TECHNICAL REVIEW AND EVALUATION
OF THE HOT MIX ASPHALT PLANT GENERAL PERMIT

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 individual "Authorization To Operate" (ATO) for each rotary dryer, pug mill, asphalt heater, batch plant, silos, crusher, screen, lime silo, and internal combustion engines (except for those internal combustion engines which are integrated into crushers, screens, or conveyors). Each 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 hours of operation limitation depending on the equipment and the county it is operating in. 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 certain portions of the State.

The Permittee that applies for an ATO under the general permit shall pay to the Department a flat permit processing fee of $500 with the submittal of the permit application. 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).

Due the fact that this is a statewide general permit there is the potential that the Permittee may operate in a PM_{10} or $PM_{2.5}$ non-attainment area in the state of Arizona. The non-attainment areas are described in Table 1 below:

Table 1: Non-Attainment Areas- Summary and Classification

County	Townships	Section Where Visual Representation Is Shown
Maricopa	All	N/A
Pinal County and the Phoenix Planning Area	T1S, R8E; T2S, R8E; T3S, R7E; T3S, R8E; T4S, R8E (excluding all lands within the Gila River Indian Community); T5S, R4E (Only sections 12, 13, 24 and 25); T5S, R5E – R8E (excluding all lands within the Gila River Indian Community); T6S, R3E – R8E; T7S, R3E – R8E Sections 1-6. Phoenix Planning Area: T1N, R8E.	Appendix A
Santa Cruz	The Nogales area located in the southern part of Santa Cruz County. The portions of the following Townships which are within the State of Arizona and lie east of 111 degrees longitude: T23S, R13E, T23S, R14E, T24S, R13E, T24S, R14E.	Appendix B

County	Townships	Section Where Visual Representation Is Shown
Gila and Pinal	T1S, R13E (sections 7–36); T1S, R14E (sections 25–36);T2S, R13E; T2S, R14E; T2S, R15E; T3S, R13E; T3S, R14E; T3S, R15E; T3S, R16E (except that portion in the San Carlos Apache Indian Reservation); T4S, R13E; T4S, R14E; T4S, R15E; T4S, R16E; T5S, R13E; T5S, R14E; T5S, R15E; T5S, R16E; T6S, R13E; T6S, R14E; T6S, R15E; and T6S, R16E. Miami planning area T1N, R13E; T1N, R14E; T1N, R15E; T1S, R13E (sections 1–6); T1S, R14E (sections 1-24); T1S, R14 1/2E; and T1S, R15E.	Appendix C
Pima	The Rillito planning area which is located in the southern part of Pima County. The following townships are located in non-attainment areas: T11S-R9E, T11S-R10E, T11S-R11E, T11S-R12E, T12S-R8E, T12S-R9E, T12S-R10E, T12S-R11E and T12S-R12E. The Ajo planning area Township T12S, R6W, T12S, R5W (sections 6–8, 17-20, and 29-32).	Appendix D
Yuma	The Lower Colorado River Valley, in the southwestern part of Yuma County. The following townships are located in non-attainment areas: T7S-R21W, T7S-R22W, T8S-R21W, T8S-R22W, T8S-R23W, T8S-R24W, T9S-R21W, T9S-R22W, T9S-R23W, T9S-R24W, T9S-R25W, T10S-R21W, T10S-R22W, T10S-R23W, T10S-R24W, and T10S-R25W.	Appendix E
Cochise	The Douglas and Paul Spur areas; the following townships are located in non-attainment areas: T23S-R25E: T23S-R26E, T23S-R27E, T23S-R28E, T24S-R25E, T24S-R26E, T24S-R27E, and T24S-R28E.	Appendix F

Notes: 1. No operations are permitted within the portion of Pinal County: T4S, R3E – R4E, T5S, R3E – R4E (excluding sections 12, 13, 24, and 25) identified as $PM_{2.5}$ non-attainment area in Appendix "A".

2. No operations are permitted in the portions of Santa Cruz County, identified as $PM_{10}/PM_{2.5}$ non-attainment areas in Appendix "B", on any day that the Nogales particle pollution risk forecast at http://www.azdeq.gov/environ/air/ozone/nogales.pdf shows the risk of unhealthy particulate matter concentration to be "High" or if the Air Quality Index (AQI) for $PM_{2.5}$ is forecast as "Unhealthy for Sensitive Groups".

II. OPERATING LIMITS AND ASSOCIATED EMISSIONS

Based on the modeled results (refer to Section V for detailed modeling analysis), the production limitations for HMAP along with collocated C & S, and CBP have been established. Table 2 below summarizes such production limitations:

Table 2: Modeling- Based Production Limitations

Facility	Maximum Daily Production	
	PM_{10} Attainment Area	PM_{10} Non-attainment Area
Stand-alone HMAP	5,280 tons	3,150 tons
HMAP collocated with C & S and CBP	HMAP: 4,200 tons C&S: 3,780 tons CBP: 1,275 yd^3	Not authorized

In addition to the above limitations, the Permittee may also be subject to operating hour limitations in the ATOs. These limits shall be calculated based on the potential to emit calculations. In no case shall the emissions in Table 3 below exceed the statewide emission limits required to stay below major source thresholds, or the Maricopa County emissions limits which is required to avoid BACT review under Maricopa County Rule 241:

Table 3: Emission Limitations

Pollutants	Statewide Emission limit (excluding Maricopa County)	Emission Limit in Maricopa County	
	(ton/yr)	(lb/day)	(ton/yr)
PM	90	135	22.5
PM_{10}	90	76.5	13.5
CO	90	495	90
NO_x	90	135	22.5
SO_2	90	135	22.5

VOC	90	135	22.5

III. APPLICABLE REGULATIONS

The Department has identified the applicable regulations that apply to each unit under this General Permit. Tables 4 below summarize the findings of the Department with respect to the regulations that are applicable to each emissions unit.

Table 4: Applicable Regulations Statewide excluding Maricopa, Pima, and Pinal County

Unit ID	Control Equipment	Applicable Regulations	Verification
Hot Mix Asphalt Plant	Baghouse/ venturi scrubber for drum dryer Baghouse/dust collector for cement silo Spray bars for screening/material handling operations Rubber sleeve for product delivery system	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.
Asphalt heater	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	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. .

Unit ID	Control Equipment	Applicable Regulations	Verification
Boiler in Concrete Batch Plant		A.A.C. R18-2-724.C.1, J, and G	A.A.C. R18-2-719- Standards of Performance for Fossil-fuel fired industrial and commercial equipment is applicable to the boiler.
		NESHAP Subpart JJJJJJ	NESHAP Subpart JJJJJJ is applicable to both existing and new boilers.
Direct fired fuel burning equipment in Concrete Batch Plant		A.A.C. R18-2-730.A.1.a and b	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.
Mobile sources	Water Sprays/Water Truck for dust control	A.A.C. R-18-2, Article 8	These standards are applicable to off-road mobile sources, which either move while emitting air pollutants or are frequently moved during the course of their utilization.
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.
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	Standards of Performance for Stationary Compression Ignition Internal Combustion Engines-40 CFR 60 Subpart IIII are applicable to compression ignition engines manufactured after April 1, 2006.
		40 CFR 60 Subpart JJJJ	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines-40 CFR 60 Subpart JJJJ are applicable to spark ignition engines manufactured after July 1, 2008

Unit ID	Control Equipment	Applicable Regulations	Verification
		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. However, engines that are subject to 40 CFR 60 Subpart IIII or JJJJ do not have any additional requirements

Table 5: Applicable Regulations for Maricopa County

Unit ID	Control Equipment	Applicable Regulations	Verification
Crushing and Screening Plants Concrete Batch Plants Hot Mix Asphalt Plant Fugitive Dust	Wet scrubbers, spray bars, wet suppressants and enclosures	Maricopa County Rule 316	Nonmetallic Mineral Processing located in Maricopa County
Facility Wide Requirements	None	Maricopa County Rule 100 Maricopa County Rule 200 Maricopa County Rule 220 Maricopa County Rule 230 Maricopa County Rule 300 Maricopa County Rule 310 Maricopa County Rule 312 Maricopa County Rule 315 Maricopa County Rule 320	General Provisions and Definitions Permit Requirements Non-Title V Permit Provisions General Permits Visible Emissions Fugitive Dust from Dust-Generating Operations Abrasive Blasting Spray Coating Operations Odors And Gaseous Air Contaminants

Unit ID	Control Equipment	Applicable Regulations	Verification
Internal Combustion Engines	None	Maricopa County Rule 324	Stationary Rotating Machinery subject to State rules located in Maricopa County.

Table 6: Applicable Regulations for Pima County

Unit ID	Control Equipment	Applicable Regulations	Verification
Hot Mix Asphalt Plant		P.C.C. §17.16.210.B, C, and D	The regulations listed are applicable to Hot Mix Asphalt Plants located in Pima County.
Concrete Batch Plant	Spray Bars	P.C.C. §17.16.380	The regulations listed are applicable to Crushing and Screening Plants located in Pinal County.
Crushing and Screening Plant	Spray Bars	P.C.C. §17.16.010.C P.C.C. §17.16.040 P.C.C. §17.16.050 P.C.C. §17.16.060 P.C.C. §17.16.070 P.C.C. §17.16.080 P.C.C. §17.16.090 P.C.C. §17.16.100 P.C.C. §17.16.360 P.C.C. §17.16.370 P.C.C. §17.16.380 P.C.C. §17.16.710 SIP Rule 343	The regulations listed are applicable to Crushing and Screening Plants located in Pima County.

Table 7: 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.

IV. PERIODIC MONITORING, RECORDKEEPING AND REPORTING REQUIREMENTS

A. Facility wide General Requirements

1. The Permittee must maintain daily records of the operating hours of the equipment covered under the General Permit which are subject to an hourly restriction.

2. The Permittee must maintain records of the total daily throughput of material for the

hot mix asphalt plant ((in tons per day), crushing & screening plant (in tons per day), and for the concrete batch plant (in cubic yards per day) covered under this General Permit.

3. The Permittee must keep on-site records of maintenance performed on all emission related equipment.

4. At the time the compliance certifications are submitted, the Permittee must submit reports of all monitoring, recordkeeping, and testing activities required by the permit.

5. The Permittee is required to conduct a monthly visual survey on all process equipment and all fugitive dust sources. If the source appears to exceed the standard, the Permittee must conduct an EPA Reference Method 9 observation. The Permittee must keep records of all surveys and EPA Reference Method 9 observations performed. These records will include the emission point observed, location of observer, name of observer, date and time of observation, and the results of the observation. If the observation shows a Method 9 opacity reading in excess of the opacity standard, the Permittee will be required to initiate appropriate corrective action to reduce the opacity below the standard. The Permittee will keep a record of the corrective action performed. These logs must be maintained on-site and be available to ADEQ representative upon request.

