AIR DISPERSION MODELING ANALYSIS

PROPOSED HOT MIX ASPHALT PLANT
EAST FLAT ROCK, NORTH CAROLINA
HENDERSON COUNTY

Prepared For:

Southeastern Asphalt
2997 Spartanburg Hwy
East Flat Rock, North Carolina 28726

BLE Project Number J20-14914-01

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APPENDICIES

1.0 INTRODUCTION

North Carolina facilities are required to demonstrate to the Air Quality Analysis Branch (AQAB) of the North Carolina Division of Air Quality (NCDAQ) that any regulated toxic air pollutant emitted from the facility and listed in 15A NCAC 02Q1 Section .0711 of the Toxic Air Pollutant (TAP) Procedures will not result in ambient concentrations exceeding the Acceptable Ambient Levels (AALs) listed in 15A NCAC 02D Section .1104.

Southeastern Asphalt proposes to construct a hot mix asphalt plant in Henderson County, North Carolina. The proposed plant is drum mix with a capacity of 200 tons per hour. Dryer emissions will be controlled by a pulse jet baghouse. Asphalt will be loaded into and unloaded from two silos. The facility has no current plans to maintain RAP piles.

Emission calculations for the plant were prepared using the spreadsheet provided by North Carolina Environmental Protection Division (NCEPD). The emission factors are based on AP-42, Fifth Edition, Volume I.,Chapter 11.1 - Hot Mix Asphalt Plant, Final Edition Dec 2000, Update 2001. Emissions are presented in **Appendix A**. The proposed construction will result in total facility-wide emissions of five regulated North Carolina Toxic Air Pollutants (TAP) that exceed the emission rates listed in 15A NCAC 02Q .0711. Therefore, air dispersion modeling of these five pollutants has been conducted to demonstrate compliance with the AALs of 15A NCAC 02D Section .1104.

This report presents the input data and modeling methodology utilized in the TAP modeling compliance demonstration. The modeling methodology follows the procedures in the *Guidelines for Evaluating the Air Quality Impacts of Toxic Pollutants in North Carolina* (May 2018). The North Carolina Modeling Protocol Checklist is provided in **Appendix B**, in lieu of a modeling protocol.

The refined air dispersion model, AERMOD (version 19191), was used to model pollutant emissions.

2.0 FACILITY LOCATION AND SITE DESCRIPTION

The facility will be located in southern Henderson county, at Spartanburg Highway US-176 and US Highway 25, southeast of East Flat Rock, North Carolina. The approximate Universal Transverse Mercator (UTM) coordinates of the facility are 371998.375 East, 3903025.71 North, at an elevation of approximately 2150 feet (655 m) above mean sea level. Figures are included in **Appendix C**. Figure 1 shows the general location of the facility on the US Geological Survey (USGS) S 7.5-minute quadrangles. Figure 2 shows the layout of the facility.

For modeling purposes, the appropriate urban/rural land use classification for the area was determined using the Auer Method[1], which is recommended in the EPA's *Guideline on Air Quality Models* (Appendix W to 40 CFR Part 51). According to the method, the area within a 3-km radius of the facility was identified on USGS topographic maps and delineated by land use type. Less than 50 percent of the surrounding land use can be classified as heavy/light industrial, commercial, or compact residential; therefore, the area is classified as rural in the model.

[1] Auer, August (1977). Correlation of Land Use and Cover with Meteorological Anomalies. http://journals.ametsoc.org

3.0 AERMOD INPUT DATA

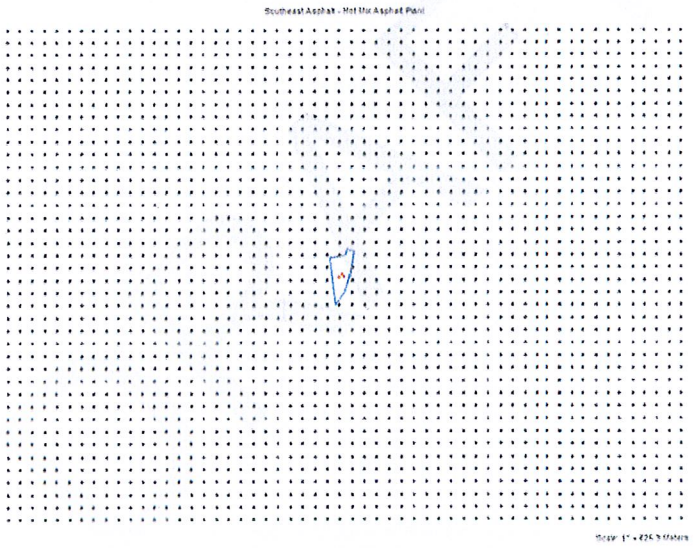
3.1 Source and Receptor Data

The property line, sources, and receptor locations are presented in the UTM coordinate system. The datum for this modeling analysis is based on North American Datum 1983 (NAD 83). UTM coordinates for this analysis all reside within UTM Zone 17.

The receptors included in the modeling analysis consist of property line receptors, spaced 25 meters (m) apart, and Cartesian receptor points spaced every 100 m, extending out 3 km from the center of the facility.

There are no public right-of-ways (e.g. roads) crossing the property line, therefore only a single property line was included in the modeling. The impacts were reviewed to ensure that the maximum impacts were captured within the 100 m spaced grid.

The receptor grid, property boundary, and sources in the model are shown below.



Source descriptions, point source and volume source parameters are presented in **Appendix D** on North Carolina Forms (NC FORM 3 and NC FORM 3V). The facility provided point source information for the baghouse stack. Point source parameters for asphalt silo filing and volume source parameters for silo asphalt truck loading were obtained from Arizona Department of Environment Quality.[2]

Modeled TAP emissions are presented in NC FORM 2, **Appendix D**.

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[2] Arizona Department of Environmental Quality, Technical Support Document for Hot Mix Asphalt Plant General Permit (https://static.azdeq.gov/permits/gnhmaptsd.pdf)

3.2 Meteorological Data

NC DEQ Division of Air Quality provided the meteorological data. The meteorological data files are Weather and Research Forecasting (WRF) model files post-processed by Mesoscale Model Interface Program (MMIF) (Version 3.3) and rerun with the current version of AERMET (version 19191). The WRF files were produced by UNC under contract to EPA and use the "standard" EPA 12km WRF projection. The chosen point (35.302N, 82.407W) was in Hendersonville, NC. Meteorological data is for years 2013 through 2015. The profile base elevation is 679.06 meters.

3.3 Terrain Considerations

The AERMAP modeling domain included the Saluda, Zirconia, Cliffield Mountain, and Hendersonville Department of Natural Resources United States Geological Survey (USGS) 7.5-minute Topographic Quadrangle. The National Elevation Dataset (NED) data was obtained from the US Geological Survey (USGS) as a products of the 3D Elevation Program. NED data consist of arrays of regularly spaced elevations. The array elevations are at a resolution of 1 arcsecond (approximately 30 m intervals) and were interpolated using the latest version of AERMAP (version 18081) to determine elevations at the defined receptor intervals. AERMAP was used to generate the elevation and height scale for each emission source.

3.4 Building Downwash

The Plume Rise Model Enhancements (PRIME) downwash algorithms are incorporated into AERMOD to reflect building downwash effects when plume rise is potentially impacted by an onsite building. The BPIP-PRIME preprocessor (version 04274) calculates direction specific building parameters required by AERMOD.

The height of a stack must allow the emissions plume to escape the cavity area created on the downwind side of a building. This is referred to as good engineering practice (GEP) stack height. According to Section 123 of the Clean Air Act, GEP is defined as "the height necessary to insure that emissions from a stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result

Stack heights greater that "Good Engineering Practice" (GEP) cannot be used in air dispersion modeling analyses, as restricted in regulations implemented by the EPA. Under these regulations, the portion of a stack that exceeds GEP stack height cannot be considered in modeling to determine source impacts. This limits the construction of excessive stack heights used to reduce ground-level pollutant concentrations.

GEP stack height, is defined by the following formula:

$H_{GEP} = H + 1.5L$, where:
H_{GEP} = GEP stack height, measured from the ground-level elevation at the base of the stack
H = height of nearby structure(s) and
L = lesser dimension, height or projected width, of the nearby structure

This equation is for stacks located within 5L of a structure. Stacks located at a distance greater than 5L are not subject to the wake effects of the structure. The wind direction-specific downwash dimensions and the dominant downwash structures used in this analysis are determined using BPIP. When determining compliance with the air quality standards, the stack height must be less than or equal to the GEP stack height within the model input file.

4.0 AERMOD MODEL RESULTS

NC FORM R5 in **Appendix D** summarizes the maximum predicted concentrations of TAPs determined by AERMOD and compares them to the Acceptable Ambient Levels (AALs) listed in 15A NCAC 02D Section.1104. As shown, all impacts are below 50% of their respective AAL.

