Air Quality Regional Conformity Analysis
Paul Spur/Douglas
PM10 Nonattainment Area
Cochise County

Prepared by:

Kimley»Horn

Prepared for:
Arizona Department of Transportation

ADOT

November 2023

TABLE OF CONTENTS

1. INTRODUCTION

As the number of vehicles on the nation's roadways increased in the second half of the 20th century, air pollution from mobile sources was identified as an important national health concern. Recognizing this connection, the 1990 Clean Air Act Amendments (CAAAs) and the Arizona Transportation Conformity Rules require transportation plans, transportation improvement programs (TIP), and projects to conform to the purpose of the Arizona State Implementation Plan (SIP). Conformity to a SIP means that planned transportation activities will not produce new air quality violations, worsen existing violations, or delay timely attainment of the national ambient air quality standards (NAAQS). The current federal transportation legislation, the Infrastructure Investment and Jobs Act (IIJA), reinforces the need for coordinated transportation and air quality planning through the metropolitan planning provisions.

The air quality conformity process establishes the connection between transportation planning and emission reductions from transportation sources and is intended to ensure that integrated transportation and air quality planning occurs in areas designated as Nonattainment or Maintenance Areas by the United States Environmental Protection Agency (EPA). A regional emissions analysis must be conducted to assess the impacts that transportation projects will have on emissions within an air quality planning area.

A Nonattainment area is an area that has violated one or more of the National Ambient Air Quality Standards (NAAQS). The Paul Spur/Douglas planning area is currently in nonattainment for large particulates, otherwise known as PM10. This area was designated as a moderate nonattainment area on Oct. 31, 1990 (55 FR 45799). As an isolated rural nonattainment area, the Paul Spur/Douglas planning area is subject to a regional air quality conformity process. Arizona Department of Environmental Quality (ADEQ) is in the process of developing a nonattainment State Implementation Plan (SIP) which will include an emission inventory, modeling demonstration, strategy for Exceptional Events, and requirements for PM10 controls. ADEQ identifies six sources of PM10 for the area – agricultural activities, unpaved roads, cleared areas/vacant lots, open burning and wildfires, windblown dust, and emissions coming across the border from areas outside the U.S. border[1].

The planned Douglas Commercial Port of Entry Connector Road is likely to be classified as regionally significant and is not within a conforming State Improvement Program (SIP). As such, a PM10 regional air quality conformity analysis is required. The purpose of this analysis is to demonstrate that implementation of the project will not worsen PM10 emissions in the Paul Spur/Douglas nonattainment area.

1.1 PM10 Nonattainment Area

The Paul Spur/Douglas PM10 nonattainment area is located along the Mexico-United States Boarder in Cochise County as shown in **Figure 1**. The Paul Spur/Douglas area is in nonattainment for PM10 particulate matter, which is a mix of solid and liquid droplets 10 microns or less in diameter. The Paul Spur/Douglas area was designated as a nonattainment area under the 1987 24-hour PM10 standard, which was retained under the Environmental Protection Agency's (EPA's) 2006 PM National Ambient Air Quality Standards (NAAQS) review (effective December 18, 2006). The baseline year is defined as the most recent year for which EPA's Air Emissions Reporting Rule requires submission of on-road mobile source emissions inventories as of the effective date of designation, which is 2008 for the 2006 PM NAAQS.

