	same time period. The upper air and surface data are considered to be representative and comparable with both the Farmington Airport and Kirtland Sand and Gravel site. The Farmington Airport meteorological data files, Albuquerque upper air files, Farmington Airport surface air file, and Farmington AERMINUTE files are included in an email submitted to the NMED-AQB Modeling Section for review.
2	Discuss how missing data were handled, how stability class was determined, and how the data were processed, if the Bureau did not provide the data. AERMINUTE was used to increase the accuracy for hourly wind speed and reduce potential calms. AERMET program was used to determine stability parameters submitted to AERMOD.

16-S: Terrain

1	Was complex terrain used in the modeling? If no, describe why. Yes, for point sources only. For volume and area sources, model was run in flat terrain mode.
2	What was the source of the terrain data? USGS National Elevation Data (NED)

16-T: Modeling Files

1 Describe the modeling files:

File name (or folder and file name)	Pollutant(s)	Purpose (ROI/SIA, cumulative, culpability analysis, other)
KirtlandCombustROI	NO_2, CO, SO_2	ROI
KirtlandPMROIS1A – 12A	$PM_{2.5}$, PM_{10}	ROI
KirtlandPMROIS1M – 12M	$PM_{2.5}$, PM_{10}	ROI
KirtlandTSPROIS1A – 12A	TSP	ROI
KirtlandTSPROIS1M – 12M	TSP	ROI
Kirtland Class 1 Incre Combust	NO_2, SO_2	Class I Increment
Kirtland Class 1 Incre PM10	PM_{10}	Class I Increment
Kirtland Class II Incre NO2 Annual	NO_2	Class II Increment
Kirtland Class II Incre SO2	SO_2	Class II Increment
KirtlandPM10IncS1A – 12A	PM_{10}	Class II Increment
KirtlandPM10IncS1M – 12M	PM_{10}	Class II Increment
KirtlandPM10IncS1Ad	PM_{10}	Class II Increment
KirtlandPM10IncS1Md, 9Md, 11Md, 12Md	PM_{10}	Class II Increment
KirtlandNO21hrPVMRM	NO_2	CIA NAAQS
KirtlandNO2Annual	NO_2	CIA NAAQS
KirtlandSO21hr	SO_2	CIA NAAQS
KirtlandPM24Hr S1A – 12A	$PM_{2.5}$, PM_{10}	CIA NAAQS
KirtlandPM24HrS1M – 12M	$PM_{2.5}$, PM_{10}	CIA NAAQS
KirtlandPM25Yr S1A – 12A	$PM_{2.5}$	CIA NAAQS
KirtlandPM25Yr S1M – 12M	$PM_{2.5}$	CIA NAAQS
KirtlandTSP24Hr S1A – 12A	TSP	CIA NMAAQS
KirtlandTSP24Hr S1M – 12M	TSP	CIA NMAAQS

	KirtlandTSPYr S1A – 12A	TSP	CIA NMAAQS
	KirtlandTSPYr S1M – 12M	TSP	CIA NMAAQS
	KirtlandAF	Asphalt Fumes	State TAP

16-U: PSD New or Major Modification Applications

1	A new PSD major source or a major modification to an existing PSD major source requires additional analysis. Was preconstruction monitoring done (see 20.2.74.306 NMAC and PSD Preapplication Guidance on the AQB website)?	Yes	**No**
2	If not, did AQB approve an exemption from preconstruction monitoring? NA	Yes	No
3	Describe how preconstruction monitoring has been addressed or attach the approved preconstruction monitoring or monitoring exemption. NA		
4	Describe the additional impacts analysis required at 20.2.74.304 NMAC. NA		
5	If required, have ozone and secondary PM2.5 ambient impacts analyses been completed? NA		

16-V: Modeling Results

1	If ambient standards are exceeded because of surrounding sources, a culpability analysis is required for the source to show that the contribution from this source is less than the significance levels for the specific pollutant. A culpability analysis was performed for $PM_{2.5}$ 24 hour and annual averaging periods. For all modeled exceedance, the impact from Kirtland Sand & Gravel sources was below the $PM_{2.5}$ 24 hour and annual SILs.
2	Identify the maximum concentrations from the modeling analysis.

Pollutant	Period	Facility Concentration (µg/m3)	Total Modeled Concentration (µg/m3)	Total Modeled Concentration (PPM)	Background Concentration	Cumulative Concentration	Standard	Value of Standard	Units of Standard, Background, and Total	Percent of Standard
NO_2 H8H	1 Hour	171.7	172.1	---	Variable	172.1	NAAQS	188.03	µg/m^3	91.5
NO_2 H1H	Annual	12.6	12.6	---	10.836	23.4	NMAAQS	94.02	µg/m^3	24.9
NO_2 Class I	Annual	0.0047	---	---	---	---	SILs	0.1	µg/m^3	4.7
NO_2 Class II	Annual	15.1	15.1	---	---	---	NAAQS	25	µg/m^3	60.4
CO H1H	1 Hour	265.4	---	---	---	---	SILs	2000	µg/m^3	13.3
CO H1H	8 Hour	119.4	---	---	---	---	SILs	500	µg/m^3	23.9
SO_2 H4H	1 Hour	100.2	100.2	---	44.515	144.8	NAAQS	196.4	µg/m^3	73.7
SO_2 Class I	3 Hour	0.60	---	---	---	---	SILs	1.0	µg/m^3	60
SO_2 Class I	24 Hour	0.075	---	---	---	---	SILs	0.2	µg/m^3	37.5

SO_2 Class I	Annual	0.0016	---	---	---	---	SILs	0.1	µg/m^3	1.6
SO_2 Class II	3 Hour	92.4	92.5	---	---	---	NAAQS	512	µg/m^3	18.1
SO_2 Class II	24 Hour	23.4	23.5	---	---	---	NAAQS	91	µg/m^3	25.8
SO_2 Class II	Annual	3.8	4.2	---	---	---	NAAQS	20	µg/m^3	21.0
$PM_{2.5}$ H8H	24 Hour	7.7	7.7	---	14.13	21.8	NAAQS	35	µg/m^3	62.3
$PM_{2.5}$ H1H	Annual	2.9	2.9	---	4.19	7.1	NAAQS	12	µg/m^3	59.2
PM_{10} H2H	24 Hour	30.3	32.1	---	42.0	74.1	NAAQS	150	µg/m^3	49.4
PM_{10} Class I	24 Hour	0.045	---	---	---	---	SILs	0.3	µg/m^3	15.0
PM_{10} Class I	Annual	0.0013	---	---	---	---	SILs	0.2	µg/m^3	0.65
PM_{10} Class II	24 Hour	28.7	28.7	---	---	---	NAAQS	30	µg/m^3	95.7
PM_{10} Class II	Annual	8.1	9.6	---	---	---	NAAQS	17	µg/m^3	56.5
TSP H1H	24 Hour	59.9	60.3	---	42.0	102.3	NMAAQS	150	µg/m^3	68.2
TSP H1H	Annual	7.0	7.4	---	8.5	15.9	NMAAQS	60	µg/m^3	26.5
Asphalt Fumes	8 Hour	9.5	---	---	---	---	STAPs	50	µg/m^3	19.0