6. The Permittee must burn only ultra low sulfur fuel in the engines, heaters and boilers. The Permittee must keep records of fuel supplier certifications. The certification shall contain information regarding the name of fuel supplier, lower heating value of the fuel and sulfur content.

B. Hot Mix Asphalt Plant

1. The Permittee shall conduct annual black light inspection on the bags contained in the drum dryer baghouse to detect broken or leaking bags. If broken or leaking bags are detected, the Permittee must repair or replace the bags. The Permittee must record the name of the inspector, the date, the time, and the results of the inspection and repairs.

2. If recycled asphalt is used, the Permittee must maintain records of the production rate of hot mix asphalt and the percentage of recycled asphalt in the aggregate.

V. TESTING REQUIREMENTS

A. Facility wide

If any equipment has emission limits specified for any criteria pollutants in the ATO, the Permittee is required conduct performance tests on each such equipment within 180 days of issuance of the ATOs, or within 180 days of commencement of operation for new facilities in order to demonstrate compliance with the specified emission limit. Subsequent test must be conducted once every year.

B. Hot Mix Asphalt Plant

Within 180 days of issuance of the permit and annually thereafter, the Permittee is required to conduct performance tests for particulate matter (PM) from the drum dryer to show compliance with the emission standards.

VI. MODELING ANALYSIS

A. Model Selection

The most recent version of the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD, version 11103) was used in this modeling analysis. 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
- BRIPPRIME: the building input processor

The terrain processor (AERMAP) and the building input processor (BRIPPRIME) were not used in this analysis because both of them require site-specific information. Moreover, an assumption of "Flat Terrain" was believed to be reasonable.

B. Source Inputs

1. Emission Rates

The most significant emission source in a hot mix asphalt plant 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 hot mix asphalt plant 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 crushing & screening plant and a concrete batch plant, which may be co-located with the hot mix asphalt plant.

a. Emission Rate Factor

Generally 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:

$$E = k(0.032)\frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} \qquad \text{(Equation 1)}$$

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

A comprehensive emission inventory was developed for a hot mix asphalt plant with an assumed operating capacity of 350 tons per hour (Table 8). Note that this capacity is used for the convenience of emission estimation only, and it may not represent the maximum allowable throughput for a hot mix asphalt plant in the General Permit. To model the operating capacity other than 350 tons per hour, the emission rates listed in Table 8 were adjusted as discussed later. In this modeling analysis, the operating capacity for a crushing & screening plant and a concrete batch plant was fixed at 315 tons per hour and 1275 yd^3 per day, respectively. The corresponding emission rates for all sources in the crushing & screening plant and the concrete batch plant are shown in Table 9 and Table 10, respectively. Besides the sources above, emissions from unpaved roads and two internal combustion engines (generators) were also modeled. The emission rates of pollutants from these sources are summarized in Table 11.

c. Modeled Emission Rates

It is critical that the emissions used for modeling are matched to the averaging time being assessed. For 24-hour PM_{10} and 24-hour $PM_{2.5}$, if a hot mix asphalt plant was modeled to run at a specific capacity (tons/hour) for certain hours per day, the modeled hourly emission rates for applicable sources were adjusted by using Emission Rate Flag HROFDY in AERMOD:

$$HROFDY = \frac{\text{Modeled operating capacity (tons/hour)}}{\text{350 tons/hour}} \times \frac{\text{Modeled operating hours}}{24}$$

Many batch drop/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.

For SO_2 and CO, maximum hourly emission rates were modeled for comparisons to their short-term air quality standards. As the SO_2 emissions are relatively small, maximum hourly emission rates were also used to provide a conservative estimation for annual impacts. To model annual average NO_2 concentrations, annual averaging hourly emission rates were used. Moreover, the NO_2/NO_x ratio was set as 0.75, the national annual default value.

2. Sources Layout

The layout of hot mix asphalt plants generally differs from one site to another. To simplify the modeling analysis, a generic site plan was developed for a hot mix asphalt plant, alone or co-located with a crushing & screening plant and a batch concrete batch plant, as shown in Figure 1 and Figure 2, respectively. The layout of sources was determined 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;
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.

Tables 12-15 summarize the source release parameters used in the modeling analysis. These parameters were determined 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 the Maricopa County.

Table 8: Maximum Hourly Emission Rates for Hot Mix Asphalt Plant (HMAP)*

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)*
HMA_LSIL	Lime Silo	1.50E-04	1.50E-04	-	-	-
HMA_ASIL	Asphalt Silo	2.24E-02	2.24E-02	-	-	3.58E-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	2.43E+00	2.56E+00	5.75E+00
Area Source						
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*			
HMA_WEAS	Aggregate Storage Pile	1.16E-05	1.16E-05			
Volume Sources						
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (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			

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	1.43E-02	1.43E-02
HMALT01	HMAP Loader Traffic	5.70E-04	4.34E-03
HMALT02	HMAP Loader Traffic	5.70E-04	4.34E-03
HMALT03	HMAP Loader Traffic	5.70E-04	4.34E-03

*: *Emission rates were estimated based on an operating capacity of 350 tons per hour.*

Table 9: Maximum Hourly Emission Rates for Crushing & Screening Plant*

Area Source			
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*
CS_WEAS	Aggregate Storage Pile	1.16E-05	1.16E-05
CS_WEFS	Fines Storage Pile	2.61E-05	2.61E-05
CS_TRANS	Transfer Points	7.12E-03	2.52E-02
Volume Sources			
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*
CS_PCRSH	Primary Crusher-Jaw	3.98E-03	2.15E-02
CS_SCR1	Screen #1	1.99E-03	2.94E-02
CS_SCR2	Screen #2	1.99E-03	2.94E-02
CS_FSCR	Fine Screen	4.41E-03	8.75E-02
CS_SCRSH	Secondary Crusher -Core	3.98E-03	2.15E-02
CS_TCRSH	Tertiary Crusher	2.87E-03	1.55E-02
CSLT01	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT02	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT03	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT04	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT05	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT06	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT07	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT08	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT09	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT10	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT11	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT12	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT13	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT14	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT15	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT16	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT17	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT18	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT19	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT20	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT21	C&S Loader Traffic	5.70E-04	4.34E-03

CSLT22	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT23	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT24	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT25	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT26	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT27	C&S Loader Traffic	5.70E-04	4.34E-03
CSLT28	C&S Loader Traffic	5.70E-04	4.34E-03

*: *Emission rates were estimated based on an operating capacity of 315 tons per hour*

Table 10: Maximum Hourly Emission Rates for Concrete Batch Plant*

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)*
CBP_CSTS	Cement Supplement Transfer to Cement Silo	1.80E-04	1.20E-03	-	-	-
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	1.92E-03	4.51E-02

Area Sources			
Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*
CBP_WEAS	Aggregate Storage Pile	1.16E-05	1.16E-05
CBP_WESS	Sand Storage Pile	6.53E-06	6.53E-06
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	CBP Loader Traffic	5.70E-04	4.34E-03
CBPLT02	CBP Loader Traffic	5.70E-04	4.34E-03
CBPLT03	CBP Loader Traffic	5.70E-04	4.34E-03

*: *Emission rates were estimated based on an operating capacity of 1275 yd^3 per day*

Table 11: Maximum Hourly 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	Generator >= 600 hp	8.84E-02	8.84E-02	3.03E+00	1.53E-03	6.95E-01
GEN_SML	Generator < 600 hp	2.78E-01	2.78E-01	3.91E+00	1.53E-03	8.44E-01

Volume Sources

Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*
TRUCK01	Truck Traffic	3.05E-04	2.50E-03
TRUCK02	Truck Traffic	3.05E-04	2.50E-03
TRUCK03	Truck Traffic	3.05E-04	2.50E-03
TRUCK04	Truck Traffic	3.05E-04	2.50E-03
TRUCK05	Truck Traffic	3.05E-04	2.50E-03
TRUCK06	Truck Traffic	3.05E-04	2.50E-03
TRUCK07	Truck Traffic	3.05E-04	2.50E-03
TRUCK08	Truck Traffic	3.05E-04	2.50E-03
TRUCK09	Truck Traffic	3.05E-04	2.50E-03
TRUCK10	Truck Traffic	3.05E-04	2.50E-03
TRUCK11	Truck Traffic	3.05E-04	2.50E-03
TRUCK12	Truck Traffic	3.05E-04	2.50E-03
TRUCK13	Truck Traffic	3.05E-04	2.50E-03
TRUCK14	Truck Traffic	3.05E-04	2.50E-03
TRUCK15	Truck Traffic	3.05E-04	2.50E-03
TRUCK16	Truck Traffic	3.05E-04	2.50E-03
TRUCK17	Truck Traffic	3.05E-04	2.50E-03
TRUCK18	Truck Traffic	3.05E-04	2.50E-03
TRUCK19	Truck Traffic	3.05E-04	2.50E-03
TRUCK20	Truck Traffic	3.05E-04	2.50E-03
TRUCK21	Truck Traffic	3.05E-04	2.50E-03
TRUCK22	Truck Traffic	3.05E-04	2.50E-03
TRUCK23	Truck Traffic	3.05E-04	2.50E-03
TRUCK24	Truck Traffic	3.05E-04	2.50E-03
TRUCK25	Truck Traffic	3.05E-04	2.50E-03
TRUCK26	Truck Traffic	3.05E-04	2.50E-03
TRUCK27	Truck Traffic	3.05E-04	2.50E-03
TRUCK28	Truck Traffic	3.05E-04	2.50E-03
TRUCK29	Truck Traffic	3.05E-04	2.50E-03
TRUCK30	Truck Traffic	3.05E-04	2.50E-03
TRUCK31	Truck Traffic	3.05E-04	2.50E-03
TRUCK32	Truck Traffic	3.05E-04	2.50E-03
TRUCK33	Truck Traffic	3.05E-04	2.50E-03
TRUCK34	Truck Traffic	3.05E-04	2.50E-03
TRUCK35	Truck Traffic	3.05E-04	2.50E-03
TRUCK36	Truck Traffic	3.05E-04	2.50E-03
TRUCK37	Truck Traffic	3.05E-04	2.50E-03

Table 11 (continued)