[1] https://azdeq.gov/paul-spurdouglas-pm-10-nonattainment-area

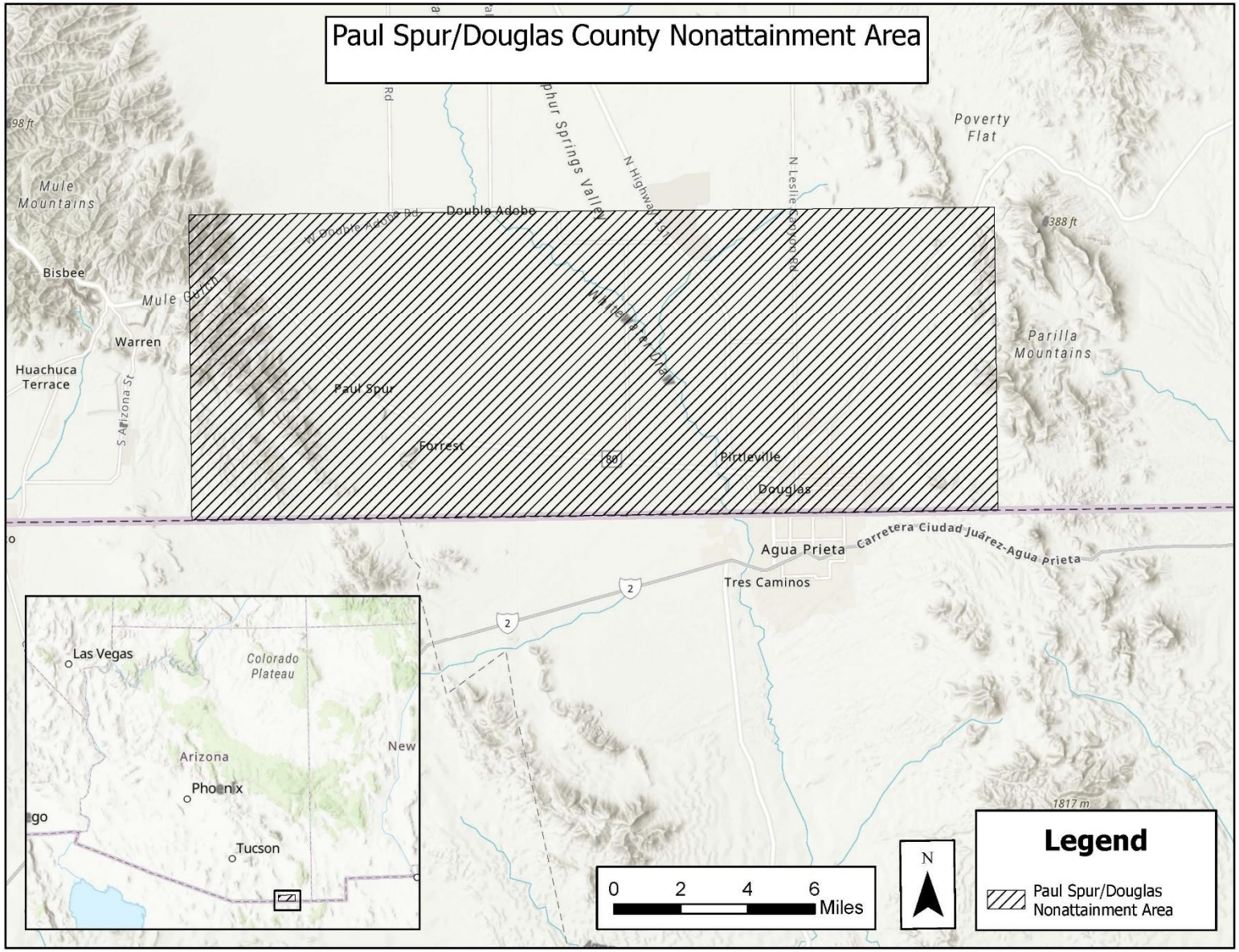

Figure 1. Paul Spur/Douglas Nonattainment Area

2. CONFORMITY OVERVIEW

Regional air quality conformity is most commonly determined by comparing the future year emissions to a motor vehicle emission budget (MVEB) established by the SIP. However, since a SIP has not yet been adopted for this nonattainment area, MVEBs have not yet been established for the area. Therefore, an interim emissions test was performed to demonstrate conformity and meet the air quality requirements for the Paul Spur/Douglas nonattainment area. The no-greater-than-baseline year emissions test was completed to demonstrate regional conformity.

The purpose of this conformity analysis is to demonstrate that the future year "build" emissions are not greater than the emissions from a baseline year for a given standard, referred to as the "no-greater-than-baseline" year, for the Paul Spur/Douglas nonattainment area. If build emissions are found to fall below the baseline emissions, they will not jeopardize the Paul Spur/Douglas region's attainment of the annual NAAQS. The conformity determination has been performed according to procedures prescribed by the following federal, state and local regulations: 69 FR 40004, 40 CFR Parts 51 and 93 (i.e., Transportation Conformity Rule Requirements); Arizona transportation conformity rules; and Planning Assistance and Standards guidance (23 CFR 450) implementing FAST Act and MAP-21 requirements. Results of this conformity determination are found in this report. For this analysis to be found to conform, ADOT must demonstrate that the applicable criteria and procedures have been satisfied (section §93.109-a).

This report documents the process used for the Paul Spur/Douglas regional conformity analysis. EPA's Motor Vehicle Emissions Simulator 3.1 (MOVES3.1[2]) software was used to estimate emissions as required by the EPA[3]. The MOVES input files were created and modified as discussed in the interagency consultation process, with general assumptions and methodology outlined in this chapter. The modeled emissions are based on inputs including temperature, relative humidity, presence of inspection and maintenance programs, vehicle source type mix, vehicle age distribution, average daily vehicle miles traveled (VMT), source type populations, hourly distribution, road type distribution, and average speed distribution.

2.1 Latest Emissions Estimation Model

Mobile source emissions estimates were developed using EPA's Motor Vehicle Emission Simulator, MOVES3.1 (November 2022 Release). According to EPA, MOVES3.1 is a major revision to MOVES2014 and improves upon it in many respects. MOVES3.1 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 MOVES2014. These new emissions data are for light- and heavy-duty vehicles, exhaust and evaporative emissions, and fuel effects. MOVES3.1 also adds updated vehicle sales, population, age distribution, and VMT data. In the MOVES3 Mobile Source Emissions Model Questions and Answers[4] the EPA states that for on-road emissions, MOVES3.1 updated heavy-duty (HD) diesel and compressed natural gas (CNG) emission running rates and updated HD gasoline emission rates. MOVES3.1 updated light-duty (LD) emission rates for hydrocarbon (HC), carbon monoxide (CO), and nitrogen oxide (NOx) and updated light-duty (LD) particulate matter rates, incorporating new data on Gasoline Direct Injection (GDI) vehicles.

[2] https://www.epa.gov/moves/moves-versions-limited-current-use

[3] MOVES3 Technical Guidance: Using MOVES to Prepare Emission Inventories for State Implementation Plans and Transportation Conformity, November 2020.

[4] EPA Releases MOVES3 Mobile Source Emissions Model - Questions and Answers (EPA-420-F-20-050), November 2020.

EPA approved MOVES4 in September 2023 with a two-year grace period extending until September 2025. This analysis was initiated prior to the release of MOVES4. Therefore, this regional conformity analysis was conducted using MOVES3.1.

2.3 Interagency Consultation and Public Participation

Interagency consultation (IAC) is the central coordinating mechanism for public agency involvement and input to the conformity determination. The conformity determination must be made according to 40 CFR §93.105-(a)-(2) and (e) and the requirements of 23 CFR 450 (40 CFR §93.112, Criteria and Procedures).

ADOT coordinated its activities for this conformity determination with numerous stakeholders and review agencies, including ADEQ, FHWA, EPA, local jurisdictions, and other necessary agencies. ADOT held teleconference calls and email correspondence to discuss the issues pertinent to the Paul Spur/Douglas Regional Conformity Demonstration, such as use of the latest planning assumptions. The meetings that were held and scheduled are listed below:

- IAC Kick-Off Meeting – May 8, 2023
- IAC Methodology Meeting – June 22, 2023
- IAC Methodology Meeting – August 21, 2023
- IAC Report Review – To be scheduled in November/December 2023

2.4 Conformity Test

The conformity tests specified in the federal transportation conformity rule are: (1) the emissions budget test, and (2) the interim emissions test. For the emissions budget test, predicted emissions for the TIP/RTP must be less than or equal to the motor vehicle emissions budget (MVEB) specified in the approved air quality implementation plan or the emissions budget found to be adequate for transportation conformity purposes. If there is no approved air quality plan for a pollutant for which the region is in nonattainment or no emission budget has been found to be adequate for transportation conformity purposes, the interim emissions reduction test applies.