16-W: Location of maximum concentrations

1 Identify the locations of the maximum concentrations.

Pollutant	Period	UTM East (m)	UTM North (m)	Elevation (ft)	Distance (m)	Radius of Impact (ROI) (m)
NO_2	1 Hour	738127.9	4069968	1684.12	Boundary	39.895 km
NO_2	Annual	738932.7	4069635	1676.4	Boundary	3851 meters
NO_2 Class I	Annual	718983	4115085	---	Mesa Verde NP Boundary	---
NO_2 Class II	Annual	738129.4	4069918	1684.17	Boundary	3851 meters
CO	1 Hour	738127.9	4069968	1684.12	Boundary	---
CO	8 Hour	738127.9	4069968	1684.12	Boundary	---
SO_2	1 Hour	738129.4	4069918	1684.17	Boundary	13.889 km
SO_2 Class I	3 Hour	735151	4122130	---	Mesa Verde NP Boundary	---
SO_2 Class I	24 Hour	735151	4122130	---	Mesa Verde NP Boundary	---
SO_2 Class I	Annual	719183	4115091	---	Mesa Verde NP Boundary	---
SO_2 Class II	3 Hour	738127.9	4069968	1684.12	Boundary	1679 meters
SO_2 Class II	24 Hour	738150	4069950	1684.01	Boundary	1360 meters
SO_2 Class II	Annual	738129.4	4069918	1684.17	25 meter	1046 meters
$PM_{2.5}$	24 Hour	738129.4	4069918	1684.17	Boundary	2154 meters
$PM_{2.5}$	Annual	737718.5	4069951	1675.96	Boundary	1620 meters
PM_{10}	24 Hour	738126.3	4070018	1686.27	Boundary	1807 meters
PM_{10} Class I	24 Hour	735548	4122141	---	Mesa Verde NP Boundary	---
PM_{10} Class I	Annual	717986	4115059	---	Mesa Verde NP Boundary	---
PM_{10} Class II	24 Hour	738126.3	4070018	1686.27	Boundary	1807 meters
PM_{10} Class II	Annual	737718.5	4069951	1675.96	Boundary	1807 meters
TSP	24 Hour	738248	4069422	1647.45	Boundary	1974 meters
TSP	Annual	737720	4069864	1678.28	Boundary	2051meters

Asphalt Fumes	8 Hour	738127.9	4069968	1684.12	Boundary	---

16-X: Summary/conclusions

1	A statement that modeling requirements have been satisfied and that the permit can be issued. Dispersion modeling was performed for all regulated sources at Kirtland Sand & Gravel. All facility pollutants with ambient air quality standards were modeled to show compliance with those standards. All results of this modeling showed the facility is in compliance with applicable ambient air quality standards and $PM_{10,}$ NO_2, and SO_2 PSD increment limits.

DISPERSION MODEL PROTOCOL FOR KIRTLAND SAND AND GRAVEL NSR MINOR SOURCE PERMIT APPLICATION

Kirtland, New Mexico

PREPARED FOR

Dated November 20, 2017

Prepared by

Class One Technical Services, Inc.

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1.0 INTRODUCTION

This dispersion modeling analysis will be conducted by Class One Technical Services, Inc. (CTS) on behalf of Elam Construction, Inc. (Elam), to evaluate ambient air quality impacts from Kirtland Sand and Gravel, as part of a minor source NSR permitting action. This permit application is for a 400 ton per hour (tph) hot mix asphalt (HMA) plant, 500 tph aggregate crushing plant, and 500 tph aggregate wash plant.

The objective of this modeling evaluation is to predict if, operating at requested maximums, the facility operations would result in ambient air concentrations for nitrogen dioxide, (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), and particulate matter; total suspended particles (TSP), and both 10 microns or less (PM_{10}) and 2.5 microns or less ($PM_{2.5}$); would exceed the New Mexico and federal ambient air quality standards, NMAAQS and NAAQS respectively. Since Kirtland Sand and Gravel is a minor source for NSR permitting and is located in AQRC Region 014, where the minor source baseline date has been triggered for NO_2 (06/06/1989), SO_2 (08/07/1978), and PM_{10} (08/07/1978), a PSD Class I and II Increment analysis will be performed. The only Class I area located within 50 km of the site is Mesa Verde National Park at 47 kilometers.

The dispersion modeling will be conducted using the American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee Dispersion Model (AERMOD), Version 16216r. This model is recommended by EPA for determining Class II impacts within 50 km of the source being assessed. Additionally, AERMOD was developed to handle complex terrain. The objective of this evaluation is to determine whether ambient air concentrations from the maximum operation of the facility for nitrogen dioxide, (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), and particulate matter; total suspended particles (TSP), and both 10 microns or less (PM_{10}) and 2.5 microns or less ($PM_{2.5}$); are below Class II federal and state ambient air quality standards (NAAQS and NMAAQS) found in 40 CFR part 50 and the state of New Mexico's air quality regulation 20.2.3 NMAC from Kirtland Sand and Gravel emission sources.

1.1 FACILITY DESCRIPTION

Elam's Kirtland Sand and Gravel is a proposed site that will operate an aggregate quarry and crushing operation, an aggregate wash plant, and a hot mix asphalt plant. Presently operating at the site is a concrete batching plant that operates under permit GCP-5-7410, in which the combustion sources will be included in the modeling analysis.

1.1.1 Aggregate Crushing Plant

The 500 tph aggregate quarry and crushing operations will include an aggregate quarry, feeder, primary jaw crusher, two (2) secondary cone crushers, three (3) 6' x 20' screens, eighteen (18) transfer conveyors, and five (5) stacker conveyors. The plant will be powered by a 1429 horsepower (hp) generator during hours of aggregate processing and a 113 hp standby generator at all other times. Aggregate from the quarry will be transported to the aggregate crushing plant by large rock trucks. Processed aggregate will be transported from the aggregate crushing plant to the HMA plant, aggregate wash plant, and off-site sales. The aggregate crushing plant will limit hourly processing rate to 500 tph and 1,000,000 tons per year (tpy). The hours of operation is presented below in Table 1, but the aggregate crushing plant will limit the daily throughput per season to the values listed in Table 2.

TABLE 1: Aggregate Crusher Hours of Operation (MST)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	1	1	1	0	0	0	0
7:00 AM	0	0	1	1	1	1	1	1	1	1	1	0
8:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
9:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
10:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
11:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
12:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
1:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
2:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
3:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
4:00 PM	0	1	1	1	1	1	1	1	1	1	1	0
5:00 PM	0	1	1	1	1	1	1	1	0	0	0	0
6:00 PM	0	0	0	0	0	1	1	1	0	0	0	0
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	8	10	11	11	11	13	13	13	10	10	10	8

TABLE 2: Aggregate Daily Production Rates

Season	Tons Per Day
Winter	4000
Spring	5500
Summer	5500
Fall	4500

Since the daily production rate is less than the proposed hours of operation running at maximum hourly production rate, two modeling scenarios will be performed, one for morning and one for afternoon hours. The model hours are presented in Tables 3 and 4.

TABLE 3: Aggregate Crusher Morning Modeled Hours of Operation (MST)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	1	1	1	0	0	0	0
7:00 AM	0	0	1	1	1	1	1	1	1	1	1	0
8:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
9:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
10:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
11:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
12:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
1:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
2:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
3:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
4:00 PM	0	0	1	1	1	1	1	1	0	0	0	0
5:00 PM	0	0	1	1	1	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	8	8	11	11	11	11	11	11	9	9	9	8

TABLE 4: Aggregate Crusher Afternoon Modeled Hours of Operation (MST)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	1	1	1	0	0	0	0	0	0	0
8:00 AM	1	0	1	1	1	1	1	1	1	1	1	1
9:00 AM	1	0	1	1	1	1	1	1	1	1	1	1
10:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
11:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
12:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
1:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
2:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
3:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
4:00 PM	0	1	1	1	1	1	1	1	1	1	1	0
5:00 PM	0	1	1	1	1	1	1	1	0	0	0	0
6:00 PM	0	0	0	0	0	1	1	1	0	0	0	0
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	8	8	11	11	11	11	11	11	9	9	9	8

1.1.2 Aggregate Wash Plant

The 500 tph aggregate wash plant will include a feeder, twin-screw wash plant, six (6) transfer conveyors, and four (4) stacker conveyors. The plant will be powered by a 475 horsepower (hp) generator. Processed aggregate will be transported from the aggregate wash plant to the HMA plant, concrete batch plant, and off-site sales. The aggregate wash plant will limit hourly processing rate to 500 tph and 1,000,000 tons per year (tpy). The hours of operation will be daylight hours and is presented below in Table 5.