APPENDIX A

Hot Mix Asphalt Plant Emission Calculations

ASPHALT EMISSIONS CALCULATOR REVISION G 08/30/2019 INPUT SCREEN

NCDENR

NOTICE: This spreadsheet is for your use only and should be used with caution. DENR does not guarantee the accuracy of the information contained. This spreadsheet is subject to continual revision and updating. It is your responsibility to be aware of the most current information available. DENR is not responsible for errors or omissions that may be contained herein.

Instructions: 1. Fill in all BLUE cells.
2.Ensure all pull down boxes and BLUE cells reflect correct conditions.
3. Read the README sheet.
4. Use the mouse pointer to read the tips in the "red cornered" input cells. (See Tools->Options->Comments if these are not displayed.

Company Name:	Southeastern Asphalt
Facility ID No.:	TBD
Permit No.:	TBD
Facility City:	Flat Rock
Facility County:	Henderson
Spreadsheet Prepared by:	Nathan Daniel - BLE

Is this spreadsheet being used for emissions inventory purposes?	2. NO		
Plant type:	Drum mix		
Fuel type:	No.2 fuel oil-fired		
Fuel Sulfur Content:	0.50	%	(default value is 0.5 %)
Controls:	Fabric filter controls		

Dryer heat input:	50	million Btu per hour
Plant maximum production capacity:	200	tons per hour

Asphalt Properties			
Asphalt temperature:	325	degrees F	(default value of 325 degrees F)
Volatility loss (V):	-0.5	%	(default value of -0.5 %)

Silo Filling?	YES

RAP crushing on site?	NO				
Crushing Capacity?	66	tons per hour	No. of crushers:	1	
Hours of operation:	8760	hours per year	No. of screens:	1	
			No. of conveyors:	1	

Asphalt Cement Heater			
AC heater heat input:	0.65	million Btu per hour	(No.2 or diesel fuel oil -fired assumed)
Fuel Sulfur Content:	0.50	%	(default value is 0.5 %)
Hours of operation:	8760	hours per year	(default is 8760 hours per year unless specified otherwise)

Calculated Annual Production Limit:	1,492,476	tons per year	
Requested Annual Production Limit:	1,492,476	tons per year	(if none desired leave default value =8760*tph)
Requested Daily Production Limit:	4,800	tons per day	(if none desired leave default value = 24*tph)

Is this plant NSPS Subpart I affected?	YES	
Stack gas flow rate :	38,359	ACFM
Stack gas temperature :	240	oF
Stack % moisture:	33	%
Allowable emission rate under NSPS Subpart I:	6.65	lb/hr
Control efficiency required:	99.881	%
Does Method 5 data already exist?:	NO	
Method 5 determined emission rate:	40.00	lb/hr
Control efficiency based on test data:	99.286	%

Allowable emission rate under 2 D .0506:	50.24	lb/hr	
Does this plant emit less than this limit ?:	Yes	*(based on emission factors)*	
Control efficiency required:	99.103	%	

Dryer Emissions
Criteria Pollutants

Pollutant	Uncontrolled Emission Factor (lb/ton)	Controlled Emission Factor (lb/ton)	uncontrolled emission rate (lb/hr)	controlled emission rate (lb/hr)	Title V, Potential Emissions (tpy) (no controls, 8760 hours per year operation)	PSD, Potential Emissions, (tpy) (with controls, 8760 hours per year operation)	Synthetic Minor, Potential Emissions (tpy) (with all operation restrictions)
Condensible PM (or PM_{10})	0.0654	0.0194	13.08	3.88			
Filterable PM	28	0.014	5600	2.8			
Filterable PM10	6.4	0.0039	1280	0.78			
Total PM	28	0.033	5600	6.6	46.1	28.9	24.6
Total PM10	6.5	0.023	1300	4.6	23.6	20.1	17.2
SO2	0.0634	0.0634	12.68	12.68	55.53	55.53	47.31
CO	0.1300	0.130	26	26	113.9	113.9	97.0
NOx	0.0550	0.055	11	11	48.2	48.2	41.0
VOC	0.0320	0.032	6.4	6.4	28.0	28.0	23.9
HAPs, TOTAL		0.009		1.74	7.6	7.6	6.5

Silo Filling plus Load Out Emissions, Criteria Pollutants

Pollutant	Emission Factor, combined (lb/ton)	emission rate (lb/hr)	Title V, Potential Emissions (tpy) (no controls, 8760 hours per year operation)	PSD, Potential Emissions, (tpy) (8760 hours per year operation)	Synthetic Minor, Potential Emissions (tpy) (with all operation restrictions)
Total PM	1.11E-03	2.22E-01	1.0	1.0	0.8
CO	2.53E-03	5.06E-01	2.2	2.2	1.9
VOC	1.61E-02	3.22E+00	14.1	14.1	12.0
HAPs, TOTAL	2.74E-04	5.48E-02	0.2	0.2	0.2

Rap Crusher Emissions

Pollutant	Emission Factor, all sources combined (lb/ton)	emission rate (lb/hr)	Title V, Potential Emissions (tpy) (no controls, 8760 hours per year operation)	PSD, Potential Emissions, (tpy) (8760 hours per year operation)	Synthetic Minor, Potential Emissions (tpy) (with all operation restrictions)
Total PM	0	0.00E+00	0.0	0.0	0.0
Total PM10	0	0.00E+00	0.0	0.0	0.0

Asphalt Cement Heater Emissions

Pollutant	Uncontrolled Emission Factor (lb/MMBtu)	emission rate (lb/hr)	Title V, Potential Emissions (tpy) (no controls, 8760 hours per year operation)	PSD, Potential Emissions, (tpy) (8760 hours per year operation)	Synthetic Minor, Potential Emissions (tpy) (with all operation restrictions)
Total PM	0.0235714	1.53E-02	0.1	0.1	0.1
Total PM10	0.0235714	1.53E-02	0.1	0.1	0.1
SO2	0.5071429	3.30E-01	1.4	1.4	1.4
CO	0.0357143	2.32E-02	0.1	0.1	0.1
NOx	0.1428571	9.29E-02	0.4	0.4	0.4
VOC	0.0024286	1.58E-03	0.0	0.0	0.0

Facility-wide Criteria Pollutant Emissions Summary

Pollutant	Controlled Emission Rate, lb/hr	Title V, Potential Emissions (tpy) (no controls, 8760 hours per year operation)	PSD, Potential Emissions, (tpy) (8760 hours per year operation)	Synthetic Minor, Potential Emissions (tpy) (with all operation restrictions)
Total PM	6.62E+00	47.1	29.9	25.5
Total PM10	4.62E+00	24.7	21.2	18.1
SO2	1.30E+01	57.0	57.0	48.7
CO	2.65E+01	116.2	116.2	99.0
NOx	1.11E+01	48.6	48.6	41.4
VOC	9.62E+00	42.1	42.1	35.9
HAPs, TOTAL	1.79E+00	7.9	7.9	6.7

Facility-wide Toxic Air Pollutants Summary

TAP	CAS No.	Action
Acetaldehyde (TH)	75070	NOTE 1
Acrolein (TH)	107028	NOTE 1
Arsenic unlisted cmpds (comp. of ASC) (TH)	ASC-other	NOTE 3
Benzene (TH)	71432	NOTE 3
Benzo(a)pyrene (T)	50328	NOTE 1
Beryllium metal (unreacted) (TH)	7440417	NOTE 1
Cadmium metal (elemental unreacted) (TH)	7440439	NOTE 3
Carbon disulfide (TH)	75150	NOTE 1
Formaldehyde (TH)	50000	NOTE 3
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8 (TH)	57653857	NOTE 1
Hexane, n- (TH)	110543	NOTE 1
Hydrogen Sulfide (T)	7783064	NOTE 1
Manganese unlisted compounds (T)	MNC-other	NOTE 1
Methyl chloroform (TH)	71556	NOTE 1

TAP	CAS No.	Action
Mercury, vapor (TH)	7439976	NOTE 1
Methyl ethyl ketone (TH)	78933	NOTE 1
Methylene chloride (TH)	75092	NOTE 1
Nickel metal (TH)	7440020	NOTE 3
Perchloroethylene (tetrachloroethylene) (TH)	127184	NOTE 1
Phenol (TH)	108952	NOTE 1
Soluble Chromate Compounds as Chrome VI (TH)	7738945	NOTE 1
Styrene (TH)	100425	NOTE 1
Tetrachlorodibenzo-p-dioxin, 2,3,7,8- (TH)	1746016	NOTE 1
Toluene (TH)	108883	NOTE 1
Trichloroethylene (TH)	79016	NOTE 1
Xylene (TH)	1330207	NOTE 1

NOTE 1: Include TAP in TPER stipulation.

NOTE 2: Include TAP in TPER stipulation with operation restrictions.

NOTE 3: Modeling Required. See "Toxic calculations" worksheet.

ASPHALT EMISSIONS CALCULATOR REVISION G 08/30/2019 OUTPUT SCREEN

NCDENR

Instructions: Enter emission source / facility data on the "INPUT" tab/screen. The air emission results and summary of input data are viewed / printed on the "OUTPUT" tab/screen. The different tabs are on the bottom of this screen.

