. References

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