DIVISION OF AIR QUALITY
March 23, 2021

MEMORANDUM

TO: Davis Murphy, Permit Coordinator, WSRO
Ray Stewart, Regional Supervisor, WSRO

FROM: Matthew Porter, Meteorologist, AQAB

THROUGH: Tom Anderson, AQAB Supervisor

SUBJECT: Sitewide NAAQS Dispersion Modeling Analysis for Carolina Sunrock, LLC – Prospect Hill
Facility ID: 1700017
Prospect Hill, NC Caswell County

I have completed my review of the sitewide NAAQS dispersion modeling analysis received March 2, 2021, and revised March 10 and 17, 2021, for the combination hot mix asphalt (HMA), concrete batch, and quarry facility that will be owned and operated by Carolina Sunrock, LLC located in Prospect Hill, Caswell County, NC. The initial modeling analysis demonstration received March 2, 2021 was revised on March 10 and 17, 2021 to address NC DAQ comments on the representation of area-line sources and worst-case daily emissions for fugitive particulate matter from paved and unpaved haul roads. The dispersion modeling analysis was conducted to evaluate the combined criteria air pollutant ambient impacts from all operations located at the site, which included emissions from the proposed construction and operation of a hot mix asphalt facility, concrete batch plant, and worst-case operational phases of the quarry plant. Sitewide criteria pollutants including particulate matter (TSP, $PM_{2.5}$ and PM_{10}), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2) were modeled for comparison with the National Ambient Air Quality Standards (NAAQS). Ultimately, the sitewide dispersion modeling analysis of criteria air pollutant emissions adequately demonstrated compliance with the NAAQS, on a source-by-source basis.

Model Selection

AERMOD (version 19191) was selected as the most appropriate dispersion model for the modeling analysis. AERMOD is currently the preferred regulatory dispersion model by the U.S. EPA for evaluating air pollutant impacts from industrial facilities. [1] The AERMOD modeling system has undergone nearly 20 years of performance evaluation studies and model coding refinements during which time NC DAQ and permit applicants have relied on this modeling system for compliance demonstrations under the NAAQS programs at small, synthetic minor, and major Title V industrial sources of air pollution in all regions of North Carolina from the mountains to the coastal plain. The AERMOD modeling system includes preprocessors for meteorology inputs (AERMET version 19191 and AERMINUTE version 15272) and complex terrain inputs (AERMAP version 18081). The performance evaluation studies have shown that AERMOD predictions of ambient air pollution impacts from various source release types

[1] See preferred models in Appendix A to Appendix W of 40 CFR Part 51. Modeling system details: https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models

(points, volumes, and area sources) are within acceptable performance ranges for model precision and model bias.[2] AERMOD was designed to simulate steady-state gaussian-shaped plume dispersion under convective, stable, and neutral boundary layer conditions in flat and complex terrain (i.e., above stack height) environments. As such, the acceptable performance model evaluations from EPA and design features of the AERMOD modeling system support selection of AERMOD for the sitewide NAAQS modeling demonstrations at the Carolina Sunrock facility.

Meteorology Selection

AERMET (version 18081) was used to process the 2014-2018 Danville Airport surface and Greensboro upper air data to generate vertical meteorological and atmospheric turbulence profiles for hourly AERMOD dispersion modeling calculations. The AERMET processing was conducted by NC DAQ and downloaded by the applicant via the NC DAQ website.

Terrain Data and Receptor Grids

Receptors were modeled around the property boundary at 25-meter intervals. A receptor grid was modeled beyond the facility property extending 2 km with 100-meter receptor spacing. In all, a total of 1,404 receptors were modeled. Building, source, and receptor elevations and receptor dividing streamline heights were calculated from 1-arc-second resolution (30-meter) USGS NED terrain data using the AERMOD terrain pre-processor AERMAP (version 18081). All modeled buildings, sources, and receptors were geo-located within the modeling domain based on the horizontal North American Datum of 1983 (NAD83) and Zone 17 of the Universal Transverse Mercator (UTM) coordinate system.

Building Downwash

Direction-specific building downwash parameters, calculated using EPA's BPIP-PRIME program (04274), were used as input to AERMOD to determine the effects of building downwash on plume rise and the entrainment of stack emissions into the cavity and turbulent wake zones downwind of buildings at the facility. The building downwash analysis included 23 buildings and 23 point sources.

