



Environmental Planning

Draft Air Quality Regional Conformity Analysis: Nogales PM_{2.5}/PM₁₀ Nonattainment Area

I-19 Frontage Road; Ruby Road – Rio Rico Drive Project

ADOT Project No. 0000 SC SSC T0558 01D

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The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by ADOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated June 25, 2024, and executed by FHWA and ADOT.

Contents

1	Introduction.....	1
1.1	PM _{2.5} Nonattainment Area	1
1.2	PM ₁₀ Nonattainment Area	3
2	Conformity Overview	4
2.1	Latest Emissions Estimation Model	4
2.2	Interagency Consultation and Public Participation.....	4
2.3	Conformity Test	5
3	Methodology	5
3.1	Mobile Source Emissions	5
3.1.1	Runspec Parameters.....	5
3.1.2	County Data Manager	6
4	PM ₁₀ and PM _{2.5} Emissions Analysis.....	11
4.1	Paved and Unpaved Road Dust.....	11
4.1.1	Paved Roadways	11
4.1.2	Unpaved Roadways	12
4.1.3	Road Dust Emission Results.....	13
4.2	Total PM ₁₀ Emissions	14
4.3	Total PM _{2.5} Emissions	14
4.4	Total NO _x Emissions	15
5	Conformity Determination.....	15
	References.....	16
	Appendix A Pre-Consensus Memorandum.....	17

Tables

Table 1.	2032 Nogales PM _{2.5} Motor Vehicle Emissions Budget	2
Table 2.	2011 Nogales PM ₁₀ Motor Vehicle Emissions Budget	3
Table 3.	Runspec Parameters	6
Table 4.	MOVES Source Type to HPMS Vehicle Type Crosswalk.....	7
Table 5.	AADVMT by HPMS Vehicle Category and Analysis Year	8
Table 6.	Source Type Population.....	8
Table 7.	2023 NEI: Unpaved and Paved PM ₁₀ and PM _{2.5} Dust Emissions for Nogales Nonattainment Area	13
Table 8.	PM ₁₀ emissions compared to the MVEB.....	14
Table 9.	PM _{2.5} emissions compared to the MVEB	14
Table 10.	PM _{2.5} emissions compared to the 2008 NEI	14
Table 11.	NO _x emissions compared to the MVEB	15
Table 12.	NO _x emissions compared to the 2008 NEI	15

Figures

Figure 1. Nogales PM _{2.5} (2006 Standard) Moderate Nonattainment Area	2
Figure 2. Nogales PM ₁₀ (1987 Standard) Moderate Nonattainment Area	3

Appendices

Appendix A Supporting Material

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1 Introduction

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 impact 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). Former nonattainment areas that have officially been redesignated to attainment status by EPA are referred to as maintenance areas for the first 20 years following redesignation. The Nogales area is designated as a nonattainment area for coarse particulate matter (PM₁₀) and as a maintenance area for fine particulate matter (PM_{2.5}). Therefore, the purpose of this analysis is to demonstrate that implementation of the project will not worsen PM₁₀ or PM_{2.5} emissions in the Nogales planning area in Santa Cruz County, Arizona.

All nonattainment areas must demonstrate that their transportation programs and long-range transportation plans conform to air quality plans that were established by the state and approved by the EPA. In urban areas, this demonstration is conducted by metropolitan planning organizations (MPOs). However, Nogales does not meet the population requirements needed to establish an MPO and is, therefore, considered a rural nonattainment area. As an isolated rural nonattainment area¹, the Nogales planning area is subject to a regional air quality conformity process. The planned improvements to the Interstate 19 (I-19) Frontage Road from Ruby Road to Rio Rico Drive is likely to be classified as regionally significant and is listed in the Arizona Department of Transportation (ADOT) State Transportation Improvement Program (STIP) and Southeastern Arizona Governments Organization (SEAGO) Region 2026-2030 Transportation Improvement Program (TIP) as ADOT Identification (ID) 104013, Region/TIP SEAGO 26-00, and Local ID SCC-24-01.

