TECHNICAL REVIEW AND EVALUATION OF APPLICATION FOR GENERAL PERMIT FOR HOT MIX ASPHALT PLANTS

I. INTRODUCTION

The Hot Mix Asphalt Plant (HMAP) General Permit is a permit for a facility class (hot mix asphalt plants) that contains 10 or more facilities that are similar in nature, have substantially similar emissions, and would be subject to the same or substantially similar requirements. The General Permit will last for 5 years from the date of its issuance. Equipment covered under this general permit will be required to have an "Authorization To Operate" (ATO) for each significant piece of equipment. The ATO will identify the piece of equipment by having the name of manufacturer, date of manufacture, maximum capacity, and serial number or equipment identification number along with the annual operating hour limitation, if any, depending on the equipment and the county of operation.

This general permit allows for portable HMAP to move to other locations statewide. This general permit allows the Permittee to co-locate a HMAP with crushing and screening (C & S) plant and/or concrete batch plant (CBP) in the PM_{10} attainment areas of the State.

The Permittee shall use the myDEQ web portal to obtain authorizations to operate for each location at which the equipment will operate. The Permittee shall conduct all permitting services and transactions, including move notices, through the myDEQ online portal. In order to get authorization to operate under the general permit, the Permittee shall pay to the Department a flat permit processing fee of $500 and obtain the permit and the authorization to operate. The Permittee must also pay, for each calendar year, the applicable administrative or inspection fees as described in the Arizona Administrative Code Title 18, Chapter 2, Article 5, section 511 (A.A.C. R18-2-511).

II. PROCESS DESCRIPTION

A. Process Equipment

Hot mix asphalt (HMA) paving materials are a mixture of size-graded, high quality aggregate, and liquid asphalt cement, which is heated and mixed in measured quantities to produce HMA. An HMA plant is a plant used for manufacturing HMA, macadam and other forms of coated roadstone. Usually the HMA plant is mainly composed of cold aggregate supply system, drum dryer, coal burner, coal feeder, dust collector, hot aggregate elevator, vibrating screen, filler supply system, weighing and mixing system, asphalt storage, bitumen supply system. All these components have characteristics that impact not only the overall quality of the asphalt but also the effect on the environment.

At crushing and screening plants, aggregate material is transported from a nearby source of material by sauce truck or front-end loader, and fed into a feed hopper for processing. Material is typically conveyed by belt conveyer through a series of crushers intended to process the aggregate material to product specifications and shaker screens to separate the process material for recirculation or product storage.

At concrete batch plants, a weigh hopper feeds sand, aggregate, cement, and water from storage silos into mixer trucks. The concrete is typically mixed on the way to the site where concrete is to be poured. At some plants, the concrete may also be manufactured in a central mix drum and

transferred to a transport truck. In some cases, concrete is dry batched and prepared at a construction site. Raw material can be obtained for the plant from the collocated crushing and screening plant, or delivery by rail, truck, or barge. The cement is transferred to elevated storage silos pneumatically or by bucket elevator, while sand and aggregate and typically fed into feed hoppers and belt conveyers or by bucket elevator into elevated storage silos.

B. Control Devices

Particulate matter is the primary pollutant of concern for HMAP, C&S, and CBP sources.

For HMAP the types of control include baghouses and venturi scrubbers for drum dryer. For co-located Crushing and Screening Plant and Concrete Batch Plant the types of control include baghouses, wet scrubbers, spray bars, wet suppressant, and enclosures. For fugitive dust the types of control include water and other reasonable precautions.

Sources of particulate matter from crushing and screening plants include belt conveyor material transfer points, crushers, and shaker screens. Control methods used to control emission of particulate matter at crushing and screening plants include baghouses, wet scrubbers, water sprays, and enclosures.

Storage silos at concrete baghouses may be equipped with baghouses to control emission of particulate matter during silo loading. A significant source of emissions from concrete batch plants is the product loading point. Truck mix concrete batch plants collocated with crushing and screening plants are required to have a baghouse installed at the product loading point to qualify for coverage under the General Permit. Central mix concrete batch plants may also be equipped with baghouses to control emission of particulate matter. However, emissions from product loading points at central mix concrete batch plants have been determined to be sufficiently low enough to qualify for coverage under the General Permit regardless of the presence of a baghouse at the product loading point. All concrete batch plants are required to install a rubber sleeve at the product loading point to control emission of particulate matter.

Sources of fugitive dust emissions include loading/unloading of aggregate material, vehicle traffic, feed hopper loading, and wind erosion from storage piles and open areas. Fugitive dust emissions are controlled by application of water and/or chemical dust suppressants.

III. OPERATING LIMITS

A. Production Throughput Limitation

The HMAP allows for statewide production limitations for the operating scenarios in Table 1 below. These throughput limitations are based on the results of a refined air dispersion modeling analysis conducted in order to demonstrate compliance with the National Ambient Air Quality Standards (NAAQS) statewide). A detailed description of the modeling analysis is presented in Section VII.

Table 1: Throughput Limitations

Operating Scenario	Throughput Limitation (tons per day)	
	PM_{10} Attainment Area	PM_{10} Non-attainment Area
Stand-alone HMAP	4,000 tons	3,000 tons

Operating Scenario	Throughput Limitation (tons per day)	
	PM_{10} Attainment Area	PM_{10} Non-attainment Area
HMAP with C & S and CBP	HMAP: 3,500 tons C&S: 3,250 tons CBP: 1,275 yd^3	Not Authorized

A. Truck Mix Concrete Batch Plant Baghouse Requirement

To qualify for coverage under the Crushing and Screening General Permit, the Permittee is required to operate a baghouse at the product loading station for co-located truck mix concrete batch plants.

B. Maricopa County Generator Horsepower Limitation

The Permittee is not authorized operate a non-certified generator rated cumulatively at 750-hoursepower or greater. A non-certified generator is any generator not certified to meet EPA Tier 1 emission standard or better in accordance with 40 CFR 89.112(a).

C. Prohibited Areas

The Permittee is not authorized to operate in areas of Pinal County designated non-attainment for $PM_{2.5}$. The Prohibited area can be found at http://gisweb.azdeq.gov/arcgis/emaps/?topic=nonattain by filtering for $PM_{2.5}$.

IV. APPLICABLE REGULATIONS

The Department has identified the applicable regulations that apply to each unit under this General Permit. Tables Table 2-5 below summarize the findings of the Department with respect to the regulations that are applicable to each emissions unit.

Table 2: Regulations Applicable Statewide

Unit ID	Control Equipment	Applicable Regulations	Verification
Hot Mix Asphalt Plant	Baghouse/ venturi scrubber for drum dryer	A.A.C. R18-2-708 40 CFR 60 Subpart I	Hot mix asphalt plant equipment constructed prior to June 11, 1973 are subject to A.A.C. R18-2-708. Hot mix asphalt plant equipment constructed after June 11, 1973 are subject to New Source Performance Standards (NSPS) under 40 CFR 60 Subpart I.

Unit ID	Control Equipment	Applicable Regulations	Verification
Asphalt heater and Rubber Mixing plants	N/A	A.A.C. R18-2-724	Standards of Performance for Fossil-fuel Fired Industrial and Commercial Equipment under A.A.C. R18-2-724 are applicable to boilers and heaters.
Crushing and Screening Plants	Baghouses, wet scrubbers, spray bars, wet suppressant, and enclosures	A.A.C. R18-2-722 40 CFR 60 Subpart OOO	Crushing and screening plants equipment constructed prior to August 31, 1983 are subject Standards of Performance for Existing or Crushed Stone Processing Plants under A.A.C. R18-2-722. Equipment constructed after August 31, 1983 are subject to NSPS under 40 CFR 60 Subpart OOO.
Concrete Batch Plant	Baghouses and wet suppressants	A.A.C. R18-2-702.B A.A.C. R18-2-723	Concrete batch plants are subject to Standards of Performance for Existing Concrete Batch Plants under A.A.C. R18-2-723. .
Boiler in Concrete Batch Plant		A.A.C. R18-2-724 NESHAP Subpart JJJJJJ	A.A.C. R18-2-719-Standards of Performance for Fossil-fuel fired industrial and commercial equipment is applicable to the boiler. National Emission Standards for Hazardous Air Pollutants (NESHAP) under 40 CFR 63 Subpart JJJJJJ are applicable to both existing and new boilers.
Direct fired fuel burning equipment in Concrete Batch Plant		A.A.C. R18-2-730	Standards of Performance for Unclassified sources is applicable to the direct fuel fired equipment.
Fugitive dust sources	Water and other reasonable precautions	A.A.C. R-18-2, Article 6, A.A.C. R18-2-702.B	These standards are applicable to all fugitive dust sources at the facility.
Spray Painting	N/A	A.A.C. R-18-2-727	This standard is applicable to any spray painting operation at the facility.
Abrasive Blasting	Wet blasting, Dust collecting equipment or other approved methods	A.A.C. R-18-2-726	This standard is applicable to any abrasive blasting operation at the facility.

Unit ID	Control Equipment	Applicable Regulations	Verification
Demolition or Renovation Operations	N/A	A.A.C. R18-2-1101.A.8	This standard is applicable to any asbestos related demolition or renovation operations.
Internal Combustion Engines	None	A.A.C. R18-2-719	A.A.C. R18-2-719-Standards of Performance for Existing Stationary Rotating Machinery is applicable to existing engines.
		40 CFR 60 Subpart IIII	NSPS 40 CFR 60 Subpart IIII standards are applicable to compression ignition engines manufactured after April 1, 2006.
		40 CFR 60 Subpart JJJJ	NSPS 40 CFR 60 Subpart JJJJ standards are applicable to spark ignition engines manufactured after July 1, 2008.
		40 CFR 63 Subpart ZZZZ	National Emission Standards for Hazardous Air Pollutants (NESHAP) 40 CFR 63 Subpart ZZZZ standards are applicable to internal combustion engines. Engines subject to 40 CFR 60 Subpart IIII or JJJJ do not have any additional requirements to comply with 40 CFR 63 Subpart ZZZZ.

Table 3: Applicable Regulations for Maricopa County

Unit ID	Control Equipment	Applicable Regulations	Verification
Hot Mix Asphalt, Crushing and Screening and Concrete Batch Plants	Wet scrubbers, spray bars, wet suppressants and enclosures	Maricopa County Rule 316	Nonmetallic Mineral Processing located in Maricopa County

Unit ID	Control Equipment	Applicable Regulations	Verification
Facility Wide Requirements	None	Maricopa County Rule 100	General Provisions and Definitions
		Maricopa County Rule 200	Permit Requirements
		Maricopa County Rule 220	Non-Title V Permit Provisions
		Maricopa County Rule 230	General Permits
		Maricopa County Rule 300	Visible Emissions
		Maricopa County Rule 310	Fugitive Dust from Dust-Generating Operations
		Maricopa County Rule 312	Abrasive Blasting
		Maricopa County Rule 315	Spray Coating Operations
		Maricopa County Rule 320	Odors and Gaseous Air Contaminants
		Maricopa County Rule 335 and 336	Architectural Coatings and Surface Coating Operations
Internal Combustion Engines	None	Maricopa County Rule 324	Stationary Rotating Machinery subject to State rules located in Maricopa County.

Table 4: Applicable Regulations for Pima County

Unit ID	Control Equipment	Applicable Regulations	Verification
Hot Mix Asphalt Plant		P.C.C. §17.16.210	These regulations are applicable to Hot Mix Asphalt Plants located in Pima County.
Crushing and Screening plant	Spray Bars	P.C.C. §17.16.370	The regulations are applicable to Crushing and Screening Plants located in Pima County.
Concrete Batch Plant		P.C.C. §17.16.380	The regulations are applicable to Concrete Batch Plants located in Pima County.

Unit ID	Control Equipment	Applicable Regulations	Verification
Fugitive Dust sources		P.C.C. §17.16.070, 80, 90, 100 and 110	The regulations are applicable to all the fugitive dust sources located in Pima County

Table 5: Applicable Regulations for Pinal County

Unit ID	Control Equipment	Applicable Regulations	Verification
Facility wide Requirements		Pinal Code §5-24-1030.F Pinal Code §5-24-1030.G	The regulations listed are applicable to facility-wide in Pinal County.
Fugitive dust		Pinal Code §4-2-040 Pinal Code §4-2-050	The regulations listed are applicable to fugitive dust sources in Pinal County.

V. PREVIOUS PERMIT CONDITIONS

Table 6 addresses the changes made to the previous Hot Mix Asphalt General Permit with conditions in this renewal permit.