This spreadsheet is for your use only and should be used with caution. DENR does not guarantee the accuracy of the information contained. This spreadsheet is subject to continual revision and updating. It is your responsibility to be aware of the most current information available. DENR is not responsible for errors or omissions that may be contained herein.

SOURCE / FACILITY / USER INPUT SUMMARY (FROM INPUT SCREEN)

COMPANY:	Southeastern Asphalt	FACILITY ID NO.:	TBD
		PERMIT NUMBER:	TBD
EMISSION SOURCE DESCRIPTION:	NSPS affected 200 tph No.2 fuel oil-fired, Drum mix asphalt plant (50 mmBtu/hr heat input, w/silofill, no RAP, sulfur=0.5%)	FACILITY CITY:	Flat Rock
		FACILITY COUNTY:	Henderson

Annual Production Limit:	1,492,476	ton/year	Daily Production Limit: n/a	ton/day
SPREADSHEET PREPARED BY:	Nathan Daniel - BLE			

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION

AIR POLLUTANT EMITTED	ACTUAL EMISSIONS (AFTER CONTROLS / LIMITS)		POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS)		POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS)	
	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
PARTICULATE MATTER (PM)	6.62	25.52		47.14		25.52
PARTICULATE MATTER<10 MICRONS (PM_{10})	4.62	18.06		24.69		18.06
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)						
SULFUR DIOXIDE (SO2)	13.01	48.75		56.98		48.75
NITROGEN OXIDES (NOx)	11.09	41.45		48.59		41.45
CARBON MONOXIDE (CO)	26.53	99.00		116.20		99.00
VOLATILE ORGANIC COMPOUNDS (VOC)	9.62	35.90		42.14		35.90
TOTAL HAP	1.79	6.70		7.86		6.70
LARGEST HAP (formaldehyde)	0.64	2.38		2.79		2.38

Attach INPUT worksheet

TOXIC / HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION

TOXIC / HAZARDOUS AIR POLLUTANT	CAS Number	ACTUAL EMISSIONS (AFTER CONTROLS / LIMITS)		POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS)		POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITS)		EMISSION FACTOR (lb/ton asphalt produced, with Fabric filter controls)
		lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	
Acetaldehyde (TH)	75070	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00	0.0E+00
Acrolein (TH)	107028	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00	0.0E+00
Antimony unlisted compounds (H)	SBC-other	3.60E-05	2.69E-01	3.60E-05	0.32	3.60E-05	2.69E-01	1.8E-07
Arsenic unlisted cmpds (comp. of ASC) (TH)	ASC-other	1.12E-04	8.36E-01	1.12E-04	0.98	1.12E-04	8.36E-01	5.6E-07
Benzene (TH)	71432	7.92E-02	5.91E+02	7.92E-02	693.90	7.92E-02	5.91E+02	4.0E-04
Benzo(a)pyrene (T)	50328	3.53E-06	2.63E-02	3.53E-06	0.03	3.53E-06	2.63E-02	1.8E-08
Beryllium metal (unreacted) (TH)	7440417	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00	0.0E+00
Cadmium metal (elemental unreacted) (TH)	7440439	8.20E-05	6.12E-01	8.20E-05	0.72	8.20E-05	6.12E-01	4.1E-07
Carbon disulfide (TH)	75150	4.98E-04	3.72E+00	4.98E-04	4.36	4.98E-04	3.72E+00	2.5E-06
Chromium unlisted cmpds (add w/chrom acid to get CRC) (H)	CRC-other	1.01E-03	7.54E+00	1.01E-03	8.85	1.01E-03	7.54E+00	5.1E-06
Chromic acid (VI) (component of solCR6 and CRC) (TH)	7738945	9.00E-05	6.72E-01	9.00E-05	0.79	9.00E-05	6.72E-01	4.5E-07
Cobalt unlisted compounds (H)	COC-other	5.20E-06	3.88E-02	5.20E-06	0.05	5.20E-06	3.88E-02	2.6E-08
Cumene (H)	98828	9.15E-04	6.83E+00	9.15E-04	8.02	9.15E-04	6.83E+00	4.6E-06
Ethyl benzene (H)	100414	5.13E-02	3.82E+02	5.13E-02	449.00	5.13E-02	3.82E+02	2.6E-04
Ethyl chloride (chloroethane) (H)	75003	1.75E-06	1.30E-02	1.75E-06	0.02	1.75E-06	1.30E-02	8.7E-09
Formaldehyde (TH)	50000	6.38E-01	4.76E+03	6.38E-01	5584.93	6.38E-01	4.76E+03	3.2E-03
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8 (TH)	57653857	2.60E-10	1.94E-06	2.60E-10	0.00	2.60E-10	1.94E-06	1.3E-12
Hexane, n- (TH)	110543	1.91E-01	1.43E+03	1.91E-01	1676.40	1.91E-01	1.43E+03	9.6E-04
Hydrogen Chloride (hydrochloric acid) (TH)	7647010	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00	0.0E+00
Hydrogen Sulfide (T)	7783064	1.09E-02	8.17E+01	1.09E-02	95.87	1.09E-02	8.17E+01	5.5E-05
Lead unlisted compounds (H)	PBC-other	3.00E-03	2.24E+01	3.00E-03	26.28	3.00E-03	2.24E+01	1.5E-05
Manganese unlisted compounds (T)	MNC-other	1.54E-03	1.15E+01	1.54E-03	13.49	1.54E-03	1.15E+01	7.7E-06
Mercury, vapor (TH)	7439976	5.20E-04	3.88E+00	5.20E-04	4.56	5.20E-04	3.88E+00	2.6E-06
Methyl bromide (H)	74839	1.99E-04	1.49E+00	1.99E-04	1.75	1.99E-04	1.49E+00	1.0E-06
Methyl chloride (H)	74873	1.25E-04	9.31E-01	1.25E-04	1.09	1.25E-04	9.31E-01	6.2E-07
Methyl chloroform (TH)	71556	9.60E-03	7.16E+01	9.60E-03	84.10	9.60E-03	7.16E+01	4.8E-05
Methyl ethyl ketone (TH)	78933	1.36E-03	1.01E+01	1.36E-03	11.90	1.36E-03	1.01E+01	6.8E-06
Methylene chloride (TH)	75092	6.58E-06	4.91E-02	6.58E-06	0.06	6.58E-06	4.91E-02	3.3E-08
Napthalene (H)	91203	1.32E-01	9.83E+02	1.32E-01	1154.36	1.32E-01	9.83E+02	6.6E-04
Nickel metal (TH)	7440020	1.26E-02	9.40E+01	1.26E-02	110.38	1.26E-02	9.40E+01	6.3E-05
Perchloroethylene (tetrachloroethylene) (TH)	127184	6.40E-05	4.78E-01	6.40E-05	0.56	6.40E-05	4.78E-01	3.2E-07
Phenol (TH)	108952	8.05E-04	6.00E+00	8.05E-04	7.05	8.05E-04	6.00E+00	4.0E-06
Phosphorus Metal, Yellow or White (H)	7723140	5.60E-03	4.18E+01	5.60E-03	49.06	5.60E-03	4.18E+01	2.8E-05
Polycyclic Organic Matter (H)	POM	1.76E-01	1.31E+03	1.76E-01	1541.76	1.76E-01	1.31E+03	8.8E-04
Propionaldehyde (H)	123386	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00	0.0E+00
Quinone (H)	106514	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00	0.0E+00
Selenium compounds (H)	SEC	7.00E-05	5.22E-01	7.00E-05	0.61	7.00E-05	5.22E-01	3.5E-07
Styrene (TH)	100425	1.92E-04	1.44E+00	1.92E-04	1.68	1.92E-04	1.44E+00	9.6E-07
Tetrachlorodibenzo-p-dioxin, 2,3,7,8- (TH)	1746016	4.20E-11	3.13E-07	4.20E-11	0.00	4.20E-11	3.13E-07	2.1E-13
Toluene (TH)	108883	5.83E-01	4.35E+03	5.83E-01	5109.34	5.83E-01	4.35E+03	2.9E-03
Trichloroethylene (TH)	79016	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00	0.0E+00
Trimethylpentane, 2,2,4- (H)	540841	8.02E-03	5.99E+01	8.02E-03	70.28	8.02E-03	5.99E+01	4.0E-05
Xylene (TH)	1330207	4.83E-02	3.60E+02	4.83E-02	422.98	4.83E-02	3.60E+02	2.4E-04
Xylene, o- (H)	95476	2.05E-03	1.53E+01	2.05E-03	18.00	2.05E-03	1.53E+01	1.0E-05

TOXIC AIR POLLUTANT EMISSIONS INFORMATION (FOR PERMITTING PURPOSES)

