

U.S. 287 at Lamar: Air Quality

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1.0 Introduction

The objectives of the air quality analysis are to (1) assess the corridor emissions of the no-build and preferred alternatives, (2) determine localized emissions impacts of the no-build and preferred alternatives, and (3) report the air quality conformity.

1.1 Proposed Action

The proposed action will relocate U.S. 287 and U.S. 50 from Main Street to a new alignment approximately one mile east of Lamar, Colorado. The proposed action consists of new mainline, ultimately four lanes wide, three new interchanges, and provisions for two future local access points along the route. In addition, the new alignment includes a new crossing of the Arkansas River. The three interchange locations are at the southern terminus, the northern portion and east of Lamar at a point along the alignment where it crosses U.S. 50.

At the southern terminus, located just north of County Road CC, the proposed interchange is a grade separated trumpet configuration with Main Street, providing a free-flow movement into downtown Lamar. A 1.2-mile segment of existing U.S. 287 will be reconfigured to serve as a frontage road providing local access.

A local access point to serve the Prowers County Medical Center will be provided at Lake Road approximately three miles north of the southern interchange. (The proposed action includes constructing an at-grade intersection, with connecting roads to be built by others in the future.) A grade-separated crossing (no access) is proposed over existing Parmenter Street. An extension of Parmenter Street to the east will be constructed to provide access back to U.S. 50.

The east interchange with U.S. 50 consists of a grade separated wide diamond with future directional loop ramps to be added when traffic volumes warrant. The mainline will cross the UPRR and County Road HH.50 at a grade-separated crossing (no access) just north of the existing U.S. 50. To facilitate this interchange configuration a 1.8-mile segment of U.S. 50 will be realigned about 1,000 feet south of its present location.

A second local access point to U.S. 287 will be provided approximately one mile north of the U.S. 50 interchange. This connection will allow the City and/or County to construct an extension of existing Crystal Street east to connect with relocated U.S. 287/U.S. 50. (The proposed action includes constructing an at-grade intersection, with connecting roads to be built by others in the future.)

The mainline will cross the Arkansas River approximately 1.4 miles downstream of the existing U.S. 287/U.S. 50 bridge. The proposed bridge is a 1,400-foot-long multi-span structure to provide adequate flood capacity and wildlife movement along the riparian corridor. A grade separated crossing (no access) is proposed over existing SH 196 just north of the new Arkansas River bridge.

Along the northern portion of the alignment a grade separated diamond interchange is proposed with SH 196. The realignment of U.S. 287 will reconnect with the existing highway at County Road 7 just west of the Port of Entry station. The existing east/west portion of U.S. 287/U.S. 50 south of the realignment will be reconfigured to serve as a frontage road to maintain access to existing businesses along U.S. 287/U.S. 50. This new frontage road will be extended west approximately 600 feet and connect to County Road 7 with an improved at-grade intersection.

The existing high-speed curve of U.S. 287/U.S. 50, known locally as the “KLMR curve” for the radio station near the west tangent of the curve, will be removed. The existing U.S. 287/U.S. 50 route north of the Arkansas River bridge will be designated as Main Street, and will consist of a four-lane section north to the proposed interchange at SH 196.