Since a budget has not been established for the Paul/Spur Douglas area the interim emission reduction test, known as the no-greater-than-baseline test, was applied. The baseline year is defined as the most recent year for which EPA's Air Emissions Reporting Rule requires submission of on-road mobile source emissions inventories as of the effective date of designation, which is 2008 for the 2006 PM10 NAAQS.

3. METHODOLOGY

The emissions inventory development and emissions projection discussion below identify procedures used by the ADOT to obtain emissions for the PM10 nonattainment area. A pre-consensus memorandum was developed and discussed during the interagency consultation coordination outlining the model assumptions and data sources. A copy of the updated pre-consensus memorandum can be found in **Appendix A**. The pre-consensus memorandum outlines the approach taken for data sources for the conformity demonstration.

3.1 Mobile Source Emissions

3.1.1 Runspec Parameters

Table 1 summarizes the settings used in the MOVES run specification file for PM10, respectively.

Table 1 – PM10 MOVES Runspec Parameters	
MOVES Runspec Parameter	**Settings**
MOVES3.1 Version	Database version 2022/10/07
Scale	County, Inventory
Time Span	Years: 2008, 2028, 2035, 2040, and 2050 Time aggregation: Hour All Months All hours of the day selected Weekdays only
Geographic Bounds	Arizona – Cochise County
Vehicles/Equipment	All available fuel types All available source types
Road Type	All road types including off-network
Pollutants and Processes	Pollutants: PM10 and any additional pre-requisites All Processes
General Output	Units: grams, joules, miles Activity: Distance Traveled, Population
Output Emissions	Time = hour, location = county
Advanced Features	None

3.1.2 County Data Manager

Once all of the base parameters have been established for a given MOVES Runspec, the County Data Manager can be used to enter locally-specific data. Input provided in Excel spreadsheet format can be referenced using this tool, which converts the data to MySQL format and incorporates it into the MOVES analysis. For this analysis, locally-specific data could consist of data used for the entire region, statewide, or county-level data. Default data refers to data extracted from the most up to date available MOVES program (MOVES3.1) for each scenario being modeled. The methodology used for each input contained within the MOVES County Data Manager is detailed below.

3.1.2.1 Source Type Population

MOVES divides the vehicle population into 13 vehicle types to calculate start and evaporative emissions. 2008 and 2020 source type (vehicle type) population information for Cochise County was obtained from Arizona Motor Vehicle Division (MVD) reports, provided by ADOT. Source type population for the County was adjusted to the nonattainment area using a ratio proportionate to HPMS VMT (provided by ADEQ) for the County and nonattainment area. This initial population contained a low level of long-haul combination trucks. Since the International Port of Entry Connector Road will connect a commercial port of entry to the existing roadway network, the source type population for long-haul combination trucks was adjusted to account for additional truck traffic in the nonattainment area consistent with the approved traffic analysis. The growth rate developed within the City of Douglas International Port of Entry Connector Road

Final Traffic Report was applied linearly to the 2020 source type in order to develop future years. **Table 2** below shows the nonattainment area source type population by analysis year.

Table 2 – Nonattainment Area Source Type Population by Analysis Year					
Source Type ID	**Analysis Year**				
	2008	**2028**	**2035**	**2040**	**2050**
11	431	563	647	714	871
21	6,278	7,887	9,060	10,003	12,194
31	5,620	7,061	8,110	8,954	10,915
32	658	827	950	1,048	1,278
41	9	14	17	18	22
42	3	5	5	6	7
43	16	20	24	26	32
51	18	13	15	17	21
52	1,495	1,884	2,164	2,389	2,913
53	66	83	95	105	128
54	205	187	215	237	289
61	110	113	130	138	155
62	316	418	482	510	572

3.1.2.2 Age Distribution

MOVES requires each of the 13 source types (vehicle types) to have an age distribution to break down the population from new vehicles to 30+ year-old vehicles. July 2008 and January 2020 vehicle registration data for Cochise County were obtained from Motor Vehicle Division (MVD) reports, furnished by ADOT. EPA's age distribution forecasting tool was used to create age distribution files for each future analysis year from the 2020 age distribution.

3.1.2.3 Meteorology

MOVES requires temperature and relative humidity information to calculate emissions rates. Local meteorological data for all months was obtained from the National Centers for Environmental Information (NCEI) website developed by the National Oceanic and Atmospheric Administration (NOAA). Meteorological information collected at the Douglas-Bisbee International Airport was selected based on available data. Historical meteorological data from 2008 was used for the 2008 analysis year. The most recent full year of data at the airport was found to be 2019 and was used for all future analysis years.

3.1.2.4 Vehicle Type VMT

The daily VMT by vehicle type for the nonattainment area was obtained from ADOT's HPMS data for 2022. HPMS data is broken down into three (3) categories: total/all vehicles, single unit, and combination unit trucks. A passenger vehicles category was developed by subtracting both the single and combination unit VMT from the total VMT. This data was allocated to the 13 MOVES source types through a mapping process using default

distributions from county-level MOVES runs. According to MOVES technical guidance, it is possible to calculate the local source type population or local VMT by using the following ratio:

$$\frac{Local\ VMT}{Local\ Population} = \frac{Default\ VMT}{Default\ Population}$$

where default VMT and default population were determined through default MOVES County runs[5] for Cochise County and County population was provided by ADOT. This County-level VMT break down was converted to distributions of the three HPMS vehicle categories. These distributions were applied to the HPMS VMT totals for the nonattainment area to calculate VMT by each MOVES source type. MOVES requires VMT to be in input by HPMS vehicle type. The mapping of MOVES source type to HPMS vehicle type is shown in **Table 3**.