Source ID	*Source Description*	*$PM_{2.5}$ (g/s)*	*PM_{10} (g/s)*
TRUCK38	Truck Traffic	3.05E-04	2.50E-03
TRUCK39	Truck Traffic	3.05E-04	2.50E-03
TRUCK40	Truck Traffic	3.05E-04	2.50E-03
TRUCK41	Truck Traffic	3.05E-04	2.50E-03
TRUCK42	Truck Traffic	3.05E-04	2.50E-03
TRUCK43	Truck Traffic	3.05E-04	2.50E-03
TRUCK44	Truck Traffic	3.05E-04	2.50E-03
TRUCK45	Truck Traffic	3.05E-04	2.50E-03
TRUCK46	Truck Traffic	3.05E-04	2.50E-03
TRUCK47	Truck Traffic	3.05E-04	2.50E-03
TRUCK48	Truck Traffic	3.05E-04	2.50E-03
TRUCK49	Truck Traffic	3.05E-04	2.50E-03
TRUCK50	Truck Traffic	3.05E-04	2.50E-03
TRUCK51	Truck Traffic	3.05E-04	2.50E-03
TRUCK52	Truck Traffic	3.05E-04	2.50E-03
TRUCK53	Truck Traffic	3.05E-04	2.50E-03
TRUCK54	Truck Traffic	3.05E-04	2.50E-03
TRUCK55	Truck Traffic	3.05E-04	2.50E-03
TRUCK56	Truck Traffic	3.05E-04	2.50E-03
TRUCK57	Truck Traffic	3.05E-04	2.50E-03
TRUCK58	Truck Traffic	3.05E-04	2.50E-03
TRUCK59	Truck Traffic	3.05E-04	2.50E-03

Figure 1: Sources Layout of a Generic Hot Mix Asphalt Plant

(Refer to Table 8 and Table 12 for detailed source descriptions)

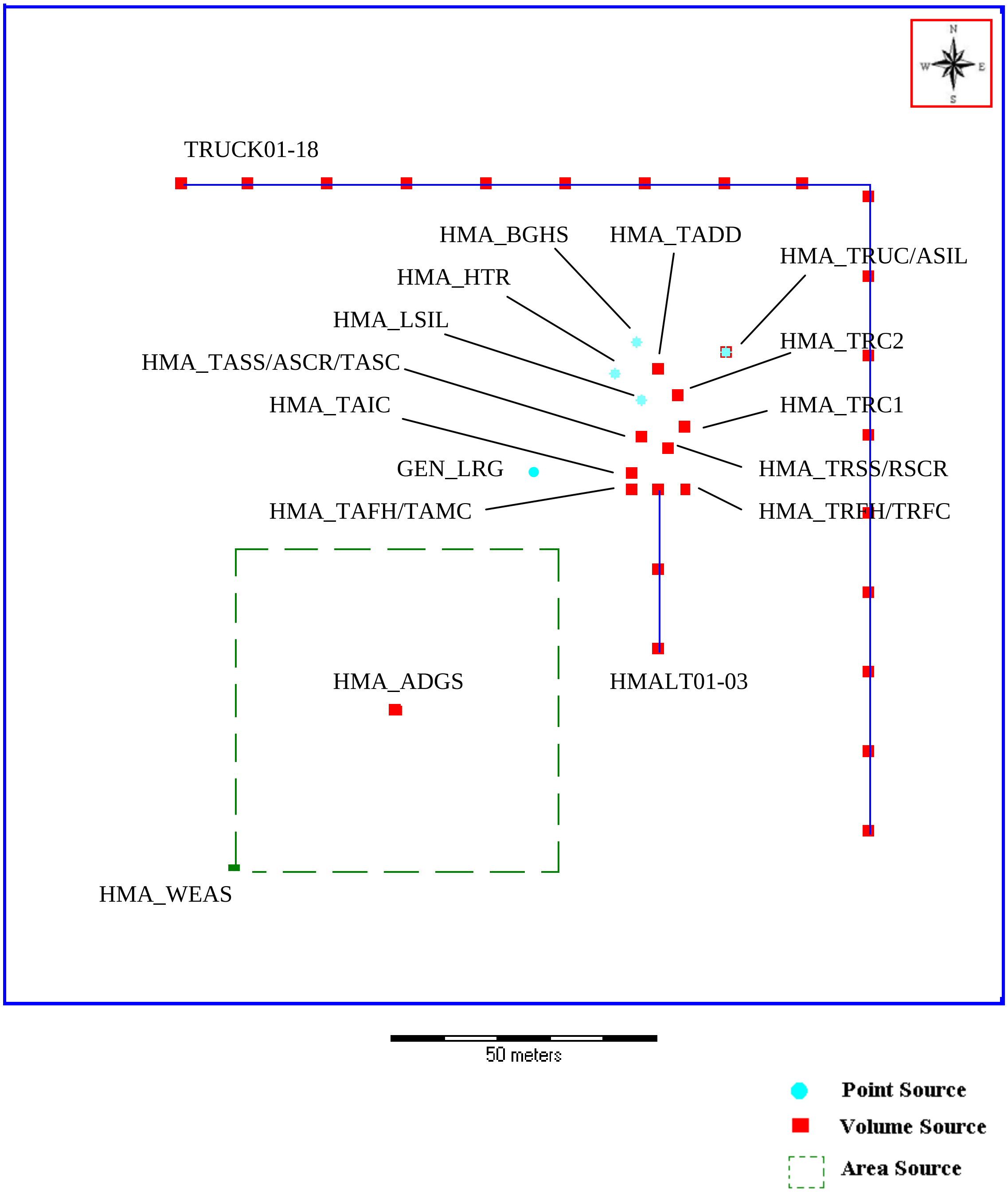

Figure 2: Sources Layout of a Generic Hot Mix Asphalt Plant Co-located with a Crushing and Screening Plant and a Concrete Batch Plant

(Refer to Tables 8-12 for detailed source descriptions)

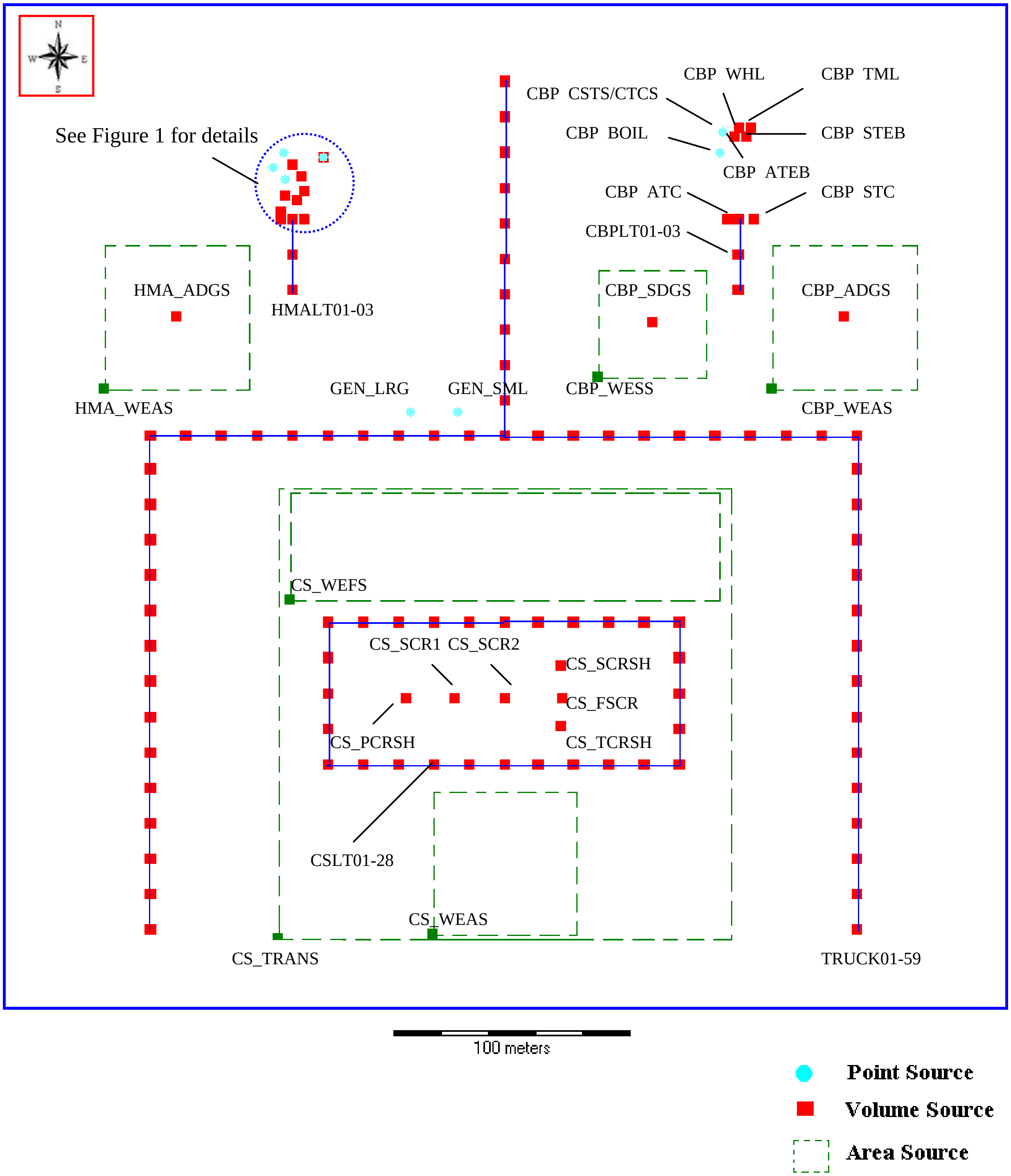

Table 12: Modeling Source Parameters for Hot Mix Asphalt Plant (HMAP)

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	0.00	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	3.05	0.27	1.43
HMALT01	HMAP Loader Traffic	3.00	7.00	2.80
HMALT02	HMAP Loader Traffic	3.00	7.00	2.80
HMALT03	HMAP Loader Traffic	3.00	7.00	2.80

Table 13: 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	C&S Loader Traffic	3.00	7.00	2.80
CSLT02	C&S Loader Traffic	3.00	7.00	2.80
CSLT03	C&S Loader Traffic	3.00	7.00	2.80
CSLT04	C&S Loader Traffic	3.00	7.00	2.80
CSLT05	C&S Loader Traffic	3.00	7.00	2.80
CSLT06	C&S Loader Traffic	3.00	7.00	2.80
CSLT07	C&S Loader Traffic	3.00	7.00	2.80
CSLT08	C&S Loader Traffic	3.00	7.00	2.80
CSLT09	C&S Loader Traffic	3.00	7.00	2.80
CSLT10	C&S Loader Traffic	3.00	7.00	2.80
CSLT11	C&S Loader Traffic	3.00	7.00	2.80
CSLT12	C&S Loader Traffic	3.00	7.00	2.80
CSLT13	C&S Loader Traffic	3.00	7.00	2.80
CSLT14	C&S Loader Traffic	3.00	7.00	2.80
CSLT15	C&S Loader Traffic	3.00	7.00	2.80
CSLT16	C&S Loader Traffic	3.00	7.00	2.80
CSLT17	C&S Loader Traffic	3.00	7.00	2.80
CSLT18	C&S Loader Traffic	3.00	7.00	2.80
CSLT19	C&S Loader Traffic	3.00	7.00	2.80
CSLT20	C&S Loader Traffic	3.00	7.00	2.80
CSLT21	C&S Loader Traffic	3.00	7.00	2.80
CSLT22	C&S Loader Traffic	3.00	7.00	2.80
CSLT23	C&S Loader Traffic	3.00	7.00	2.80
CSLT24	C&S Loader Traffic	3.00	7.00	2.80
CSLT25	C&S Loader Traffic	3.00	7.00	2.80
CSLT26	C&S Loader Traffic	3.00	7.00	2.80
CSLT27	C&S Loader Traffic	3.00	7.00	2.80
CSLT28	C&S Loader Traffic	3.00	7.00	2.80