TABLE 5: Wash Plant Modeled Hours of Operation (MST)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0
5:00 AM	0	0	0	1	1	1	1	1	0.5	0	0	0
6:00 AM	0	0.5	1	1	1	1	1	1	1	1	0.5	0
7:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
8:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
9:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
10:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
11:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
12:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
1:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
2:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
3:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
4:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
5:00 PM	0.5	1	1	1	1	1	1	1	1	1	0	0
6:00 PM	0	0	0	1	1	1	1	1	0.5	0	0	0
7:00 PM	0	0	0	0	0	0.5	0.5	0	0	0	0	0
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0
Total	10.5	11.5	12	14	14	14.5	14.5	14	13	12	10.5	10

1.1.3 HMA Plant

The 400 tph hot mix asphalt plant will include a 5-bin cold aggregate feeder, scalping screen, pug mill, 2- bin RAP feeder , RAP scalping screen, mineral filler silo with baghouse, drum dryer with baghouse, incline conveyor, asphalt silo, asphalt heater, and eight (8) transfer conveyors. The plant will be powered by a 1429 horsepower (hp) generator during hours of asphalt processing and a 158 hp standby generator at all other times. Processed asphalt will be transported from the HMA plant to off-site sales. The HMA plant will limit hourly processing rate to 400 tph and 400,000 tons per year (tpy). The hours of operation is presented below in Table 6. Seasonal daily throughput are presented in Table 7.

TABLE 6: HMA Plant Hours of Operation (MST)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
12:00 AM	0	0	0	0	0	1	1	1	0	0	0	0
1:00 AM	0	0	0	0	0	1	1	1	0	0	0	0
2:00 AM	0	0	0	0	0	1	1	1	0	0	0	0
3:00 AM	0	0	0	0	0	1	1	1	0	0	0	0
4:00 AM	0	0	1	1	1	1	1	1	1	1	1	0
5:00 AM	0	0	1	1	1	1	1	1	1	1	1	0
6:00 AM	0	0	1	1	1	1	1	1	1	1	1	0
7:00 AM	0	0	1	1	1	1	1	1	1	1	1	0
8:00 AM	0	0	1	1	1	1	1	1	1	1	1	0
9:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
10:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
11:00 AM	1	1	1	1	1	1	1	1	1	1	1	1
12:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
1:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
2:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
3:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
4:00 PM	1	1	1	1	1	1	1	1	1	1	1	1
5:00 PM	0	0	1	1	1	1	1	1	1	1	1	0
6:00 PM	0	0	1	1	1	1	1	1	1	1	1	0
7:00 PM	0	0	1	1	1	1	1	1	1	1	1	0
8:00 PM	0	0	1	1	1	1	1	1	0	0	0	0
9:00 PM	0	0	1	1	1	1	1	1	0	0	0	0
10:00 PM	0	0	0	0	0	1	1	1	0	0	0	0
11:00 PM	0	0	0	0	0	1	1	1	0	0	0	0
Total	8	8	18	18	18	24	24	24	16	16	16	8

TABLE 7: HMA Daily Production Rates and Corresponding Max Hours of Production

Season	Tons Per Day	At Max Hourly Throughput – Hours per Day
Winter	3200	8
Spring	4000	10
Summer	4000	10
Fall	4000	10

Table 8 presents the 12 model scenarios modeled hours for showing compliance with the worst-case operating scenario.

TABLE 8: HMA Model Scenario Time Segments

Model Scenario	Time Segments 8-Hour Blocks Winter Months	Time Segments 10-Hour Blocks Spring, Summer, Fall Months
1	12 AM to 8 AM	12 AM to 10 AM
2	2 AM to 10 AM	2 AM to 12 PM
3	4 AM to 12 PM	4 AM to 2 PM
4	6 AM to 2 PM	6 AM to 4 PM
5	8 AM to 4 PM	8 AM to 6 PM
6	10 AM to 5 PM	10 AM to 8 PM
7	12 PM to 8 PM	12 PM to 10 PM
8	2 PM to 10 PM	2 PM to 12 AM
9	4 PM to 12 AM	4 PM to 2 AM
10	6 PM to 2 AM	6 PM to 4 AM
11	8 PM to 4 AM	8 PM to 6 AM
12	10 PM to 6 AM	10 PM to 8 AM

1.2 FACILITY IDENTIFICATION AND LOCATION

Elam's Kirtland Sand and Gravel is located at 32 Road 6210 in Kirtland, San Juan County, New Mexico. This is approximately 5.8 miles west of intersection Highway 64 (Murray Rd) and W Main Street in Farmington, New Mexico. The UTM Coordinates of the facility are 737,900 meters East and 4,070,000 meters North, Zone 12, with NAD83 datum at an elevation of approximately 5,240 feet above mean sea level.

Figure 1 below presents a layout of the site showing the area where each material is handled.