Table 3 - Source Type and HPMS Vehicle Type

Source Type ID	Source Type	HPMS Vehicle Type ID	HPMS Vehicle Types
11	Motorcycle	10	Motorcycles
21	Passenger Car	25	Light Duty Vehicles
31	Passenger Truck		
32	Light Commercial Truck		
41	Intercity Bus	40	Buses
42	Transit Bus		
43	School Bus		
51	Refuse Truck	50	Single Unit Trucks
52	Single Unit Short-haul Truck		
53	Single Unit Long-haul Truck		
54	Motor Home		
61	Combination Short-haul Truck	60	Combination Trucks
62	Combination Long-haul Truck		

Future year VMT was obtained by first generating annual growth rates for background traffic in the nonattainment area from information contained within the City of Douglas International Port of Entry Connector Road Final Traffic Report and applying those growth rates to the 2022 VMT. Additional VMT growth due to the Port of Entry Connector Road and adjacent land uses was added to each analysis year to remain consistent with VMT developed in the Traffic Report. EPA's AADVMT Converter tool was used to convert daily VMT to yearly VMT for each analysis year. **Table 4** summarizes the Yearly VMT for PM10 by analysis year.

Table 4 – Yearly VMT by Analysis Year and Nonattainment Area

	Analysis Year				
	2008	**2028**	**2035**	**2040**	**2050**
Yearly VMT PM10	114,302,480	164,227,431	198,192,340	224,085,403	281,513,342

[5] https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1010LY2.pdf

3.1.2.5 Monthly/Daily/Hourly VMT Fractions

Vehicle speeds and volumes vary depending on the time of day, type of day, and time of year. Monthly, daily, and hourly VMT fractions are required by MOVES to break down the yearly Vehicle Type VMT input file to various time periods. Locally available data sources do not provide information that allows for the generation of VMT by month, day, or time of day. Discussions with ADOT considered surrogate data sources elsewhere in the state but determined that these sources were not of sufficient quality to use for the Paul Spur/Douglas nonattainment area. As a result, national default data from MOVES was used for monthly, daily, and hourly VMT fractional distributions by roadway type and vehicle type.

3.1.2.6 Average Speed Distribution

MOVES separates vehicle speed information into 16 average speed bins by road type, source type, and hour of the day. Each bin represents a five (5) mile per hour (mph) range of speeds. MOVES uses average speed distribution information to calculate operating mode distributions and determine emission rates. Detailed speed data is not available at a regional or state level so default speed data from MOVES for Cochise County was used for all analysis years.

3.1.2.7 Road Type Distribution

VMT distributions vary between different road types, which impacts the level of emissions from vehicles on each facility. MOVES recognizes five (5) roadway types: Off-Network (related to parking and refueling vehicles), Rural Restricted Access, Rural Unrestricted Access, Urban Restricted Access, and Urban Unrestricted Access. MOVES requires a VMT fraction for each of the roadway types by source type. ADOT HPMS data was used to determine the most current road type distribution for year 2022 for the nonattainment area. Detailed historical data was not available, so the 2022 road type distribution was used for the 2008 analysis year. Based on the future volume and VMT growth assumptions for 2028 and 2050 contained in the City of Douglas International Port of Entry Connector Road Final Traffic Report, a different road type distribution was developed for each future analysis year.

3.1.2.8 Fuel

In MOVES, fuel information is broken down into four inputs: Fuel Supply, Fuel Formulation, Fuel Usage Fraction, and AVFT (fuel type and vehicle technology). There is no locally available fuels data for the Paul Spur/Douglas nonattainment area. Default fuel data from MOVES for Cochise County was used.

3.1.2.9 Inspection/Maintenance (I/M) Program

No inspection/maintenance programs exist in the nonattainment area of Cochise County. This is assumed to continue in the future.

3.1.2.10 Starts

Starts is an optional input that is only used if local information is available for vehicle start activity. No local data is available, so this input was not used. When no local information is provided, MOVES calculates start activity based on source type population and default vehicle activity assumptions.

3.1.2.11 Hoteling

Hoteling is an optional input that is only used if local information is available for long-haul combination truck hoteling activity. No local data is available, so this input was not used. When no local information is provided, MOVES calculates hoteling activity based on long-haul combination truck VMT on restricted access roads.

3.1.2.12 Idle

Idle is an optional input that is only used if local information is available for off-network idle activity. This off-network idle is not related to combination truck hoteling activity. No local data is available, so this input was not used. When no local information is provided, MOVES default information is used.

3.1.2.13 Retrofit Data

Retrofit Data is an optional input that is only used if there are local heavy-duty diesel retrofit and/or replacement programs in use. No retrofit programs currently exist in the nonattainment area and this is assumed to continue in the future.

4. PM10 ANALYSIS

The following sections outline the analysis components and results of the PM10 conformity demonstration.

4.1 Paved and Unpaved Road Dust

The primary contributor to PM10 emissions in the Paul Spur/Douglas - area is road dust from paved and unpaved roads. Emissions for road dust are calculated using the AP-42[6]. The *AP-42, Compilation of Air Pollutant Emission Factors*, has been published since 1972 as the primary compilation of EPA's emission factor information. This document, currently in its fifth edition, contains guidance on how to determine PM10 road dust emissions from both paved and unpaved roads in Chapter 13, Sections 13.2.1 (updated January 2011) and 13.2.2 (updated November 2006) respectively. The methodology for determining paved and unpaved road dust emissions was determined following consultation with the FHWA Resource Center.

4.1.1 Paved Roadways

Emissions for paved road dust were estimated for Cochise County using the 2020 NEI and were then distributed to the nonattainment area based on population. According to the 2020 NEI, paved road dust emissions can be calculated at the county level by multiplying VMT per road type and the appropriate emissions factor as described in AP-42, which can be determined using the following equation:

$$E = k(sL)^{0.91} \times W^{1.02}$$

where:

E = particulate emission factor (having units matching the units of k),
k = particle size multiplier for particle size range and units of interest (1.00 for PM10 and units of g/VMT),
sL = road surface silt loading (grams per square meter) (g/m^2), and
W = average weight (tons) of the vehicles traveling the road.