As the project is not located within a MPO, transportation planning processes in the Nogales area are conducted by ADOT as part of its statewide planning and programing efforts. Therefore, ADOT is required to coordinate the regional transportation conformity process with the Arizona Department of Environmental Quality (ADEQ) and other regulatory authorities including the EPA and the Federal Highway Administration (FHWA).

1.1 PM_{2.5} Nonattainment Area

The Nogales area was designated as a moderate nonattainment in the Federal Register (FR) for the 2006 PM_{2.5} NAAQS on November 13, 2009 (55 FR 58688). The nonattainment designation was for the 24-hour PM_{2.5} standard and unclassifiable/attainment for the annual standard. The PM_{2.5} nonattainment area is shown in Figure 1.

¹ An isolated rural nonattainment area is defined as a geographic region that does not meet the NAAQS and is not within a designated MPO.

Figure 1. Nogales PM_{2.5} (2006 Standard) Moderate Nonattainment Area



Source: ADEQ 2025

ADEQ submitted revisions to the State Implementation Plan (SIP) in 2013 and 2021 which demonstrated that all applicable Clean Air Act (CAA) requirements for nonattainment area, maintenance, and redesignation requirements were met. The EPA approved the State of Arizona's request to redesignate the Nogales planning area from nonattainment to attainment for the 2006 24-hour PM_{2.5} NAAQS standards in 2022 under CAA section 175A (87 FR 49997). The attainment classification remains in place. Therefore, Nogales is designated as a maintenance area for PM_{2.5} (2006 Standard). EPA proposed the Nogales motor vehicle emission budgets (MVEBs) for PM_{2.5} and nitrogen oxides (NO_x), as a precursor to PM_{2.5}. **Table 1** provides the EPA-approved PM_{2.5} and NO_x MVEBs which must be used for transportation conformity determinations.

Table 1. 2032 Nogales PM_{2.5} Motor Vehicle Emissions Budget

Inventory	PM _{2.5}	NO _x
Winter Daily Budget	637.0 tons per day	513.0 tons per day
Annual Budget	116.2 tons per year	93.7 tons per year
Direct On-Road Mobile Sources	1.4 tons per year	93.7 tons per year
Paved Road Fugitive Dust	14.2 tons per year	-
Unpaved Road Fugitive Dust	100.6 tons per year	-

Source: OFR 2022

1.2 PM₁₀ Nonattainment Area

This area was designated as a moderate nonattainment area for PM₁₀ on Oct. 31, 1990 (55 FR 45799) under the 1987 24-hour PM₁₀ standard, which was retained under the EPA's 2006 PM NAAQS review (effective December 18, 2006). The PM₁₀ nonattainment area is shown in Figure 2.

Figure 2. Nogales PM₁₀ (1987 Standard) Moderate Nonattainment Area



Source: ADEQ 2025

EPA approved the Nogales 2012 PM₁₀ nonattainment area SIP, 2012 *State Implementation Plan, Nogales PM₁₀ Nonattainment Area*, on October 25, 2012. As part of that process, EPA approved a PM₁₀ MVEB and an attainment demonstration showing the Nogales area would meet the 24-hour PM₁₀ NAAQS but for emissions sources in Nogales, Mexico. **Table 2** provides the EPA-approved PM₁₀ MVEB, which must be used for transportation conformity determinations.

Table 2. 2011 Nogales PM₁₀ Motor Vehicle Emissions Budget

Source Category	PM ₁₀ (tons per year)
Dust – Unpaved Road	864.9
Dust – Road Construction	267.0
Dust – Paved Road	121.4
Mobile – Gasoline and Diesel (including exhaust, brake, and tire wear)	21.0
Total	1,274.3

Source: OFR 2012

Conformity Overview

Transportation conformity is required by the CAA, Section 176(c), to ensure that federal funding and approvals are given to highway and transit projects that are consistent with an area's air quality goals established in SIPs. Demonstrating conformity means verifying that planned transportation improvement projects will not cause new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS.