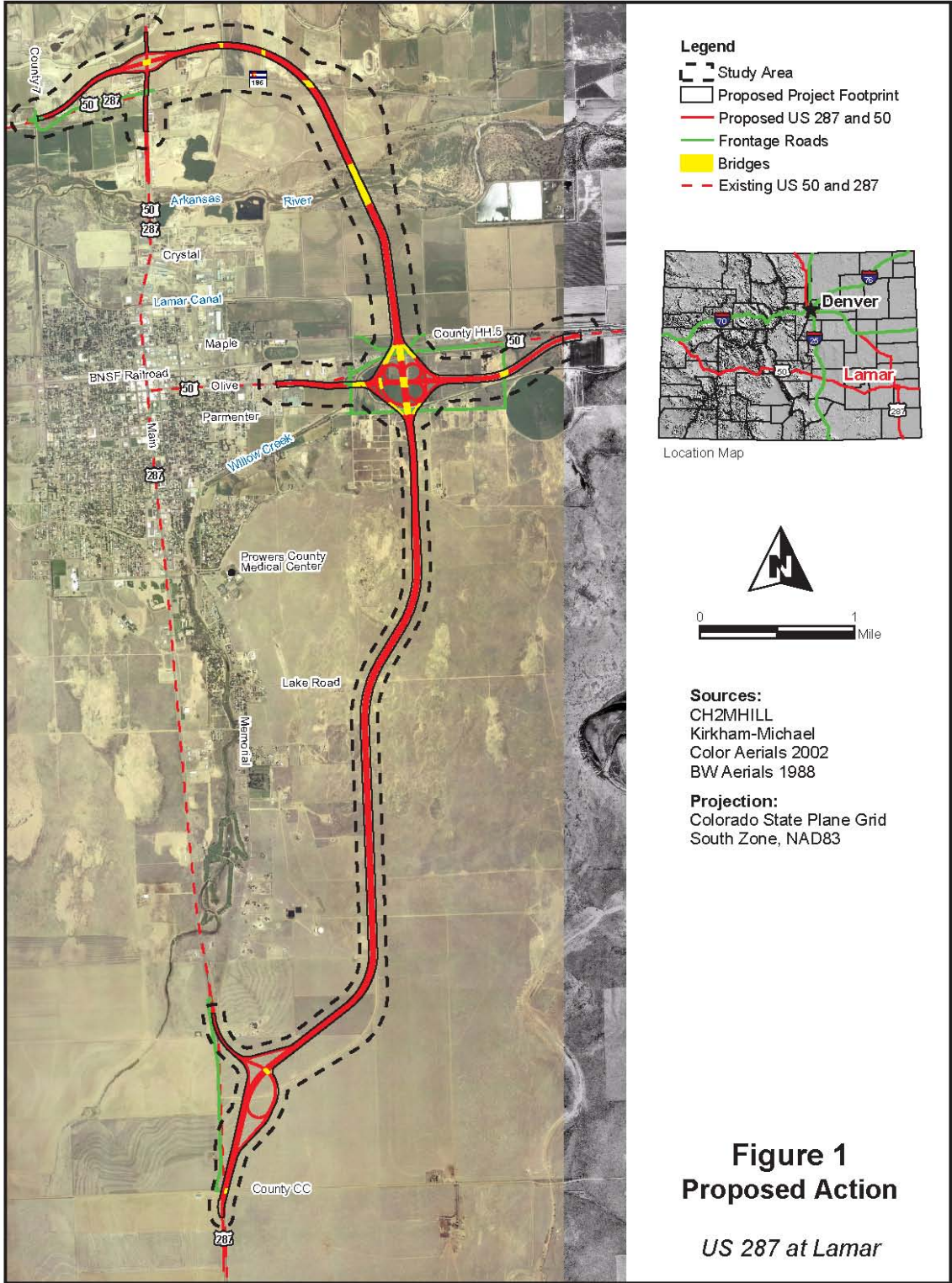
The “study area” in which environmental resources were evaluated is 600 feet wide south of U.S. 50 and 1,200 feet wide north of U.S. 50. The “project footprint” or “preferred alignment” comprises a 300-foot-wide right-of-way, including the features described above, and is illustrated in Figure 1.

US 287 serves as a major north-south corridor through the states of Texas, Colorado, Wyoming and Montana. This route is also part of the North American Free Trade Agreement (NAFTA) providing a key transportation corridor linking Mexico, the United States and Canada. In Lamar, Colorado, US 287 passes through the central business district as main street. Heavy Truck traffic uses this primary route and passes through Lamar causing several safety, air quality, noise and congestion problems. The purpose of this project is to propose a bypass route to the east of Lamar to divert through traffic around the central business district while improving mobility and safety through downtown Lamar.