[6] https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emission-factors

The 2020 NEI contains tables that list the appropriate values for each variable in the equation above. The value of silt loading is based on road type and average daily traffic volumes. The average vehicle weights for each county by road type were estimated based on the VMT by each vehicle type, total county VMT for all vehicle types, and the average vehicle type mass within EPA's MOVES software. Control factors were applied to the emissions factor based on the assumed control measure of vacuum sweeping of paved roads twice per month. Because the area is considered a moderate nonattainment area, the control factors were only applied to urban roads. A meteorological adjustment was also applied in the NEI to account for the reduction in road dust emissions from precipitation and other meteorological factors.

4.1.2 Unpaved Roadways

Emissions estimates for unpaved road dust in the nonattainment area were developed using the 2020 NEI for Cochise County and recent rural population estimates and forecasts. County-level unpaved road dust emissions per roadway type were developed by multiplying annual unpaved road VMT estimates by an AP-42 emissions factor. This emissions factor was calculated using the following equation from AP-42:

$$E = \frac{k\left(\frac{s}{12}\right)^{a}\left(\frac{S}{30}\right)^{d}}{\left(\frac{M}{0.5}\right)^{c}} - C$$

where:

E = size-specific emission factor (lb/VMT), calculated for each of nine unpaved roadway types
k = empirical constant = 1.8 lb/VMT; from AP-42
a = empirical constant = 1; from AP-42
d = empirical constant = 0.5; from AP-42
c = empirical constant = 0.2; from AP-42
s = surface material silt content (%) = 3.0%; average state value based on samples taken as part of the 1985 NAPAP Inventory (AZ is on this table twice and has values of either 3.0% or 3.9%, NEI section 24, table 24-3)
M = surface material moisture content (%) = 0.5% (conservative national default value used for the NEI)
S = mean vehicle speed (mph) = range between 39 miles per hour (mph) and 20 mph based on roadway type
C = 0.00047 lb/VMT; PM10 emission factor for 1980s vehicle fleet exhaust, brake wear, and tire wear

As in the paved road emissions methodology, controls were only applied to urban roads due to the area being denoted as a moderate nonattainment area. The control factor listed in the NEI for unpaved roads is assumed to be paving of the road. A meteorological adjustment was also applied to the unpaved road emissions to account for the reduction in emissions from precipitation and other meteorological events.

Annual unpaved road VMT by roadway type were first estimated at the state-level based on Federal Highway Administration (FHWA) data on unpaved road lengths by road type and annual average daily traffic (AADT). State-level VMT estimates were then allocated to Cochise County based on a ratio of rural population in the county to the state per the 2020 U.S. Census. For this analysis county-level emissions were apportioned to the nonattainment area through the same ratio of nonattainment area population to county population as in the paved roadways analysis.

2020 nonattainment area emissions were forecast to each analysis year using county-wide population growth estimates developed using forecasts provided by the Arizona Department of Administration, Employment and Population Statistics, Office of Economic Opportunity.

Additional adjustment was not included related to the proposed project for paving a portion of an unpaved road, because of the low project level volume that exists on the roadway today is negligible related to the regional analysis.

4.1.3 Construction Dust

Based on the 2020 National Emissions Inventory, Technical Support Document March 2023[7], PM10 impacts due to road construction can be determined and applied to account for the new project. Initial PM10 emissions from construction of roads are calculated using an emission factor of 0.42 tons/acre-month. This emission factor represents the large amount of dirt moved during the construction of roadways, reflecting the high level of cut and fill activity that occurs at road construction sites. The duration of construction activity for road construction is assumed to be 12 months. Regional variances in construction emissions are corrected using soil moisture level and silt content. These correction parameters are applied to initial PM10 emissions from road construction to develop the final emissions inventory.

PM10 emissions were weighted using 30-year average precipitation-evaporation (PE) values from Thornthwaite's PE Index to correct for soil moisture level. Average precipitation evaporation values for each State were estimated based on PE values for specific climatic divisions within Arizona. PM10 emissions were weighted using average silt content for Cochise County to account for silt content. EPA uses the National Cooperative Soil Survey Microsoft Access Soil Characterization Database to develop county-level average silt content values for surface soil. This database contains information from the National Cooperative Soil Survey Laboratories. The equation for the PM10 emissions factor corrected for soil moisture and silt content is:

$$EF_{PM10,C} = EF_{PM10} \times \frac{24}{PE_S} \times \frac{S_C}{9\%}$$

where:

$EF_{PM10,C}$ = PM10 emissions factor corrected for soil moisture and silt content
EF_{PM10} = Initial PM10 emissions factor for road construction, 0.42 tons/acre-month
PE_S = precipitation-evaporation value for each State
S_C = % dry silt content in soil for county being inventoried.

Construction of the Douglas Commercial Port of Entry Connector Road will begin in 2025 and will be completed in 2026. Therefore, there are no PM10 emissions associated with construction of the Connector Road in 2028 or any of the other analysis years. .

4.1.4 Methods for Adjustment to Nonattainment Area

As described above the unpaved roadway dust, paved roadway dust and construction dust was obtained from the NEI for Cochise County for the year 2008 and 2020. County-wide population growth estimates developed using forecasts provided by the Arizona Department of Administration, Employment and Population Statistics, Office of Economic Opportunity was used to project the 2020 values to the analysis years. Census track data related to the County and to the nonattainment area was used to proportionately adjust the unpaved, paved and construction dust from the County level to the nonattainment area.

[7] https://www.epa.gov/system/files/documents/2023-03/NEI2020_TSD_Section21_Dust_Construction_NonResidential.pdf

4.2 Total PM10 Emissions

Emissions from all processes were combined to estimate the overall impact of on-road mobile sources on PM10 levels in the Paul Spur/Douglas nonattainment area. **Table 5** and **Figure 2** show these emissions for all analysis years, along with the values used to calculate paved road dust emissions.