Regional conformity, or conformity of a plan or TIP, demonstrates that the total emissions from an area's future transportation system are consistent with goals for air quality found in the SIP. Regional conformity is demonstrated by conducting an analysis that shows future year emissions are less than or equal to a MVEB established by the SIP(s) (§ 93.118). The Nogales area has established a MVEB for PM₁₀ and PM_{2.5} in the SIP to ensure that emissions from transportation activities do not exceed air quality standards.

2.1 Latest Emissions Estimation Model

Mobile source emissions estimates were developed using EPA's Motor Vehicle Emission Simulator, MOVES5 (November 2024 Release). According to EPA, MOVES5 is a major revision to MOVES4 and improves upon it in many respects. MOVES5 includes new data, more stringent standards, and new functional improvements and features. It accounts for EPA's Light- and Medium- Duty Multi-Pollutant Rule with higher projected electric vehicle (EV) fractions and more stringent standards for carbon dioxide (CO₂), PM, non-methane organic gases, and NO_x. MOVES5 also accounts for EPA's Heavy-Duty Greenhouse Gas Emissions – Phase 3 Rule with higher projected EV fractions and updated energy consumption for heavy-duty EVs. In the MOVES5 Mobile Source Emissions Model Questions and Answers, EPA states that new data was incorporated into light-duty and heavy-duty brake wear emissions. Additionally, detailed calculations for a given analysis year for vehicles were expanded from 30 to 40 years old. MOVES5 also updated fuel properties for calendar years 2021 and later, in addition to historical and forecast default travel activity, vehicle population, age distributions, and fuel distributions (EPA 2024).

For this project, future year projections for the Alternative Vehicle Fuel and Technology tab in MOVES were held constant at the same fractions as Year 2025 to adjust for EPA's latest planning assumptions requirement in 40 CFR 93.110. This is further discussed in Section 3.1.2.

2.2 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 Nogales Regional Conformity Demonstration, such as Alternate Vehicle Fuel and Technology (AVFT) Tool assumptions, National Emissions Inventory (NEI) data, and the

latest vehicle registration data. The meetings that were held and are planned are listed below:

- IAC Kick-off Meeting – April 9, 2026
- IAC Meeting – October 8, 2026

2.3 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/Regional Transportation Plan (RTP) must be less than or equal to the 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 designated as nonattainment or no emission budget has been found to be adequate for transportation conformity purposes, the interim emissions reduction test applies.

Since 2011, Nogales PM10 MVEB and 2032 Nogales PM2.5 MVEB have been established for the Nogales area, therefore, the EPA-approved emissions budget test was applied. For PM_{2.5}, because an emissions budget has been established only for 2032, an interim emissions test was conducted using 2008 NEI data as the baseline for comparison with the project analysis year of 2026 (EPA 2026). This is consistent with 40 CFR 93.119(e)(4) and EPA guidance for the Baseline Year Test (EPA 2025).

Methodology

The emissions inventory development and emissions projection discussion below identify procedures used by the ADOT to obtain emissions for the PM₁₀ and PM_{2.5} nonattainment area. A pre-consensus memorandum, outlining the model assumptions and data sources for the analysis years 2026, 2032, 2040, was presented during the IAC Kick-off Meeting. A copy of the pre consensus memorandum can be found in Appendix A. Since then, various updates have been made as discussed with ADOT, ADEQ, and Maricopa Association of Governments (MAG) through emails. The following section reflects those updates.

3.1 Mobile Source Emissions

3.1.1 Runspec Parameters

The on-road PM₁₀ emissions will be modeled using EPA's MOVES5 software. Several parameters have been identified for use in the preparation of this analysis. The parameters listed in Table 3 will be applied in the base MOVES5 setup.

Table 3. Runspec Parameters

MOVES Runspec Parameters	Settings
Scale	County, Inventory
Time Spans	Years: 2026 (first year of SEAGO TIP, NOx/PM2.5 MVEB), 2032 (NOx/PM2.5 MVEB), 2040 (interim year), 2050 (Long Range Transportation Plan [LRTP] Horizon Year) Time aggregation: Hour All 12 Months All 24 hours selected Weekdays and Weekends
Geographic Bounds	AZ – Santa Cruz County
Vehicle Selection	All available vehicle types All available source types
Road Type	All Road Types (1-5)
Pollutants and Processes	PM _{2.5} , PM ₁₀ , and NO _x . PM includes Exhaust, Tire wear, and Brake wear
General Output	Units: Grams, Joules, Miles Activity: Distance Traveled, Population
Output Emission Detail	Output Aggregation: Hour, County Onroad: Road Type, Source Use Type, Regulatory Class
Advanced Features	None