Expected actual emissions after controls and limitations consisting of an annual production limit of 1492476 tons .						EMISSION FACTOR (lb/ton asphalt produced, with Fabric filter controls)
TOXIC AIR POLLUTANT	CAS Num.	lb/hr	lb/day	lb/yr	Modeling Required?	
Acetaldehyde (TH)	75070	0.00E+00	0.00E+00	0.00E+00	NO. Based on facility-wide potential.	0.00E+00
Acrolein (TH)	107028	0.00E+00	0.00E+00	0.00E+00	NO. Based on facility-wide potential.	0.00E+00
Arsenic unlisted cmpds (comp. of ASC) (TH)	ASC-other	1.12E-04	2.69E-03	8.36E-01	YES. Modeling required	5.60E-07
Benzene (TH)	71432	7.92E-02	1.90E+00	5.91E+02	YES. Modeling required	3.96E-04
Benzo(a)pyrene (T)	50328	3.53E-06	8.47E-05	2.63E-02	NO. Based on facility-wide potential.	1.76E-08
Beryllium metal (unreacted) (TH)	7440417	0.00E+00	0.00E+00	0.00E+00	NO. Based on facility-wide potential.	0.00E+00
Cadmium metal (elemental unreacted) (TH)	7440439	8.20E-05	1.97E-03	6.12E-01	YES. Modeling required	4.10E-07
Carbon disulfide (TH)	75150	4.98E-04	1.20E-02	3.72E+00	NO. Based on facility-wide potential.	2.49E-06
Soluble Chromate compounds as Chrome (VI) (TH)	SOLCR6	9.00E-05	2.16E-03	6.72E-01	NO. Based on facility-wide potential.	4.50E-07
Formaldehyde (TH)	50000	6.38E-01	1.53E+01	4.76E+03	YES. Modeling required	3.19E-03
Hexane, n- (TH)	110543	1.91E-01	4.59E+00	1.43E+03	NO. Based on facility-wide potential.	9.57E-04
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8 (TH)	57653857	2.60E-10	6.24E-09	1.94E-06	NO. Based on facility-wide potential.	1.30E-12
Hydrogen Sulfide (T)	7783064	1.09E-02	2.63E-01	8.17E+01	NO. Based on facility-wide potential.	5.47E-05
Manganese unlisted compounds (T)	MNC-other	1.54E-03	3.70E-02	1.15E+01	NO. Based on facility-wide potential.	7.70E-06
Mercury, vapor (TH)	7439976	5.20E-04	1.25E-02	3.88E+00	NO. Based on facility-wide potential.	2.60E-06
Methylene chloride (TH)	75092	6.58E-06	1.58E-04	4.91E-02	NO. Based on facility-wide potential.	3.29E-08
Methyl chloroform (TH)	71556	9.60E-03	2.30E-01	7.16E+01	NO. Based on facility-wide potential.	4.80E-05
Methyl ethyl ketone (TH)	78933	1.36E-03	3.26E-02	1.01E+01	NO. Based on facility-wide potential.	6.79E-06
Nickel metal (TH)	7440020	1.26E-02	3.02E-01	9.40E+01	YES. Modeling required	6.30E-05
Perchloroethylene (tetrachloroethylene) (TH)	127184	6.40E-05	1.54E-03	4.78E-01	NO. Based on facility-wide potential.	3.20E-07
Phenol (TH)	108952	8.05E-04	1.93E-02	6.00E+00	NO. Based on facility-wide potential.	4.02E-06
Styrene (TH)	100425	1.92E-04	4.62E-03	1.44E+00	NO. Based on facility-wide potential.	9.62E-07
Tetrachlorodibenzo-p-dioxin, 2,3,7,8- (TH)	1746016	4.20E-11	1.01E-09	3.13E-07	NO. Based on facility-wide potential.	2.10E-13
Toluene (TH)	108883	5.83E-01	1.40E+01	4.35E+03	NO. Based on facility-wide potential.	2.92E-03
Trichloroethylene (TH)	79016	0.00E+00	0.00E+00	0.00E+00	NO. Based on facility-wide potential.	0.00E+00
Xylene (TH)	1330207	4.83E-02	1.16E+00	3.60E+02	NO. Based on facility-wide potential.	2.41E-04

Toxic Air Pollutant ission rate calculations page

This sheet presents the emission rate calculations that are necessary for modeling determinations.