Table 6: Previous Permit Conditions

Section No.	Determination			Comments
	Added	Revised	Deleted	
Section I		X		Introduction: Revised the eligibility for this general permit
Att. "A"		X		General Provisions: Revised to represent the most recent template language
Att. "B"		X		Facility Wide Requirements: Revised to represent the most recent template language
Att. "B" Section III.B		X		Facility Wide Requirements: Revised $PM_{2.5}$ nonattainment area
Att. "B" Section VI		X		Internal Combustion Spark Ignition Engines Subject to 40 CFR 60 Subpart JJJJ: More detailed requirements from 40 CFR 60 Subpart JJJJ were added.
Att. "B" Section VIII			X	Mobile Source Requirements: Deleted.
Att. "F"		X		Additional Requirements for Sources Operating in Maricopa County: Revised to reflect current county rules

Section No.	Determination			Comments
	Added	Revised	Deleted	
Att. “G”		X		Additional Requirements for Sources Operating in Pima County: Revised to reflect current county rules

VI. MONITORING, RECORDKEEPING, AND REPORTING REQUIREMENTS

Table 7 contains an inclusive but not an exhaustive list of the monitoring, recordkeeping and reporting requirements prescribed by the air quality permit. The table below is intended to provide insight to the public for how the Permittee is required to demonstrate compliance with the emission limits in the permit.

Table 7: HMAP General Permit 2022

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Statewide				Do not operate the equipment identified in the ATO for more than the number of annual hours limit specified in the ATO.	Maintain records of the operating hours of the equipment with an hourly restriction, records of the total daily throughput of material, processed by the hot mix asphalt plant, and crushing and screening plant, records of the total daily production of the concrete batch plant in cubic yards per day. Keep a logbook of the updated emission calculations and make it available to inspectors upon request. Keep a log for each non-road engine, including the dates the engine is brought to and removed from the facility, and the make, model, serial number and capacity.	

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
	Internal Combustion Engine(S)-Non-NSPS	PM	$1.02Q^{0.769}$, Q is the heat input in million Btu per hour.		Keep records of a current, valid purchase contract, tariff sheet or transportation contract, including fuel lower heating value, and make them available to ADEQ upon request.	
		Opacity	40% (excluding the first 10 minutes from cold start)	Conduct quarterly periodic opacity monitoring for all engines except natural gas or propane engines.		
		SO_2	1.0 lb/MMBtu		For spark ignition (SI) engines, maintain records of the gas quality characteristics in a current, valid purchase contract, tariff sheet or transportation contract for the gaseous fuel, specifying that the maximum total sulfur content of the fuel; for diesel engines, keep records of fuel supplier certifications or other documentation listing the sulfur content. Make the records available to ADEQ upon request.	Report to the Director any daily period when the fuel sulfur content exceeds 0.8%.

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
		HAPs (Emergency Engines)			Keep records of operation hours of the RICE recorded through the non-resettable hour meter, including the date, start and stop times, hours spent for emergency operation, what classified the operation as emergency and how many hours are spent for non-emergency operation; keep records of the oil analysis parameters and the results, if any, and the oil changes for the engine; and keep records of the maintenance conducted on the engine.	
		HAPs (Non-Emergency Compression Ignition Engines)	Limit CO concentration in the engine exhaust to 49 ppmv at 15 percent O_2 for engines between 300-500 HP, and 23 ppmvd at 15 percent O_2 for engines greater than	For Engines greater than 500 HP, choose to use CEMS or CPMS for monitoring CO emissions. Conduct initial and subsequent performance test.	Keep a copy of each notification and report that was submitted to comply with 40 CFR 63 Subpart ZZZZ, records of the occurrence and duration of each malfunction of operation or the air pollution control and monitoring equipment, records of performance tests and performance evaluations, records of all	Submit all applicable notifications in 40 CFR 63.7(b) and (c), 63.8(e), (f)(4) and (f)(6), 63.9(b) through (e), and (g) and (h), a Notification of Intent to conduct a performance test at least 60 days before the performance test is scheduled to begin; for engines greater than 300 HP required to conduct a performance test or initial compliance demonstration,

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
			500 HP, or reduce CO emissions by 70%.		required maintenance, records of actions taken during periods of malfunction, and records of continuous compliance.	submit a Notification of Compliance Status. For engines greater than 300 HP and 4 SRB or 4 SLB engines greater than 500 HP, submit semi-annual compliance reports.
		HAPs (Non-Emergency Spark Ignition Engines)		Install and operate a CPMS to continuously monitor catalyst inlet temperature, and install equipment to automatically shut down the engine if the catalyst inlet temperature exceeds 1350 °F for 4SLB engine and/or 1250 °F for 4SRB engine. Conduct initial and subsequent performance test.	For each CEMS or CPMS, keep records described in 40 CFR 63.10(b)(2)(vi) through (xi), previous versions of the performance evaluation plan, requests for alternatives to the relative accuracy test for CEMS or CPMS. For engines less than 300 HP, 2SLB engines, 4 SRB (<500 HP) engines, and 4SLB (<500 HP) engines, and subject to management practices, keep records of the maintenance.	
	Internal Combustion Engine(S) Subject to NSPS Subpart IIII		For non-emergency engines: depending on model year, displacement, and engine	For non-emergency engines: if an engine is equipped with a diesel particulate filter, install a backpressure monitor on the diesel particulate filter that notifies the	For non-emergency engines: if an engine is equipped with a diesel particulate filter, shall keep records of any corrective action taken after the backpressure	For non-emergency engines: for an engine that is a pre-2007 model year > 175 hp and not certified, submit an initial notification as required in 40 CFR 60.7(a)(1).

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
			power, comply with the applicable emission standards.	Permittee when the high backpressure limit of the engine is approached.	monitor has notified the Permittee that the high backpressure limit of the engine is approached. For an engine that is a pre-2007 model year > 175 hp and not certified, keep records of all notifications submitted, maintenance conducted on the engine. If the engine is certified, keep documentation from the manufacturer, or if the engine is not certified, keep documentation that the engine meets the emission standards.	
			For fire pump engines, and emergency engines depending on the model year, displacement, brake horsepower, and modified or reconstructed	Depending on model year, conduct performance tests and/or purchase certified engines.	Keep performance test results, records of engine manufacturer data and certification, and records of control device vendor data, as applicable. For an engine that is a pre-2007 model year > 175 hp and not certified, keep records of all notifications submitted, maintenance conducted on the engine. If the engine is certified,	For pre-2007 model year engines that are greater than 175 HP and are not certified, submit an initial notification as required in 40 CFR 60.7(a)(1).

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
			emergency engines, comply with the applicable emission standards.		keep documentation from the manufacturer, or if the engine is not certified, keep documentation that the engine meets the emission standards. If the emergency engine does not meet the standards applicable to non-emergency engines in the applicable model year, keep records of the operation of the engine in emergency and non-emergency service that are recorded through the non-resettable hour meter, and records of the operation time of the engine and the reason the engine was in operation during that time. If the stationary CI internal combustion engine is equipped with a diesel particulate filter, keep records of any corrective action taken after the backpressure monitor has notified the Permittee that the high	

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
					backpressure limit of the engine is approached. Maintain monthly records of engine operation.	
	Internal Combustion Spark Ignition Engines Subject to 40 CFR 60 Subpart JJJJ		For stationary engines with a maximum engine power less than or equal to 19 KW (25 HP) manufactured on or after July 1, 2008, comply with the emission standards in 40 CFR 60.4231(a); stationary gasoline engines with a maximum engine power greater than 19 KW (25 HP) manufactured on or after January 1, 2009 comply	Purchase an engine certified to the emission standards as applicable and control device according to the manufacturer's instructions. If not operate and maintain according to the manufacturer's instructions, comply with Condition VI.E.1.b.	Keep records of all notifications and all documentation supporting any notification, maintenance conducted on the engine. For certified engine, keep documentation from the manufacturer; for non-certified engine or a certified engine operating in a non-certified manner and subject to 40 CFR 60.4243(a)(2), keep documentation that the engine meets the emission standards. If the emergency stationary SI ICE ≥ 500 HP after July 1, 2010, or if 130 HP ≤ the emergency stationary SI ICE ≤ 500 HP on or after July 1, 2011, or if the 25 HP ≤ the emergency stationary SI	If operating a non-certified stationary SI ICE ≥ 500 HP to meet the emission standards in 40 CFR 60.4231, submit an initial notification as required in 40 CFR 60.7(a)(1). If operating an emergency stationary CI ICE > 100 HP or is contractually obligated to be available for more than 15 hours per calendar year for the purposes specified in Conditions VI.E.4.a(2)(b) and (c), submit an annual report according to the requirements in Conditions VI.F.6.

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
			with the emission standards in 40 CFR 60.4231(b); stationary rich burn engines with a maximum engine power greater than 19 KW (25 HP) manufactured on or January 1, 2009 that use LPG comply with the emission standards in 40 CFR 60.4231(c).		ICE ≤ 130 HP manufactured on or after July 1, 2008, that do not meet the applicable non-emergency engines standards, keep records of the hours of engine operation recorded through the non-resettable hour meter.	

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
			Non-emergency engines greater than 19 KW (25 HP) and less than 75 KW (100 HP) (except gasoline and rich burn engines that use LPG), comply with the emission standards for field testing in 40 CFR 1048.101(c); for the other stationary engines, comply with the emission standards listed in Table 2 in Condition VI.D.12.	Purchase a certified engine; if not, demonstrate compliance according to the performance testing requirements in 40 CFR 60.4244, as applicable, and according to Conditions VI.E.2.b.		

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
			For modified or reconstructed stationary engines, comply with Conditions VI.D.10.	Purchase a certified engine, or demonstrate compliance according to the performance testing requirements in 40 CFR 60.4244, as applicable.		
	Fugitive Dust	PM	40% Opacity		A Method 9 observer is required to conduct a weekly survey of visible emissions. Maintain records of the dates when any of the reasonable precautions and control measures were adopted. Keep records of the explosive blasting information.	Record of the dates and types of dust control measures employed, and if applicable, the results of any Method 9 observations, and any corrective action taken to lower the opacity of any excess emissions.
	Abrasive Blasting	PM	20% Opacity			Record the date, duration and pollution control measures of any abrasive blasting project.
	Spray Painting	VOC	20% Opacity Control 96% of the overspray			Maintain records of the date, duration, quantity of paint used, any applicable MSDS, and pollution control measures of any spray painting project.

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
	Demolition/ Renovation	Asbestos				Maintain records of all asbestos related demolition or renovation projects including the "NESHAP Notification for Renovation and Demolition Activities" form and all supporting documents
	Hot Mix Asphalt Plant			Install, operate and maintain a temperature monitoring device and continuously record the temperature of the hot aggregate mixture.	Keep records of the temperature of the hot aggregate mixture.	
		PM	For equipment subject to NSPS: 0.04 grains/dscf For equipment not subject to NSPS: (1) for the facilities process weight rate ≤ 60,000 pounds per hour (30 tons per hour): $4.10P^{0.67}$;	If a baghouse is used, install, calibrate, maintain and operate a device for the continuous measurement of the pressure drop across the baghouse; monitor the pressure drop at the time of performance test. If a wet scrubber is used install, calibrate, maintain and operate a device for the continuous measurement of the pressure loss of the gas	If a baghouse is used, record the pressure drop across the baghouse once per day. If a wet scrubber is used, record the pressure drop across the scrubber, and the scrubber liquid flow rate once per day. Maintain, on site, copies of the fuel analysis and records of the production rate of hot mix asphalt and	

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
			(2) for the facilities process weight rate > 60,000 pounds per hour (30 tons per hour): $55.0P^{0.11} - 0.40$; P = the process weight rate in tons-mass per hour.	stream through the scrubber; a device for the continuous measurement of the scrubbing liquid flow rate to the wet scrubber; monitor the pressure drop across the scrubber and scrubber liquid flow rates and establish the operating ranges for these parameters at the time of performance test. Operate and maintain the wet suppression systems according to the requirements. Conduct weekly monitoring of visible emissions. Conduct periodic black light inspections on the bags when operating. For NSPS affected Drum Dryer, conduct initial performance test for PM within 180 days; conduct performance test for PM within 12 months. For non-NSPS Drum Dryer	the percentage of recycled asphalt in the aggregate.	
		Opacity	20%			

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
				conduct performance test for PM within 12 months.		
	Asphalt Heaters	PM	$1.02Q^{0.769}$, Q = heat input in MMBtu/hr		Keep records of fuel supplier certifications	
		Opacity	15%	Conduct monthly monitoring of visible emissions from asphalt heaters stack when in operation		Report all 6-minute periods if visible emissions exceed 15% opacity
		SO_2	1.0 lb/MMBtu		Keep records of fuel supplier certifications	
	Crushing and Screening Plant Subject to NSPS	PM and Opacity	Crushers without capture systems: ≤ 15% (fugitive emissions, after August 31, 1983 and before April 22, 2008) ≤ 12% (fugitive emissions, on	Conduct monthly opacity monitoring. Monitor the daily process weight of sand, gravel or crushed stone produced. If a wet scrubber is used, monitor the scrubber accordingly and conduct initial performance test. If wet suppression is used perform monthly periodic inspections. If a baghouse is used for facilities on or	For facilities on or after April 22, 2008, record each periodic inspection required in a logbook and keep the logbook onsite and make it available to the Director upon request.	For all new facilities, submit a notification of the date construction or reconstruction no later than 30 days after; submit a notification of the actual initial startup date within 15 days after. For existing facilities, submit a notification of any physical or operational change which may increase the emission rate of any air pollutant; a notification of the actual date of initial startup; for a combination of