Sitewide Modeling for NO_2 and SO_2

The sitewide modeling demonstration for the NO_2 and SO_2 NAAQS included 13 combustion point sources from the proposed new hot mix asphalt plant, concrete plant, and quarry operations. Point source parameters are provided in the attached Table A1. Sitewide modeled NO_2 and SO_2 emission rates are provided in attached Table A2. All emission rates were conservatively modeled 8,760 hours per year. Note that three power generators (PGEN1, PGEN2, PGEN3) associated with the quarry processing area were modeled to operate with only two operating together at any one time.

The 1-hour NO_2 NAAQS modeling demonstration relied on the EPA Tier 2 regulatory option, Ambient Ratio Method Version 2 (ARM2) regulatory option in AERMOD.[3] The ARM2 option

[2] AERMOD Model Formulation and Evaluation. August 2019. EPA-454/R-19-014. See: https://gaftp.epa.gov/Air/aqmg/SCRAM/models/preferred/aermod/aermod_mfed.pdf

[3] Ambient Ratio Method Version (ARM2) for use with AERMOD for 1-hr NO_2 Modeling. September 20, 2013. See:

simulates the atmospheric chemistry conversion of NO_X to ambient NO_2 based on polynomial correlations developed from data taken from EPA's Air Quality System.[4] The ARM2 regulatory option is recommended as a Tier 2 approach in Section 4.2.3.4 of Appendix W to 40 CFR Part 51.

Maximum modeled impacts for NO_2 and SO_2 are provided in Table 1. NO_2 background concentrations were based on 2015-2017 data collected at the NC DAQ Blackstone site located in Lee County. The Blackstone NO_2 concentrations were considered representative of the Prospect Hill location based on similarities in rural locale and traffic patterns. SO_2 background concentrations were conservatively based on 2017-2019 data from the Person County DRR site located near Roxboro.

Table 1.
Maximum NO_2 and SO_2 Impacts from Sitewide Emissions
Carolina Sunrock, LLC, Prospect Hill, NC

Pollutant	Avg. Period	NAAQS (µg/m3)	Background Concentration (µg/m3)	Modeled Impact (µg/m3)	Total Impact (µg/m3)	% of NAAQS
SO_2	1-hour	196	83.8	71.39	155.19	79%
NO_2	1-hour	188	15.3	98.36	113.66	60%

Sitewide Modeling for TSP, PM_{10}, and $PM_{2.5}$

The sitewide modeling demonstration for the TSP, $PM_{2.5}$ and PM_{10} NAAQS included 23 point sources, 78 volume sources, 12 rectangular area sources, and 13 polygon-shaped area sources from the proposed new asphalt plant, concrete batch plant, and quarry. Point and volume source parameters are provided in the attached Tables A1 and A3, respectively. Rectangular area source parameters are provided in the attached Table A4. Polygon-shaped area source parameters are provided in attached Table A5. Sitewide modeled TSP, PM_{10} and $PM_{2.5}$ emission rates are provided in attached Table A6.

Six operating scenarios were modeled involving different combinations of quarry generators, pits A and B emission activities, and crushing operations. Three operating scenarios represent combinations of emissions activities associated with Pit A. Similarly, three operating scenarios were modeled separately to represent emissions associated with construction and operations for Pit B, which would be exclusive to the conclusion of operations in Pit A. Operations and emissions activities at the concrete batch plant and asphalt plant were assumed to coincide with all six quarry operating scenarios. Source groupings modeled under each scenario are provided in Table A7.

In general, the annual TSP and $PM_{2.5}$ demonstrations assumed hourly emissions based on annual limits from all sources modeled for 8,760 hours per year. The 24-hour TSP, $PM_{2.5}$, and PM_{10} demonstrations included various assumptions as indicated in Appendix A of the revised Carolina Sunrock modeling report received March 17, 2021.

https://gaftp.epa.gov/Air/aqmg/SCRAM/models/preferred/aermod/ARM2_Development_and_Evaluation_Report-September_20_2013.pdf

[4] Podrez, M. 2015. An Update to the Ambient Ratio Method for 1-hr NO_2 Air Quality Standards Dispersion Modeling. Atmospheric Environment, 103: 163–170.