The assumptions listed below in Section 3.1.2, *County Data Manager*, will be applied within the County Data Manager portion of the MOVES software package. Each parameter is identified, along with the source data that will be applied (if applicable). Due to the rural nature of the Nogales nonattainment area (NNA), local data is not readily available for all input files. Where local data is unavailable, county or state level assumptions that could also apply to the NNA are provided for the data sources being used for the affected input areas.

3.1.2 County Data Manager

Once all 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

(MOVES5) for each scenario being modeled. The methodology used for each input contained within the MOVES County Data Manager is detailed below.

Vehicle Type VMT

The average daily vehicle miles travelled (VMT) for years 2025 (589,130 VMT in NNA) and 2050 (628,678 VMT in NNA) were generated using a travel demand model that was developed for Santa Cruz County. The model was developed by leveraging road network, traffic analysis zone, and external traffic forecast and distribution information from the Arizona Statewide travel model. The data were then supplemented using other data sources, such as Census household and Longitudinal Employer-Household Dynamics (LEHD) employment data, school enrollment, aerial photos, and industry standard values to create a more detailed model for Santa Cruz County than was available from the statewide model. The model was calibrated to 2025 traffic counts available from the ADOT.

VMT results were collected for modeled roads for the subset of the model within the non-attainment boundary and were calculated for interim years using a constant annual growth factor (0.26 percent/year) derived from the VMT in 2025 and 2050. The VMT, provided through the Santa Cruz County travel demand model, was split for automobiles, single unit trucks, and combination trucks. Auto VMT was further split by Highway Performance Monitoring System (HPMS) type (10, 25, and 40) using default MOVES5 runs for activity type 4 (source operating hours) for each analysis year. The crosswalk between the MOVES source types and HPMS categories are shown in **Table 4** below.

Table 4. MOVES Source Type to HPMS Vehicle Type Crosswalk

sourceTypeID	HPMSVtypeID	sourceTypeName
11	10	Motorcycle
21	25	Passenger Car
31	25	Passenger Truck
32	25	Light Commercial Truck
41	40	Other Buses
42	40	Transit Bus
43	40	School Bus
51	50	Refuse Truck
52	50	Single Unit Short-haul Truck
53	50	Single Unit Long-haul Truck
54	50	Motor Home
61	60	Combination Short-haul Truck
62	60	Combination Long-haul Truck

For each analysis year, the Annual Average Daily VMT (AADVMT) by HPMSVtypeID was entered into the MOVES5 AADVMT Converter Tool to calculate the MOVES inputs for HPMSVTypeYear, monthVMTFraction, dayVMTFraction, and hourVMTFraction. MOVES defaults were used for the monthly, daily, and hourly fractions. **Table 5** shows the AADVMT calculated for each analysis year.

Table 5. AADVMT by HPMS Vehicle Category and Analysis Year

HPMS	2026 Build AADVMT	2032 Build AADVMT	2040 Build AADVMT	2050 Build AADVMT
10	1,147	1,167	1,192	1,223
25	535,012	542,265	553,658	568,235
40	4,266	4,606	4,702	4,826
50	29,140	29,669	30,292	31,090
60	21,097	22,239	22,706	23,304
Total	590,663	599,945	612,550	628,678

Source Type Population

MOVES divides the vehicle population into 13 vehicle types. MAG's modeling team created MOVES ready inputs for this parameter for the Year 2025. For transit bus, MAG's script assigned zero transit bus population for Santa Cruz County. MOVES default runs were conducted for activity type 6 (source type population) for each analysis year and Year 2025 to determine the appropriate growth factor to project the source type population for future analysis years. **Table 6** presents the source type populations provided by MAG and projected for Year 2025 and the calculated populations for the future analysis years.