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
			or after April 22, 2008)	after April 22, 2008, conduct quarterly 30-minute visible emissions inspections. Conduct initial performance test for all the applicable opacity and PM limits.		affected facilities begin actual initial startup on the same day, submit a single notification of startup within 15 days after. If a facility operates any wet and saturated material processing operation and subsequently processes unsaturated materials, submit a report of this change within 30 days. Submit written reports of the results of all performance tests.
			Crusher with capture systems: ≤ 10% (fugitive emissions), ≤ 7% (dry control device stack emissions), and ≤ 0.05 g/dsm^3 (stack emissions), after August 31, 1983 and before April 22, 2008 ≤ 7% (fugitive emissions, dry control device stack emissions) and 0.032 g/dsm^3 (stack emissions), on			

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
			or after April 22, 2008			
			Operations enclosed in a building: ≤ 7% (fugitive emissions) ≤ 7% or ≤ 0.05 g/dsm^3 (stack emissions), after August 31, 1983 and before April 22, 2008 ≤ 0.032 g/dsm^3 (stack emissions), on or after April 22, 2008			
	Crushing and Screening Plant Subject to Existing	PM	≤ $4.10P^{0.67}$ (for process weight rate ≤ 60,000 lbs/hr) ≤ $55.0P^{0.11}$ – 40 (for process	Conduct monthly opacity monitoring. Install, calibrate, maintain, and operate monitoring devices to determine daily the	Maintain records of the daily production rate of gravel or crushed stone produced.	

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
	Source Requirements		weight rate > 60,000 lbs/hr) P = process weight rate in tons/hr	process weight of sand, gravel or crushed stone produced. Monitor and record once per day the pressure drop (in inches of H_2O) across the baghouse.	Maintain logs of all maintenance activities performed on the baghouse.	
		Opacity	20%			
	Concrete Batch Plants	Opacity	20%	Conduct monthly opacity monitoring. Monitor and record once per day the pressure drop (in inches of H_2O) across the baghouse.	Maintain logs of all maintenance activities performed on the baghouse.	
	Boilers			Burn only natural gas, liquefied petroleum gas (butane or propane), on-specification used oil, or ultra-low sulfur diesel fuel in the boiler(s).	Maintain copies of the fuel analysis.	
		PM	$\leq 1.02Q^{0.769}$, Q = the heat input in MMBtu/hr		Keep records of fuel supplier certifications.	
		Opacity	15%	Conduct monthly opacity monitoring of visible emissions.		

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
		SO_2	≤ 1.0 lb/MMBtu.	Burn only ultralow sulfur fuel.		
		HAPs			Keep a copy of each notification and report that was submitted to comply with this 40 CFR 63 Subpart JJJJJJ and all documentation supporting any Initial Notification or Notification of Compliance Status, and records to document conformance with the work practices, and management practices.	Prepare by March 1 and submit upon request, a biennial compliance certification report.
	Direct-fired Equipment	PM	≤ $4.10P^{0.67}$ (for process weight rate ≤ 60,000 lbs/hr) ≤ $55.0P^{0.11}$ – 40 (for process weight rate > 60,000 lbs/hr) P = process weight rate in tons/hr			
		Opacity	20%			

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
Maricopa County	Facility Wide	Opacity	20% for a period aggregating more than three minutes in any 60 minute period	Conduct a weekly monitoring of visible emissions	Keep for 5 years records of process and operational information required; maintain all the records in accordance with the approved O&M Plan; maintain a copy of all earth moving permits; and maintain a copy of the most recently approved Dust Control Plan on-site.	
	Hot Mix Asphalt Plant	PM/Opacity	When producing non-rubberized asphaltic concrete, stack emissions: 5% opacity or 0.04 gr/dscf When producing rubberized asphaltic concrete, stack emissions: 20% opacity; or 0.04 gr/dscf When producing	Meet all of the applicable monitoring and recordkeeping requirements specified in Condition I.F.		

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
			rubberized asphaltic concrete, fugitive emissions of blue smoke from the drum dryer: 20% opacity. Fugitive dust emissions: 10% opacity excluding truck dumping. Fugitive dust emissions: 20% opacity from truck dumping			
	Internal Combustion Engines	Opacity	20%		Maintain a list of stationary RICE including: combustion type; manufacturer; model designation, rated bhp, serial number, and the location of each engine. Maintain records of the monthly and 12-month rolling total hours of	
			For non-emergency engines rated 250 bhp or greater: comply with the emission standards in			

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
			Table 1 or Table 2 of Attachment "F" as applicable		operation for each stationary RICE, and monthly and annual hours of operation for reliability related activities and the number of operating hours for emergency use and an explanation for the emergency use. Maintain records of all stationary RICE maintenance (including the date when maintenance was performed and the maintenance procedures that were performed). Make one of the following where the stationary RICE is located: a. The manufacturer's written instructions for operations and maintenance of each stationary RICE; b. A written maintenance schedule; or c. A written maintenance plan. Maintain records of the type and amount of fuel purchased for use in the stationary RICE; and maintain records of the	

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
					sulfur content of any fuel that is used in the stationary RICE, excluding gasoline. For gasoline, maintain records that the fuel was purchased in the United States. If applicable, keep manufacturer's written instructions for operation and maintenance. If the manufacturer's written instructions are not available, keep a preventative maintenance plan. For each non-road engine, keep the make, model, serial number, and rated capacity (bhp hours); and the Date of each instance in which the engine is moved from its existing location, and the reason why the engine was moved; and the fuel type and sulfur content. Retain all records for 5 years.	

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
	Fugitive Dust	Opacity	20%	Conduct a monthly visual survey of visible emissions. Conduct performance tests for soil stabilization and moisture content as required.	Keep records of the name of observer, date, time, and result of the visible emissions survey and observation. Maintain written records of all self-inspections of fugitive dust control measures implemented. Maintain records of all Basic Dust Control Training Class certifications on site. For visible emissions survey, if opacity < 20%, make a record of the location, date, and time of the observation, and the results of the Method 9 observation.	Submit a Dust Control Plan that includes all the information required in the permit, and submit a revised Dust Control Plan if applicable according to the permit. For visible emissions survey, if opacity ≥ 20%, report it as an excess emission.
	Abrasive Blasting	Opacity	20% (aggregating more than three minutes in any sixty-minute period)	Conduct visible emissions observations with Method 9 and other provisions in the permit.	Keep the records onsite that are applicable to all abrasive blasting operations, and reports, logs, and supporting documentation required. Maintain records of the Operation and Maintenance Plan for each	

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
					emission control system used to control emissions.	
	Painting Operations	VOCs	Surface coating and architectural coating operations: comply with all the applicable requirements in Maricopa County rules 335 and 336. Spray Coating Operations: meet all the requirements in the permit.			
Pima County	Hot Mix Asphalt Plant	PM	$\leq 3.59P^{0.62}$ (for process weight rate $\leq$ 60,000 lbs/hr) $\leq 17.31P^{0.16}$ (for process weight rate > 60,000 lbs/hr) P = process weight rate in tons/hr			
	Crushing and Screening Plant	PM	$\leq 3.59P^{0.62}$ (for process weight rate $\leq$ 60,000 lbs/hr) $\leq 17.31P^{0.16}$ (for process weight rate > 60,000 lbs/hr)			

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
			P = process weight rate in tons/hr			
		Opacity	Comply with Table 1 of this Attachment			
	Concrete Batch Plant	Fugitive Emissions	Same as Fugitive Dust			
	Fugitive Dust	Opacity (point sources)	60% (Cold Diesel Engines the first 10 consecutive minutes after starting up; Loaded Diesel Engines being accelerated under loa;d) 0 (Asbestos-Containing Operation); 20% (Other sources)	Conduct weekly visible emissions observations by Method 9	Maintain the records of weekly visible emissions observations	
		Opacity (non-point sources)	20% (Eastern Pima County, east of the eastern	Conduct visible emissions observations by Reference Method 9	Maintain the records of weekly visible emissions observations.	

Location	Emission Unit	Pollutant	Emission Limit	Monitoring Requirements	Recordkeeping Requirements	Reporting Requirements
			boundary of the Tohono O'Odham Reservations) 40% (all other areas of Pima County)			
Pinal County	Fugitive Dust	Opacity	20% (from open areas/vacant lots, or unpaved lots greater than 5000 square feet)	Conduct visible emissions observations by Method 9.	Make a record of the control measures applied.	

VII. AMBIENT AIR IMPACT ANALYSIS

A. Overview of Modeling Methodology

The Department performed a modeling analysis to determine throughput limits for hot mix asphalt plants (HMAP) under which compliance with the National Ambient Air Quality Standards (NAAQS) can be demonstrated using regulatory air quality models. Because particulate matter (PM) is the primary pollutant emitted from a HMAP, the Department has established the maximum daily throughputs for HMAP to protect the 24-hour standards for PM_{10} and $PM_{2.5}$.

In the modeling analysis, the Department estimated the emissions rates for individual operating processes based on the maximum daily throughputs in the previous HMAP general permit (GP). These emission rates, along with other model inputs such as meteorology and source release parameters, were input into a regulatory air dispersion model. Representative background concentrations were added to modeled concentrations and the total concentrations were then compared to the NAAQS. If the total concentrations are below the NAAQS, the Department would retain the existing maximum daily throughputs. However, if the total concentrations are higher than the NAAQS, the Department would reduce the daily throughput limits until the total concentrations are below the NAAQS. Figure 1 shows the procedures.

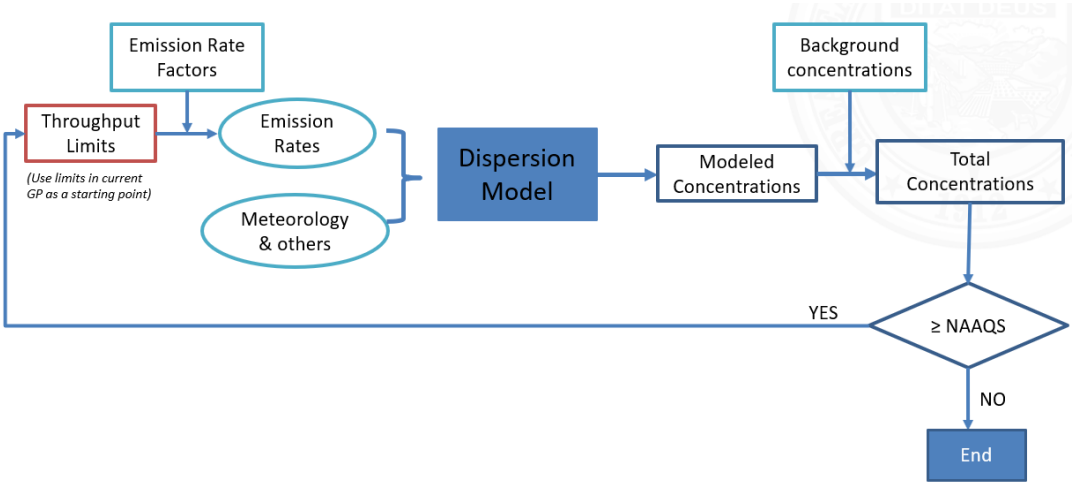

Figure 1. Flowchart for Determining Throughput Limits Using a Regulatory Dispersion Model

B. Updates in Comparison with the Previous GP Modeling

Compared to the previous modeling efforts for GP (dated April 24, 2017), this modeling analysis has made the following updates:

- Used the latest version of the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) modeling system;
- Used the most recent 5 years of meteorological data;
- Updated the emission rates for silo filling, plant load out, and wind erosion; and
- Re-estimated background concentrations aligning with the EPA's Guideline on Air Quality Models (40 CFR Part 51 Appendix W).

Based on the modeled results, the Department is proposing the following daily throughput limits as presented in Table 8.