The TSP, PM_{10}, and $PM_{2.5}$ sitewide emission inventory includes combustion sources and fugitive emissions from crushing, screening, conveyors, material transfers, material handling, trucking and loader traffic on unpaved and paved roads, wind erosion from sorted and unsorted aggregate stock piles, and activities in the open pit. The EPA Method 1 dry deposition non-default, regulatory option was applied to TSP and PM10 modeling demonstrations in accordance with NC DAQ quarry modeling guidelines. [5] Fugitive emission source parameters and model emissions methodologies were taken from NC DAQ, EPA, and applicable nationally available guidance documents. [6, 7, 8,]

Sitewide modeled impacts for 24hr and annual TSP, $PM_{2.5}$, and 24hr PM_{10} are provided in Table 2. PM_{10} and $PM_{2.5}$ background concentrations were based on 2017-2019 data from the Guilford County monitoring site. Background concentrations for TSP were not required to assess total source impacts per NC DAQ modeling guidance. Note the 'ACRUSH' operating scenario was determined to result in the worst-case ambient impacts for TSP, PM_{10}, and $PM_{2.5}$.

Table 2.
Maximum Modeled TSP, PM_{10}, and $PM_{2.5}$ Impacts from Sitewide Emissions
Carolina Sunrock, LLC, Prospect Hill, NC

Pollutant	Avg. Period	NAAQS (µg/m3)	Background Concentration (µg/m3)	Modeled Impact (µg/m3)	Total Impact (µg/m3)	% of NAAQS
TSP	24-hour	150	--	59.87	59.87	40%
	Annual	75	--	12.57	12.57	17%
PM_{10}	24-hour	150	17	124.20	141.20	94%
$PM_{2.5}$	24-hour	35	15	16.87	31.87	91%
	Annual	12	7.3	2.77	10.07	84%

This review assumes the emissions scenarios, sources modeled, source parameters, and pollutant emission rates used in the dispersion modeling analysis are correct.

cc: Tom Anderson
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[5] https://files.nc.gov/ncdeq/Air Quality/permits/mets/NC_DAQ_Quarry_Modeling_Guidance_31May2018.pdf
[6] Haul Road Workgroup Final Report Submission to EPA-OAQPS. March 2, 2012. U.S. EPA. See: https://gaftp.epa.gov/Air/aqmg/SCRAM/conferences/2012_10th_Conference_On_Air_Quality_Modeling/Review_Material/Haul_Road_Workgroup-Final_Report_Package-20120302.pdf
[7] WRAP Fugitive Dust Handbook. September 7, 2006. Western Regional Air Partnership (WRAP). See: https://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf
[8] Air/Superfund National Technical Guidance Study Series; Volume III – Estimation of Air Emissions from Cleanup Activities at Superfund Sites, Interim final report EPA-450/1-89-003. January 1989. U.S. EPA

Table A1. Modeled Release Parameters for Point Sources

MODEL ID	Description	X-Utm (m)	Y-Utm (m)	Elevation (m)	Stack Height (m)	Temp. (K)	Velocity (m/s)	Stack Diameter (m)	CAPped or HORizontal Release?
PGEN1	Power Engine 1	664513.40	4018866.70	200.10	5.18	788.71	22.02	0.15	NO
PGEN2	Power Engine 2	664513.40	4018864.90	200.00	5.18	788.71	22.02	0.15	NO
PGEN3	Power Engine 3	664513.40	4018863.10	200.00	5.18	788.71	22.02	0.15	NO
CD1	Asphalt Plant Baghouse	664069.60	4018718.70	204.60	9.22	388.71	29.41	0.96	NO
IES4	Asphalt Heater	664066.80	4018732.00	204.70	2.74	435.93	0.01	0.30	NO
IES5	Liquid Asphalt Heater	664071.10	4018735.00	204.80	4.57	435.93	0.01	0.05	NO
HMASILO1	Asphalt Silo 1 Vent	664109.10	4018719.00	205.10	19.81	298.15	0.01	0.30	NO
HMASILO2	Asphalt Silo 2 Vent	664112.00	4018721.40	205.10	19.81	298.15	0.01	0.30	NO
HMASILO3	Asphalt Silo 3 Vent	664115.00	4018723.70	205.00	18.29	298.15	0.01	0.30	NO
HMASILO4	Asphalt Silo 4 Vent	664117.90	4018726.20	204.90	18.29	298.15	0.01	0.30	NO
HMASILO5	Asphalt Silo 5 Vent	664106.10	4018716.50	205.20	18.29	298.15	0.01	0.30	NO
CD2	Concrete Plant Baghouse	664155.20	4018786.60	202.20	10.67	298.15	24.38	0.46	NO
GEN1	Quarry Generator	664799.00	4018997.20	184.00	3.66	797.04	29.11	0.15	NO
GEN1A	Quarry Generator	665011.60	4019023.40	184.00	3.66	797.04	29.11	0.15	NO
GEN2	Quarry Generator	664851.90	4019087.30	184.00	3.66	797.04	29.11	0.15	NO
GEN3	Quarry Generator	664603.30	4018928.60	200.00	3.66	797.04	29.11	0.15	NO
GEN4	Quarry Generator	665031.30	4019118.90	188.20	1.83	778.71	15.07	0.15	HOR
GEN5	Quarry Generator	664608.90	4018937.90	199.60	3.66	797.04	29.11	0.15	NO
GEN7	Quarry Generator	664585.20	4018949.20	200.90	3.66	797.04	29.11	0.15	NO
CRGEN3	Crusher Generator 3	664603.30	4018928.60	200.00	3.66	797.04	29.11	0.15	NO
CRGEN5	Crusher Generator 5	664608.90	4018937.90	199.60	3.66	797.04	29.11	0.15	NO