Table 6. Source Type Population

MOVES Source Type	Year 2025	Year 2026	Year 2032	Year 2040	Year 2050
11	1503	1510	1540	1578	1671
21	23366	22880	19845	17209	16513
31	39638	40577	45746	50762	55921
32	1279	1309	1476	1638	1804
41	45	46	52	58	65
42	0	0	0	0	0
43	19	19	22	24	27
51	6	6	7	8	10
52	1513	1556	1801	2079	2449
53	66	68	79	91	107
54	338	348	402	464	547
61	775	787	846	882	903

62	706	717	771	804	823
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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 40+ year-old vehicles. MAG provided MOVES ready inputs for the age distribution in Year 2025 using the January 2026 vehicle registration data for Santa Cruz County from ADOT. Despite a zero transit bus population, the age distribution for transit bus used MOVES defaults to prevent errors in running MOVES. The MOVES5 age distribution projection tool was used to estimate source-type age distribution for future analysis years.

Meteorology Data

MOVES requires temperature and relative humidity information to calculate emissions rates. ADEQ provided the County Data Manager used for the Nogales PM_{2.5} MVEB for both Years 2026 and 2032. This meteorology data was used for this regional conformity analysis to maintain consistency with the SIP and MVEB. The meteorology data provided for 2026 and 2032 were the same and were therefore assumed to apply to the future analysis years 2040 and 2050. The data provide average hourly temperature and relative humidity values for each month over an average year. The analysis assumed that meteorological conditions in the NNA have not changed significantly since the SIPs were developed.

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. These fractions were generated through the MOVES5 AADVMT Converter Tool described under *Vehicle Type VMT*.

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. HDR's traffic modeling team calculated local speed distribution for the NNA as part of the development of the subarea model. Similar to the Vehicle Type VMT input, the speed distribution was broken down by automobiles, single unit trucks, and combination trucks for the Years 2025 and 2050. The average speed distribution used in MOVES was assumed to be the same for Years 2032, 2040, and 2050 and are based on the traffic subarea model speed distribution for Year 2050. The average speed distribution for Year 2026 used the traffic subarea model distribution from Year 2025. Speed fractions are held constant for all road types and hour of day.

Road Type Distribution

VMT distributions vary between different road types, which impacts the level of emissions from vehicles on each facility. MOVES recognizes five 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.

ADEQ provided the County Data Manager used for the Nogales PM_{2.5} MVEB for 2026 and 2032. The road type distribution was used for this regional conformity analysis to maintain consistency with the SIP and MVEB. The road type distribution provided for both 2026 and 2032 were assumed to remain the same for future analysis years 2040 and 2050.

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). The Fuel Supply, Fuel Formulation, and Fuel Usage Fraction inputs were taken from the county data manager for the Nogales PM_{2.5} MVEB. These fuel inputs, provided for Years 2026 and 2032, were the same and therefore were assumed to be the same for future analysis years 2040 and 2050. Fuel formulation 97's methyl tert-butyl ether (MTBE) volume was updated to zero to prevent an error in MOVES. These fuel inputs are the same for all analysis years.

MAG provided the AVFT for Year 2025. The AVFT tool in MOVES was used to project all analysis years from the 2025 AVFT data. A Constant projection method was used to fix EV adoption rates at the 2025 baseline across future analysis years, consistent with EPA's latest planning assumptions requirement in 40 CFR §93.110 and MOVES5 technical guidance.

Inspection/Maintenance Program

No inspection/maintenance (I/M) programs exist in the nonattainment area of Santa Cruz County. This is assumed to continue in the future and would not influence PM emissions.

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.

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.

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.

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.

PM₁₀ and PM_{2.5} Emissions Analysis

The following sections outline the analysis components and results of the PM₁₀ and PM_{2.5} conformity demonstration.

4.1 Paved and Unpaved Road Dust

The primary contributor to PM₁₀ and PM_{2.5} emissions in the Nogales nonattainment area is road dust from paved and unpaved roads. Emissions for road dust use AP-42 calculation methodology. 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 and PM_{2.5} road dust emissions from both paved and unpaved roads. While the NEI relies on AP-42 methodology to calculate dust emissions, both paved and unpaved road dust emissions used in this analysis were taken directly from the NEI.