Table 8: Throughput Limits for Hot Mix Asphalt Plants

Facility	Throughput Limits for Demonstrating the Compliance with NAAQS	
	PM_{10} Attainment Area	PM_{10} Non-attainment Area
Stand-alone HMAP	4,000 tons per day (tpd)	3,000 tpd
HMAP collocated with crushing & screening (C&S) plant and concrete batch plant (CBP)	HMAP: 3,500 tpd C&S: 3,250 tpd CBP: 1,275 cubic yard (yd^3) per day	Not authorized

Additionally, the Department requires that the following permitting conditions must be met:

- The applicable operating area shall exclude the West Central Pinal $PM_{2.5}$ nonattainment area (NAA);
- If operating in Maricopa County, the size of non-certified generator shall not exceed 700 horsepower (HP). A non-certified engine is any engine that does not meet at least a Tier 1 emission standard in accordance with 40 CFR 89.112(a);
- If a CBP is collocated with a C&S and the CBP has truck mixing operations, the truck loading point must be controlled by a dust capture system and baghouse. The use of a boot or skirt that surrounds the opening at the loading point only does not fall into the category of "Controlled".

C. Model Selection

The Department used the most recent version of AERMOD (version 21112) for this modeling analysis.[1] AERMOD is the EPA's preferred near-field dispersion modeling system for a wide range of regulatory applications. The AERMOD modeling system includes four regulatory components:

- AERMOD: the dispersion model;
- AERMAP: the terrain processor for AERMOD;
- AERMET: the meteorological data processor for AERMOD; and

[1] There is a coding bug related to 1-hour NO_2 modeling in AERMOD version 21112. Therefore, the Department used AERMOD version 19191 to model 1-hour NO_2 and version 21112 for all other modeling efforts.

- BRIPPRIME: the building input processor

The Department did not use the terrain processor (AERMAP) and the building input processor (BRIPPRIME) for this modeling analysis because both of them require site-specific information. Moreover, the Department determined that an assumption of "Flat Terrain" was reasonable, since the emission sources of a C&S are mainly ground level sources or near ground sources and the worst-case impacts are expected to occur in or near the ambient area boundary.

The Department used AERMET (version 21112) to process the meteorological data collected from 11 Automated Surface Observing Stations (ASOS) across the State of Arizona and one station in California. For details, please see Section VII.E.

D. Source Inputs

1. Emission Rates

The most significant emission source in a HMAP is the rotary drum dryer. Emissions from the drum consist of Particulate Matter (PM), CO, SO_2, and NO_x. Other emission sources in a HMAP include storage piles, batch drop/material transfer points, unpaved roads, asphalt heater, and internal combustion engines (generator). PM is the primary pollutant emitted from a C&S and a CBP, which may be collocated with a HMAP.

a. Emission Rate Factor

In general, the emissions were estimated according to latest AP-42 emission factors for rotary drum dryer, concrete batching, crushing & screening, internal combustion engines, boilers, wind erosion, and unpaved roads. In particular, a consistent approach was developed for estimating $PM_{2.5}$ and PM_{10} emissions for batch drop operations and material transfer operations. This approach was based on AP-42 Section 13.2.4 Equation 1:

$$E = k(0.032)\frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}$$

E = emission factor (lb/ton)

k = particle size multiplier (dimensionless), 0.35 for PM_{10} and 0.053 for $PM_{2.5}$

U = mean wind speed (miles per hour)

M = material moisture content (%)

State-wide meteorological data sets were reviewed and a mean wind speed of 7.5 miles per hour was determined. Due to very limited data available for the parameter M, the moisture content was arbitrary set as 5% for controlled emissions.

b. Emission Inventory

ADEQ has developed an emission inventory for a HMAP with an operating capacity of 350 tons per hour (tph), a C&S with an operating capacity of 325 tph, and a CBP with an operating capacity of 1,275 yd^3 per day, respectively (Table 9, Table 10, and Table 11). Note that these operating capacities were used for the convenience of emission estimation only, and they were not the throughput limits for a HMAP GP. Besides the sources above, fugitive emissions from unpaved roads and emissions from internal combustion engines (generators) were also modeled. For a HMAP that is collocated with a C&S and a CBP, two generators were modeled, one large generator rated 1,500 horsepower (hp) and one small generator rated 500 hp. For a HMAP alone, one large generator rated 700 hp for Maricopa County and one large generator rated 1000 hp for other areas were modeled. The emission rates of pollutants from these sources are summarized in Table 12.

c. Modeled Emission Rates

<u>24-hour $PM_{2.5}$ and PM_{10} standards</u>

As indicated above, ADEQ estimated maximum hourly emission rates for HMAP sources based on an operating capacity of 350 tons per hour. If a HMAP was modeled to run at a specific capacity (tons/day), the modeled hourly emission rates for applicable sources were adjusted by using Emission Rate Flag HROFDY in AERMOD:

$$HROFY = \frac{\text{modeled operating capacity (tons per day)}}{350 \text{ tons per hour} \times 24 \text{ hours}}$$

Many batch drop and material transfer operations in hot mix asphalt plants are not continuous and the emission sources are typically characterized as intermittent sources. The Emission Rate Flag approach substitutes an intermittent source with a continuous source that emits an identical amount of PM_{10} or $PM_{2.5}$ over a 24-hour time period. Such treatment should provide a reasonable approximation of 24-hour average impact.

<u>Short-term standards for gaseous pollutants</u>

A daily throughput limit may not necessarily protect the short-term standards for gaseous pollutants because a HMAP could be operated at a very high hourly throughput even if the daily throughput limit is met. Based on the available HMAP operating data, ADEQ determined that the maximum hourly throughput for a HMAP is equal to or less than 500 tph.

Therefore, ADEQ estimated maximum hourly emission rates for gaseous pollutants based on an operating capacity of 500 tph and then modeled these maximum hourly emission rates for comparisons to the short-term air quality standards of gaseous pollutants, specifically 1-hour standard for NO_2, 1-hour and 3-hour standards for SO_2, and 1-hour and 8-hour standards for CO. If the compliance with these standards can be demonstrated based on an operating capacity of 500 tph, it would be unnecessary to establish hourly throughput limits for the HMAP GP.

Annual standards

For the HMAP GP, ADEQ requires that the annual plant-wide emissions for any criterial pollutants shall be less than 90 tons per year (tpy). For each modeling scenario, ADEQ initially estimated the maximum annual emissions for any criterial pollutants based on daily throughput limits and 365 days per year. If the maximum annual emissions obtained were greater than 90 tpy, ADEQ took the threshold of 90 tpy into account and used Emission Rate Flag HROFDY to make an adjustment on modeled annual average emission rates.

2. Sources Layout

The layout of hot mix asphalt plants generally differs from one site to another. To simplify the modeling analysis, ADEQ developed a generic site plan for a HMAP, alone or collocated with a C&S and a CBP, as shown in Figure 2 and Figure 3, respectively. ADEQ developed the layout of sources according to the site plans of several existing plants with necessary simplifications for modeling purposes.

3. Source Release Parameters

The emission sources, categorized by source type (release characteristics), are as follows:

Point Sources: drum dyer baghouse, asphalt heater, cement silo, boiler, and generator; Point Sources;

Area Sources: aggregate storage pile wind erosion, sand storage pile wind erosion, combined transfer points in crushing & screening plants;

Volume Sources: crushing & screening operations, batch drop operations, material transfer operations, truck/front-end loaders traveling on unpaved roads.

Table 13-16 summarize the source release parameters used in the modeling analysis. ADEQ determined these parameters following the ADEQ air modeling guidelines as well as the methodology for modeling fugitive dust sources developed by National Stone, Sand & Gravel Association. The representative physical dimensions for stacks, crushers, screens, storage piles, hoppers, bins, silos, trucks, and front-end loaders were determined on the basis of actual measurements or testing data from three facilities in Maricopa County.

Table 9: Maximum Hourly Emission Rates for Hot Mix Asphalt Plant (HMAP)[2]

Point Source						
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*	*NOx (g/s)*	*SO_2 (g/s)*	*CO (g/s)*
HMA_LSIL	Lime Silo	1.50E-04	1.50E-04			
HMA_ASIL	Asphalt Silo	2.59E-02	2.59E-02			
HMA_ASIL (500 tph)[3]	Asphalt Silo					7.45E-02
HMA_HTR	Asphalt Heater	1.26E-02	1.26E-02	1.26E-01	1.34E-03	7.58E-03
HMA_BGHS	Baghouse	7.01E-01	1.02E+00			
HMA_BGHS (500 tph)[4]	Baghouse			3.47E+00	3.66E+00	8.21E+00

Area Source			
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*
HMA_WEAS	Aggregate Storage Pile	5.55E-04	3.70E-03

Volume Sources				
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*	*CO (g/s)*
HMA_ADGS	Aggregate Delivery to Ground Storage	3.27E-03	2.16E-02	
HMA_TAFH	Aggregate Transfer to Feed Hopper	2.62E-03	1.73E-02	
HMA_TAMC	Aggregate Transfer to Metering Conveyor	2.62E-03	1.73E-02	
HMA_TAIC	Aggregate Transfer to Inclined Conveyor	4.27E-04	1.51E-03	
HMA_TRFH	Transfer to RAP Feed Hopper	6.55E-04	4.32E-03	
HMA_TRFC	RAP Transfer from Feed Hopper to Conveyor	6.55E-04	4.32E-03	
HMA_TASS	Aggregate Transfer to Scalping Screen	2.62E-03	1.73E-02	
HMA_ASCR	Aggregate Scalping Screen	1.64E-03	2.43E-02	
HMA_TASC	Aggregate Transfer from Screen to Conveyor	2.62E-03	1.73E-02	

[2] Emission rates were estimated based on an operating capacity of 350 tph except the emissions rates in footnotes 3-5.
[3] The CO emission rate was estimated based on an operating capacity of 500 tph.
[4] Emission rates were estimated based on an operating capacity of 500 tph. These emission rates were modeled for comparisons to the short-term air quality standards of gaseous pollutants, specifically 1-hour standard for NO_2, 1-hour and 3-hour standards for SO_2, and 1-hour and 8-hour standards for CO.

HMA_TADD	Aggregate Transfer to Drum Dryer	2.62E-03	1.73E-02	
HMA_TRSS	RAP Transfer to Scalping Screen	6.55E-04	4.32E-03	
HMA_RSCR	RAP Scalping Screen	4.11E-04	6.08E-03	
HMA_TRC1	RAP Transfer from Screen to Conveyor #1	6.55E-04	4.32E-03	
HMA_TRC2	RAP Transfer from Conveyor #1 to #2	1.07E-04	3.78E-04	
HMA_TRUC	Asphalt Drop into Truck	2.31E-02	2.31E-02	
HMA_TRUC (500 tph)[5]	Asphalt Drop into Truck			8.52E-02
HMALT01-03	HMAP Loader Traffic	3.59E-03	3.59E-02	

Table 10: Maximum Hourly Emission Rates for Crushing & Screening[6]

Area Source			
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*
CS_WEAS	Aggregate Storage Pile	5.55E-04	3.70E-03
CS_WEFS	Fines Storage Pile	1.25E-03	8.32E-03
CS_TRANS	Transfer and Drop points	1.51E-02	7.34E-02
Volume Sources			
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*
CS_PCRSH	Primary Crusher-Jaw	4.10E-03	2.22E-02
CS_SCR1	Screen #1	2.05E-03	3.03E-02
CS_SCR2	Screen #2	2.05E-03	3.03E-02
CS_FSCR	Fine Screen	4.55E-03	9.03E-02
CS_SCRSH	Secondary Crusher -Core	4.10E-03	2.22E-02
CS_TCRSH	Tertiary Crusher	4.10E-03	2.22E-02
CSLT01-28	C&S Loader Traffic	5.35E-03	5.35E-02

Table 11: Maximum Hourly Emission Rates for Concrete Batch Plant[7]

Point Sources				
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*	*NOx (g/s)*
CBP_CSTS	Cement Supplement Transfer to Cement Silo	1.84E-04	1.20E-03	-

[5] The CO emission rate was estimated based on an operating capacity of 500 tph.
[6] Emission rates were estimated based on an operating capacity of 325 tph.
[7] Emission rates were estimated based on an operating capacity of 1,275 yd^3 per day.