Pollutant	CAS No.	emissions from dryer	emissions from handling	TPER	Units	TPER	Units	dryer: Controlled Emission Factor (lb/ton)	dryer: Controlled Emission Rate (lb/hour)	Silo Filling: Emission factor (lb/ton)	Silo Filling: Emission Rate (lb/hr)	Loadout: Emission factor (lb/ton)	Loadout: Emission Rate (lb/hr)	total handling: Emission Factor (lb/ton)	total handling: Emission Rate (lb/hour)	total: Controlled Emission Factor (lb/ton)	total: Controlled Emission Rate (lb/hour)	Controlled Emission Rate (lb/day)	Controlled Emission Rate (lb/year)	Controlled w/Limitations Emission Rate (lb/day)	Controlled w/Limitations Emission Rate (lb/year)	Controlled ER greater than TPER ?	Controlled w/Limitations ER greater than TPER ?	Comments
Acetaldehyde (TH)	75070	yes	no	6.8	lb/hr			0.00E+00	0.00E+00							0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			NOTE 1
Acrolein (TH)	107028	yes	no	0.02	lb/hr			0.00E+00	0.00E+00							0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No		NOTE 1
Formaldehyde (TH)	50000	yes	yes	0.04	lb/hr			3.10E-03	6.20E-01	8.41E-05	1.68E-02	3.66E-06	7.32E-04	8.77E-05	1.75E-02	3.19E-03	6.38E-01	1.53E+01	5.58E+03	1.53E+01	4.76E+03	Yes		NOTE 3
Phenol (TH)	108952	no	yes	0.24	lb/hr					0.00E+00	0.00E+00	4.02E-06	8.05E-04	4.02E-06	8.05E-04	4.02E-06	8.05E-04	1.93E-02	7.05E+00	1.93E-02	6.00E+00	No		NOTE 1
Styrene (TH)	100425	no	yes	2.7	lb/hr					6.58E-07	1.32E-04	3.04E-07	6.07E-05	9.62E-07	1.92E-04	9.62E-07	1.92E-04	4.62E-03	1.68E+00	4.62E-03	1.44E+00	No		NOTE 1
Methyl chloroform (TH)	71556	yes	yes	64	lb/hr	250	lb/day	4.80E-05	9.60E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.80E-05	9.60E-03	2.30E-01	8.41E+01	2.30E-01	7.16E+01	No	No	NOTE 1
Methyl ethyl ketone (TH	78933	yes	yes	22.4	lb/hr	78	lb/day	0.00E+00	0.00E+00	4.75E-06	9.51E-04	2.04E-06	4.08E-04	6.79E-06	1.36E-03	6.79E-06	1.36E-03	3.26E-02	1.19E+01	3.26E-02	1.01E+01	No	No	NOTE 1
Toluene (TH)	108883	yes	yes	14.4	lb/hr	98	lb/day	2.90E-03	5.80E-01	7.56E-06	1.51E-03	8.73E-06	1.75E-03	1.63E-05	3.26E-03	2.92E-03	5.83E-01	1.40E+01	5.11E+03	1.40E+01	4.35E+03	No	No	NOTE 1
Xylene (TH)	1330207	yes	yes	16.4	lb/hr	57	lb/day	2.00E-04	4.00E-02	2.44E-05	4.87E-03	1.71E-05	3.41E-03	4.14E-05	8.29E-03	2.41E-04	4.83E-02	1.16E+00	4.23E+02	1.16E+00	3.60E+02	No	No	NOTE 1
Methylene chloride (TH	75092	no	yes	0.39	lb/hr	1600	lb/year			3.29E-08	6.58E-06	0.00E+00	0.00E+00	3.29E-08	6.58E-06	3.29E-08	6.58E-06	1.58E-04	5.76E-02	1.58E-04	4.91E-02	No	No	NOTE 1
Soluble Chromate compounds as Chrome (VI) (TH	SOLCR6	yes	no	0.013	lb/day			4.50E-07	9.00E-05							4.50E-07	9.00E-05	2.16E-03	7.88E-01	2.16E-03	6.72E-01	No	No	NOTE 1
Hexane, n- (TH)	110543	yes	yes	23	lb/day			9.38E-04	1.88E-01	1.22E-05	2.44E-03	6.24E-06	1.25E-03	1.84E-05	3.69E-03	9.57E-04	1.91E-01	4.59E+00	1.68E+03	4.59E+00	1.43E+03	No	No	NOTE 1
Manganese unlisted compounds (T	MNC-other	yes	no	0.63	lb/day			7.70E-06	1.54E-03							7.70E-06	1.54E-03	3.70E-02	1.35E+01	3.70E-02	1.15E+01	No	No	NOTE 1
Mercury, vapor (TH)	7439976	yes	no	0.013	lb/day			2.60E-06	5.20E-04							2.60E-06	5.20E-04	1.25E-02	4.56E+00	1.25E-02	3.88E+00	No	No	NOTE 1
Nickel metal (TH)	7440020	yes	no	0.13	lb/day			6.30E-05	1.26E-02							6.30E-05	1.26E-02	3.02E-01	1.10E+02	3.02E-01	9.40E+01	Yes	Yes	NOTE 3
Carbon disulfide (TH)	75150	no	yes	3.9	lb/day					1.95E-05	3.90E-04	5.41E-07	1.08E-04	2.49E-06	4.98E-04	2.49E-06	4.98E-04	1.20E-02	4.36E+00	1.20E-02	3.72E+00	No	No	NOTE 1
Tetrachlorodibenzo-p-dioxin, 2,3,7,8- (TH	1746016	yes	no	0.0002	lb/yr			2.10E-13	4.20E-11							2.10E-13	4.20E-11	1.01E-09	3.68E-07	1.01E-09	3.13E-07	No	No	NOTE 1
Arsenic unlisted cmpds (comp. of ASC) (TH	ASC-other	yes	no	0.016	lb/yr			5.60E-07	1.12E-04							5.60E-07	1.12E-04	2.69E-03	9.81E-01	2.69E-03	8.36E-01	Yes	Yes	NOTE 3
Benzene (TH)	71432	yes	yes	8.1	lb/yr			3.90E-04	7.80E-02	3.90E-06	7.80E-04	2.16E-06	4.33E-04	6.06E-06	1.21E-03	3.96E-04	7.92E-02	1.90E+00	6.94E+02	1.90E+00	5.91E+02	Yes	Yes	NOTE 3
Benzo(a)pyrene (T	50328	yes	yes	2.2	lb/yr			9.80E-09	1.96E-06	0.00E+00	0.00E+00	7.84E-09	1.57E-06	7.84E-09	1.57E-06	1.76E-08	3.53E-06	8.47E-05	3.09E-02	8.47E-05	2.63E-02	No	No	NOTE 1
Hydrogen Sulfide (T)	7783064	yes	yes	1.7	lb/day			5.18E-05	1.04E-02	1.46E-06	2.92E-04	1.46E-06	2.92E-04	2.92E-06	5.84E-04	5.47E-05	1.09E-02	2.63E-01	9.59E+01	2.63E-01	8.17E+01	No	No	NOTE 1
Beryllium metal (unreacted) (TH	7440417	yes	no	0.28	lb/yr			0.00E+00	0.00E+00							0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No	No	NOTE 1
Cadmium metal (elemental unreacted) (TH	7440439	yes	no	0.37	lb/yr			4.10E-07	8.20E-05							4.10E-07	8.20E-05	1.97E-03	7.18E-01	1.97E-03	6.12E-01	Yes	Yes	NOTE 3
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8 (TH	57653857	yes	no	0.0051	lb/yr			1.30E-12	2.60E-10							1.30E-12	2.60E-10	6.24E-09	2.28E-06	6.24E-09	1.94E-06	No	No	NOTE 1
Hydrogen Chloride (hydrochloric acid) (TH	7647010	yes	no	0.18	lb/hr			0.00E+00	0.00E+00							0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No		NOTE 1
Perchloroethylene (tetrachloroethylene) (TH	127184	no	yes	13000	lb/yr					0.00E+00	0.00E+00	3.20E-07	6.40E-05	3.20E-07	6.40E-05	3.20E-07	6.40E-05	1.54E-03	5.61E-01	1.54E-03	4.78E-01	No	No	NOTE 1
Trichloroethylene (TH	79016	no	yes	4000	lb/yr					0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	No	No	NOTE 1
Napthalene (H	91203	yes	yes					6.50E-04	1.30E-01	4.62E-06	9.24E-04	4.26E-06	8.52E-04	8.88E-06	1.78E-03	6.59E-04	1.32E-01	3.16E+00	1.15E+03	3.16E+00	9.33E+02			
Phosphorus Metal, Yellow or White (H	7723140	yes	no					2.80E-05	5.60E-03							2.80E-05	5.60E-03	1.34E-01	4.91E+01	1.34E-01	4.18E+01			
Polycyclic Organic Matter (H	POM	yes	no					8.80E-04	1.76E-01							8.80E-04	1.76E-01	4.22E+00	1.54E+03	4.22E+00	1.31E+03			
Propionaldehyde (H	123386	yes	no					0.00E+00	0.00E+00							0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
Quinone (H)	106514	yes	no					0.00E+00	0.00E+00							0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00			
Selenium compounds (H	SEC	yes	no					3.50E-07	7.00E-05							3.50E-07	7.00E-05	1.68E-03	6.13E-01	1.68E-03	5.22E-01			
Trimethylpentane, 2,2,4- (H	540841	yes	yes					4.00E-05	8.00E-03	3.78E-08	7.56E-06	7.49E-06	1.50E-05	1.13E-07	2.25E-05	4.01E-05	8.02E-03	1.93E-01	7.03E+01	1.93E-01	5.99E+01			
Antimony unlisted compounds (H	SBC-other	yes	no					1.80E-07	3.60E-05							1.80E-07	3.60E-05	8.64E-04	3.15E-01	8.64E-04	2.69E-01			
Chromium unlisted cmpds (add w/chrom acid to get CRC) (H	CRC-other	yes	no					5.05E-06	1.01E-03							5.05E-06	1.01E-03	2.42E-02	8.85E+00	2.42E-02	7.54E+00			
Cobalt unlisted compounds (H	COC-other	yes	no					2.60E-08	5.20E-06							2.60E-08	5.20E-06	1.25E-04	4.56E-02	1.25E-04	3.88E-02			
Ethyl benzene (H	100414	yes	yes					2.40E-04	4.80E-02	4.63E-06	9.25E-04	1.16E-05	2.33E-03	1.63E-05	3.26E-03	2.56E-04	5.13E-02	1.23E+00	4.49E+02	1.23E+00	3.82E+02			
Lead unlisted compounds (H	PBC-other	yes	no					1.50E-05	3.00E-03							1.50E-05	3.00E-03	7.20E-02	2.63E+01	7.20E-02	2.24E+01			
Methyl bromide (H	74839	no	yes							5.97E-07	1.19E-04	3.99E-07	7.99E-05	9.96E-07	1.99E-04	9.96E-07	1.99E-04	4.78E-03	1.75E+00	4.78E-03	1.49E+00			
Cumene (H)	98828	no	yes							0.00E+00	0.00E+00	4.57E-06	9.15E-04	4.57E-06	9.15E-04	4.57E-06	9.15E-04	2.20E-02	8.02E+00	2.20E-02	6.83E+00			
Ethyl chloride (chloroethane) (H	75003	no	yes							0.00E+00	0.00E+00	8.73E-09	1.75E-06	8.73E-09	1.75E-06	8.73E-09	1.75E-06	4.19E-05	1.53E-02	4.19E-05	1.30E-02			
Methyl chloride (H	74873	no	yes							0.00E+00	0.00E+00	6.24E-07	1.25E-04	6.24E-07	1.25E-04	6.24E-07	1.25E-04	2.99E-03	1.09E+00	2.99E-03	9.31E-01			
Xylene, o- (H	95476	no	yes							6.95E-06	1.39E-03	3.33E-06	6.65E-04	1.03E-05	2.05E-03	1.03E-05	2.05E-03	4.93E-02	1.80E+01	4.93E-02	1.53E+01			
HAPs, TOTAL								8.70E-03	1.74E+00	1.87E-04	3.75E-02	8.66E-05	1.73E-02	2.74E-04	5.48E-02	8.97E-03	1.79E+00	4.31E+01	1.57E+04	4.31E+01	1.34E+04			

APPENDIX B

North Carolina Modeling Protocol Checklist

A.1
North Carolina Modeling Protocol Checklist

The North Carolina Modeling Protocol Checklist may be used in lieu of developing the traditional written modeling plan for North Carolina toxics and criteria pollutant modeling. The protocol checklist is designed to provide the same level of information as requested in a modeling protocol as discussed in Chapter 2 of the *Guideline for Evaluating the Air Quality Impacts of Toxic Pollutants in North Carolina.* The modeling protocol checklist is submitted with the modeling analysis.

Although most of the information requested in the modeling protocol checklist is self explanatory, additional comments are provided, where applicable, and are discussed in greater detail in the toxics modeling guidelines referenced above. References to sections, tables, figures, appendices, etc., in the protocol checklist are found in the toxics modeling guidelines.

INSTRUCTIONS: The modeling report supporting the compliance demonstration should include most of the information listed below. As appropriate, answer the following questions or indicate by check mark the information provided or action taken is reflected in your report.