4.1.1 Paved Roadways

Emissions for paved road dust were estimated for Santa Cruz County using the 2023 National Emissions Inventory (NEI) and distributed to the nonattainment area using a population comparison. The 2023 NEI data for nonpoint, nonroad, and on-road categories were provided by ADEQ for Santa Cruz County. As of September 2026, the 2023 NEI data is still in draft version and subject to change.

The paved road dust emissions as presented in the NEI are calculated at the county level by multiplying VMT per roadway 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 0.25 for PM_{2.5} and units of grams (g)/VMT),

sL = road surface silt loading (grams per square meter) (g/m²), and

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

The 2023 NEI contains tables that list the appropriate values for each variable in the equation above. The value of sL 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. At this time the technical support document for the 2023 NEI is not available so this methodology is based upon the 2020 NEI.

County-level emissions were apportioned to the nonattainment area through a comparison of Nogales nonattainment area population to that Santa Cruz County population. Methodology for determining the nonattainment area population was confirmed through consultation with the Interagency Consultation (IAC) Group. 2023 nonattainment area paved road dust emissions will be forecasted to each analysis year using county-wide population growth estimates developed using forecasts provided by the Arizona Office of Economic Opportunity. Both historical population estimates (1980-2025) and future medium series population projections (out to 2060) were used for Santa Cruz County and Nogales. Nogales' population percentage as a portion of Santa Cruz County's population was calculated for every year. (Arizona Office of Economic Opportunity 2026)

4.1.2 Unpaved Roadways

The main contributor to PM₁₀ and PM_{2.5} emissions in the nonattainment area is dust emissions from unpaved roads. The NEI calculates county-level unpaved road dust emissions per roadway type 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 (pounds (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 (miles per hour (mph) = range between 39 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, no controls were applied to the NEI emissions estimate given the rural nature of Santa Cruz County and due to the area being denoted as a moderate nonattainment area. A meteorological adjustment was also applied to the unpaved road emissions to account for the reduction in emissions from precipitation and other meteorological events. At this time the technical support document for the 2023 NEI is not available so this methodology is based upon the 2020 NEI.

Similar to the paved dust emissions, 2023 NNA unpaved dust emissions were forecasted to each analysis year using county-wide population growth estimates developed using forecasts provided by the Arizona Office of Economic Opportunity.

4.1.3 Road Dust Emission Results

Table 7 displays the total road dust emissions in tons per year from the 2023 NEI for the Nogales Nonattainment Area.

Table 7. 2023 NEI: Unpaved and Paved PM₁₀ and PM_{2.5} Dust Emissions for Nogales Nonattainment Area

	Year 2026	Year 2032	Year 2040	Year 2050
Unpaved Road Dust PM ₁₀ Emissions (tons per year)	139.56	140.45	139.46	137.72
Paved Road Dust PM ₁₀ Emissions (tons per year)	39.76	40.01	39.73	39.23
Unpaved Road Dust PM _{2.5} Emissions (tons per year)	13.86	13.95	13.85	13.68
Paved Road Dust PM _{2.5} Emissions (tons per year)	9.94	10.00	9.93	9.81

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 Nogales nonattainment area. **Table 8** compares these values in tons per year to the 2011 Nogales PM₁₀ MVEB.

Table 8. PM₁₀ emissions compared to the MVEB

	Year 2026	Year 2032	Year 2040	Year 2050	2011 Nogales PM ₁₀ Motor Vehicle Emissions Budget
Unpaved Road Dust PM ₁₀ Emissions (tons per year)	139.56	140.45	139.46	137.72	864.9
Paved Road Dust PM ₁₀ Emissions (tons per year)	39.76	40.01	39.73	39.23	121.4
On-Road PM ₁₀ Emissions (tons per year)	0.61	0.48	0.38	0.34	21
Total (tons per year)	179.93	180.94	179.57	177.29	1274.3

Note: The 2011 Nogales PM₁₀ MVEB total includes an additional 267 tons PM₁₀/year for road construction.