Table 14: Modeling Source Parameters for Concrete Batch Plant (CBP)

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	408.00	4.00	0.32
CBP_CTCS	Cement Transfer to Cement Silo	12.20	408.00	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	CBP Loader Traffic	3.00	7.00	2.80
CBPLT02	CBP Loader Traffic	3.00	7.00	2.80
CBPLT03	CBP Loader Traffic	3.00	7.00	2.80

Table 15: 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	Truck Traffic	3.00	7.00	2.80
TRUCK02	Truck Traffic	3.00	7.00	2.80
TRUCK03	Truck Traffic	3.00	7.00	2.80
TRUCK04	Truck Traffic	3.00	7.00	2.80
TRUCK05	Truck Traffic	3.00	7.00	2.80
TRUCK06	Truck Traffic	3.00	7.00	2.80
TRUCK07	Truck Traffic	3.00	7.00	2.80
TRUCK08	Truck Traffic	3.00	7.00	2.80
TRUCK09	Truck Traffic	3.00	7.00	2.80
TRUCK10	Truck Traffic	3.00	7.00	2.80
TRUCK11	Truck Traffic	3.00	7.00	2.80
TRUCK12	Truck Traffic	3.00	7.00	2.80
TRUCK13	Truck Traffic	3.00	7.00	2.80
TRUCK14	Truck Traffic	3.00	7.00	2.80
TRUCK15	Truck Traffic	3.00	7.00	2.80
TRUCK16	Truck Traffic	3.00	7.00	2.80
TRUCK17	Truck Traffic	3.00	7.00	2.80
TRUCK18	Truck Traffic	3.00	7.00	2.80
TRUCK19	Truck Traffic	3.00	7.00	2.80
TRUCK20	Truck Traffic	3.00	7.00	2.80
TRUCK21	Truck Traffic	3.00	7.00	2.80
TRUCK22	Truck Traffic	3.00	7.00	2.80
TRUCK23	Truck Traffic	3.00	7.00	2.80
TRUCK24	Truck Traffic	3.00	7.00	2.80
TRUCK25	Truck Traffic	3.00	7.00	2.80
TRUCK26	Truck Traffic	3.00	7.00	2.80
TRUCK27	Truck Traffic	3.00	7.00	2.80
TRUCK28	Truck Traffic	3.00	7.00	2.80
TRUCK29	Truck Traffic	3.00	7.00	2.80
TRUCK30	Truck Traffic	3.00	7.00	2.80
TRUCK31	Truck Traffic	3.00	7.00	2.80
TRUCK32	Truck Traffic	3.00	7.00	2.80
TRUCK33	Truck Traffic	3.00	7.00	2.80
TRUCK34	Truck Traffic	3.00	7.00	2.80
TRUCK35	Truck Traffic	3.00	7.00	2.80
TRUCK36	Truck Traffic	3.00	7.00	2.80

TRUCK37	Truck Traffic	3.00	7.00	2.80

Table 15 (continued)

Source ID	*Source Description*	*Release Height (m)*	Initial Horizontal Dimensions (m)	Initial Vertical Dimensions (m)
TRUCK38	Truck Traffic	3.00	7.00	2.80
TRUCK39	Truck Traffic	3.00	7.00	2.80
TRUCK40	Truck Traffic	3.00	7.00	2.80
TRUCK41	Truck Traffic	3.00	7.00	2.80
TRUCK42	Truck Traffic	3.00	7.00	2.80
TRUCK43	Truck Traffic	3.00	7.00	2.80
TRUCK44	Truck Traffic	3.00	7.00	2.80
TRUCK45	Truck Traffic	3.00	7.00	2.80
TRUCK46	Truck Traffic	3.00	7.00	2.80
TRUCK47	Truck Traffic	3.00	7.00	2.80
TRUCK48	Truck Traffic	3.00	7.00	2.80
TRUCK49	Truck Traffic	3.00	7.00	2.80
TRUCK50	Truck Traffic	3.00	7.00	2.80
TRUCK51	Truck Traffic	3.00	7.00	2.80
TRUCK52	Truck Traffic	3.00	7.00	2.80
TRUCK53	Truck Traffic	3.00	7.00	2.80
TRUCK54	Truck Traffic	3.00	7.00	2.80
TRUCK55	Truck Traffic	3.00	7.00	2.80
TRUCK56	Truck Traffic	3.00	7.00	2.80
TRUCK57	Truck Traffic	3.00	7.00	2.80
TRUCK58	Truck Traffic	3.00	7.00	2.80
TRUCK59	Truck Traffic	3.00	7.00	2.80

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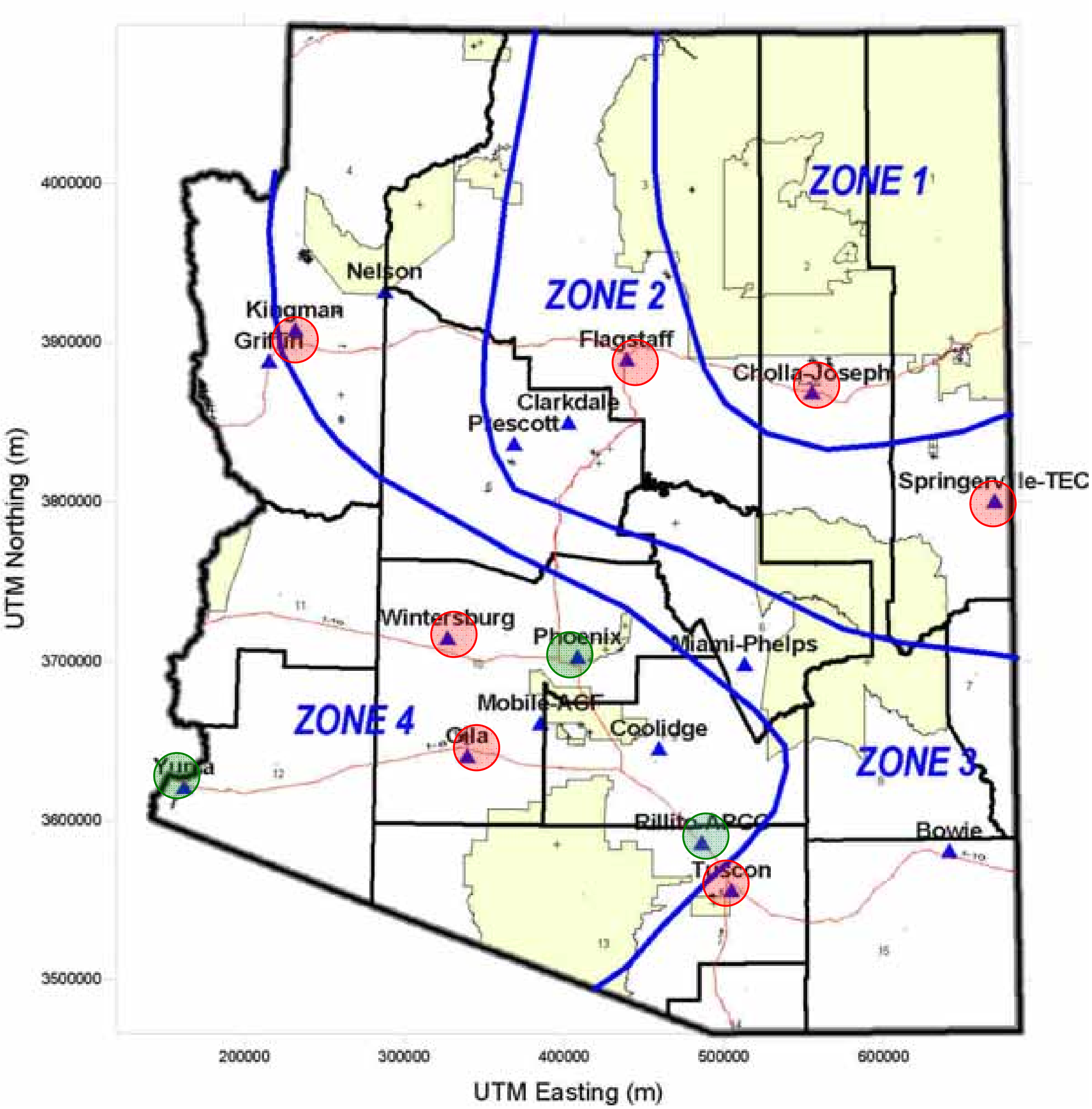
C. METEOROLOGICAL DATA

As shown in Table 16, seven meteorological data sets were used to represent the meteorological conditions for PM_{10} attainment areas and three meteorological data sets for PM_{10} non-attainment areas, respectively. All meteorological data are ADEQ AERMET pre-processed data sets, which have been widely used by air permit applicants for regulatory air quality dispersion modeling. The locations of meteorological data sets are shown in Figure 3

Table 16: Meteorological Data Sets used for AERMOD Modeling Analysis

Data Set Name	Climate Zone	Data Period	For PM_{10} attainment areas or non-attainment areas?
Joseph city	1	04/01/2005-03/31/2006	Attainment areas
Flagstaff NWS	2	01/01/2001-12/31/2005	Attainment areas
Springerville	2	01/01/1995-12/31/1999	Attainment areas
Kingman NWS	3	01/01/2001-12/31/2005	Attainment areas
Tucson NWS	3	01/01/2001-12/31/2005	Attainment areas
Gila Bend	4	01/01/1994-12/31/1995	Attainment areas
Wintersburg	4	01/01/1994-12/31/1998	Attainment areas
Phoenix NWS	4	01/01/2001-12/31/2005	Non-attainment areas
Yuma	4	01/01/2001-12/31/2005	Non-attainment areas
Rillito	4	06/01/2000-05/31/2005	Non-attainment areas

Figure 3: Locations of Meteorological Data Sets Used in AERMOD Modeling Analysis



Meteorological Sites Used for PM_{10} Attainment Areas

Meteorological Sites Used for PM_{10} Nonattainment Areas

ADEQ AERMET Meteorological Sites

ZONE 1-4 **AZ Climate Zones**

D. BACKGROUND CONCENTRATIONS

Table 17 presents the state-level background concentrations that were used in the modeling analysis. Note that the background concentrations used for PM_{10}, SO_2, NO_2 and CO are identical to those shown in General Permit for Concrete Batch Plant. The determination for $PM_{2.5}$ background concentrations is discussed as follows.