CBP_CTCS	Cement Transfer to Cement Silo	8.40E-05	5.60E-04	-
CBP_BOIL	Boiler	1.17E-02	1.17E-02	1.80E-01
Area Sources				
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*	
CBP_WEAS	Aggregate Storage Pile	5.55E-04	3.70E-03	
CBP_WESS	Sand Storage Pile	3.12E-04	2.08E-03	
Volume Sources				
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*	
CBP_ADGS	Aggregate Delivery to Ground Storage	4.98E-04	3.29E-03	
CBP_SDGS	Sand Delivery to Ground Storage	3.81E-04	2.52E-03	
CBP_ATC	Aggregate Transfer to Conveyor	4.98E-04	3.29E-03	
CBP_STC	Sand Transfer to Conveyor	3.81E-04	2.52E-03	
CBP_ATEB	Aggregate Transfer to Elevation Bins	4.98E-04	3.29E-03	
CBP_STEB	Sand Transfer to Elevation Bins	3.81E-04	2.52E-03	
CBP_WHL	Weigh Hopper Loading	3.98E-04	2.65E-03	
CBP_TML	Truck Mix Loading (controlled)	1.56E-03	1.04E-02	
CBPLT01-03	CBP Loader Traffic	1.76E-03	1.76E-02	

Table 12: Emission Rates for Other Sources

Point Sources						
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*	*NOx (g/s)*	*SO_2 (g/s)*	*CO (g/s)*
GEN_LAR (1500 hp)	Generator >= 600 hp	1.33E-01	1.33E-01	4.55E+00	2.30E-03	1.04E+00
GEN_LAR (1000 hp)	Generator >= 600 hp	8.84E-02	8.84E-02	3.03E+00	1.53E-03	6.93E-01
GEN_LAR (700 hp)	Generator >= 600 hp	6.19E-02	6.19E-02	2.12E+00	1.07E-03	4.85E-01
GEN_SML (500 hp)	Generator < 600 hp	1.39E-01	1.39E-01	1.96E+00	7.65E-04	4.22E-01
Volume Sources						
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*			
TRUCK01-59	Truck Traffic	3.00E-02	3.00E-01			

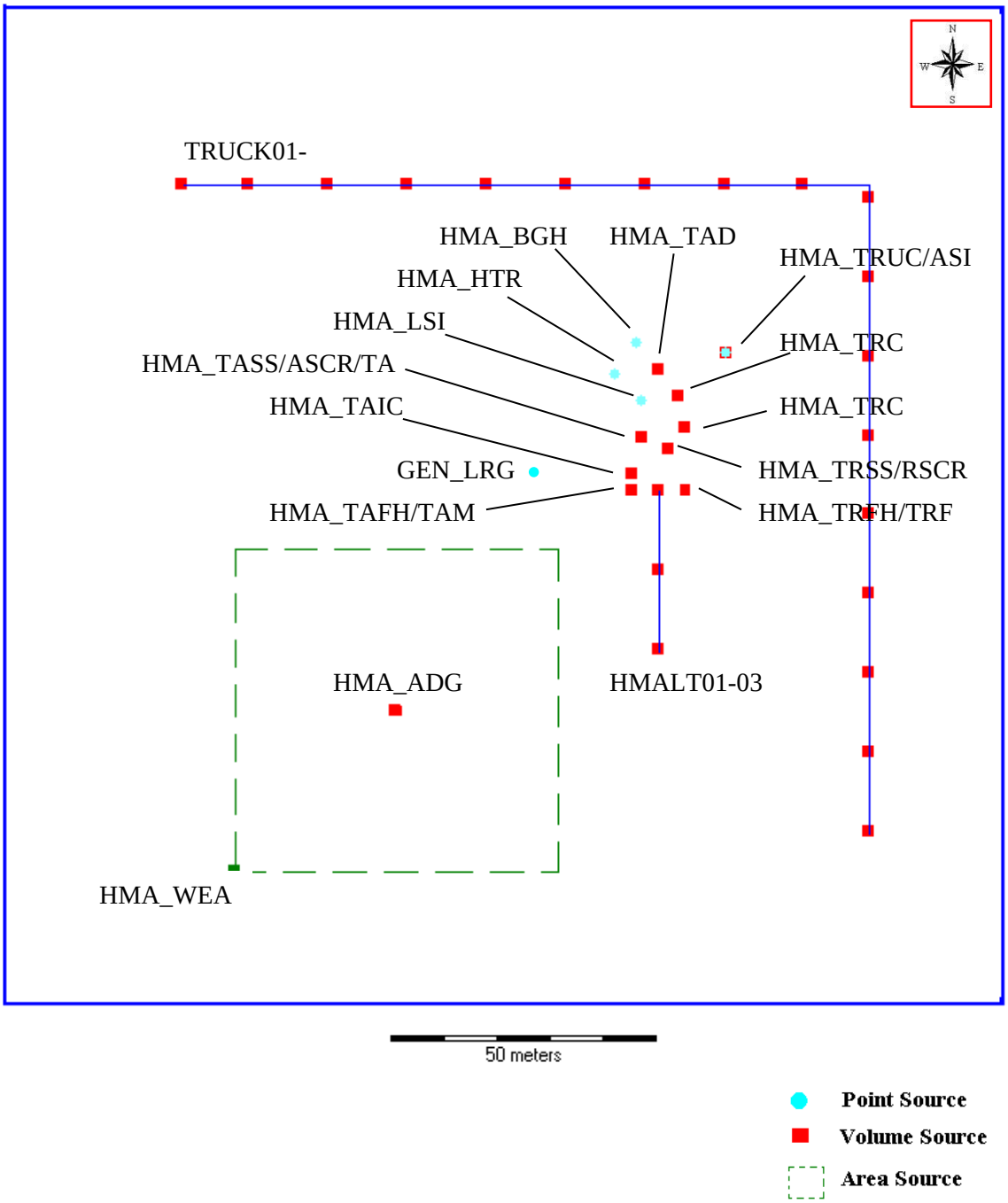

Figure 2. Sources Layout of a Generic Hot Mix Asphalt Plant (refer to Table 9 for detailed source descriptions)

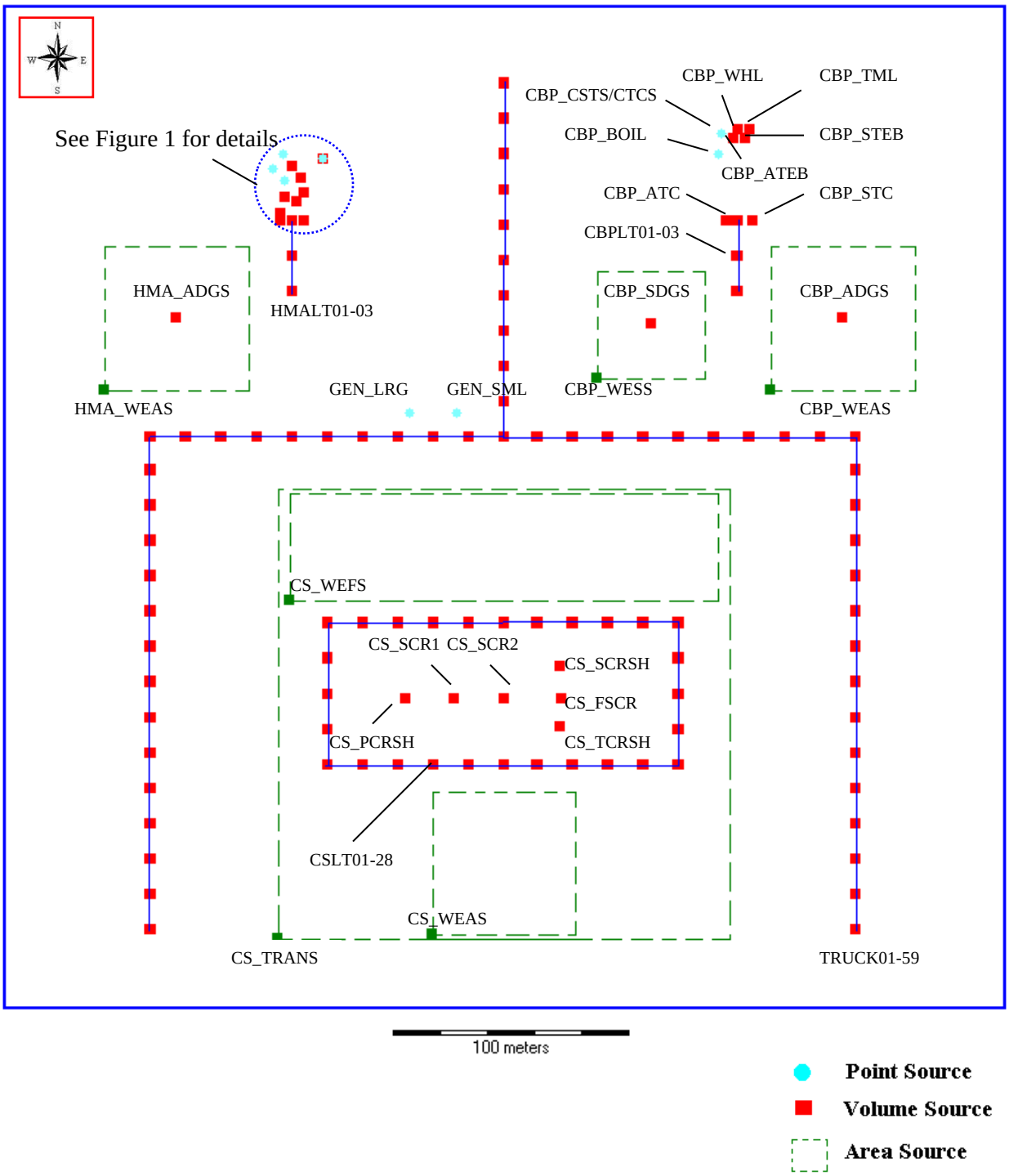

Figure 3. Sources Layout of a Generic Hot Mix Asphalt Plant Collocated with a Crushing and Screening Plant and a Concrete Batch Plant (refer to Table 9-17 for detailed source descriptions)

Table 13: Modeling Source Parameters for Hot Mix Asphalt Plant

Point Sources					
Source ID	*Source Description*	*Release Height (m)*	*Stack Temperature (K)*	*Stack Velocity (m/s)*	*Stack Diameter (m)*
HMA_LSIL	Lime Silo	24.38	Ambient Temperature	0.001	0.001
HMA_ASIL	Asphalt Silo	19.51	435.93	0.001	0.30
HMA_HTR	Asphalt Heater	3.66	448.98	90.73	0.25
HMA_BGHS	Baghouse	11.23	367.12	36.63	1.44
Area Source					
Source ID	*Source Description*	*Release Height (m)*	X-Length (m)	Y-Length (m)	Angel (degree)
HMA_WEAS	Aggregate Storage Pile	1.83	60.96	60.96	0.00

Volume Sources				
Source ID	*Source Description*	*Release Height (m)*	Initial Horizontal Dimensions (m)	Initial Vertical Dimensions (m)
HMA_ADGS	Aggregate Delivery to Ground Storage	6.17	1.60	2.20
HMA_TAFH	Aggregate Transfer to Feed Hopper	4.57	1.01	2.13
HMA_TAMC	Aggregate Transfer to Metering Conveyor	1.52	0.06	0.70
HMA_TAIC	Aggregate Transfer to Inclined Conveyor	1.52	0.06	0.70
HMA_TRFH	Transfer to RAP Feed Hopper	4.57	1.01	2.13
HMA_TRFC	RAP Transfer from Feed Hopper to Conveyor	1.52	0.06	0.70
HMA_TASS	Aggregate Transfer to Scalping Screen	6.71	0.15	3.11
HMA_ASCR	Aggregate Scalping Screen	5.79	0.40	2.68
HMA_TASC	Aggregate Transfer from Screen to Conveyor	5.79	0.15	0.06
HMA_TADD	Aggregate Transfer to Drum Dryer	7.32	0.15	3.41
HMA_TRSS	RAP Transfer to Scalping Screen	5.49	0.15	2.56
HMA_RSCR	RAP Scalping Screen	4.88	0.55	2.26
HMA_TRC1	RAP Transfer from Screen to Conveyor #1	5.49	0.15	2.56
HMA_TRC2	RAP Transfer from Conveyor #1 to #2	5.49	0.15	0.06
HMA_TRUC	Asphalt Drop into Truck	7.5	0.43	0.14

HMALT01-03	HMAP Loader Traffic	3.00	7.00	2.80

Table 14: Modeling Source Parameters for Crushing and Screening Plant

Area Source					
Source ID	*Source Description*	*Release Height (m)*	X-Length (m)	Y-Length (m)	Angel (degree)
CS_WEAS	Aggregate Storage Pile	1.83	60.96	60.96	0.00
CS_WEFS	Fines Storage Pile	1.83	182.88	45.72	0.00
CS_TRANS	Transfer Points	1.52	192.02	192.02	0.00

Volume Sources				
Source ID	*Source Description*	*Release Height (m)*	Initial Horizontal Dimensions (m)	Initial Vertical Dimensions (m)
CS_PCRSH	Primary Crusher-Jaw	5.18	0.43	2.41
CS_SCR1	Screen #1	7.62	0.85	3.54
CS_SCR2	Screen #2	7.62	0.85	3.54
CS_FSCR	Fine Screen	7.62	0.85	3.54
CS_SCRSH	Secondary Crusher -Core	7.62	0.37	3.54
CS_TCRSH	Tertiary Crusher	6.10	0.27	2.83
CSLT01-28	C&S Loader Traffic	3.00	7.00	2.80