Table 5 – Paul Spur/Douglas Particulate Matter (PM10) Conformity Analysis

Source	2008	2028	2035	2040	2050
	(Tons/Year)				
Unpaved Road Dust	704.92	192.18	194.05	202.38	196.61
Paved Road Dust	234.52	27.14	27.40	28.58	27.77
Road Construction Dust	198.29	6.71	6.78	7.07	6.87
On-Road Emissions (exhaust, brake, and tire wear included)	17.93	11.17	12.79	14.18	17.81
Total	**1155.66**	**237.20**	**241.02**	**252.21**	**249.05**

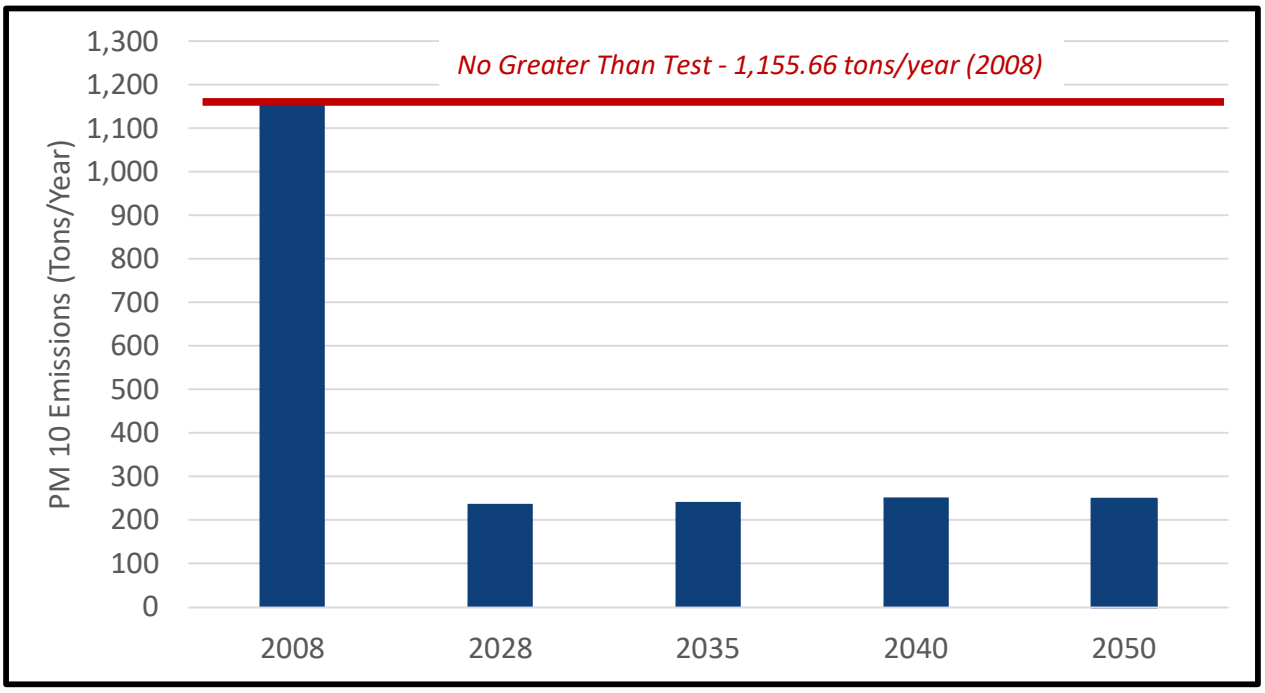

Figure 2. Interim PM10 Emissions Test

5. CONFORMITY DETERMINATION

The analysis indicates that the projected emissions levels for the Paul Spur/Douglas nonattainment area meet the applicable conformity tests with the planned Douglas Commercial Port of Entry Connector Road project. Therefore, it is the determination of this analysis that this plan conforms under the 24-hour PM10 National Ambient Air Quality Standards (NAAQS).

Kimley»Horn

Pre-Consensus Memorandum

To:	Beverly Chenausky, Arizona Department of Transportation (ADOT)
From:	Allison Fluitt, P.E., AICP Kimley-Horn and Associates, Inc.
Date:	June 2, 2023; Updated September 7, 2023
Subject:	Douglas Non-Attainment Area Air Quality Conformity Pre-Consensus Memorandum

Background

The purpose of this memo is to detail the assumptions and procedures that will be used in the regional air quality conformity analysis for the Paul Spur/Douglas planning area in Cochise County, Arizona. The Paul Spur/Douglas planning area is currently in non-attainment for large particulates, otherwise known as PM10. This area was designated as a moderate non-attainment area on Oct. 31, 1990 (55 FR 45799). As an isolated rural non-attainment area, the Paul Spur/Douglas planning area is subject to a regional air quality conformity process. The planned Douglas Commercial Port of Entry Connector Road is likely to be classified as regionally significant and is not within a conforming Transportation Improvement Program (TIP). As such, a PM10 regional air quality conformity analysis will be required to complete this project.

Conformity Test

Regional air quality conformity is most commonly determined by comparing the future year emissions to a motor vehicle emission budget (MVEB) established by the State Implementation Plan (SIP). However, if an area does not have an approved MVEB, an interim emissions test may be performed to determine conformity. The two types of interim emissions tests consist of:

- Demonstrating that future year “build” emissions (representing projects included within a TIP or LRTP) are not greater than emissions from a baseline “no-build” scenario, referred to as a “build/no-build” test.
- Demonstrating that the future year “build” emissions are not greater than the emissions from a baseline year for a given standard, referred to as the “no greater than” test.

At this time, the Paul Spur/Douglas PM10 area does not have an approved MVEB, meaning than an interim conformity test will be used. Specifically, the no-greater-than-baseline year emissions test is proposed to be used to demonstrate regional conformity. The Douglas area was designated as a non-attainment area under the 1987 24-hour PM10 standard, which was retained under the Environmental Protection Agency’s (EPA’s) 2006 PM National Ambient Air Quality Standards (NAAQS) review (effective December 18, 2006). The baseline year is defined as the most recent year for which EPA’s

Air Emissions Reporting Rule requires submission of on-road mobile source emissions inventories as of the effective date of designation, which is 2008 for the 2006 PM NAAQS. The PM10 non-attainment area is shown in **Figure 1**.