4.3 Total PM_{2.5} Emissions

Emissions from all processes were combined to estimate the overall impact of on-road mobile sources on PM_{2.5} levels in the Nogales nonattainment area. **Table 9** compares these values for Years 2032, 2040, and 2050 to the 2032 Nogales PM_{2.5} MVEB. **Table 10** compares these values in tons per year for Year 2026 to the 2008 NEI as the Baseline Year Test.

Table 9. PM_{2.5} emissions compared to the MVEB

	Year 2032	Year 2040	Year 2050	2032 Nogales PM _{2.5} Motor Vehicle Emissions Budget
Unpaved Road Dust PM _{2.5} Emissions (tons per year)	13.95	13.85	13.67	100.6
Paved Road Dust PM _{2.5} Emissions (tons per year)	10.00	9.93	9.81	14.2
On-Road PM _{2.5} Emissions (tons per year)	0.23	0.15	0.11	1.4
Total (tons per year)	24.18	23.93	23.59	116.2

Table 10. PM_{2.5} emissions compared to the 2008 NEI

	Year 2026	2008 NEI
Unpaved Road Dust PM _{2.5} Emissions (tons per year)	13.86	100.8
Paved Road Dust PM _{2.5} Emissions (tons per year)	9.94	32.3

On-Road PM _{2.5} Emissions (tons per year)	0.33	17.7
Total (tons per year)	24.13	-

4.4 Total NO_x Emissions

Emissions from all processes were combined to estimate the overall impact of on-road mobile sources on NO_x levels in the Nogales nonattainment area. **Table 11** compares these values in tons per year for Years 2032, 2040, and 2050 to the 2032 Nogales PM_{2.5} MVEB. **Table 12** compares these values in tons per year for Year 2026 to the 2008 NEI as the Baseline Year Test.

Table 11. NO_x emissions compared to the MVEB

	Year 2032	Year 2040	Year 2050	2032 Nogales PM_{2.5} Motor Vehicle Emissions Budget
On-Road NO _x Emissions (tons per year)	6.76	3.39	2.48	93.7

Table 12. NO_x emissions compared to the 2008 NEI

	Year 2026	2008 NEI
On-Road NO _x Emissions (tons per year)	12.81	602.1

Conformity Determination

The analysis indicates that the projected emissions levels for the Nogales nonattainment area meet the applicable conformity tests with the planned I-19 Frontage Road; Ruby Road – Rio Rico Drive Project. Therefore, it is the determination of this analysis that this plan conforms under the 24-hour PM₁₀ NAAQS and 24-hour PM_{2.5} NAAQS.

References

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- . 2022. *Federal Register, Volume 87 Issue 156*. Accessed September 1, 2026. Available at: <https://www.govinfo.gov/content/pkg/FR-2022-08-15/html/2022-17189.htm>.

Appendix A Supporting Material

Technical Modeling Data Available by Request

https://azdot.my.workfront.adobe.com/document/public/view?publicToken=Mj7xhD6T_Y-6AqQfchUPkQmrNKQLGFi6kbclaw5knREPUb6CY38UdJb3W9CAkWS5OewmGvhbcPD0c56MczcuiA==&endcap

-  Age Distribution
-  Fuels
-  Meteorology
-  MOVES5_inputs_Santa Cruz County_2025_fromMAG
-  Road Type Distribution
-  Source Type Population
-  Speed Distribution
-  Vehicle Type VMT
-  2026Build_MOVES5.mrs
-  2032Build_MOVES5.mrs
-  2040Build_MOVES5.mrs
-  2050Build_MOVES5.mrs
-   MOVES On road summary.xlsx
-   Rio_Rico_Frontage_build_vs_nobuild_AQedited_MOVES5version.xlsx
-   Santa Cruz County AZ 2023 NEI draft data updated 08192026_fromADEQ.xlsx
-  sourcehours_2026_MOVES5
-  sourcehours_2050_MOVES5
-  sourcepopulation_2025_MOVES5
-  sourcepopulation_2026_MOVES5
-  sourcepopulation_2032_MOVES5
-  sourcepopulation_2040_MOVES5
-  sourcepopulation_2050_MOVES5