FACILITY INFORMATION			
Name:	Southeastern Asphalt	**Consultant (if applicable):**	
Facility ID:	N/A		Bunnell Lammons Engineering, Inc. 6004 Ponders Court Greenville, South Carolina 29615
Address:	2997 Spartanburg Hwy East Flat Rock, NC 28792		
Contact Name:	Jeff Shipman, Owner	**Contact Name:**	Anna C. Franklin
Phone Number:	828-693-0230	**Phone Number:**	864-288-1265
Email:	jshipman@se-asphalt.com	**Email:**	anna.franklin@blecorp.com

GENERAL

Description of New Source or Source / Process Modification: provide a short description of the new or modified source(s) and a brief discussion of how this change affects facility production or process operation.	X
Source / Pollutant Identification: provide a table of the affected pollutants, by source, which identifies the source type (point, area, or volume), maximum pollutant emission rates over the applicable averaging period(s), and, for point sources, indicate if the stack is capped or non-vertical (C/N).	X
Pollutant Emission Rate Calculations: indicate how the pollutant emission rates were derived (e.g., AP-42, mass balance, etc.) and where applicable, provide the calculations.	X
Site / Facility Diagram: provide a diagram or drawing showing the location of all existing and proposed emission sources, buildings or structures, public right-of-ways, and the facility property (toxics) / fence line (criteria pollutants) boundaries. The diagram should also include a scale, true north indicator, and the UTM or latitude/longitude of at least one point.	X
Certified Plat or Signed Survey: a certified plat (map) from the County Register of Deeds or a signed survey must be submitted to validate property boundaries modeled.	X
Topographic Map: A topographic map covering approximately 5km around the facility must be submitted. The facility boundaries should be annotated on the map as accurately as possible.	X
Cavity Impact Analysis: No cavity analysis is required if using AERMOD. *See Section 4.2*	N/A

Background Concentrations (criteria pollutant analyses only): Background concentrations must be determined for each pollutant for each averaging period evaluated. The averaged background value used (e.g., high, high-second-high, high-third-high, etc.) is based on the pollutant and averaging period evaluated. The background concentrations are added to the modeled concentrations, which are then compared to the applicable air quality standard to determine compliance.	N/A
Offsite Source Inventories (criteria pollutant analyses only): Offsite source inventories must be developed and modeled for all pollutants for which onsite sources emissions are modeled in excess of the specific pollutant significant impact levels (SILs) as defined in the PSD New Source Review Workshop Manual. The DAQ AQAB must approve the inventories. An initial working inventory can be requested from the AQAB.	N/A

SCREEN LEVEL MODELING

Model: The latest version of the AERSCREEN model must be used. The use of other screening models should be approved by NCDAQ prior to submitting the modeling report.	N/A
Source / Source emission parameters: Provide a table listing the sources modeled and the applicable source emission parameters. See NC Form 3 – Appendix A.	N/A
Merged Sources: Identify merged sources and show all appropriate calculations. See Section 3.3	N/A
GEP Analysis: See Section 3.2 and NC Form 1 – Appendix A	N/A
Terrain: Indicate the terrain modeled: simple (Section 4.4), and complex (Section 4.5 and NC Form 4 – Appendix A). If complex terrain is within 5 kilometers of the facility, complex terrain must be evaluated. Simple terrain must include terrain elevations if any terrain is greater than the stack base of any source modeled. Simple: _____ Complex:_____	N/A
Meteorology: Refer to Section 4.1 for AERSCREEN inputs.	N/A
Receptors: AERSCREEN – use shortest distance to property boundary for each source modeled and use sufficient range to find maximum (See Section 4.1 (i) and (j)). Terrain above stack base must be evaluated.	N/A
Modeling Results: For each affected pollutant, modeling results should be summarized, converted to the applicable averaging period (See Table 3), and presented in tabular format indicating compliance status with the applicable AAL, SIL, or NAAQS. See NC Form S5 – Appendix A.	N/A
Modeling Files: Either electronic or hard copies of AERSCREEN output must be submitted.	N/A

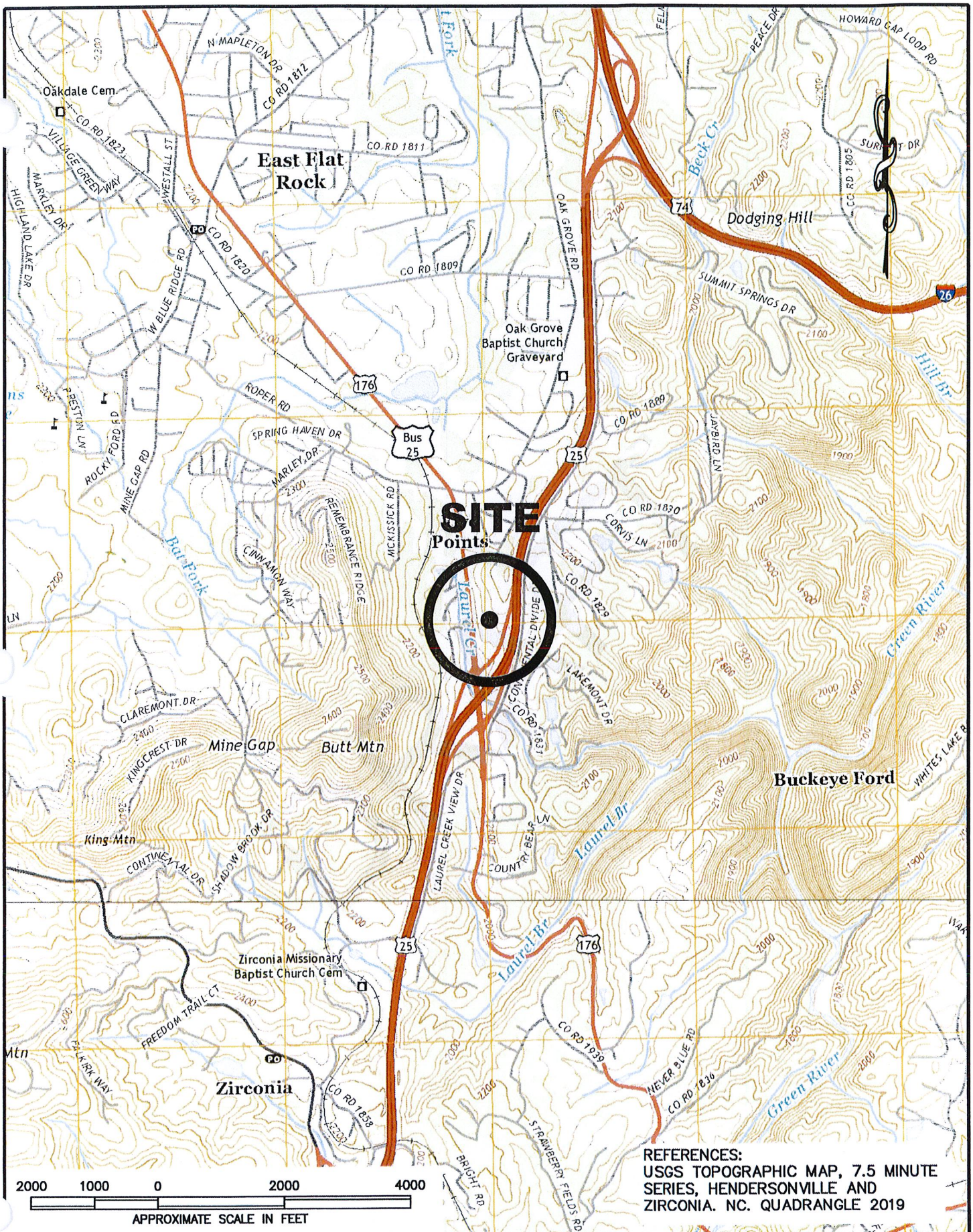
REFINED LEVEL MODELING

Model: The latest version of AERMOD should be used, and may be found at http://www.epa.gov/scram001/dispersion_prefrec.htm. The use of other refined models must be approved by NCDAQ prior to submitting the modeling report.	X
Source / Source emission parameters: Provide a table listing the sources modeled and the applicable source emission parameters. See NC Form 3 - Appendix A.	X
GEP Analysis: Use BPIP-Prime with AERMOD.	X
Cavity Impact Analysis: No separate cavity analysis is required when using AERMOD as long as receptors are placed in cavity susceptible areas. See Section 4.2 and 5.2.	X
Terrain: Use digital elevation data from the USGS NED database (http://seamless.usgs.gov/index.php). Use of other sources of terrain elevations or the non-regulatory Flat Terrain option will require prior approval from DAQ AQAB.	X
Coordinate System: Specify the coordinate system used (e.g., NAD27, NAD83, etc.) to identify the source, building, and receptor locations. Note: Be sure to specify in the AERMAP input file the correct base datum (NADA) to be used for identifying source input data locations. Clearly note in both the protocol checklist and the modeling report which datum was used.	X
Receptors: The receptor grid should be of sufficient size and resolution to identify the maximum pollutant impact. See Section 5.3.	X