The background concentrations of $PM_{2.5}$ were determined in accordance with language in EPA's March 23, 2010 memorandum, "Modeling Procedures for Demonstrating Compliance with $PM_{2.5}$ NAAQS". For annual averaging period, the 3-year average of the annual average $PM_{2.5}$ concentrations was used as the background concentration. For 24-hour averaging period, the 3-year average of the 98th percentile 24-hour average $PM_{2.5}$ concentrations was used as the background concentration. Based on the available monitoring data and attainment/non-attainment classification, the state was classified into four different zones.

Pinal County $PM_{2.5}$ non-attainment area: the monitoring data in this area show significant violation for $PM_{2.5}$ NAAQS, both annual and 24-hour standards. Since a modeling compliance demonstration for this area is impossible, the area has been excluded from the applicable coverage in this General Permit. EPA has finalized Pinal County $PM_{2.5}$ non-attainment area, which is larger than Arizona's recommended. A modeling analysis was performed to evaluate whether the EPA's final area or Arizona's recommended area should be banned from this General Permit. The results suggest that the use of Arizona's recommend area is more appropriate, mainly due to the fact that the impacts from hot mix asphalt plants are limited to near-source areas (less than 1 kilometer).

Nogales County $PM_{2.5}$ non-attainment area: the $PM_{2.5}$ exceedance in this area is mainly due to the emissions transported from Nogales, Sonora, Mexico, via nighttime drainage flows. Wood burning, food cooking, open burning, dust emissions, and tailpipe emissions from on-road and off-road vehicles in the Mexico side have been identified as the primary sources for $PM_{2.5}$. Since the exceedance caused by international transport of emissions is not controllable or preventable, this General Permit may be still applicable to the Nogales County $PM_{2.5}$ non-attainment area. However, to protect the public health, operations in this area may only be conducted when the forecasts show Low or Moderate Risks.

Maricopa County: while the Maricopa County is a $PM_{2.5}$ attainment area, the monitoring data show the $PM_{2.5}$ concentrations in this area are significantly higher than other attainment areas. The background concentrations were determined based on the monitoring data collected from four monitors, including JLG Supersite, South Phoenix, West Phoenix, and Mesa. The background concentration levels determined are about 65-70% of NAAQS.

Other Attainment Areas: the background concentrations for other attainment areas were determined based on the monitoring data collected from six monitors across the state, including Flagstaff Middle School, Children's Park, Orange Grove, Apache Junction Fire Station, Casa Grande Downtown, and Prescott Valley. The background concentration levels determined are less than 50% of NAAQS.

In response to the request from Arizona Department of Transportation (ADOT), a statistical analysis was performed to compare $PM_{2.5}$ monitoring concentrations on weekend versus weekdays for the four monitors in the Maricopa County. The underlying assumption for the request was that, the background concentrations on weekend are lower than on weekdays, which will enable the facility to run more capacity on weekend. However, it is evident from Figure 4 that this assumption is not justified. The $PM_{2.5}$ concentrations on weekend are not statistically lower than on weekdays. On the contrary, the highest concentration for three of the four monitors occurred during weekend periods.

Table 17: Background Concentrations used in Modeling Analysis

Pollutant	Averaging Period	Background Concentration (µg/m^3)	Note
PM_{10}	24-hour	Attainment Areas: 26 Non-Attainment Areas: 58	Used in the General Permit for Concrete Batch Plant 2010 refined PM background established in accordance with Appendix W of 40 CFR 51.
$PM_{2.5}$	24-hour	Pinal County $PM_{2.5}$ non-attainment area: 48 Nogales $PM_{2.5}$ non-attainment area: 40 Maricopa County: 23.3 Other areas: 14.6	Determined by averaging the 98th percentile 24-hour average concentrations over three years (2006-2008)
	Annual	Pinal County $PM_{2.5}$ non-attainment area: 22 Nogales $PM_{2.5}$ non-attainment area: 14 Maricopa County: 10.6 Other areas: 6.7	Determined by averaging the annual average concentrations over three years (2006-2008)
SO_2	Annual	5	Used in the General Permit for Concrete Batch Plant-2010
	24-hour	50	
	3-hour	250	
NO_2	Annual	30	Used in the General Permit for Concrete Batch Plant-2010
CO	8-hour	2,800	Used in the General Permit for Concrete Batch Plant-2010
	1-hour	4,500	

E. RECEPTOR NETWORK

Receptors were spaced 25 meters along process area boundary (PAB) and 50 meters from PAB to 500 meters. Since the emission sources modeled are mainly ground level sources, the receptor network beginning at PAB and extending outward to 500 m is sufficiently large to identify the maximum impacts.

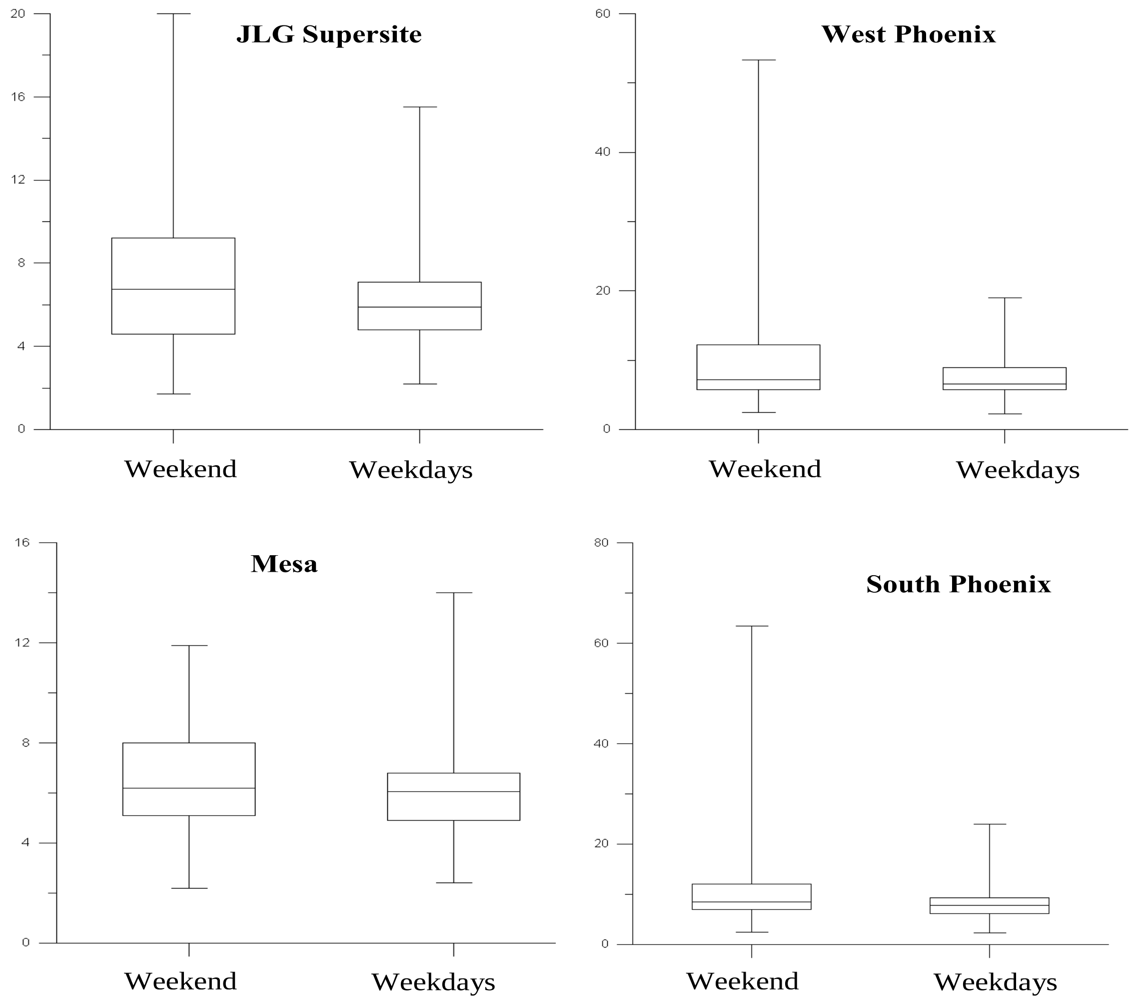


Figure 4 Box and whisker plots for 24-hour $PM_{2.5}$ concentrations ($\mu g/m^3$) on weekend vs. weekdays in Year 2010

(The plots show the lowest observation, lower quartile, median upper quartile, and highest observation)

F. MODELING SCENARIOS

The modeling scenarios are shown in Table 18.

Table 18: Modeling scenarios for Hot Mix Asphalt Plants

<table>
<tr><th rowspan="2">Facility</th><th colspan="2">Modeling Scenario for Demonstrating the Compliance of NAAQS</th><th colspan="2">Maximum Daily Operation</th></tr>
<tr><th>PM_{10} Attainment Area</th><th>PM_{10} Non-attainment Area</th><th>PM_{10} Attainment Area</th><th>PM_{10} Non-attainment Area</th></tr>
<tr><td>Hot mix asphalt plant (HMAP) alone</td><td>440 tons per hour
12 hours per day

One large generator rated 1000 horsepower</td><td>350 tons per hour
9 hours per day

One large generator rated 1000 horsepower</td><td>5280 tons per day</td><td>3150 tons per day</td></tr>
<tr><td>Collocation of hot mix asphalt plant (HMAP), crushing and screening plant (C&S), and concrete batch plant (CBP)</td><td><u>C&S:</u>
315 tons per hour
12 hours per day

<u>CBP:</u>
1275 yd^3 per day

<u>HMAP:</u>
350 tons per hour
12 hours per day

One large generator and one small generator, total 2000 horsepower</td><td>N/A</td><td><u>C&S:</u>
3780 tons per day

<u>CBP:</u>
1275 yd^3 per day

<u>HMAP:</u>
4200 tons per day</td><td>N/A</td></tr>
</table>

G. MODELED RESULTS

The modeled results for an individual hot mix asphalt plant are summarized in Table 19 for $PM_{10}/PM_{2.5}$ and Table 20 for gaseous pollutants, respectively. The modeled results for the co-location of a hot mix asphalt plant, a crushing & screening plant and a concrete batch plant are summarized in Table 21 for $PM_{10}/PM_{2.5}$ and Table 22 for gaseous pollutants, respectively. 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 hot mix asphalt plant (alone or co-located with a crushing & screening plant and a concrete batch plant) will not cause or contribute to a violation of the NAAQS under the operation limits/conditions as proposed in Table 18.