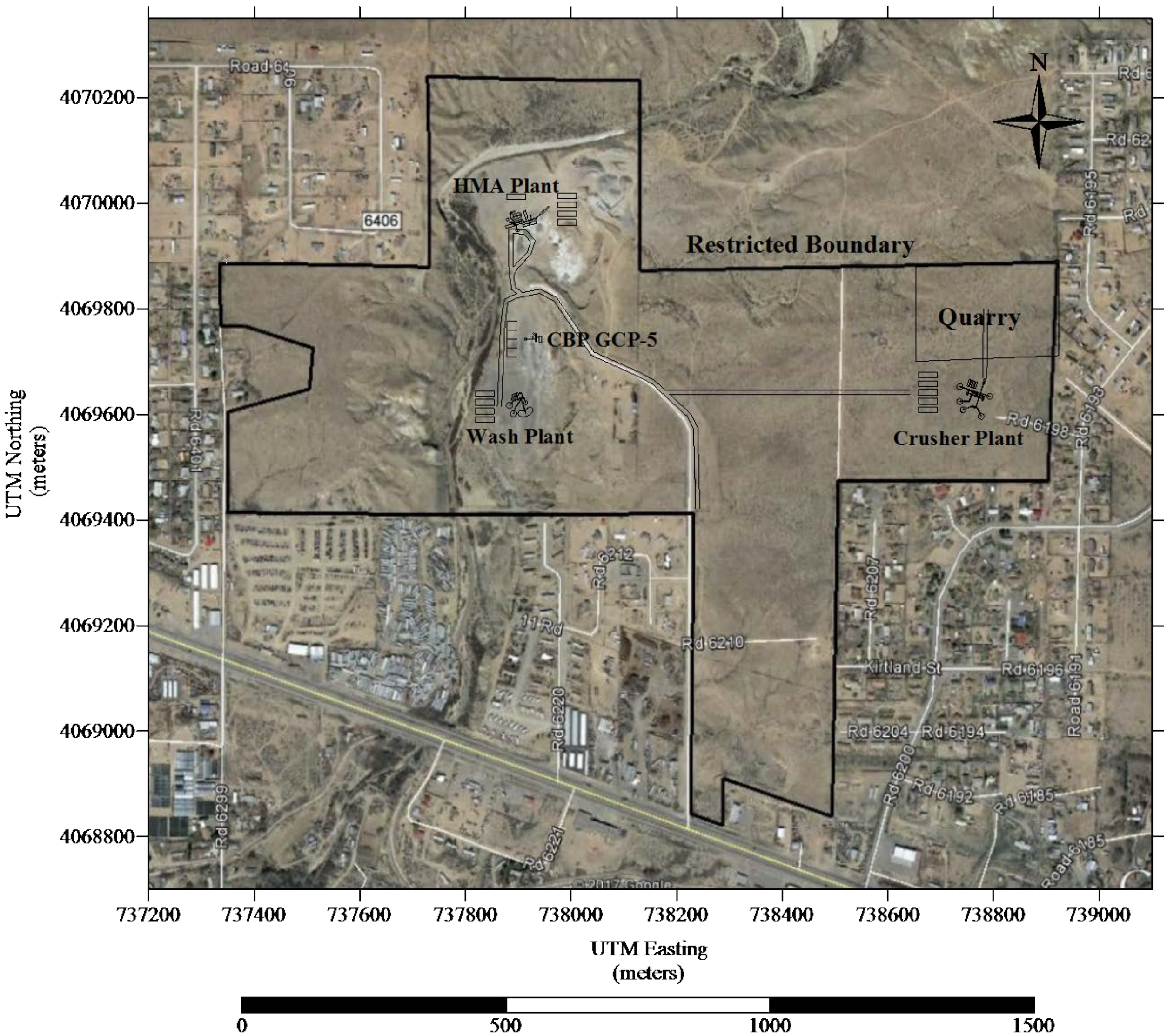

Figure 1: Elam's Kirtland Sand and Gravel Aerial View with Material Handling Areas

2.0 SIGNIFICANT MONITORING AIR QUALITY IMPACT ANALYSIS

This section identifies the technical approach and dispersion model inputs that will be used for the Class II federal and State ambient air quality standards and PM_{10} Class II Increment impacts for this stationary source. NMED AQB requires that all applicable criteria pollutant emissions be modeled using the most recent versions of US EPA's approved models and be compared with National Ambient Air Quality Standards (NAAQS), and New Mexico Ambient Air Quality Standards (NMAAQS). Table 9 shows the NAAQS and NMAAQS (without footnotes) that the source's ambient impacts must meet in order to demonstrate compliance. Table 9 also lists the Class II Significant Impact Levels (SILs) which are used to assess whether a source has a significant impact at downwind receptors.

The dispersion modeling analysis will be performed to estimate concentrations resulting from the operation of the Kirtland Sand and Gravel using the maximum hourly emission rates while all emission sources are operating. The modeling will determine maximum off site concentrations for nitrogen dioxide, (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), and particulate matter; Total Suspended Particulate Matter (TSP) and particulate matter with aerodynamic diameter less than 10 micrometers (PM_{10}) and particulate matter with aerodynamic diameter less than 2.5 micrometers ($PM_{2.5}$), for comparison with modeling significance levels, and national/New Mexico ambient air quality standards (AAQS). Additionally, modeling will determine maximum off site concentrations for NO_2 annual average; SO_2 3 hour, 24hour, and annual averages; and PM_{10} 24 hour and annual average increment limits. The modeling will follow the guidance and protocols outlined in the New Mexico Air Quality Bureau "Air Dispersion Modeling Guidelines" (Revised 08/08/2017) and the most up to date EPA's *Guideline on Air Quality Models*.

Initial modeling will be performed with Kirtland Sand and Gravel sources only to determine pollutant and averaging periods that exceeds pollutant SILs. If initial modeling for any pollutant and averaging period exceeds the SILs, than cumulative modeling will be performed for those pollutants and averaging periods and will include significant neighboring sources along with background ambient concentrations as defined in the NMED's modeling guidelines.

TABLE 9: National and New Mexico Ambient Air Quality Standard Summary

Pollutant	Avg. Period	Sig. Lev. (μg/m^3)	Class I Sig. Lev. (μg/m^3)	NAAQS	NMAAQS	PSD Increment Class I	PSD Increment Class II
CO	8-hour	500		9,000 ppb(1)	8,700 ppb(2)		
	1-hour	2,000		35,000 ppb(1)	13,100 ppb(2)		
NO_2	annual	1.0	0.1	53 ppb(3)	50 ppb(2)	2.5 μg/m^3	25 μg/m^3
	24-hour	5.0			100 ppb(2)		
	1-hour	7.54		100 ppb(4)			
$PM_{2.5}$	annual	0.3	0.06	12 μg/m^3(5)		1 μg/m^3	4 μg/m^3
	24-hour	1.2	0.07	35 μg/m^3(6)		2 μg/m^3	9 μg/m^3
PM_{10}	annual	1.0	0.2			4 μg/m^3	17 μg/m^3
	24-hour	5.0	0.3	150 μg/m^3(7)		8 μg/m^3	30 μg/m^3
TSP	7-day				110 μg/m^3		
	30-day				90 μg/m^3		
	annual	1.0			60μg/m^3		
	24-hour	5.0			150μg/m^3		
SO_2	annual	1.0	0.1		20 ppb(2)	2 μg/m^3	20 μg/m^3
	24-hour	5.0	0.2		100 ppb(2)	5 μg/m^3	91 μg/m^3
	3-hour	25.0	1.0	500 ppb(1)		25 μg/m^3	512 μg/m^3
	1-hour	7.8		75 ppb(8)			

Standards converted from ppb to μg/m^3 use a reference temperature of 25° C and a reference pressure of 760 millimeters of mercury.
(1) Not to be exceeded more than once each year.
(2) Not to be exceeded.
(3) Annual mean.
(4) 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years.
(5) Annual mean, averaged over 3 years.
(6) 98th percentile, averaged over 3 years.
(7) Not to be exceeded more than once per year on average over 3 years.
(8) 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years.

TABLE 10: Standards for Which Modeling Is Not Required by NMED AQD.

Standard not Modeled	Surrogate that Demonstrates Compliance
CO 8-hour NAAQS	CO 8-hour NMAAQS
CO 1-hour NAAQS	CO 1-hour NMAAQS
NO_2 annual NAAQS	NO_2 annual NMAAQS
NO_2 24-hour NMAAQS	NO_2 1-hour NAAQS
O_3 8-hour	Regional modeling
TSP 7-day NMAAQS	TSP 24-hour NMAAQS
SO_2 annual NMAAQS	SO_2 1-hour NAAQS
SO_2 24-hour NMAAQS	SO_2 1-hour NAAQS
SO_2 3-hour NAAQS	SO_2 1-hour NAAQS

2.1 DISPERSION MODEL SELECTION

The dispersion modeling will be conducted using the American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee Dispersion Model (AERMOD), Version 16216r. This model is recommended by EPA for determining Class II impacts within 50 km of the source being assessed. Additionally, AERMOD was developed to handle complex terrain. In this analysis, AERMOD will be used to estimate pollutant ambient air concentrations of TSP, PM_{10}, and $PM_{2.5}$ from Elam's Kirtland Sand and Gravel emission sources.

AERMOD is a Gaussian plume dispersion model that is based on planetary boundary layer principles for characterizing atmospheric stability. The model evaluates the non-Gaussian vertical behavior of plumes during convective conditions with the probability density function and the superposition of several Gaussian plumes. AERMOD modeling system has three components: AERMAP, AERMET, and AERMOD. AERMAP is the terrain preprocessor program. AERMET is the meteorological data preprocessor. AERMOD includes the dispersion modeling algorithms and was developed to handle simple and complex terrain issues using improved algorithms. AERMOD uses the dividing streamline concept to address plume interactions with elevated terrain.