1.2 Regulatory Requirements

Under the direction of the Clean Air Act Amendments of 1990, the U.S. Environmental Protection Agency (EPA) has established health-based NAAQS for six pollutants. These six “criteria pollutants” are lead (Pb), ozone (O₃), sulfur dioxide (SO₂), oxides of nitrogen (NO_x), carbon monoxide (CO), and particulate matter smaller than 10 microns in diameter (PM₁₀). Based on past Colorado Air Pollution Control Division air quality monitoring data, the project area is designated as being in “attainment” with the NAAQS for lead, sulfur dioxide, oxides of nitrogen, carbon monoxide, ozone, and “attainment-maintenance” for PM₁₀. Designations with respect to the remanded 8-hour ozone standard cannot be made until U.S. Federal Courts make a final determination regarding this standard.

There is ongoing litigation regarding the EPA’s proposed 8-hour ozone standard (which would replace the existing 1-hour standard), and the U.S. Supreme Court has recently directed the EPA to revise this proposed standard. However, since the project area is currently an ozone attainment area, it is anticipated that it will meet whatever standard is eventually implemented.



2.0 Current Conditions

2.1 Meteorology and Climate

The geographical and meteorological characteristics of the study area contribute to the air quality conditions.

US 287 at Lamar is located in Prowers County which is in the Eastern High Plains Air Quality Control Region, in the Arkansas River basin as defined by Air Pollution Control Division.

Based on National Weather Service data the climate is semiarid with average monthly temperatures ranging from -22.8°C (-9.0°F) in January to 43.3°C (110°F) in July, with low relative humidity. The average annual precipitation is 37.6 centimeters (14.8 inches).

2.2 Current Air Quality

The sources of air pollution in the Eastern High Plains Air Quality Control Region include agricultural processes, gravel pits, power plants, and natural gas pipeline compression stations. Because of the region's semiarid nature, fugitive dust from agricultural operation dominates the PM₁₀ emissions in the region.

In November 2001, The Colorado Air Quality Control Commission adopted redesignation plans for the Lamar PM₁₀ non-attainment area. The area has not violated the National Ambient Air Quality Standard for PM₁₀ since 1992. In the 2001 to 2002 period, Lamar had a single-day exceedances of PM₁₀ due to high wind events, but no violations occurred during this period. High wind events are excluded in the compliance determination under the provisions of the "Natural Events Plan for High Win Events in Lamar, Colorado" prepared By the Colorado Department of Public Health and Environment, dated September, 1997.

Currently, motor vehicle exhaust contribute approximately 0.4 percent (56 tons per day) of the total PM₁₀ emissions (12,700 tons per day) in the Lamar area.

3.0 PM₁₀ "Hotspot" Analysis

3.1 PM₁₀ Quantitative "Hot-Spot" Analysis

The requirements for performing a PM₁₀ quantitative "hot-spot" analysis will not take effect until EPA releases modeling guidance on this subject and announces in the Federal Register that these requirements are in effect. EPA has not released its modeling guidance to date, therefore these requirements are not in effect for this project. As a result a quantitative PM₁₀ "hot-spot" analysis will not be conducted for this project.

3.2 PM₁₀ Qualitative "Hot-Spot" Analysis

In September 2001, FHWA issued guidance for completing a project level qualitative PM₁₀ hot spot analysis. The requirement for the analysis on this project is satisfied by the regional PM₁₀ modeling completed for the " PM₁₀ Redesignation Request and Maintenance Plan for the Lamar Area" (Colorado Air Pollution Control Division, November 2001). This plan must provide for the maintenance of the PM₁₀ NAAQS for at least 10 years following redesignation. Modeling completed for the Maintenance Plan demonstrates that the Lamar

Area will not violate Federal PM₁₀ standards through the year 2015. Projected PM₁₀ concentrations for the year 2015 for the Lamar area are 145 micrograms per cubic meter, which is below the federal 24-hour PM₁₀ standard of 150 micrograms per cubic meter.