The AERMOD modeling analysis also revealed that the modeled impacts from hot mix asphalt plants were limited to near-field areas. All modeled maximum concentrations for all pollutants under varied meteorological conditions occurred in or near the process area boundary.

Table 19: Modeling Results of $PM_{2.5}$ and PM_{10} for Hot Mix Asphalt Plant

Pollutant	Meteorological data sets	Modeled concentration [a] (µg/m³)		Background concentration (µg/m³)		Total concentration (µg/m³)		NAAQS (µg/m³)	
		24-hr	Annual	24-hr	Annual	24-hr	Annual	24-hr	Annual
$PM_{2.5}$	Joseph City	17.4	4.9	14.6	6.7	32.0	11.6	35	15
	Flagstaff	16.5	5.3			31.1	12.0		
	Springerville	19.9	6.6			34.5	13.3		
	Kingman	12.8	4.4			27.4	11.1		
	Tucson	16.1	6.1			30.7	12.8		
	Gila Bend	16.2	5.1			30.8	11.8		
	Wintersburg	15.8	5.0			30.4	11.7		
	Rillito	11.7	5.0			26.3	11.7		
	Yuma	7.1	2.3			21.7	9.0		
	Phoenix	10.9	3.0	23.3	10.6	34.2	13.6		

Pollutant	Meteorological data sets	Modeled concentration [b] (µg/m³) 24-hr	Background concentration (µg/m³) 24-hr	Total concentration (µg/m³) 24-hr	NAAQS (µg/m³) 24-hr
PM_{10}	Joseph City	98.0	26	124.0	150
	Flagstaff	70.6		96.6	
	Springerville	108.6		134.6	
	Kingman	66.1		92.1	
	Tucson	81.8		107.8	
	Gila Bend	87.7		113.7	
	Wintersburg	87.6		113.6	
	Phoenix	52.2	58	110.2	
	Yuma	34.1		92.1	
	Rillito	64.4		122.4	

[a] *Per EPA's March 23, 2010 memorandum, "Modeling Procedures for Demonstrating Compliance with PM2.5 NAAQS", the highest average of the modeled annual averages across five years of National Weather Service (NWS) meteorological data or the highest modeled annual average for one year of site-specific meteorological data was used as the design value. The highest average of the maximum 24-hour averages across five years of NWS meteorological data or the highest modeled 24-hour average for one year of site specific meteorological data was used as the design value.*

[b] *Per 40 CFR Part 51, "…when n years are modeled, the (n+1)th highest concentration over the n-year period is the design value, since this represents an average or expected exceedance rate of one per year". For one-year Joseph city data, the H2H (highest second highest) value was used as the design concentration. For two-year Gila Bend data, the H3H (highest third highest) value was used as the design concentration. Since other meteorological data sets include five-year data, the H6H (highest sixth highest) value was used as the design concentration.*

Table 20: Modeling Results of NO_2, SO_2, and CO for Hot Asphalt Plant

Pollutant	Meteorological data sets	Modeled concentration (µg/m^3)			Background concentration (µg/m^3)			Total concentration (µg/m^3)			NAAQS (µg/m^3)		
		3-hr	24-hr	Annual	3-hr	24-hr	Annual	3-hr	24-hr	Annual	3-hr	24-hr	Annual
SO_2	Joseph City	73	22	1.2	250	50	5	323	72	6.2	1,300	365	80
	Flagstaff	119	75	6.8				369	125	11.8			
	Springerville	82	33	1.6				332	83	6.6			
	Kingman	85	30	3.0				335	80	8.0			
	Tucson	86	37	1.5				336	87	6.5			
	Gila Bend	53	14	1.7				303	64	6.7			
	Wintersburg	89	31	3.0				339	81	8.0			
	Phoenix	49	10	1.1				299	60	6.1			
	Yuma	72	23	1.6				322	73	6.6			
	Rillito	57	23	1.9				307	73	6.9			

Pollutant	Meteorological data sets	Modeled concentration (µg/m^3)		Background concentration (µg/m^3)		Total concentration (µg/m^3)		NAAQS (µg/m^3)	
		1-hr	8-hr	1-hr	8-hr	1-hr	8-hr	1-hr	8-hr
CO	Joseph City	327	130	4,500	2,800	4827	2930	40,000	10,000
	Flagstaff	296	249			4796	3049		
	Springerville	224	168			4724	2968		
	Kingman	264	154			476	2954		
	Tucson	296	141			4796	2941		
	Gila Bend	257	85			4757	2885		
	Wintersburg	585	186			5085	2986		
	Phoenix	164	78			4664	2878		
	Yuma	234	130			4734	2930		
	Rillito	231	113			4731	2913		

Pollutant	Meteorological data sets	Modeled concentration (µg/m^3) Annual	Background concentration (µg/m^3) Annual	Total concentration (µg/m^3) Annual	NAAQS (µg/m^3) Annual
NO_2	Joseph City	8.4	30	38.4	100
	Flagstaff	25.6		55.6	
	Springerville	12.3		42.3	
	Kingman	19.3		49.3	
	Tucson	15.2		45.2	
	Gila Bend	10.6		40.6	
	Wintersburg	20.0		50.0	
	Phoenix	7.9		37.9	
	Yuma	12.4		42.4	
	Rillito	15.2		45.2	

Table 21: Modeling Results of $PM_{2.5}$ and PM_{10} for Collocation of Hot Mix Asphalt Plant, Concrete Batch Plant and Crushing & Screening Plant

Pollutant	Meteorological data sets	Modeled concentration (µg/m³)[a]		Background concentration (µg/m³)		Total concentration (µg/m³)		NAAQS (µg/m³)	
		24-hr	Annual	24-hr	Annual	24-hr	Annual	24-hr	Annual
$PM_{2.5}$	Joseph City	16.1	4.4	14.6	6.7	30.7	11.1	35	15
	Flagstaff	7.5	3.0			22.1	9.7		
	Springerville	19.8	6.6			34.4	13.3		
	Kingman	12.2	4.2			26.8	10.9		
	Tucson	15.1	6.0			29.7	12.7		
	Gila Bend	15.6	4.3			30.2	11.0		
	Wintersburg	10.9	3.4			25.5	10.1		

Pollutant	Meteorological data sets	Modeled concentration (µg/m³)[b] 24-hr	Background concentration (µg/m³) 24-hr	Total concentration (µg/m³) 24-hr	NAAQS (µg/m³) 24-hr
PM_{10}	Joseph City	78.4	26	104.4	150
	Flagstaff	31.6		57.6	
	Springerville	95.2		121.2	
	Kingman	54.9		80.9	
	Tucson	73.3		99.3	
	Gila Bend	78.3		104.3	
	Wintersburg	64.1		90.1	

[a]*Per EPA's March 23, 2010 memorandum, "Modeling Procedures for Demonstrating Compliance with [a] PM2.5 NAAQS", the highest average of the modeled annual averages across five years of National Weather Service (NWS) meteorological data or the highest modeled annual average for one year of site-specific meteorological data was used as the design value. The highest average of the maximum 24-hour averages across five years of NWS meteorological data or the highest modeled 24-hour average for one year of site specific meteorological data was used as the design value.*

[b]*Per 40 CFR Part 51, "…when n years are modeled, the (n+1)th highest concentration over the n-year period is the design value, since this represents an average or expected exceedance rate of one per year". For one-year Joseph city data, the H2H (highest second highest) value was used as the design concentration. For two-year Gila Bend data, the H3H (highest third highest) value was used as the design concentration. Since other meteorological data sets include five-year data, the H6H (highest sixth highest) value was used as the design concentration.*

Table 22: Modeling Results of NO_2, SO_2, and CO for Collocation of Hot Mix Asphalt Plant, Concrete Batch Plant and Crushing & Screening Plant

Pollutant	Meteorological data sets	Modeled concentration (μg/m³)			Background concentration (μg/m³)			Total concentration (μg/m³)			NAAQS (μg/m³)		
		3-hr	24-hr	Annual	3-hr	24-hr	Annual	3-hr	24-hr	Annual	3-hr	24-hr	Annual
SO_2	Joseph City	58	18	1.0	250	50	5	308	68	6.0	1,300	365	80
	Flagstaff	94	60	5.4				344	110	10.4			
	Springerville	65	26	1.3				315	76	6.3			
	Kingman	68	24	2.4				318	74	7.4			
	Tucson	68	29	1.2				318	79	6.2			
	Gila Bend	42	11	1.4				292	61	6.4			
	Wintersburg	70	25	2.4				320	75	7.4			

Pollutant	Meteorological data sets	Modeled concentration (μg/m³)		Background concentration (μg/m³)		Total concentration (μg/m³)		NAAQS (μg/m³)	
		1-hr	8-hr	1-hr	8-hr	1-hr	8-hr	1-hr	8-hr
CO	Joseph City	583	139	4,500	2,800	5083	2939	40,000	10,000
	Flagstaff	231	195			4731	2995		
	Springerville	191	155			4691	2955		
	Kingman	195	135			4695	1935		
	Tucson	204	130			4704	2930		
	Gila Bend	213	136			4713	2936		
	Wintersburg	426	130			4926	2930		