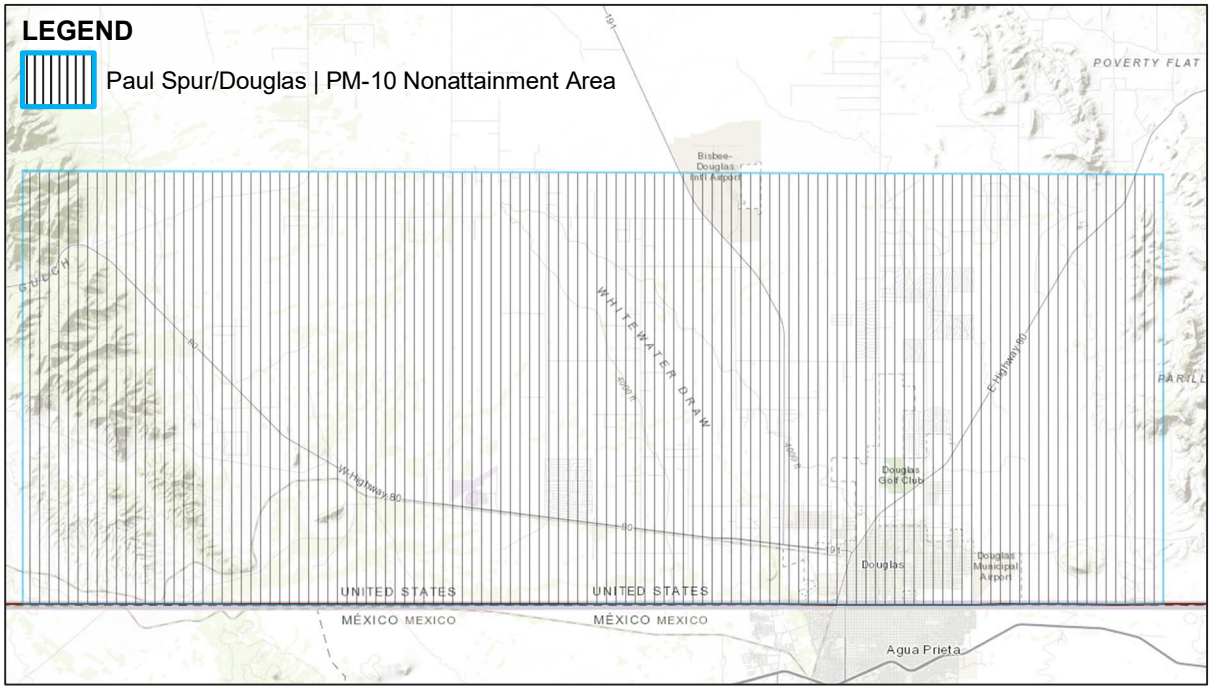

Figure 1. PM10 Non-Attainment Area (AZDEQ)[1]

The planning horizon years were identified based on correspondence with the Interagency Consultation Group on August 21, 2023. These years are 2028, 2035, 2040, and 2050.

On-Road Emissions

The on-road PM10 emissions will be modeled using EPA's Motor Vehicle Emissions Simulator 3.1 (MOVES3.1) software. Several parameters have been identified for use in the preparation of this analysis. The parameters listed below will be applied in the base MOVES3.1 setup:

- Description
  - Use this to document the purpose of each run (e.g., "base year, "2008 No-build", etc.)

[1] https://azdeq.gov/node/3943

- Scale
  - Domain/Scale: County
  - Calculation Type: Inventory

- Time Span:
  - Years: 2008, 2028, 2035, 2040, and 2050
  - Months:
    - PM 10: All Months
  - Days: Weekdays
  - Hours: All Hours

- Geographic Bounds: Arizona – Cochise County

- Vehicles/Equipment
  - All Available Fuel Types
    - Compressed Natural Gas (CNG)
    - Diesel Fuel
    - Electricity
    - Ethanol (E85)
    - Gasoline
  - All Available Source Types
    - Combination Long-haul Truck
    - Combination Short-haul Truck
    - Intercity Bus
    - Light Commercial Truck
    - Motor Home
    - Motorcycle
    - Passenger Car
    - Passenger Truck
    - Refuse Truck
    - School Bus
    - Single Unit Long-haul Truck
    - Single Unity Short-haul Truck
    - Transit Bus
- Road Type
  - All road types including off-network

- Pollutants and Processes:
  - Pollutants:
    - PM10, and any additional pre-requisites.
  - Processes: All processes

- General Output:
  - Mass Units: Grams

- Energy Units: Joules
- Distance Units: Miles
- Activity: Distance Traveled, Population

The following assumptions will be applied within the County Data Manager portion of the MOVES3.1 software package. Each parameter is identified, along with the source data that will be applied (if applicable). Due to the rural nature of the Paul Spur/Douglas non-attainment area, local data is not readily available for all input files. Where local data is unavailable, more detail is provided for the data sources being used for the affected input areas.

- Age Distribution: January 2008, July 2008, and January 2020 vehicle registration data for the Douglas area will be obtained from Motor Vehicle Division (MVD) reports, furnished by ADOT. EPA's age distribution forecasting tool will be used to create age distribution files for each analysis year.

- Source Type Population: 2008 and 2020 source type population information will be obtained for the Douglas area from MVD reports, furnished by ADOT. Future year growth will be obtained by determining annual growth rates in Vehicle Miles Traveled (VMT) generated from information contained within the City of Douglas International Port of Entry Connector Road Final Traffic Report, and then applying those growth rates to the source type population data for each study year.

- Meteorology Data: Local meteorological data for all months will be obtained from the National Centers for Environmental Information (NCEI) website developed by the National Oceanic and Atmospheric Administration (NOAA).