AERMOD will be run using all the regulatory default options including use of stack-tip downwash, buoyancy-induced dispersion, calms processing routines, upper-bound downwash concentrations for super-squat buildings, default wind speed profile exponents, vertical potential temperature gradients, and no use of gradual plume rise. Beta version options include the use of flat terrain mode for fugitive ground release sources and horizontal release stacks. The model incorporated local terrain into the calculations for point sources and neighboring sources only.

2.2 BUILDING WAKE EFFECTS

AERMOD can account for building downwash and cavity zone effects. Evaluation of building downwash on adjacent stack sources is deemed necessary, since most (if not all) of the stack source heights may be below Good Engineering Practice (GEP) heights. The formula for GEP height estimation is:

$H_s = H_b + 1.50L_b$

where: H_s = GEP stack height

H_b = building height

L_b = the lesser building dimension of the height, length, or width

The effects of aerodynamic downwash due to buildings and other structures will be accounted for by using wind direction-specific building parameters calculated by the USEPA-approved Building Parameter Input Program Prime (BPIP-Prime (*Version 04274*)) and the algorithms included in the AERMOD air dispersion model. No buildings are located at the site that will cause building wake effects for facility point sources.

2.3 METEOROLOGICAL DATA

Dispersion model meteorological input files were created for the year 2016 from meteorological data collected at Farmington Airport, NM for the year 2016, about 5 kilometers from the site. The similar elevation, topography, terrain, vegetation, and climate of both sites make this meteorological data representative of the model area. Figure 2 shows wind rose diagram of the meteorological wind speed versus direction data that has been collected for the year 2016.

AERMET wind speed threshold for surface data will be 0.5 meters per second.

To reduce the high incidence of calms and variable wind conditions, AERMINUTE (*Version 15272*) was used to supplement hourly observed wind speed and direction for the Farmington surface data when processing with AERMET. Albuquerque Airport 2016 data was used for upper air.

Since the meteorological input data does not use turbulence data, the adjust U* option in AERMET was used during processing of the meteorological data.

AERMET/AERMOD requires that several additional parameters be input during data processing in AERMET:

- Surface roughness length (m)
- Albedo
- Bowen Ratio

The surface roughness length influences the surface shear stress and is an important factor in determining the magnitude of mechanical turbulence and the stability of the boundary layer. The albedo is the fraction of total incident solar radiation reflected by the surface back to space without absorption. The daytime Bowen ratio, an indicator of surface moisture, is the ratio of sensible heat flux to latent heat flux and, together with albedo and other meteorological observations, is used for determining planetary boundary layer parameters for convective conditions driven by the surface sensible heat flux.

These parameters would be obtained using AERSURFACE (*Version 13016*). AERSURFACE requires the input of land cover data from the U.S. Geological Survey (USGS) National Land Cover Data 1992 archives (NLCD92), which it uses to determine the land cover types for the Farmington airport-specified location. AERSURFACE matches the NLCD92 land cover categories to seasonal values of albedo, Bowen ratio, and surface roughness. Values of surface characteristics are calculated based on the land cover data for the study area and output in a format for input into AERMET Stage 3. Site descriptive questions required by AERSURFACE include:

- Meteorological data from airport
- Continuous snowcover in winter
- Arid climate
- Dry climate

For the Farmington Airport meteorological data, YES was checked for airport data, NO was checked for continuous snowcover, YES was checked for arid climate, and YES was checked for dry climate. For each parameter, data was extracted from land cover data for each month of the year and 12 equal sectors radiating from the Farmington Airport.

The meteorological data was processed using AERMET (*Version 16216)* and upper air from Albuquerque Airport for the same time period. The upper air and surface data are considered to be representative and comparable with both the Farmington Airport and Kirtland Sand and Gravel site. The Farmington Airport meteorological data files, Albuquerque upper air files, Farmington Airport surface air file, and Farmington AERMINUTE files are included in this email submitted to the NMED-AQB Modeling Section for review.

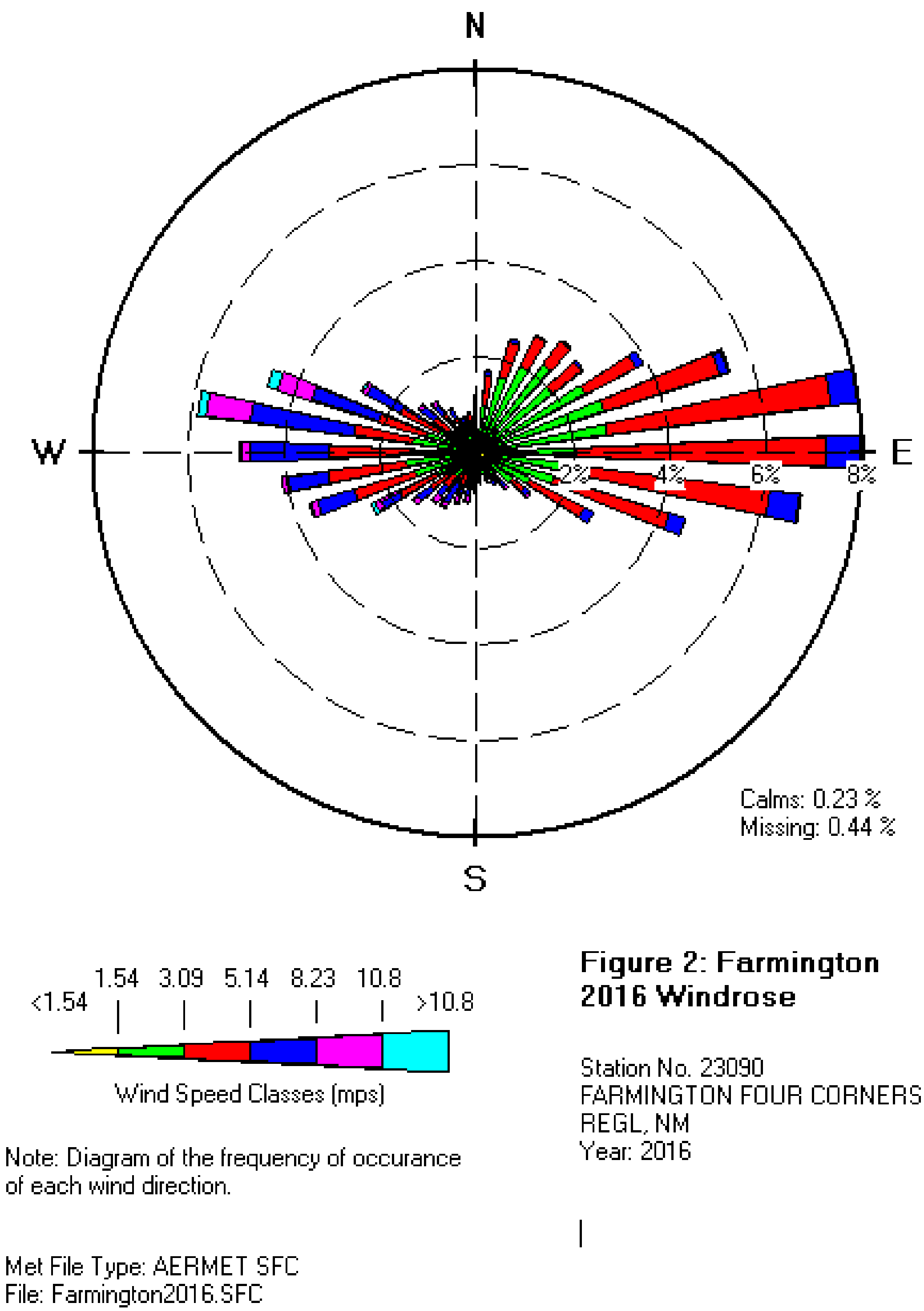

Figure 2: Wind Rose Farmington Meteorological Data 2016

2.4 RECEPTORS AND TOPOGRAPHY

For each pollutant, the radius of significant impact around the facility is established using a Cartesian grid. A 50-meter grid spacing is used for the facility boundary receptors. A 50-meter spacing and 100-meter spacing are extended to 500-meters and 1-km beyond the facility boundary, respectively from the facility boundary in each direction for a very fine grid resolution. Receptors for a fine grid resolution are placed with 250-meter spacing to a distance of 3-km from the facility boundary. Receptors for a course grid resolution are placed with 500-meter, 1000-meter, and 2000-meter spacing to a distance of 5-km, 10-km, and 24-km, respectively from the facility boundary.