Meteorology: Indicate the AQAB, pre-processed, 5-year data set used in the modeling demonstration: (See Section 5.5 and Appendix B) AERMOD_____ If processing your own raw meteorology, then pre-approval from AQAB is required. Additional documentation files (e.g. AERMET stage processing files) will also be necessary. For NC toxics, the modeling demonstration requires only the last year of the standard 5 year data set (e.g., 2005) provided the maximum impacts are less than 50% of the applicable AAL(s).	X
Modeling Results: For each affected pollutant and averaging period, modeling results should be summarized and presented in tabular format indicating compliance status with the applicable AAL, SIL or NAAQS. See NC Form R5 - Appendix A.	X
Modeling Files: Submit input and output files for AERMOD. Also include BPIP-Prime files, AERMAP files, DEM files, and any AERMET input and output files, including raw meteorological data.	X

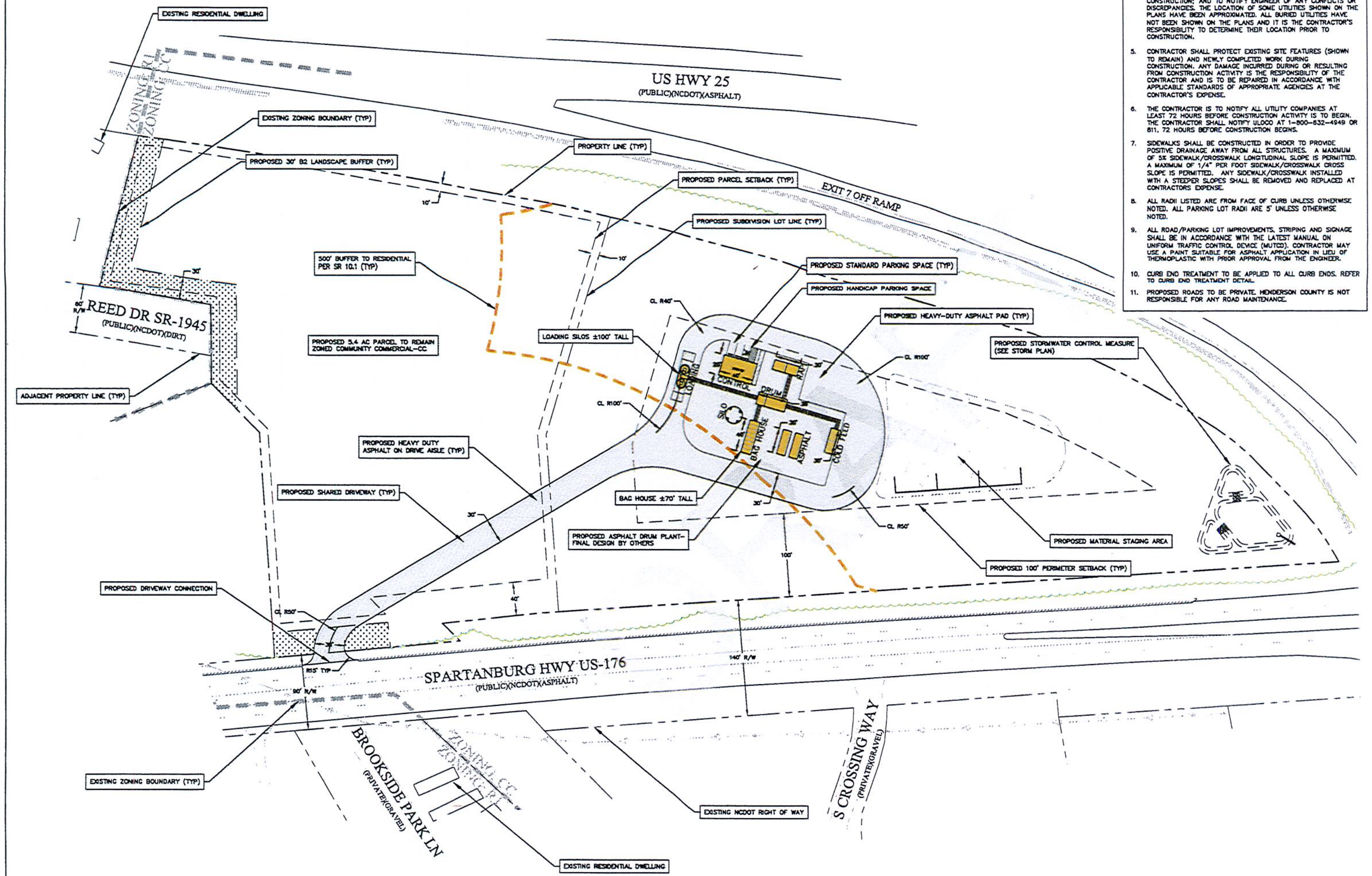
APPENDIX C

Figures



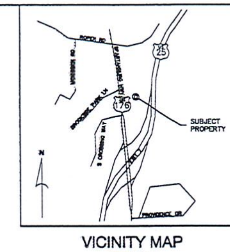
REFERENCES:
USGS TOPOGRAPHIC MAP, 7.5 MINUTE SERIES, HENDERSONVILLE AND ZIRCONIA. NC. QUADRANGLE 2019

DRAWN: KLW	DATE: 8-6-2020	BUNNELL LAMMONS ENGINEERING	FIGURE
CHECKED: ACF	CAD: SEASPHALT-01SLM	6004 Ponders Court, Greenville, SC 29615 Phone: (864) 288-1265 Fax: (864) 288-4430	SITE LOCATION MAP SOUTHEASTERN ASPHALT PROPOSED ASPHALT PLANT HENDERSON COUNTY, NORTH CAROLINA
APPROVED: ACF	JOB NO: J20-14914-01		1



NOTES

1. ALL SITEWORK SHALL BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND NATIONAL REGULATORY STANDARDS AND ALL REQUIREMENTS IN THE PROJECT TECHNICAL SPECIFICATIONS.
2. SINGLE-PHASE CONSTRUCTION.
3. ALL WORK MUST BE PERFORMED BY A NORTH CAROLINA LICENSED CONTRACTOR.
4. CONTRACTOR IS RESPONSIBLE FOR LOCATING AND VERIFYING THE EXACT LOCATION AND ELEVATION FOR ALL UTILITIES PRIOR TO CONSTRUCTION; AND TO NOTIFY ENGINEER OF ANY CONFLICTS OR DISCREPANCIES. THE LOCATION OF SOME UTILITIES SHOWN ON THE PLANS HAVE BEEN APPROXIMATED. ALL BURIED UTILITIES HAVE NOT BEEN SHOWN ON THE PLANS AND IT IS THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THEIR LOCATION PRIOR TO CONSTRUCTION.
5. CONTRACTOR SHALL PROTECT EXISTING SITE FEATURES (SHOWN TO REMAIN) AND NEWLY COMPLETED WORK DURING CONSTRUCTION. ANY DAMAGE INCURRED DURING OR RESULTING FROM CONSTRUCTION ACTIVITY IS THE RESPONSIBILITY OF THE CONTRACTOR AND IS TO BE REPAIRED IN ACCORDANCE WITH APPLICABLE STANDARDS OF APPROPRIATE AGENCIES AT THE CONTRACTOR'S EXPENSE.
6. THE CONTRACTOR IS TO NOTIFY ALL UTILITY COMPANIES AT LEAST 72 HOURS BEFORE CONSTRUCTION ACTIVITY IS TO BEGIN. THE CONTRACTOR SHALL NOTIFY ULOCO AT 1-800-632-4949 OR 811, 72 HOURS BEFORE CONSTRUCTION BEGINS.
7. SIDEWALKS SHALL BE CONSTRUCTED IN ORDER TO PROVIDE POSITIVE DRAINAGE AWAY FROM ALL STRUCTURES. A MAXIMUM OF 5% SIDEWALK/CROSSWALK LONGITUDINAL SLOPE IS PERMITTED. A MAXIMUM OF 1/4" PER FOOT SIDEWALK/CROSSWALK CROSS SLOPE IS PERMITTED. ANY SIDEWALK/CROSSWALK INSTALLED WITH A STEEPER SLOPES SHALL BE REMOVED AND REPLACED AT CONTRACTORS EXPENSE.
8. ALL RADII LISTED ARE FROM FACE OF CURB UNLESS OTHERWISE NOTED. ALL PARKING LOT RADII ARE 5' UNLESS OTHERWISE NOTED.
9. ALL ROAD/PARKING LOT IMPROVEMENTS, STRIPING AND SIGNAGE SHALL BE IN ACCORDANCE WITH THE LATEST MANUAL ON UNIFORM TRAFFIC CONTROL DEVICE (MUTCD). CONTRACTOR MAY USE A PAINT SUITABLE FOR ASPHALT APPLICATION IN LIEU OF THERMOPLASTIC WITH PRIOR APPROVAL FROM THE ENGINEER.
10. CURB END TREATMENT TO BE APPLIED TO ALL CURB ENDS. REFER TO CURB END TREATMENT DETAIL.
11. PROPOSED ROADS TO BE PRIVATE. HENDERSON COUNTY IS NOT RESPONSIBLE FOR ANY ROAD MAINTENANCE.