In October 2002, the EPA made an adequacy determination of the Lamar CO PM₁₀ Maintenance Plan for conformity purposes. The major source of motor vehicle PM₁₀ emissions results from diesel engines. The control measure in the Lamar maintenance plan is stated as follows:

“The Federal Motor Vehicle Emission Control Program (FMVECP) has reduced PM₁₀ emissions through a continuing process of requiring diesel engine manufacturers to produce new vehicles that meet tighter emission standards. As older, higher emitting diesel vehicles are replaced with newer vehicles, PM₁₀ emissions in the Lamar area will be reduced.”

Data provided as part of the Technical Memorandum *Summary of Data Collection, Travel Demand Forecasting Model Development, and Traffic Results for the U.S. 287 at Lamar Project* (CH2M HILL 2003) was used to qualitatively assess the 2025 no-build and preferred alternatives.

The following table presents existing daily traffic volumes and vehicle composition.

TABLE 1
Daily Traffic Volume and Vehicle Mix near the Study Area

Location	Existing 1998 Counts	Percent Cars	Percent Trucks
U.S. 287 south of CO 196 (North Station)	9,000	83	17
U.S. 287 south of Arkansas River	10,200	79	21
U.S. 287 north of U.S. 50	13,400	83	17
U.S. 287 south of U.S. 50	12,900	87	13
U.S. 287 south of Alternate Route(South Station)	2,650	52	48
U.S. 50 east of U.S. 287	6,100	89	11
U.S. 50 east of Alt Route (East Station)	3,000	85	15

Source: *Summary of Data Collection, Travel Demand Forecasting Model Development, and Traffic Results for the U.S. 287 at Lamar Project*, Table 5: Existing Daily Traffic Volumes & Vehicle Composition, CH2M HILL, May 8, 2003.

FOOTNOTES

The truck designation in the report refers to heavy-duty diesel vehicles.

By using a weighted average of vehicle in the Lamar transportation system, it is estimated that diesel vehicles constitute approximately 17 percent of the total daily traffic in the Lamar area.

The traffic modeling results are presented in the following table describing the daily system-wide summary for all vehicles.

TABLE 2
Daily Traffic Volume and Vehicle Mix near the Study Area

System Performance	Vehicle Miles Traveled			Vehicle Hours Traveled		
	Local Roads	Alternate Route	System Wide	Local Roads	Alternate Route	System Wide
Modeled Existing (2002)	69,939	N/A	69,939	2,147	N/A	2,147
Modeled Future (2025) No-Build	82,568	N/A	82,568	2,534	N/A	2,534

Source: *Summary of Data Collection, Travel Demand Forecasting Model Development, and Traffic Results for the U.S. 287 at Lamar Project*, Table 10: Daily System Wide Summary, CH2M HILL, May 8, 2003.

Based on modeled results, the exiting vehicle miles traveled (VMT) by diesel vehicles is estimated to be approximately 11,890 (17 percent of 69,939 vehicle miles traveled). The modeled no-build scenario would increase VMT to 14,037. As stated in the PM₁₀ Redesignation Request and Maintenance Plan for the Lamar Area, conformity will be met and attainment of the NAAQS will be maintained. The modeled preferred alternative scenario projects that diesel vehicle VMT will increase to approximately 14,237. The increase of VMT as a result of the preferred alternative over the no-build scenario is approximately 1.4 percent. This is well within the modeling error of the analysis and can be considered as no significant increase.

In addition, the routing of diesel vehicles on a free-flow highway system will increase the operating speeds over that of having these vehicles travel through the congested streets in the City of Lamar by approximately 3.6 percent. This small increase of speed is within the modeling error of emissions estimation and can be considered as no significant increase to the generation of addition fugitive dust in the area.

As a result, The amount of PM₁₀ emissions from diesel vehicles, and all other affected vehicles will be relatively the same and thus will maintain conformity with the Lamar portion of the Colorado State Implementation Plan.

3.0 Impacts of Construction

The Colorado State Implementation Plan does not identify construction-related fugitive PM₁₀ as a contributor to the particulate problem, therefore the fugitive PM₁₀ emissions associated with highway project construction are not required to be considered in the regional emission analysis.