AERMAP (*Version 11103*) will be used to calculate the receptor elevations and the controlling hill heights. Terrain files for the area will be pulled down obtained from the National Elevation Dataset (NED) 1 Arc Second found at http://landfire.cr.usgs.gov. The AERMAP domain will be large enough to encompass the 10 percent slope factor required for calculating the controlling hill height.

2.5 MODELED EMISSION SOURCES INPUTS

Kirtland Sand and Gravel operates 7 days per week and 52 weeks per year or 365 days per year. Requested hours of operation for each plant is discussed in Section To represent the worst-case modeling scenario, two modeling runs will be performed, morning and afternoon. Based on modeling experience, early morning and late afternoon hours with low wind speeds are typically determined to represent the highest modeled hourly concentrations for low release fugitive emission sources. Tables 2, 3, 4, and 5 below summarizes the modeled hours of operation for each material transloaded.

2.5.1 Kirtland Sand and Gravel Road Vehicle Traffic Model Inputs

The unpaved road fugitive dust for truck traffic is modeled as a line of volume sources. The AQB's approved procedure for Modeling Haul Roads was followed to develop modeling input parameters for unpaved haul roads. Volume source characterization followed the steps described in the Air Quality Bureau's Guidelines.

2.5.2 Kirtland Sand and Gravel Material Handling Volume Source Model Inputs

Material handling and processing for aggregate crushers and HMA plants will follow the procedure found in AQB's Modeling Guidelines for Fugitive Equipment Sources (Section 5.3.2).

2.5.3 Kirtland Sand and Gravel Point Source Model Inputs

Model input parameters are based on release height, release diameter, release velocity or flow rate, and release temperature. For exhaust releases at ambient temperature, the modeled temperature input will be zero Kelvin. For horizontal or raincap releases, the AERMOD option for horizontal and raincap releases will be used with actual release parameters. For exhaust from baghouses, the release height will be the height from the ground to the exhaust exit height. For all baghouse point sources, the exit diameter is 1 foot, release direction is horizontal, exit temperature is ambient, and exit velocity is based on the exhaust flow rate.

2.6 PARTICLE SIZE DISTRIBUTION

PM_{10} and TSP emissions were modeled using plume depletion. Plume deposition simulates the effect of gravity as particles '"fall-out" from the plume to the ground as the plume travels downwind. Therefore, the farther the plume travels from the emission point to the receptor, the greater the effect of plume deposition and the greater the decrease in modeled impacts or concentrations. Particle size distribution, particle mass fraction, and particle density are required inputs to the model to perform this function.

The particle size distribution data used in the modeling for material handling of coal, dolomite, sand, specialty sand, urea, and waste will be based upon data obtained from the City of Albuquerque AQB's "Air Dispersion Modeling Guidelines for Air Quality Permitting", revised 02/03/2016, Table 1. Particle size distribution for fugitive road dust on unpaved roads; cement truck loading; and cement, lime, dolomite, and urea baghouse exhaust will use the particle size distribution found in the NMED Modeling Section approved values.

The mass-mean particle diameters were calculated using the formula:

$$d = ((d^3_1 + d^2_1 d_2 + d_1 d^2_2 + d^3_2) / 4)^{1/3}$$

Where: d = mass-mean particle diameter
d_1 = low end of particle size category range
d_2 = high end of particle size category range

Representative average particle densities were obtained from NMED accepted values.

Material	Density (g/cm^3)	Reference
Road Dust – Kirtland and Neighbor	2.5	NMED Value
Lime – Kirtland and Neighbor	3.3	NMED Value
HMA Asphalt – Kirtland and Neighbor	1.5	NMED Value
Combustion – Kirtland and Neighbor	1.5	NMED Value
Fugitive Dust – Kirtland and Neighbor	2.5	NMED Value
Cooling Tower - Neighbor	2.5	NMED Value
Coal - Neighbor	1.5	NMED Value
Fly Ash - Neighbor	1.04	NMED Value
Cement - Neighbor	2.85	NMED Value

The densities and size distribution for PM_{10} and TSP emission sources are presented in Tables 11 - 19.

TABLE 11: Unpaved Road Vehicle Fugitive Dust Depletion Parameters

Particle Size Category (µm)	Mass Mean Particle Diameter (µm)	Mass Weighted Size Distribution (%)	Density (g/cm^3)
PM10			
0 – 2.5	1.57	25.0	2.5
2.5 – 10	6.91	75.0	2.5
TSP			
0-2.5	1.57	5.0	2.5
2.5-10	6.91	15.0	2.5
10-15	12.63	5.0	
15-30	23.23	75.0	2.5

Based on NMED Particle Size Distribution Spreadsheet – April 25, 2007

TABLE 12: Lime Baghouse Source Depletion Parameters

Particle Size Category (µm)	Mass Mean Particle Diameter (µm)	Mass Weighted Size Distribution (%)	Density (g/cm^3)
PM10			
0-2.5	1.57	25	3.3
2.5-10	6.91	75	3.3
TSP			
0-2.5	1.57	17.4	3.3
2.5-10	6.91	52.1	3.3
10-30	21.54	30.5	3.3

Parameters based on baghouse exhaust capture percentages.

TABLE 13: Combustion Source Depletion Parameters

Particle Size Category (µm)	Mass Mean Particle Diameter (µm)	Mass Weighted Size Distribution (%)	Density (g/cm^3)
PM10			
0 - 2.5	1.57	100	1.5
TSP			
0 - 2.5	1.57	100	1.5

Based on NMED Particle Size Distribution Spreadsheet – April 25, 2007

TABLE 14: Asphalt Baghouse and Stack Source Depletion Parameters

Particle Size Category (μm)	Mass Mean Particle Diameter (μm)	Mass Weighted Size Distribution (%)	Density (g/cm^3)
PM10			
0-1.0	0.63	50.0	1.5
1.0-2.5	1.85	19.0	1.5
2.5-10	6.92	31.0	1.5
TSP			
0-1.0	0.63	15.0	1.5
1.0-2.5	1.85	6.0	1.5
2.5-10	6.92	9.0	1.5
10.0-15.0	12.66	5.0	1.5
15.0-30.0	23.3	65.0	1.5

Based on NMED Particle Size Distribution Spreadsheet – April 25, 2007

TABLE 15: Fugitive Dust Source Depletion Parameters

Particle Size Category (μm)	Mass Mean Particle Diameter (μm)	Mass Weighted Size Distribution (%)	Density (g/cm^3)
PM10			
2.5 – 5	3.88	22.6	2.5
5 – 10	7.77	77.4	2.5
TSP			
2.5 – 5	3.88	6.0	2.5
5 – 10	7.77	20.5	2.5
10 – 15	12.66	16.0	2.5
15 – 20	17.62	17.5	2.5
20 – 30	25.33	22.5	2.5
30 – 45	38.00	17.5	2.5

Parameters based on values from the Albuquerque Air Quality Division Modeling Guidelines.