Table 15: Modeling Source Parameters for Concrete Batch Plant

Point Sources					
Source ID	*Source Description*	*Release Height (m)*	*Stack Temperature (K)*	*Stack Velocity (m/s)*	*Stack Diameter (m)*
CBP_CSTS	Cement Supplement Transfer to Cement Silo	12.20	Ambient Temperature	4.00	0.32
CBP_CTCS	Cement Transfer to Cement Silo	12.20	Ambient Temperature	4.00	0.32
CBP_BOIL	Boiler	12.19	533.00	7.62	0.30
Area Sources					
Source ID	*Source Description*	*Release Height (m)*	*X-length*	*Y-length*	*Angel (degree)*
CBP_WEAS	Aggregate Storage Pile	1.83	60.96	60.96	0.00
CBP_WESS	Sand Storage Pile	1.83	45.72	45.72	0.00
Volume Sources					

Source ID	*Source Description*	*Release Height (m)*	*Initial Horizontal Dimensions (m)*	*Initial Vertical Dimensions (m)*
CBP_ADGS	Aggregate Delivery to Ground Storage	6.17	1.60	2.20
CBP_SDGS	Sand Delivery to Ground Storage	6.17	1.60	2.20
CBP_ATC	Aggregate Transfer to Conveyor	3.51	0.85	0.43
CBP_STC	Sand Transfer to Conveyor	3.51	0.85	0.43
CBP_ATEB	Aggregate Transfer to Elevation Bins	8.08	0.71	0.43
CBP_STEB	Sand Transfer to Elevation Bins	8.08	0.71	0.43
CBP_WHL	Weigh Hopper Loading	4.72	0.85	0.14
CBP_TML	Truck Mix Loading (controlled)	3.05	0.25	0.50
CBPLT01-03	CBP Loader Traffic	3.00	7.00	2.80

Table 16: Modeling Source Parameters for Other Sources

Point Sources					
Source ID	*Source Description*	*Release Height (m)*	*Stack Temperature (K)*	*Stack Velocity (m/s)*	*Stack Diameter (m)*
GEN_LAR	Generator >= 600 hp	6.71	783.00	30.50	0.20
GEN_SML	Generator < 600 hp	3.36	774.62	84.32	0.15

Volume Sources				
Source ID	*Source Description*	*Release Height (m)*	Initial Horizontal Dimensions (m)	Initial Vertical Dimensions (m)
TRUCK01-59	Truck Traffic	3.00	7.00	2.80

E. Meteorological Data

The Department obtained meteorological data from the ASOS network. The ASOS station can utilize AERMINUTE to significantly reduce calm or missing hours, which is critical for modeling short-term standards. As shown in Table 17, nine meteorological data sets were used to represent the meteorological conditions for PM_{10} attainment areas and three meteorological data sets for PM_{10} NAA, respectively. Data are available for the five-year period of 2016 to 2020.

The Department processed the meteorological data using AERMET version 21112 and AERMINUTE version 15272 and AERSURFACE version 20060. Based on EPA's recommendations, a minimum wind speed threshold of 0.5 m/s was used to treat winds

below the threshold as calms. Additionally, the Department has incorporated the ADJ_U* option in the meteorological data processing.

It should be addressed that the EPA overhauled the AERSURFACE tool. The previous version (13016) was limited to the use of the 1992 National Land Cover Database (NLCD) while the new version (20060) has the ability to process more recent NLCD products, including 2001, 2006, 2011, and 2016 land cover data. These updates to AERSURFACE may significantly influence the estimated surface characteristics parameters and thus modeled concentrations. Compared to the version 13016, as the Department found, the 20060 version may yield a lower surface roughness, resulting in a higher modeled concentration for the C&S GP modeling.

F. Receptor Grid

Receptors were spaced 25 meters along ambient air boundary (AAB) and 50 meters from AAB to 500 meters. Since the emission sources modeled are mainly ground level sources, the receptor network beginning at AAB and extending outward to one kilometer (km) is sufficiently large to identify the maximum impacts.

Table 17: Meteorological Data Sets used for AERMOD Modeling Analysis

Data Name	Surface Data	Upper Air Data	Data Period	County	For PM_{10} attainment areas or non-attainment areas?
Blythe, California	Blythe Airport	Las Vegas (KVEF)	01/01/2016-12/31/2020	La Paz[8]	Attainment
Flagstaff	Flagstaff Pulliam Airport	Flagstaff (KFGZ)	01/01/2016-12/31/2020	Coconino	Attainment
Kingman	Kingman Airport	Las Vegas (KVEF)	01/01/2016-12/31/2020	Mohave	Attainment
Nogales	Nogales International Airport	Tucson (KTUS)	01/01/2016-12/31/2020	Santa Cruz	Non-attainment
Tucson	Tucson International Airport	Tucson (KTUS)	01/01/2016-12/31/2020	Pima	Attainment
Page	Page Municipal Airport	Flagstaff (KFGZ)	01/01/2016-12/31/2020	Coconino	Attainment
Phoenix	Phoenix Sky Harbor International Airport	Tucson (KTUS)	01/01/2016-12/31/2020	Maricopa	Non-attainment
Prescott	Prescott Municipal Airport	Flagstaff (KFGZ)	01/01/2016-12/31/2020	Yavapai	Attainment
Safford	Safford Regional Airport	Tucson (KTUS)	01/01/2016-12/31/2020	Graham	Attainment
St Johns	St. Johns Industrial Air Park	Albuquerque (KABQ)	01/01/2016-12/31/2020	Apache	Attainment
Winslow	Winslow–Lindbergh Regional Airport	Albuquerque (KABQ)	01/01/2016-12/31/2020	Navajo	Attainment

[8] Due to the proximity, the Blythe Airport data are used to represent the meteorological conditions in La Paz County.

Yuma	Yuma Marine Corps Air Station	Tucson (KTUS)	01/01/2016-12/31/2020	Yuma	Non-attainment

G. Background Concentrations

1. Background Concentration for PM_{10}

In the previous modeling for the C&S GP, the Department estimated the background concentrations for 24-hour average PM_{10} based on language in Paragraph 8.2.2(b) of 40 CFR Part 51 Appendix W (November 2005). Specifically, the Department determined the meteorological conditions accompanying the concentration of concern (wind over 15 miles per hour, sustained for 3 or more hours) and averaged all 24-hour average PM_{10} concentrations over the course of the last 3 years for days that were over that wind speed. Based on this approach, the background concentration that used for modeling in PM_{10} NAA was 58 micrograms per cubic meter ($\mu g/m^3$). For PM_{10} attainment areas the concentration was 26 $\mu g/m^3$. Using these concentrations allowed facilities covered under the C&S GP to operate statewide, including in Maricopa County.

On January 17, 2017, EPA published a final rule that revises 40 CFR Part 51 Appendix W. The final rule removed the language of averaging concentrations for meteorological conditions of concern when determining the background concentrations for shorter averaging periods. Instead, the final rule recommends the use of the current design value for the applicable NAAQS as the best starting point. Therefore, the Department re-examined the background concentrations for 24-hour PM_{10} to ensure that the background determinations for the C&S GP modeling are consistent with Federal regulation.

a. Overview of PM_{10} Background Concentrations in Arizona

In Arizona, the PM_{10} monitoring data are strongly influenced by the climate, elevation and precipitation of the area where a monitoring station is located. Arizona has varied topographical areas and climate zones (Figure 4):

- Zone 1: A high plateau in the northeast, with elevations averaging between 5,000 and 7,000 feet above mean sea level. The plateau country receives approximately 10 inches of precipitation annually. Since vegetation on the plateau consists of sagebrush and native grasses, grazing is the primary land use. Higher ridges here are covered with junipers and pinon trees.
- Zone 2: A high mountainous region oriented southeast to northwest with maximum elevations between 9,000 and 12,000 feet. This region of the state averages between 25 and 30 inches of precipitation (rain plus snow water equivalence) annually. Within this region lies an unbroken stand of Ponderosa Pine.
- Zone 3: Low mountain ranges that form a transition zone between the high mountainous region and desert valleys in the southwestern portion of the state.

- Zone 4: Desert valleys in the southwestern portion of the state, with elevations as low as 100 feet above mean sea level. These desert valleys are an extension of the Sonoran Desert of Mexico. Annual precipitation is as low as three or four inches per year.

In general, Zone 2 has the lowest PM_{10} background concentration in Arizona, mainly due to high precipitation and heavy vegetation. On the contrary, Zone 4 has the highest background concentrations because of its desert nature. Indeed, many PM_{10} NAA in Arizona (Phoenix, West Pinal, Rillito and Yuma) are within Zone 4. The PM_{10} background concentrations in the transition Zone 3 are usually higher than those of Zone 2 but lower than those of Zone 4. Due to the lack of monitoring data, the background concentration for Zone 1 cannot be evaluated. However, the majority of Zone 1 are in tribal lands where the state GPs do not apply.

It should be addressed that an individual monitor is also strongly influenced by the degree of localized emissions of coarse particles. Therefore, even under the same climate zone, the monitoring concentrations from different monitors may vary significantly. Additionally, some areas such as Nogales and Yuma are impacted by international/interstate transport of emissions.

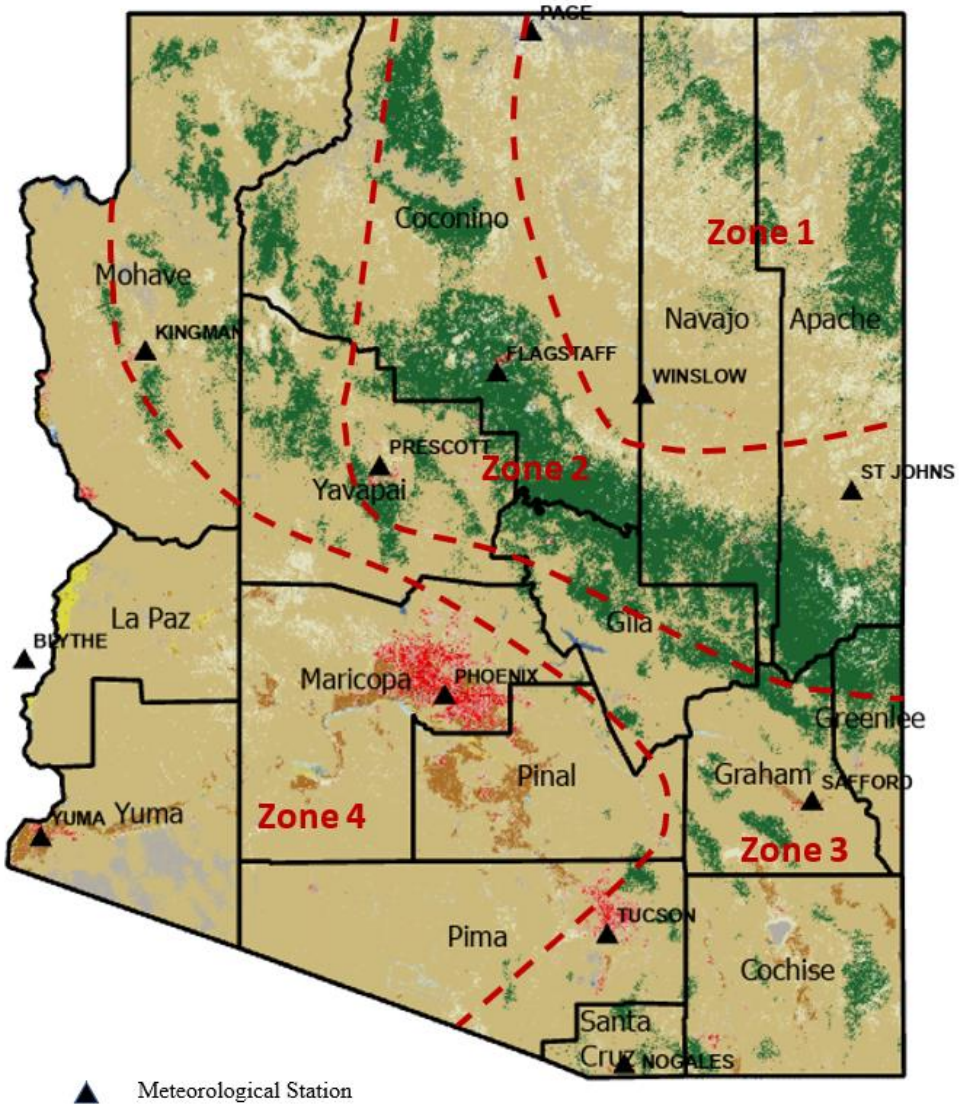

Figure 4. Arizona Climatological Zones (Zone 1 is northeast high plateau, Zone 2 is high mountains, Zone 3 is low mountains and transition zone, and Zone 4 is southwest desert.)

b. PM_{10} NAA

The Department's analysis focused on Maricopa County as it is the most concentrated area for the C&S GPs, and also has been extensively monitored for PM_{10}. The Department selected a time period of 2017-2019 to estimate the PM_{10} background concentration. The 2020 data were not

used because the lockdowns during 2020 pandemic may result in a biased estimate of air quality.