- Inspection/Maintenance (I/M) Programs: No I/M program information will be applied

- Vehicle Type VMT (Highway Performance Monitoring System [HPMS]): The daily VMT by vehicle type for Cochise County will be obtained from ADOT. The ADOT Statewide Travel Demand Model (TDM) will be used to factor the County VMT within the Paul Spur/Douglas planning area. Future year VMT will be obtained by generating annual growth rates from information contained within the City of Douglas International Port of Entry Connector Road Final Traffic Report.

- Hourly VMT Fraction: Locally available data sources do not provide information that allows for the generation of VMT by time of day. Discussions with ADOT considered surrogate data sources elsewhere in the state but determined that these sources were not of sufficient quality to use for the Douglas area. As a result, default data will be used for hourly VMT fractional distributions by roadway type and vehicle type (Default data is extracted from the most up to date available MOVES program (MOVES3.1)).

- Fuels: There is no locally available fuels data for the Douglas area. Default data is extracted from the most up to date available MOVES program (MOVES3.1).

- Road Type Distribution: County-wide HPMS data will be used to determine the road type distribution.
- Average Speed Distribution: Default data will be used because more detailed data is not available at a regional or state level (Default data is extracted from the most up to date available MOVES program (MOVES3.1)).
- Starts: No input necessary
- Hoteling: No input necessary

Paved and Unpaved Road Dust

The primary contributor to PM10 emissions in the Paul Spur/Douglas nonattainment area is road dust from paved and unpaved roads. Emissions for road dust were calculated using the AP-42[2]. The *AP-42, Compilation of Air Pollutant Emission Factors*, has been published since 1972 as the primary compilation of EPA's emission factor information. This document, currently in its fifth edition, contains guidance on how to determine PM10 road dust emissions from both paved and unpaved roads. The methodology for determining paved and unpaved road dust emissions will be confirmed following consultation with IAC.

Paved Roadways

Emissions for paved road dust were estimated for Cochise County using the 2020 NEI and were then distributed to the non-attainment area using a population comparison. According to the 2020 NEI, paved road dust emissions can be calculated at the county level by multiplying VMT per road type and the appropriate emissions factor as described in AP-42, which can be determined using the following equation:

$$E = k(sL)^{0.91} \times W^{1.02}$$

where:

E = particulate emission factor (having units matching the units of k),

k = particle size multiplier for particle size range and units of interest (1.00 for PM10 and units of g/VMT),

sL = road surface silt loading (grams per square meter) (g/m^2), and

W = average weight (tons) of the vehicles traveling the road.

[2] https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emission-factors

The 2020 NEI contains tables that list the appropriate values for each variable in the equation above. The value of silt loading is based on road type and average daily traffic volumes. The average vehicle weights for each county by road type were estimated based on the VMT by each vehicle type, total county VMT for all vehicle types, and the average vehicle type mass within EPA's MOVES software. Control factors were applied to the emissions factor based on the assumed control measure of vacuum sweeping of paved roads twice per month. Because the area is considered a moderate non-attainment area, the control factors were only applied to urban roads. A meteorological adjustment was also applied in the NEI to account for the reduction in road dust emissions from precipitation and other meteorological factors.

County-level emissions were apportioned to the non-attainment area through a comparison of non-attainment area population to county population. Methodology for determining the non-attainment area population will be confirmed through consultation with the Interagency Consultation (IAC) Group.

2020 non-attainment area emissions were forecast to each analysis year using county-wide population growth estimates developed using forecasts provided by the Arizona Department of Administration, Employment and Population Statistics, Office of Economic Opportunity.

Unpaved Roadways

Emissions estimates for unpaved road dust in the non-attainment area were developed using the 2020 NEI for Cochise County and recent rural population estimates and forecasts. County-level unpaved road dust emissions per roadway type were developed by multiplying annual unpaved road VMT estimates by an AP-42 emissions factor. This emissions factor was calculated using the following equation from AP-42:

$$E = \frac{k\left(\frac{s}{12}\right)^{a}\left(\frac{S}{30}\right)^{d}}{\left(\frac{M}{0.5}\right)^{c}} - C$$

where:

E = size-specific emission factor (lb/VMT), calculated for each of nine unpaved roadway types

k = empirical constant = 1.8 lb/VMT; from AP-42

a = empirical constant = 1; from AP-42

d = empirical constant = 0.5; from AP-42

c = empirical constant = 0.2; from AP-42

s = surface material silt content (%) = 3.0%; average state value based on samples taken as part of the 1985 NAPAP Inventory (AZ is on this table twice and has values of either 3.0% or 3.9%, NEI section 24, table 24-3)

M = surface material moisture content (%) = 0.5% (conservative national default value used for the NEI)

S = mean vehicle speed (mph) = range between 39 miles per hour (mph) and 20 mph based on roadway type

C = 0.00047 lb/VMT; PM10 emission factor for 1980s vehicle fleet exhaust, brake wear, and tire wear

As in the paved road emissions methodology, controls were only applied to urban roads due to the area being denoted as a moderate non-attainment area. The control factor listed in the NEI for unpaved roads is assumed to be paving of the road. A meteorological adjustment was also applied to the unpaved road emissions to account for the reduction in emissions from precipitation and other meteorological events.

Annual unpaved road VMT by roadway type were first estimated at the state-level based on Federal Highway Administration (FHWA) data on unpaved road lengths by road type and annual average daily traffic (AADT). State-level VMT estimates were then allocated to Cochise County based on a ratio of rural population in the county to the state per the 2020 U.S. Census. Non-attainment area VMT estimates were developed using the same ratio of non-attainment area population to county population as in the paved roadways analysis.

2020 non-attainment area emissions were forecast to each analysis year using county-wide population growth estimates developed using forecasts provided by the Arizona Department of Administration, Employment and Population Statistics, Office of Economic Opportunity.

Documentation

Documentation of the air quality conformity analysis will be prepared as a stand-alone deliverable. Following the conclusion of the analysis and preparation of documentation, these materials will be presented to the IAC group for review. Feedback received during this process will be incorporated as needed into the analysis and final documentation.