TABLE 16: Cooling Tower Source Depletion Parameters

Particle Size Category (µm)	Mass Mean Particle Diameter (µm)	Mass Weighted Size Distribution (%)	Density (g/cm³)
PM10			
0-2.5	1.57	7.8	2.5
2.5-5	3.88	27.0	2.5
5-10	7.77	65.2	2.5
TSP			
0-2.5	1.57	3.0	2.5
2.5-5	3.88	10.0	2.5
5-10	7.77	24.0	2.5
10-20	15.54	38.0	2.5
20-30	25.33	25.0	2.5

Based on NMED Particle Size Distribution Spreadsheet – April 25, 2007

TABLE 17: Coal Handling Fugitive Source Depletion Parameters

Particle Size Category (µm)	Mass Mean Particle Diameter (µm)	Mass Weighted Size Distribution (%)	Density (g/cm³)
PM10			
0-2.5	1.57	7.8	1.5
2.5-5	3.88	27.0	1.5
5-10	7.77	65.2	1.5
TSP			
0-2.5	1.57	3.0	1.5
2.5-5	3.88	10.0	1.5
5-10	7.77	24.0	1.5
10-20	15.54	38.0	1.5
20-30	25.33	25.0	1.5

Based on NMED Particle Size Distribution Spreadsheet – April 25, 2007

TABLE 18: Fly Ash Baghouse Source Depletion Parameters

Particle Size Category (µm)	Mass Mean Particle Diameter (µm)	Mass Weighted Size Distribution (%)	Density (g/cm^3)
PM10			
0-2.5	1.57	7.8	1.5
2.5-5	3.88	27.0	1.5
5-10	7.77	65.2	1.5
TSP			
0-2.5	1.57	3.0	1.5
2.5-5	3.88	10.0	1.5
5-10	7.77	24.0	1.5
10-20	15.54	38.0	1.5
20-30	25.33	25.0	1.5

Based on NMED Particle Size Distribution Spreadsheet – April 25, 2007

TABLE 19: Cement Baghouse Depletion Parameters

Particle Size Category (µm)	Mass Mean Particle Diameter (µm)	Mass Weighted Size Distribution (%)	Density (g/cm^3)
PM10			
0-2.5	1.5	0.26	2.85
2.5-5	3	0.25	2.85
5-10	6	0.48	2.85
TSP			
0-2.5	1.5	0.11	2.85
2.5-5	3	0.11	2.85
5-10	6	0.21	2.85
10-20	12	0.26	2.85
	24	0.23	2.85
20-30	30	0.08	2.85

Based on NMED Particle Size Distribution Spreadsheet – April 25, 2007

2.7 NO_2 DISPERSION MODELING ANALYSIS

The AERMOD model predicts ground-level concentrations of any generic pollutant without chemical transformations. Thus, the modeled NO_X emission rate will give ground-level modeled concentrations of NO_X. NAAQS and NMAAQS values are presented as NO_2. If modeling shows exceedance with the NO_2 1-hour and annual SILs, CIA modeling will be performed.

EPA has a three-tier approach to modeling NO_2 concentrations.

- Tier I – total conversion, or all NOx = NO_2
- Tier II – use a default NO_2/NOx ratio, 1 hour = 80%; Annual = 75% or Ambient Ratio Method 2[1] (ARM2) modeling.
- Tier III – case-by-case detailed screening methods, such as OLM (Ozone Limiting Method) and Plume Volume Molar Ratio Method (PVMRM)

For the annual NO_2 modeling approach, the Tier II annual 75% default NO_2/NOx ratio was used.

Tier III NO_2 modeling approach, OLM or PVMRM, considers the basic chemical assumptions, the titration of NO by ozone to form NO_2. Both use the NO_2/NO_X in-stack ratio (ISR) and information about the ambient ozone in the determination of the amount of titration that will occur in the plume. The primary difference between the two methods is the way in which the amount of ozone available for conversion of NO to NO_2 is determined. OLM assumes that all the ambient ozone is available for NO titration (i.e., instantaneous complete mixing with background air), regardless of the source or plume characteristics. In contrast, PVMRM determines the amount of ozone within the plume volume (computed from the source to the receptor) and limits the conversion of NO to NO_2 based on the ozone entrained in the plume. The calculation of the plume volume is done for an individual source or group of sources and on an hourly basis for each source/receptor combination, taking into account the plume dispersion for that hour. For this modeling analysis, if the Tier III methodology is required, PVMRM will be selected.

For PVMRM, three inputs can be selected in the model, the ISR, the NO_2/NO_X equilibrium ratio for the ambient air, and the ambient ozone concentration. The ISR will be determined for each source or group of sources. The NO_2/NO_X equilibrium ratio will be the EPA default of 0.90. Ozone input will be from monitored ozone data collected from the Shiprock Substation monitoring station as representative for simultaneous hourly model meteorological data years 2016.

Based on EPA's ISR databases, a proposed conservative NO_2/NO_X ISR ratio for Diesel-fired RICE is 0.15. No data could be found for a hot mix asphalt drum so to be conservative the EPA default ISR of 0.50 will be used. For natural gas combustion, to be conservative, the EPA default ISR of 0.50 will be used. For neighboring sources, since the ISR has a diminishing impact on ambient NO_2/NO_X ratios as a plume is transported farther downwind due to mixing and reaction towards background ambient NO_2/NO_X ratios, a default ISR of 0.20[2] in lieu of source specific data will be used. Table 20 summarizes the ISR selected for each NO_X source in the NO_2 1 hour modeling.

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[1] Memo: "Clarification on the Approval Process for Regulatory Application of the AERMOD Modeling System Beta Options" Richard A. Wayland, Director, Air Quality Assessment Division (C304-02), dated December 10, 2015.

[2] Technical support document (TSD) for NO2-related AERMOD modifications, EPA- 454/B-15-004, July 2015

TABLE 20: Summary of Selected ISR

Source Description	Selected ISR
Kirtland HMA Baghouse Stack	0.50
Kirtland HMA Asphalt Cement Heater	0.50
Kirtland Plant Generators/Engines	0.15
Kirtland CBP Plant Water Heater	0.50

Model Ozone Data

For PVMRM, modeling of the project-generated 1-hour NO_2 concentrations requires use of ambient monitored O_3 concentrations. Background ambient O_3 concentrations for the project area during the 2016 meteorological data years has been obtained from the Shiprock Substation (Year 2016) monitoring station, which is the monitoring site nearest to the project.

Concerning data substitution for missing hourly O_3 ambient monitoring data, the hourly O_3 data are used within the AERMOD air dispersion model when operated using the PVMRM option that simulates the atmospheric chemistry of O_3 reacting with initially emitted nitric oxide (NO) to form NO_2. If there is only a limited amount of O_3 in the plume, then the reaction is limited, forming less NO_2 than occurs with the simplifying assumption of complete conversion. The model disperses the initial NO_X emissions, which are mostly NO, during each of the 8,760 hours in a 365-day year. If the hourly ambient O_3 data from the nearest monitoring station have missing data, the missing O_3 hours are given substituted concentrations with the following procedure to better simulate the resulting NO_2 concentrations:

- If two or fewer consecutive hours of O_3 ambient concentrations are missing, the missing concentrations will be based on the highest previous or subsequent hour concentration.
- If three or more consecutive hours of O_3 ambient concentrations are missing, then substitution for each missing concentration will be based on the same hour from the previous or following day. Example: for data missing of hours 9-12 will be substituted with either the previous or following day for hours 9-12, etc.