The Department used the following procedures to estimate the background concentration for Maricopa County:

- Obtained daily concentrations data for Years 2017, 2018 and 2019 from the EPA website: https://www.epa.gov/outdoor-air-quality-data;

- Calculated the 24-hour average monitoring concentration for each day by averaging the daily concentrations for 21 monitoring stations across Maricopa County;

- Removed the 24-hour average concentrations for days associated with unusual events or atypical conditions. Due to the arid nature of the state, Arizona is susceptible to both windblown dust events and smoke events from forest fire, both of which may qualify as unusual events or atypical conditions. Air quality monitoring data due to unusual events or atypical conditions must be excluded for the background determinations. The Department has identified the following unusual or atypical days:

  Year 2017: 9/7/2017, 10/21/2017;
  Year 2018: 1/9/2018, 4/12/2018, 4/19/2018, 7/8/2018, 7/9/2018, 7/21/2018, 7/30/2018, 8/2/2018, 8/7/2018, 8/8/2018;
  Year 2019: None.

- Selected the 2nd highest daily concentration for each year and then calculated the average concentration of the three years.

The calculated 24-hour average concentration was 86.5 µg/m^3. The Department rounded it up to 90 µg/m^3, which was used as the background concentration for PM_{10} NAA for the GP modeling purposes.

c. PM_{10} Attainment/Maintenance Areas

As previously discussed, the PM_{10} monitoring concentrations may vary significantly from one region to another. Upon reviewing the PM_{10} minoring data across the state, the Department determined that the Pima County monitoring data generally provide a reasonable estimation of the background concentrations for PM_{10} attainment/maintenance areas except two regions:

- Mohave Valley region; and

- High mountainous region in Coconino County and Yavapai County.

In general, the use of the Pima County monitoring data would underestimate the background concentrations for Mohave Valley region while overestimating the background concentrations in the high mountainous region (such as Flagstaff and Prescott Valley) in Coconino County and Yavapai County.

Mohave Valley Region

The Mohave Valley region is located in climate Zone 4 and has experienced elevated PM_{10} concentrations. Historically the Bullhead City, Arizona area was designated as a moderate PM_{10} nonattainment area, and now the area is a PM_{10} maintenance area. The PM_{10} monitoring data collected at the Bullhead City monitoring site between 2017 and 2019 indicate that the average of the 2nd highest 24-hour concentrations over three years was 88 $\mu g/m^3$. Therefore, the Department used a background concentration of 88 $\mu g/m^3$ coupled with the Kingman Airport meteorological data to model the GPs in Mohave County.

High Mountainous Region in Coconino County and Yavapai County

The PM_{10} background concentrations in this region are relatively low as they are located in Zone 2. Currently there is no state operated monitor within this region. The Department reviewed the historical monitoring data (2011-2013) collected from the Prescott Valley PM_{10} monitor and the Flagstaff PM_{10} monitor. While both monitors were disactivated, it is expected that these historical data may still represent the current air quality in Prescott Valley and Flagstaff. The average of the 2nd highest 24-hour concentrations over three years was 29 $\mu g/m^3$ for Prescott Valley and 33 $\mu g/m^3$ for Flagstaff, respectively. Considering these data were not current, the Department used a background concentration of 40 $\mu g/m^3$ for this region with a sufficient safety margin.

Pima County and Remaining Areas

There are 9 active monitoring stations in Pima County. Since the Rillito monitor is located within the Rillito PM_{10} NAA, the Department focused on the monitoring data collected from the other 8 monitoring stations during 2017-2019. The Department calculated the 24-hour average monitoring concentration for each day by averaging the daily concentrations for these stations. The average of the 2nd highest 24-hour concentrations over three years was 59.3 $\mu g/m^3$. Therefore, the Department used a background concentration of 60 $\mu g/m^3$ for Pima County and remaining areas.

Table 18 summarizes the PM_{10} background concentrations used in the GP modeling analysis.

Table 18: PM_{10} Background Concentrations Used in the GP Modeling Analysis

Regions		PM_{10} Background Concentration ($\mu g/m^3$)	Notes
PM_{10} NAA		90	2017-2019 data from Maricopa County
PM_{10} Attainment /Maintenance Areas	Mohave Valley (Bullhead City)	88	2017-2019 data from Bullhead City
	High Mountainous Region in Coconino County and Yavapai County (Flagstaff, Prescott Valley)	40	2011-2013 data from Flagstaff/Prescott Valley with sufficient safety margin
	Remaining Areas	60	2017-2019 data from Pima County

2. Background Concentration for $PM_{2.5}$

The spatial variations of $PM_{2.5}$ are typically smaller compared to PM_{10} because the long atmospheric residence time of fine particles allows long-range transport and leads to more uniform mass concentrations. Based on the 2017-2019 monitoring data, the Department classified the state into three different zones.

a. West Central Pinal $PM_{2.5}$ NAA

A portion of the West Central Pinal $PM_{2.5}$ NAA was banned from the previous C&S GP because the monitoring data collected from the Cowtown monitor showed significant violation for $PM_{2.5}$ NAAQS, both annual and 24-hour standards. In 2016, Pinal County Air Quality Control District (PCAQCD) moved the Cowtown monitor to a new location (Hidden Valley) at Stanfield. The 2017-2019 data collected from the Hidden Valley monitor still show violation for both annual and 24-hour $PM_{2.5}$. Therefore, the Department is proposing to expand the prohibition area to the entire West Central $PM_{2.5}$ NAA.

b. PM_{10} NAA (Excluding the West Central Pinal $PM_{2.5}$ NAA)

While the 2017-2019 monitoring data in these areas show the compliance with the NAAQS for $PM_{2.5}$, the $PM_{2.5}$ concentrations in these areas are significantly higher than other areas in the state. The Department estimated the $PM_{2.5}$ background concentration for these areas by averaging the monitoring concentrations obtained from all monitors in Maricopa County, the Casa Grande monitor in Pinal County, the Nogales monitor in Santa Cruz, and the Yuma monitor in Yuma County.

c. Remaining areas

For the remaining areas, the Department estimated the background concentrations for $PM_{2.5}$ by averaging the monitoring concentrations obtained from the monitors in Pima County, Cochise County, and La Paz County.

Table 19 summarizes the $PM_{2.5}$ background concentrations used in the GP modeling analysis.

Table 19: $PM_{2.5}$ Background Concentrations Used in the GP Modeling Analysis

Areas	Averaging Period	Background Concentration ($\mu g/m^3$)	Source of Data	Note
West Central Pinal $PM_{2.5}$ NAA	--	--	--	Prohibited
PM_{10} NAA (excluding the West Central Pinal $PM_{2.5}$ NAA)	24-hour	21	https://www.epa.gov/outdoor-air-quality-data Monitors including: all monitors in Maricopa; Case Grande in Pinal County; Nogales in Santa Cruz County; and Yuma Supersite in Yuma County.	Average of the 98th percentile 24-hour values over 2017-2019
	Annual	7.9		Average of the annual values over 2017-2019
Other Areas	24-hour	12	https://www.epa.gov/outdoor-air-quality-data Monitors including: Children's Park and Orange Grove in Pima County; Douglas in Cochise County; Alamo Lake in La Paz County.	Average of the 98th percentile 24-hour values over 2017-2019
	Annual	5.4		Average of the annual values over 2017-2019

3. Background Concentration for NO_2

a. Background Concentration for One-Hour NO_2

There are very limited NO_2 monitoring sites in Arizona and nearly all monitoring sites are located in the Phoenix and Tucson metropolitan areas. To determine representative background concentrations for 1-hour NO_2, the modeling analysis has classified the state of Arizona into three areas: Phoenix metropolitan area; Tucson metropolitan area; and the remaining

areas. Based on this classification, background concentrations were determined for the three areas separately.

The monitoring data collected from 6 monitors (Central Phoenix, JLG Supersite, West Phoenix, Diablo, Thirty-Third, Buckeye) during 2017-2019 were used to determine the background concentrations for Phoenix metropolitan area. The monitoring data collected from 2 monitors (Children's Park and 22nd & Craycroft) during 2017-2019 were used to determine the background concentrations for Tucson metropolitan area. The monitoring data collected from Deming, New Mexico were used for the background concentrations for the remaining areas, considering that the data should provide a representative or conservative estimate.

The modeling analysis used hour-of-day monitored background concentrations, which were determined as follows:

- For each of the three years under review, compiled all of the NO_2 concentrations by hour of day (1AM, 2AM, 3AM, etc) and calculated the 98 percentiles of NO_2 concentrations for each hour of the day;
- Calculated the background concentrations as the 3-year average of the 98 percentiles of concentrations for each hour of the day.

Table 20 provides the background concentrations for modeling 1-hour NO_2.

Table 20: One-Hour NO_2 Background Concentrations (µg/m^3)

	Phoenix Metropolitan Area	Tucson Metropolitan Area	Remaining Areas
HOUR 1	78.1	47.8	34.6
HOUR 2	72.8	43.4	32.1
HOUR 3	67.9	39.3	31.5
HOUR 4	65.7	38.6	29.6
HOUR 5	64.7	40.3	32.1
HOUR 6	68.0	42.9	34.0
HOUR 7	69.2	48.5	36.5
HOUR 8	71.3	51.0	34.0
HOUR 9	73.8	46.8	29.0
HOUR 10	73.1	39.6	18.3
HOUR 11	68.6	34.5	8.8
HOUR 12	60.4	27.6	5.7
HOUR 13	54.9	21.1	5.0
HOUR 14	52.3	18.1	4.4
HOUR 15	49.8	17.5	4.4
HOUR 16	49.6	20.1	5.0
HOUR 17	54.7	29.4	5.7
HOUR 18	71.1	47.1	16.4
HOUR 19	85.9	58.7	36.5
HOUR 20	87.7	62.6	46.0

HOUR 21	88.3	62.8	46.6
HOUR 22	87.3	61.1	45.4
HOUR 23	86.1	57.3	42.8
HOUR 24	82.7	53.7	38.4

b. Background Concentration for Annual NO_2

The Department selected the JLG Supersite Monitor in Maricopa County for determining the state-wide background concentrations for annual NO_2, considering that the data should provide a representative or conservative estimate. The highest annual concentration of NO_2 during 2017-2019 was approximately 30 $\mu g/m^3$.

4. Background Concentration for SO_2 and CO

ADEQ selected the JLG Supersite Monitor in Maricopa County for determining the state-wide background concentrations for SO_2, CO and annual NO2 (Table 21), considering that the data should provide a representative or conservative estimate.

Table 21: Background Concentrations for SO_2 and CO

Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$)	Source of Data	Note
SO_2	3-hour	21	https://www.epa.gov/outdoor-air-quality-data JLG Supersite Monitor	Highest concentration during 2017-2019
	1-hour	16		99th percentile of the annual distribution of daily maximum 1-hours values averaged across
CO	8-hour	2,000	https://www.epa.gov/outdoor-air-quality-data JLG Supersite Monitor	Highest concentration during 2017-2019
	1-hour	2,915		Highest concentration during 2017-2019

H. NO_2 Modeling Methodology

1. One-Hour NO_2 Modeling

The Department employed the Plume Volume Molar Ratio Method (PVMRM) approach for modeling 1-hour NO_2:

- The in-stack ratios of NO_2/NOx for a generator and a boiler were assumed to be 10%.
- Hourly background ozone concentrations from the JLG Supersite monitor were used across the State, considering that the Phoenix ozone data should provide conservative estimate for areas other than Phoenix metropolitan Area.

- Because urban heat island affects Phoenix all year-round, the urban dispersion option was used for modeling the Phoenix metropolitan areas. Considering part of the urban area that will contribute to the urban heat island plume affecting the sources, the Department determined a population of 3,000,000 for input to AERMOD. The rural dispersion option is used for other areas.

NO_2 background concentrations as listed in Table 20 were directly input to the model with the HROFDY option.

2. Annual NO_2 Modeling

To estimate the annual ambient NO_2 concentrations, the Department assumed a full conversion of NO to NO_2 (all NOx is NO_2), which is conservative. A background concentration of 30 µg/m^3 was added to the modeled concentration.

I. MODELED RESULTS

1. HMAP Collocated with C&S and CBP

Table 22-26 summarize the modeled results for the co-location of a HMAP (3,500 tpd), a C&S (3,250 tpd), and a CBP (1,275 yd^3 per day). Representative background concentrations were added to modeled impacts and the total concentrations were then compared to the NAAQS. As shown in the tables, emissions from a HMAP collocated with a C&S and a CBP will not cause or contribute to a violation of the NAAQS as long as a GP meets the operation limits and conditions as proposed in Section VII.B.

The AERMOD modeling analysis also revealed that the modeled impacts from a HMAP collocated with a C&S and a CBP were limited to near-field areas. The modeled maximum concentrations for any pollutants occurred in ambient area boundary.