VICINITY MAP
(NOT TO SCALE)

DEVELOPMENT DATA

OWNER/DEVELOPER:	SE ASPHALT 2997 SPARTANBURG HWY EAST FLAT ROCK, NC 28726
CONTACT:	JEFF SHIPMAN (828) 693-0230
CIVIL ENGINEER:	CIVIL DESIGN CONCEPTS, P.A. 168 PATTON AVENUE ASHEVILLE, NC 28801
CONTACT:	WARREN SUGG, P.E. (828) 252-5388

PROJECT DATA

PIN:	9586-37-1990
ADDRESS:	9999 SPARTANBURG HWY, E FLAT ROCK
DEED BOOK/PAGE:	1466/24
SITE ACREAGE:	TOTAL: 11.9 ACRES PROJECT PARCEL: 6.5 ACRES
ZONING:	CC-COMMUNITY COMMERCIAL
PROPOSDED ZONING:	CZ-CONDITIONAL ZONING

SETBACKS (ASPHALT PLANT):

FRONT:	100'
SIDES:	100'
REAR:	100'
CORNER	100'
DISTURBED AREA:	TOTAL: 4.5 AC (38%) PROJECT PARCEL: 3.8 AC (60%)
GRADING:	20,000 CY ONSITE-BALANCED

PARKING CALCULATIONS:

VEHICULAR:
REQUIRED SPACES: 1 (MIN. 1/4000 SF)
SPACES PROVIDED: 3
HANDICAPPED SPACES:
SPACES REQUIRED: 1 SPACES PROVIDED: 1

BUILDING DATA:

BUILDING	DESCRIPTION	HEIGHT	GFA
CONTROL	STEEL	12'	350 SF

IMPERVIOUS CALCULATIONS:

	IMPERVIOUS	PERVIOUS
PRE-DEVELOPMENT:	0.00 ACRES (0%)	11.9 ACRES (100%)
POST-DEVELOPMENT:	2.0 ACRES (17%)	9.9 ACRES (83%)

OPEN SPACE CALCULATIONS:

N/A

LANDSCAPING REQUIREMENTS:
BUFFER: 30' B2 BUFFER TO RESIDENTIAL
(PLANTINGS BY EXISTING TREE CREDIT PENDING TREE SURVEY)
SOIL TYPE EwE/HyC
SOIL GROUP: B/C

811 Know what's below. Call before you dig.

NORTH

SITE PLAN

GRAPHIC SCALE

(IN FEET)
1 inch = 60 ft.

CDC Civil Design Concepts, PA
www.civildesignconcepts.com
NCBELS LICENSE #: C-2184

NO.	DATE	DESCRIPTION	BY
1	05/01/2020	CONDITIONAL ZONING SUBMITTAL	SDB

FOR REVIEW ONLY

PRELIMINARY NOT RELEASED FOR CONSTRUCTION

WARREN M. SUGG ENGINEER

SITE PLAN FOR:

HENDERSON COUNTY ASPHALT PLANT

SE ASPHALT - HENDERSON COUNTY, NORTH CAROLINA

DRAWN BY: SDB
CDC PROJECT NO.: 22019
HC PERMIT NO. N/A

SHEET
C201

APPENDIX D

NC Forms – Modeling Data and Results

NC FORM 2 – POLLUTANT EMISSION RATES

Facility Name:
Southeastern Asphalt - Henderson County

Date:
August-20

Calculation Method:
AP-42, Fifth Edition, Volume I., Chapter 11.1 - Hot Mix Asphalt Plant, Final Edition Dec 2000, Update 2001

Pollutant	Stack I.D.	lbs / hour		lbs / 24 hours		lbs / year	
		(a)	(b)	(a)	(b)	(a)	(b)
Arsenic	BAGHOUSE	1.12E-04		0.003		0.981	
Benzene	BAGHOUSE	0.078		1.872		683.280	
Benzene	SILO1FIL	3.90E-04		0.009		3.416	
Benzene	SILO1LO	2.17E-04		0.005		1.897	
Benzene	SILO2FIL	3.90E-04		0.009		3.416	
Benzene	SILO2LO	2.17E-04		0.005		1.897	
Cadmium	BAGHOUSE	8.20E-05		0.002		0.718	
Formaldehyde	BAGHOUSE	0.620		14.880		5431.200	
Formaldehyde	SILO1FIL	0.008		0.202		73.584	
Formaldehyde	SILO1LO	3.66E-04		0.009		3.206	
Formaldehyde	SILO2FIL	0.008		0.202		73.584	
Formaldehyde	SILO2LO	3.66E-04		0.009		3.206	
Nickel	BAGHOUSE	0.013		0.302		110.376	

(a) = facility source emissions
(b) = 2Q.0711 emission rates - ***See TPER in emission calculations for facility-wide comparison.***

NC FORM 3 – POINT SOURCE EMISSION PARAMETERS

Facility Name: Southeastern Asphalt - Henderson County					**Date:** August-20	
Stack I.D. Number		BAGHOUSE	SILO1FIL	SILO2FIL		
Source Description		Dryer Baghouse	Silo 1 Filling	Silo 2 Filling		
Stack Direction [a]		H	V	V		
Stack Height (m) [b]		11.23	19.51	19.51		
Stack Diameter (m)		1.22	0.30	0.30		
Stack Temperature (K)		367.12	435.93	435.93		
Stack Exit Velocity (m/s) [c]		15.507	0.001	0.001		
Building Height (m)		4.572	4.572	4.572		
Building Width (m)		7.62	7.62	7.62		
Building Length (m)		12.192	12.192	12.192		
UTM Coordinates (m) NAD = 83 circle the appropriate, above	Horizontal (E)	371998.38	372026.89	372021.98		
	Vertical (N)	3903025.7	3903049.3	3903049.3		
Stack Base Elevation Above MSL [d] (m)		658.68	662.76	662.23		

[a] Stack direction: H = horizontal / V = vertical.

[b] Stack height above ground level.

[c] An exit velocity of 0.01 is entered if the stack is horizontal, or if it has a raincap.

[d] MSL = mean sea level.

NC FORM 3V – VOLUME SOURCE EMISSION PARAMETERS

Facility Name: Southeastern Asphalt - Henderson County		**Date:** August-20				
Source I.D. Number		SILO1LO	SILO2LO			
Source Description / Type		Silo 1 Loadout	Silo 2 Loadout			
Volume Source Height (m) *		6.1	6.1			
Volume Source Sigma Y (m) *		0.27	0.27			
Volume Source Sigma Z (m) *		1.43	1.43			
UTM Coordinates (m) NAD = 83	Horizontal (E)	372026.892	372021.98			
	Vertical (N)	3903049.31	3903049.3			
Source Base Elevation Above MSL (m)		662.76	662.23			

* provide a written explanation of the derivation of these parameters

Volume source parameters were obtained from the Arizona Department of Environmental Quality, Technical Support Document-HMAP General Permit (April 24, 2017), Table 17. Tables 17-20 summarize the source release parameters used in the modeling analysis. ADEQ determined these parameters following the ADEQ air modeling guidelines. They representative physical dimensions for stacks, silos, trucks, etc. and were determined on the basis of actual measurements or testing data from three facilities in Maricopa County, Arizona.

From EPA's User's Guide for the AMS/EPA Regulatory Model (AERMOD):

Volume Source Parameters

Release Height = release height (center of volume) above ground

σyo = initial lateral dimension of the volume

σzo = initial vertical dimension of the volume

Summary of Procedures for Estimating Initial Lateral Dimensions and Initial Vertical Dimensions for Volume Sources

Initial Lateral (Horizontal) Dimensions (σyo)	
Type of Source	**Procedure for Obtaining Dimensions**
Single Volume Source	σyo = length of side divided by 4.3

Initial Vertical Dimensions (szo)	
Type of Source	**Procedure for Obtaining Dimensions**
Surface-Based Source (he - 0)	σzo = vertical dimension of source divided by 2.1
Elevated Source (he > 0) on or Adjacent to a Building	σzo = building height divided by 2.15
Elevated Source (he > 0) not on or Adjacent to a Building	σzo = vertical dimension of source divided by 4.3

NC FORM R5 – REFINED MODEL RESULTS

MAXIMUM IMPACTS (ug/m^3)

Facility Name: Southeastern Asphalt - Henderson County

Date: August-20

Pollutant	Averaging Period	Year 2013	Year 2014	Year 2015	Maximum Modeled	AAL	% of AAL	Compliance (y/n)
Arsenic	Annual	0.00008	0.00008	0.00007	0.00008	2.10E-03	4%	YES
Benzene	Annual	0.0569	0.05653	0.05394	0.0569	1.20E-01	47%	YES
Cadmium	Annual	0.00006	0.00006	0.00005	0.00006	5.50E-03	1%	YES
Formaldehyde	1-hour	9.70691	9.39514	8.99966	9.70691	150	6%	YES
Nickel	24-hour	0.46838	0.23771	0.60765	0.60765	6	10%	YES