2.8 SIGNIFICANT NEIGHBORING BACKGROUND SOURCES

For all Cumulative Impact Analysis (CIA) combustion emissions dispersion modeling (NO_X, CO, SO_2), only monitored background will be included. CIA particulate dispersion modeling will include all significant neighboring sources within 10 kilometers of Kirtland Sand and Gravel and regional monitored background. PSD Increment Analysis dispersion modeling will include all PSD increment consuming neighboring sources within 25 kilometers and increment consuming neighboring sources with pollutant emission rates over 1000 lbs/hr out to 50 kilometers of Kirtland Sand and Gravel. These sources will be obtained from the Air Quality Bureau's database.

2.9 REGIONAL BACKGROUND CONCENTRATIONS

Ambient background concentrations represent the contribution of pollutant sources that are not included in the modeling analysis, including naturally occurring sources. If the modeled concentration of a criteria pollutant is above the modeling significance level, the background concentration for each criteria pollutant will be added to the maximum modeled concentration to calculate the total estimated pollutant concentration for comparison with the AAQS.

The ambient background concentrations are listed in the Air Quality Bureau Guidelines for TSP, PM10, and $PM_{2.5}$. For TSP, PM10, and $PM_{2.5}$, Elam is proposing using backgrounds from Farmington Environmental Department (Monitor ID 1FO). For NO_X and SO_2, Elam is proposing using backgrounds from Shiprock Substation (Monitor ID 1H). For CO, Elam is proposing using backgrounds from the rest of New Mexico (Monitor ID 350010023).

	$PM_{2.5}$ (µg/m^3)	PM_{10} (µg/m^3)	TSP (µg/m^3)	NO_2 (µg/m^3)	CO (µg/m^3)	SO_2 (µg/m^3)
1 Hour					1787.865	44.515
8 Hour					1183.006	
24 Hour	14.13	42.0	42.0			
Annual	4.19		8.5	10.836		

NO_2 1-hour Background data

NO_2 1-hour background data will be based on the Tier 2 procedure found in EPA guidance document[3] for determining background concentrations.

> *"Based on this guidance, we believe that an appropriate methodology for incorporating background concentrations in the cumulative impact assessment for the 1-hour NO_2 standard would be to use multiyear averages of the 98th-percentile of the available background concentrations by season and hour-of-day, excluding periods when the source in question is expected to impact the monitored concentration (which is only relevant for modified sources). For situations involving a significant mobile source component to the background monitored concentrations, inclusion of a day-of-week component to the temporal variability may also be appropriate. The rank associated with the 98th-percentile of daily maximum 1-hour values should be generally consistent with the number of "samples" within that distribution for each combination based on the temporal resolution but also account for the number of samples "ignored" in specifying the 98th-percentile based on the annual distribution. For example, Table 1 in Section 5 of Appendix S specifies the rank associated*

[3] Memo: "Additional Clarification Regarding Application of Appendix W Modeling Guidance for 1-hour N02 National Ambient Air Quality Standard" Tyler Fox, Leader, Air Quality Modeling Group, C439-01, dated March 1, 2011.

> *with the 98th-percentile value based on the annual number of days with valid data. Since the number of days per season will range from 90 to 92, Table 1 would indicate that the 2nd-highest value from the seasonal distribution should be used to represent the 98th-percentile. On the other hand use of the 2nd-highest value for each season would effectively "ignore" only 4 values for the year rather than the 7 values "ignored" from the annual distribution. Balancing these considerations we recommend that background values by season and hour-of-day used in this context should be based on the 3rd-highest value for each season and hour-of-day combination, whereas the 8th-highest value should be used if values vary by hour-of-day only. For more detailed temporal pairing, such as season by hour-of- day and day-of-week or month by hour-of-day, the 1st-highest values from the distribution for each temporal combination should be used."*

The NO_2 monitoring data will be from the Shiprock Substation monitor for the most recent complete 3-years of data, 2014 – 2016. This monitoring station is the closest and most representative monitor station for Kirtland Sand and Gravel. For each season; winter (December – February), spring (March – May), summer (June – August), and fall (September – November), the multi-year average of the 3-highest value for each hour of the day was determined. This was input into the model and the background value will be added to the model concentration results for each corresponding hour of the day and season.

Background concentrations specified in units of PPB are converted to µg/m^3 based on reference temperature (25° C) and pressure (1013.25 millibars). This further provides a conservative result based on standard pressure and temperature instead of actual pressure and temperature which would result in a lower µg/m^3 based on the monitored background concentration in PPB at the Kirtland Sand and Gravel elevation.

TABLE 21: Substation Monitored Seasonal NO_2 Background – 3rd Highest Hourly PPB

Hour	Winter	Spring	Summer	Fall
1	23.33	11.33	13.33	16.67
2	23.00	10.33	11.00	16.00
3	21.67	11.67	12.00	18.33
4	22.00	14.00	12.00	18.00
5	22.67	17.00	12.67	19.33
6	23.00	16.00	15.67	19.00
7	22.67	16.00	26.00	18.33
8	19.00	21.00	23.33	15.33
9	18.67	24.33	27.33	19.33
10	20.67	19.33	25.33	21.00
11	24.00	15.67	16.67	26.33
12	24.00	12.67	10.67	21.67
13	23.33	9.33	11.67	20.33
14	22.00	5.00	8.00	15.33
15	19.33	6.00	8.33	17.67
16	24.00	7.00	7.33	17.67
17	26.33	5.67	10.67	19.33
18	25.33	4.67	11.33	14.00
19	21.33	6.33	15.33	11.67
20	21.67	5.00	14.67	13.00
21	21.00	10.00	10.67	16.00
22	22.00	9.67	13.67	18.00
23	23.00	8.67	14.67	18.33
24	22.67	10.67	12.33	18.33

Section 17

Compliance Test History

(Submitting under 20.2.70, 20.2.72, 20.2.74 NMAC)

To show compliance with existing NSR permits conditions, you must submit a compliance test history. The table below provides an example.

This is a new construction permit with no existing compliance history.

Section 20

Other Relevant Information

Other relevant information. Use this attachment to clarify any part in the application that you think needs explaining. Reference the section, table, column, and/or field. Include any additional text, tables, calculations or clarifying information.

Additionally, the applicant may propose specific permit language for AQB consideration. In the case of a revision to an existing permit, the applicant should provide the old language and the new language in track changes format to highlight the proposed changes. If proposing language for a new facility or language for a new unit, submit the proposed operating condition(s), along with the associated monitoring, recordkeeping, and reporting conditions. In either case, please limit the proposed language to the affected portion of the permit.

No other relevant information is submitted with the application.

Section 22: Certification

Company Name: Elam Construction

I, Russell A. Larson hereby certify that the information and data submitted in this application are true and as accurate as possible, to the best of my knowledge and professional expertise and experience.

Signed this 18 day of December, 2017 upon my oath or affirmation, before a notary of the State of

Colorado.

[signature] 12-18-17

*Signature Date

Russell A. Larson C.O.O.

Printed Name Title

Scribed and sworn before me on this 18th day of December, 2017.

My authorization as a notary of the State of Colorado expires on the

21st day of March, 2021.

[signature] 12/18/2017

Notary's Signature Date

Rhonda Busch Morgan

Notary's Printed Name

RHONDA BUSCH MORGAN
Notary Public – State of Colorado
Notary ID 20174012396
My Commission Expires Mar 21, 2021

*For Title V applications, the signature must be of the Responsible Official as defined in 20.2.70.7.AE NMAC.