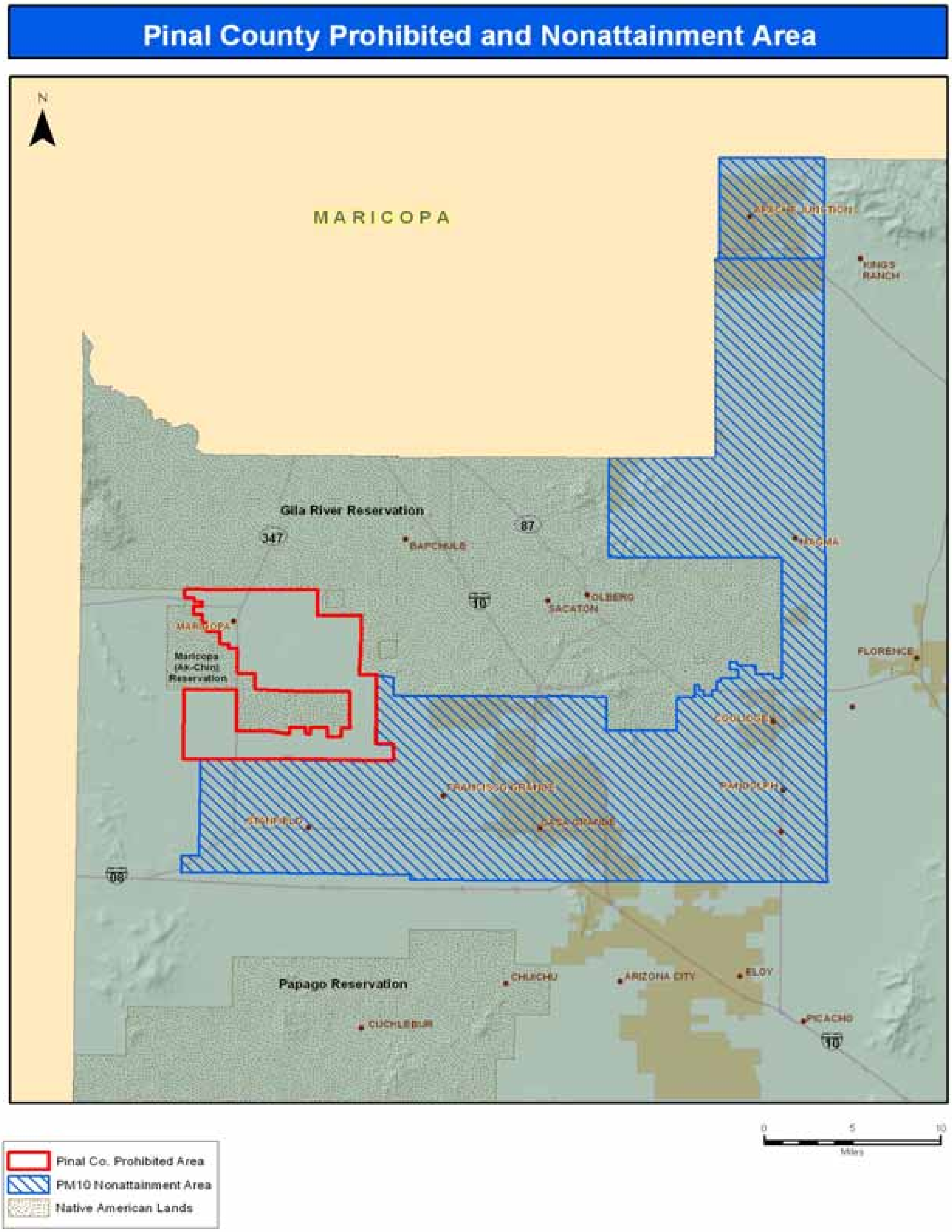
Pollutant	Meteorological data sets	Modeled concentration (μg/m³) Annual	Background concentration (μg/m³) Annual	Total concentration (μg/m³) Annual	NAAQS (μg/m³) Annual
NO_2	Joseph City	11.7	30	41.7	100
	Flagstaff	21.1		51.1	
	Springerville	19.8		49.8	
	Kingman	25.1		55.1	
	Tucson	22.4		52.4	
	Gila Bend	9.8		39.8	
	Wintersburg	21.8		51.8	

IX. LIST OF ABBREVIATIONS

A.A.C. .... Arizona Administrative Code
ADEQ .... Arizona Department of Environmental Quality
ADGS .... Aggregate Delivery to Ground Storage
AQD .... Air Quality Division
ATC .... Aggregate Transfer to Conveyor
ATEB .... Aggregate Transfer to Elevation Bins
ATO .... Authorization to Operate
AZ .... Arizona
CFR .... Code of Federal Regulations
CO .... Carbon Monoxide
CSTS .... Cement Supplement Transfer to Cement Silo
CTCS .... Cement Transfer to Cement Silo
EPA .... Environmental Protection Agency
g .... Gram
GEN .... Generator
HAP .... Hazardous Air Pollutant
ID .... Identification
K .... Kelvin
lb/hr .... Pound per Hour
LPG .... Liquefied Petroleum Gas
m .... Meter
Met .... Meteorological Data
MMBtu/hr .... Million British Thermal Units per Cubic Foot
NAAQS .... National Ambient Air Quality Standards
NOV .... Notice of Violation
NO_x .... Nitrogen Oxides
NSPS .... New Source Performance Standards
NWS .... National Weather Service
PAB .... Process Area Boundary
P.C.C. .... Pima County Code
PM .... Particulate Matter
PM_{10} .... Particulate Matter Nominally less than 10 Micrometers
PTE .... Permanent Total Enclosure
s .... Second
SDGS .... Sand Delivery to Ground Storage
SIP .... State Implantation Plan
SO_2 .... Sulfur Dioxide
STC .... Sand Transfer to Conveyor
STEB .... Sand Transfer to Elevated Bins
TML .... Truck Mix Loading
tph .... Ton per Hour
UR .... Unpaved Road
UTM .... Universal Transverse Mercator
VOC .... Volatile Organic Compound
WEAS .... Wind Erosion from Aggregate Storage Piles
WESS .... Wind Erosion from Sand Storage Piles
WHL .... Weigh Hopper Loading
yd^3 .... Cubic Yards
µ .... Micro
.... Number
% .... Percentage

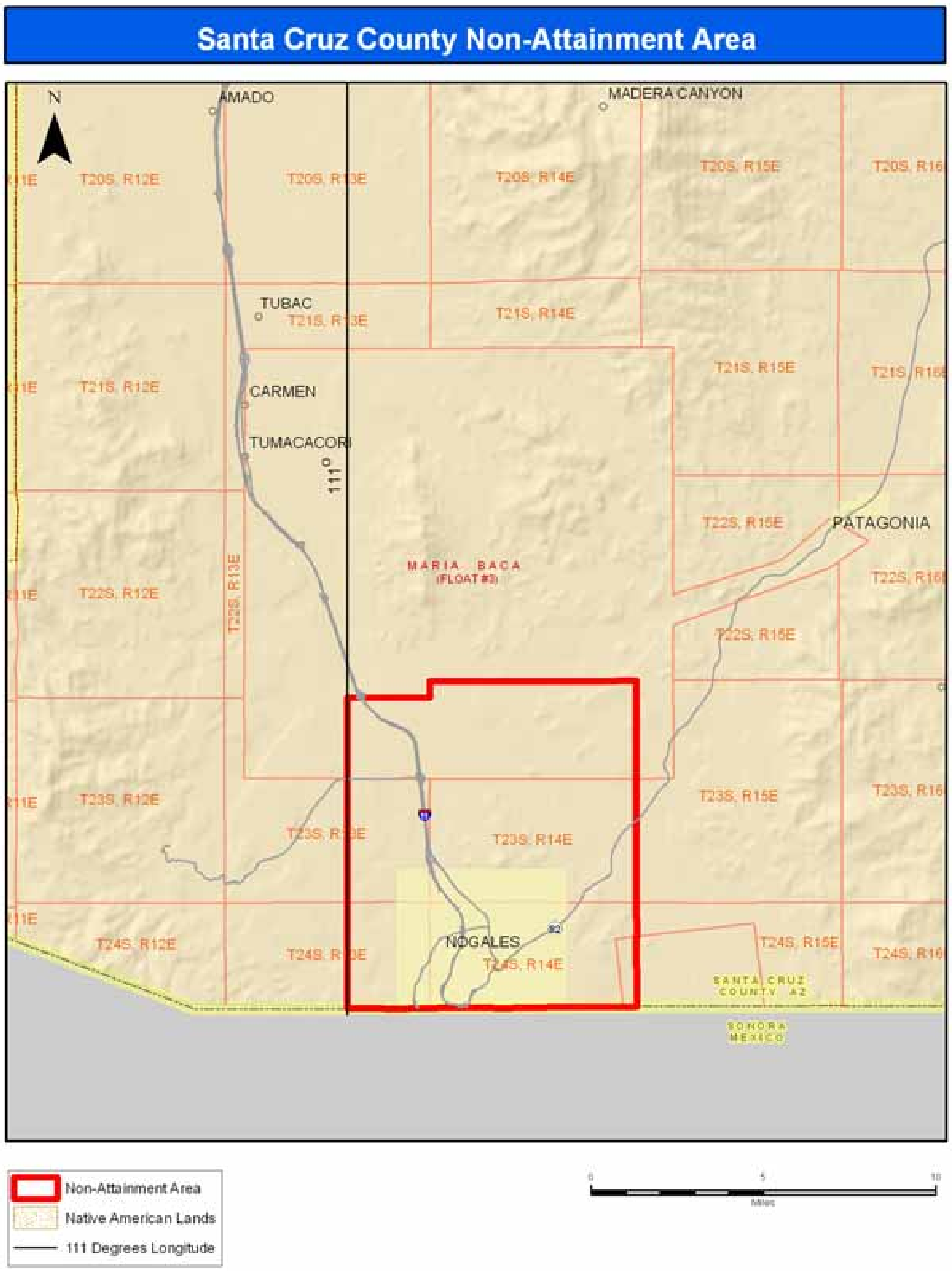
APPENDIX "A"

GENERAL AIR QUALITY CONTROL PERMIT FOR HOT MOX ASPHALT PLANTS
MAP OF THE PINAL COUNTY PROHIBITED AND NON-ATTAINMENT AREAS