Table 22: Modeled Results for $PM_{2.5}$ for HMAP Collocated with C&S and CBP

Meteorological data sets	Modeled concentration (µg/m^3)		Background concentration (µg/m^3)		Total concentration (µg/m^3)		NAAQS (µg/^{3})
	24-hour	Annual	24-hour	Annual	24-hour	Annual	
Blythe	12.2	4.3	12	5.4	24.2	9.7	24-hour: 35 Annual: 12
Flagstaff	12.0	5.6	12	5.4	24.0	11.0	
Kingman	9.5	4.3	12	5.4	21.5	9.7	
Page	8.4	4.0	12	5.4	20.4	9.4	
Prescott	11.6	6.5	12	5.4	23.6	11.9	
Safford	9.3	3.6	12	5.4	21.3	9.0	
St Johns	9.0	4.3	12	5.4	21.0	9.7	
Tucson	10.3	5.1	12	5.4	22.3	10.5	
Winslow	8.3	4.2	12	5.4	20.3	9.6	

Table 23: Modeled Results for 24-hour PM_{10} for HMAP Collocated with C&S and CBP

Meteorological data sets	Modeled concentration ($\mu g/m^3$)	Background concentration ($\mu g/m^3$)	Total concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
Blythe	47.5	60	107.5	150
Flagstaff	83.1	40	123.1	
Kingman	53.7	88	141.7	
Page	65.5	60	125.5	
Prescott	87.9	40	127.9	
Safford	49.6	60	109.6	
St Johns	81.1	60	141.1	
Tucson	62.6	60	122.6	
Winslow	67.1	60	127.1	

Table 24: Modeled Results for NO_2 for HMAP Collocated with C&S and CBP

Meteorological data sets	Modeled concentration ($\mu g/m^3$)		Background concentration ($\mu g/m^3$)		Total concentration ($\mu g/m^3$)		NAAQS ($\mu g/m^3$)
	1-hour[9]	Annual	1-hour	Annual	1-hour	Annual	
Blythe	170	11.4	See Table 13	30	170	41.4	1-hour: 189 Annual: 100
Flagstaff	148	11.4	See Table 13	30	148	41.4	
Kingman	154	10.5	See Table 13	30	154	40.5	
Page	132	3.8	See Table 13	30	132	33.8	
Prescott	145	6.7	See Table 13	30	145	36.7	
Safford	162	11.9	See Table 13	30	162	41.9	
St Johns	153	10.0	See Table 13	30	153	40.0	
Tucson	159	6.9	See Table 13	30	159	36.9	
Winslow	152	8.4	See Table 13	30	152	38.4	

Table 25: Modeled Results for SO_2 for HMAP Collocated with C&S and CBP

Meteorological data sets	Modeled concentration ($\mu g/m^3$)		Background concentration ($\mu g/m^3$)		Total concentration ($\mu g/m^3$)		NAAQS ($\mu g/m^3$)
	1-hour	3-hour	1-hour	3-hour	1-hour	3-hour	
Blythe	88	66	16	21	104	87	1-hour: 196 3-hour: 1,300
Flagstaff	99	90	16	21	115	111	
Kingman	112	98	16	21	128	119	
Page	64	38	16	21	80	59	
Prescott	53	44	16	21	69	65	
Safford	94	55	16	21	110	76	
St Johns	86	81	16	21	102	102	
Tucson	70	51	16	21	86	72	
Winslow	92	80	16	21	108	101	

Table 26: Modeled Results for CO for HMAP Collocated with C&S and CBP

[9] Background concentrations have been included in the model runs. Therefore, the reported concentrations reflect the total concentrations of modeled concentrations plus background concentrations.

Meteorological data sets	Modeled concentration (µg/m^3)		Background concentration (µg/m^3)		Total concentration (µg/m^3)		NAAQS (µg/m^3)
	1-hour	8-hour	1-hour	8-hour	1-hour	8-hour	
Blythe	491	313	2,915	2,000	3,406	2,313	1-hour: 40,000 8-hour: 10,000
Flagstaff	530	412	2,915	2,000	3,445	2,412	
Kingman	381	263	2,915	2,000	3,296	2,263	
Page	326	161	2,915	2,000	3,241	2,161	
Prescott	394	153	2,915	2,000	3,309	2,153	
Safford	577	324	2,915	2,000	3,492	2,324	
St Johns	510	248	2,915	2,000	3,425	2,248	
Tucson	343	180	2,915	2,000	3,258	2,180	
Winslow	351	238	2,915	2,000	3,266	2,238	

2. Stand Alone HMAP

Table 27-31 summarize the modeled results for a HMAP with a throughput of 4,000 tpd located in PM_{10} attainment areas and a HMAP with a throughput of 3,000 tpd in PM_{10} non-attainment areas. As shown in the tables, emissions from a HMAP will not cause or contribute to a violation of the NAAQS as long as a GP meets the operation limits and conditions as proposed in Section VII.B.

The AERMOD modeling analysis also revealed that the modeled impacts from a HMAP were limited to near-field areas. The modeled maximum concentrations for any pollutants occurred in ambient area boundary.

Table 27: Modeled Results for $PM_{2.5}$ for Stand Alone HMAP

Meteorological data sets	Modeled concentration (µg/m^3)		Background concentration (µg/m^3)		Total concentration (µg/m^3)		NAAQS (µg/m^3)
	24-hour	Annual	24-hour	Annual	24-hour	Annual	
Blythe	8.7	3.0	12	5.4	20.7	8.4	24-hour: 35 Annual: 12
Flagstaff	13.9	5.6	12	5.4	25.9	11.0	
Kingman	8.4	3.0	12	5.4	20.4	8.4	
Page	8.7	3.9	12	5.4	20.7	9.3	
Prescott	12.7	6.4	12	5.4	24.7	11.8	
Safford	7.4	2.8	12	5.4	19.4	8.2	
St Johns	9.3	4.1	12	5.4	21.3	9.5	
Tucson	7.5	3.9	12	5.4	19.5	9.3	
Winslow	7.7	3.1	12	5.4	19.7	8.5	
Nogales	7.1	3.2	21	7.9	28.1	11.1	
Phoenix	6.3	2.9	21	7.9	27.3	10.8	
Yuma	7.5	2.4	21	7.9	28.5	10.3	

Table 28: Modeled Results for 24-hour PM_{10} for Stand Alone HMAP

Meteorological data sets	Modeled concentration (µg/m^3)	Background concentration (µg/m^3)	Total concentration (µg/m^3)	NAAQS (µg/m^3)
Blythe	46.0	60	106.0	150
Flagstaff	93.9	40	133.9	
Kingman	52.4	88	140.4	
Page	74.6	60	134.6	
Prescott	104.6	40	144.6	
Safford	44.5	60	104.5	
St Johns	77.7	60	137.7	
Tucson	54.3	60	114.3	
Winslow	59.4	60	119.4	
Nogales	51.9	90	141.9	
Phoenix	44.7	90	134.7	
Yuma	48.0	90	138.0	

Table 29: Modeled Results for NO_2 for Stand Alone HMAP

Meteorological data sets	Modeled concentration (µg/m^3)		Background concentration (µg/m^3)		Total concentration (µg/m^3)		NAAQS (µg/m^3)
	1-hour[10]	Annual	1-hour	Annual	1-hour	Annual	
Blythe	183	9.6	See Table 13	30	183	39.6	1-hour: 189 Annual: 100
Flagstaff	159	15.7	See Table	30	159	45.7	
Kingman	174	14.4	See Table	30	174	44.4	
Page	103	5.3	See Table	30	103	35.3	
Prescott	99	5.0	See Table	30	99	35.0	
Safford	169	15.7	See Table	30	169	45.7	
St Johns	165	12.5	See Table	30	165	42.5	
Tucson	146	5.7	See Table	30	146	35.7	
Winslow	166	10.9	See Table	30	166	40.9	
Nogales	125	7.0	See Table	30	125	37.0	
Phoenix	166	5.0	See Table	30	166	35.0	
Yuma	153	7.2	See Table	30	153	37.2	

Table 30: Modeled Results for SO_2 for Stand Alone HMAP

Meteorological data sets	Modeled concentration (µg/m^3)		Background concentration (µg/m^3)		Total concentration (µg/m^3)		NAAQS (µg/m^3)
	1-hour	3-hour	1-hour	3-hour	1-hour	3-hour	
Blythe	102	91	16	21	118	112	1-hour: 196 3-hour: 1,300
Flagstaff	90	82	16	21	106	103	
Kingman	112	97	16	21	128	118	
Page	62	38	16	21	78	59	

[10] Background concentrations have been included in the model runs. Therefore, the reported concentrations reflect the total concentrations of modeled concentrations plus background concentrations.

Prescott	53	44	16	21	69	65	
Safford	95	80	16	21	111	101	
St Johns	85	81	16	21	101	102	
Tucson	70	51	16	21	86	72	
Winslow	92	80	16	21	108	101	
Nogales	84	84	16	21	100	105	
Phoenix	75	58	16	21	91	79	
Yuma	88	69	16	21	104	90	

Table 31: Modeled Results for CO for Stand Alone HMAP

Meteorological data sets	Modeled concentration ($\mu g/m^3$)		Background concentration ($\mu g/m^3$)		Total concentration ($\mu g/m^3$)		NAAQS ($\mu g/m^3$)
	1-hour	8-hour	1-hour	8-hour	1-hour	8-hour	
Blythe	305	205	2,915	2,000	3,220	2,205	
Flagstaff	277	213	2,915	2,000	3,192	2,213	
Kingman	318	174	2,915	2,000	3,233	2,174	
Page	213	89	2,915	2,000	3,128	2,089	
Prescott	290	100	2,915	2,000	3,205	2,100	1-hour: 40,000
Safford	323	144	2,915	2,000	3,238	2,144	
St Johns	243	170	2,915	2,000	3,158	2,170	8-hour: 10,000
Tucson	215	110	2,915	2,000	3,130	2,110	
Winslow	255	154	2,915	2,000	3,170	2,154	
Nogales	285	190	2,915	2,000	3,200	2,190	
Phoenix	249	110	2,915	2,000	3,164	2,110	
Yuma	248	144	2,915	2,000	3,163	2,144	

VIII. LIST OF ABBREVIATIONS

AAB ..... Process Area Boundary
A.A.C. ..... Arizona Administrative Code
ADEQ ..... Arizona Department of Environmental Quality
AERMAP ..... Terrain Processor for AERMOD
AERMINUTE ..... 1-minute ASOS Wind Data Processor for AERMOD
AERMOD ..... AMS/EPA Regulatory Model
AERMET ..... AERMOD Meteorological Preprocessor
AERSURFACE ..... Surface Characteristics Processor for AERMOD
AMS ..... American Meteorological Society
ASOS ..... Automated Surface Observing Stations
ATO ..... Authorization To Operate
BACT ..... Best Available Control Technology
BRIPPRIME ..... Building Input Processor for AERMOD
Btu ..... British Thermal Units
CBP ..... Concrete Batch Plant
CEMS ..... Continuous Emissions Monitoring System
CFR ..... Code of Federal Regulations
CO ..... Carbon Monoxide
C & S ..... Crushing and Screening
CPMS ..... Continuous Parametric Monitoring System

EPA ..... Environmental Protection Agency
°F ..... degrees Fahrenheit
g ..... Gram
GP ..... General Permit
gr/dscf ..... Grains per dry standard cubic foot
HAP ..... Hazardous Air Pollutant
HMAP ..... Hot Mix Asphalt Plant
HP ..... Horsepower
hr ..... Hour
K ..... Kelvin
Km ..... Kilometer
kW ..... Kilowatt
m ..... Meter
MMBtu ..... Metric Million British Thermal Unit
NAA ..... Nonattainment Area
NAAQS ..... National Ambient Air Quality Standard
NESHAP ..... National Emission Standards for Hazardous Air Pollutants
NLCD ..... National Land Cover Database
NO_X ..... Nitrogen Oxides
NO_2 ..... Nitrogen Dioxide
NSPS ..... New Source Performance Standards
PCAQCD ..... Pinal County Air Quality Control District
PM ..... Particulate Matter
PM_{10} ..... Particulate Matter no larger than 10 µm nominal aerodynamic diameter
$PM_{2.5}$ ..... Particulate Matter no larger than 2.5 µm nominal aerodynamic diameter
PTE ..... Potential to Emit
PVMRM ..... Plume Volume Molar Ratio Method
RACT ..... Reasonably Available Control Technology
RICE ..... Stationary Reciprocating Internal Combustion Engine
SIA ..... Significant Impact Area
SIL ..... Significant Impact Level
SO_2 ..... Sulfur Dioxide Significant Impact Levels
tpd ..... Tons per day
tph ..... Ton per Hour
TPY ..... Tons per Year
VOC ..... Volatile Organic Compound
µ ..... Micro
yd^3 ..... Cubic Yards
yr ..... Year