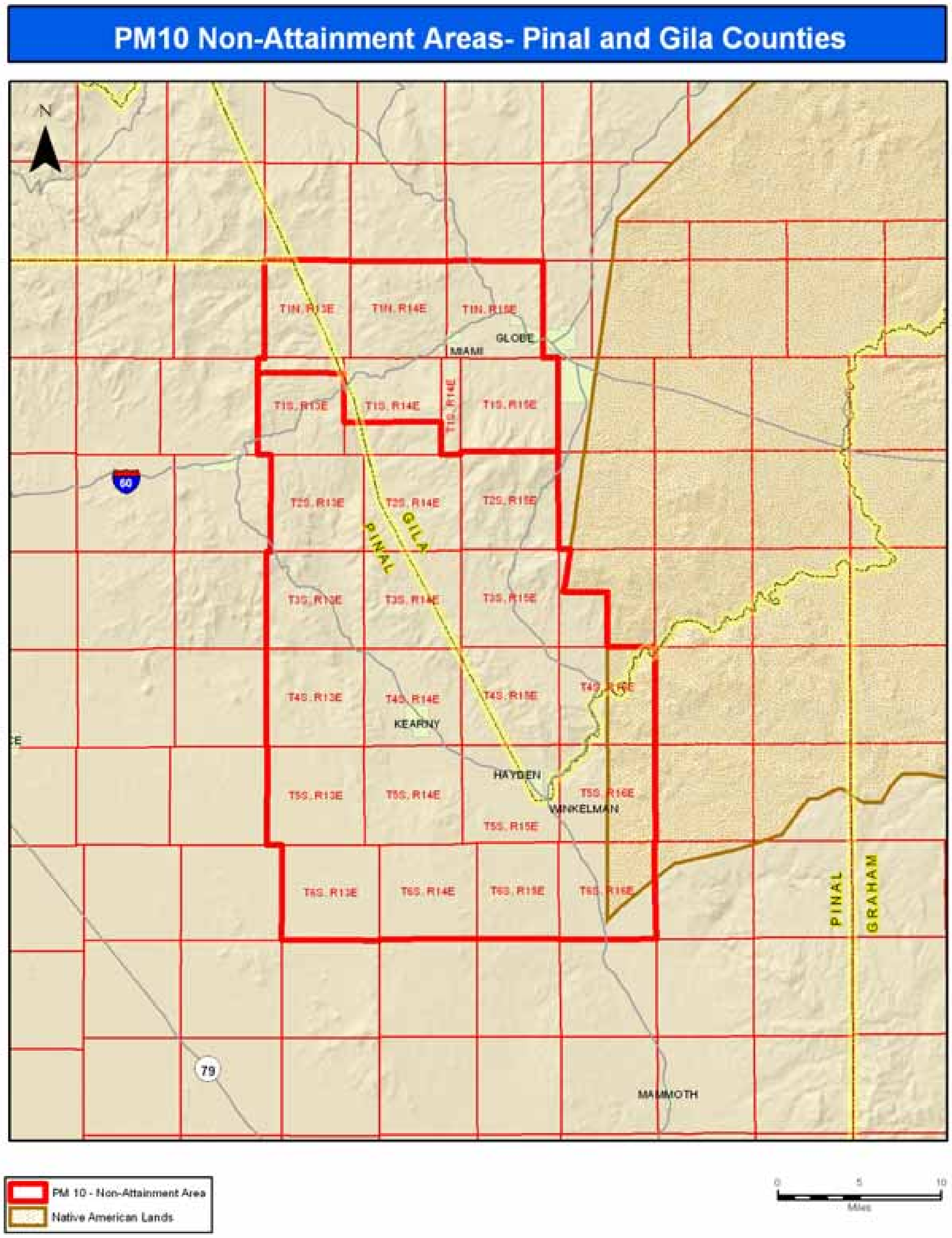


APPENDIX “B”

GENERAL AIR QUALITY CONTROL PERMIT FOR HOT MOX ASPHALT PLANTS MAP OF THE SANTA CRUZ COUNTY NON-ATTAINMENT AREAS

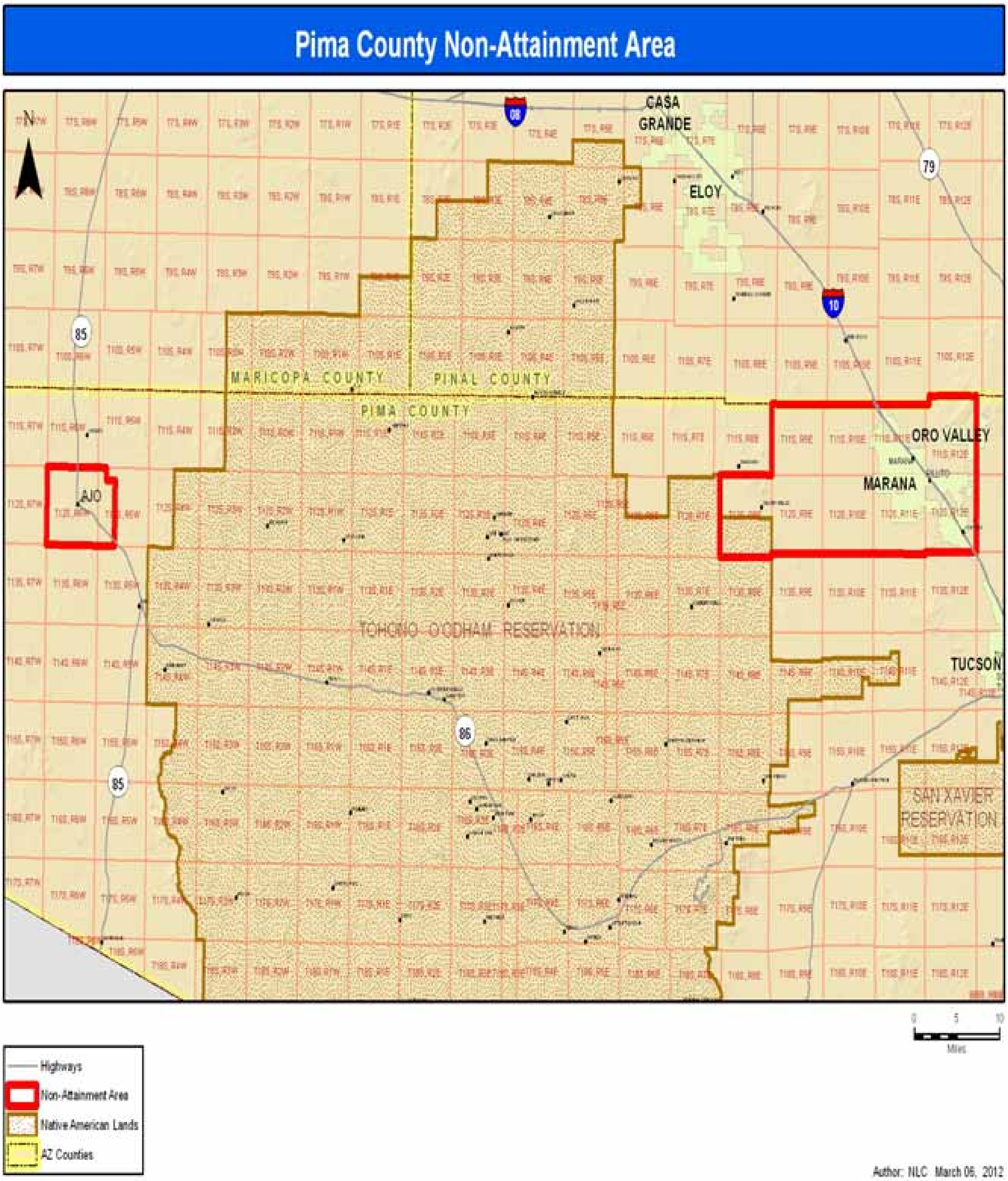


GENERAL AIR QUALITY CONTROL PERMIT FOR HOT MOX ASPHALT PLANTS
MAP OF THE PM_{10} PINAL AND GILA COUNTY NON-ATTAINMENT AREAS



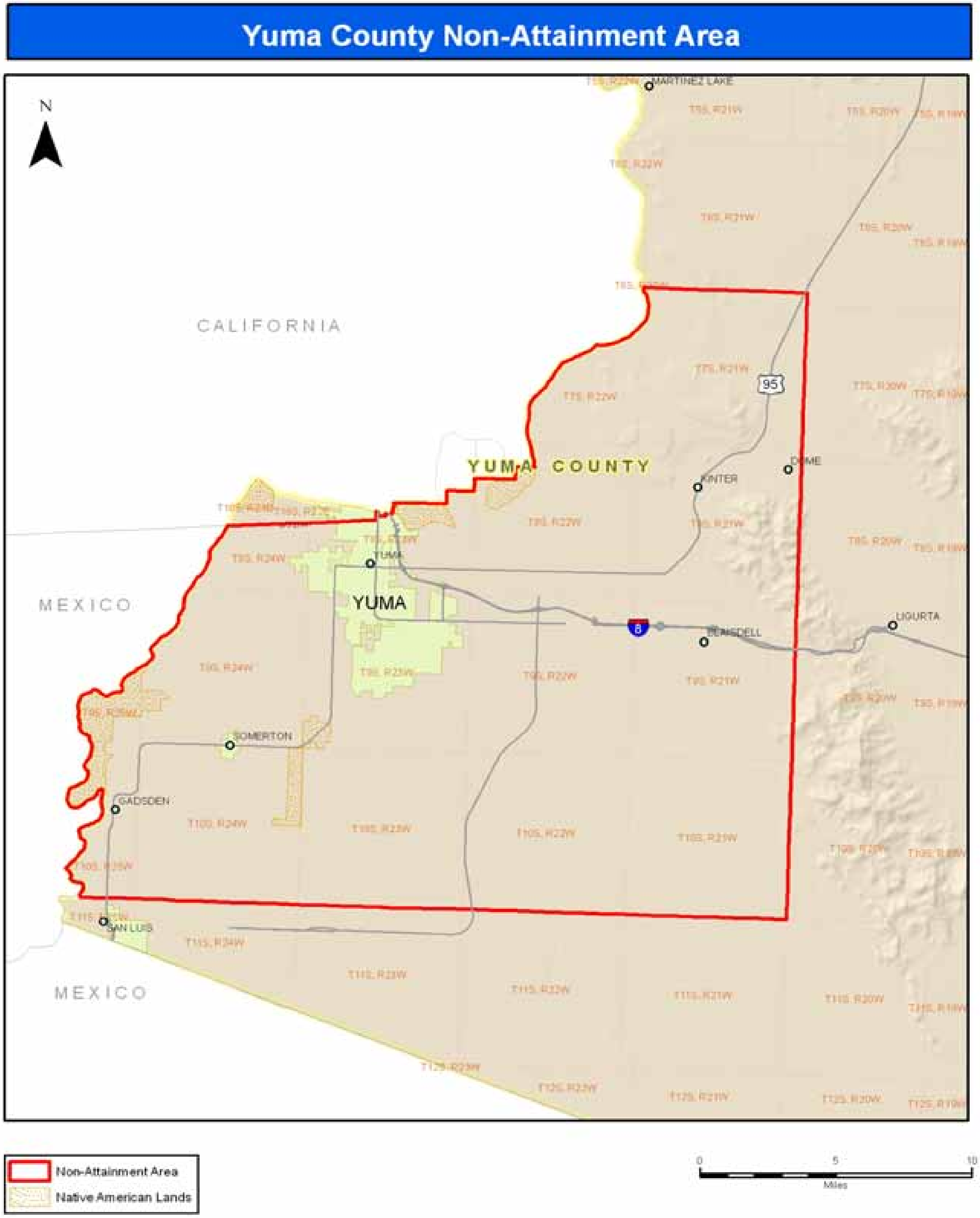
APPENDIX "D"

GENERAL AIR QUALITY CONTROL PERMIT FOR HOT MOX ASPHALT PLANTS
MAP OF THE PIMA COUNTY NON-ATTAINMENT AREAS



APPENDIX "E"

GENERAL AIR QUALITY CONTROL PERMIT FOR HOT MOX ASPHALT PLANTS
MAP OF THE YUMA COUNTY NON-ATTAINMENT AREAS



APPENDIX "F"

GENERAL AIR QUALITY CONTROL PERMIT FOR HOT MIX ASPHALT PLANTS MAP OF THE COCHISE COUNTY NON-ATTAINMENT AREAS