MODEL ID	Description	X-Utm (m)	Y-Utm (m)	Elevation (m)	Stack Height (m)	Temp. (K)	Velocity (m/s)	Stack Diameter (m)	CAPped or HORizontal Release?
CRGEN7	Crusher Generator 7	664585.20	4018949.20	200.90	3.66	797.04	29.11	0.15	NO
BGEN1	Quarry Generator	665230.30	4018636.40	163.00	3.66	797.04	29.11	0.15	NO
BGEN1A	Quarry Generator	665366.20	4018573.60	163.00	3.66	797.04	29.11	0.15	NO
BGEN2	Quarry Generator	665267.60	4018494.40	163.00	3.66	797.04	29.11	0.15	NO
BGEN4	Quarry Generator	665322.90	4018727.50	163.00	1.83	778.71	15.07	0.15	HOR

Table A2. NO_2 and SO_2 Modeled Hourly Emission Rates (lb/hr)

MODEL ID	Type	Description	NO_2	SO_2
PGEN1	POINT	Power Engine 1	2.729E+00	8.500E-03
PGEN2	POINT	Power Engine 2	2.729E+00	8.500E-03
PGEN3	POINT	Power Engine 3	2.653E+00	2.408E-02
CD1	POINT	Asphalt Plant Baghouse	1.392E+01	2.154E+01
IES4	POINT	Asphalt Heater	1.714E-01	1.825E-03
IES5	POINT	Liquid Asphalt Heater	1.571E-01	1.674E-03
GEN1	POINT	Quarry Generator	2.299E-01	4.248E-03
GEN1A	POINT	Quarry Generator	2.299E-01	4.248E-03
GEN2	POINT	Quarry Generator	8.214E-02	1.517E-03
GEN3	POINT	Quarry Generator	2.890E-01	5.340E-03
GEN4	POINTHOR	Quarry Generator	8.214E-02	1.517E-03
GEN5	POINT	Quarry Generator	2.956E-01	5.461E-03
GEN7	POINT	Quarry Generator	2.299E-01	4.248E-03

Table A3. Modeled Release Parameters for Volume Sources

Model ID	Source Description	X-Utm (m)	Y-Utm (m)	Elevation (m)	Release Height (m)	Init. Sigma-Y (m)	Init. Sigma-Z (m)	Drop Height AGL (m)	Drop Distance (m)
GEN3	Crusher GEN3	664603.00	4018930.40	200.00	1.98	0.63	1.84	2.97	3.96
GEN5	Crusher GEN5	664609.30	4018939.80	199.60	1.98	0.63	1.84	2.97	3.96
GEN7	Crusher GEN7	664587.70	4018947.20	200.80	1.98	0.68	1.84	2.97	3.96
HMALO1	Asphalt Loadout 1	664109.10	4018719.00	205.10	3.66	0.15	1.70	5.49	3.66
HMALO2	Asphalt Loadout 2	664112.00	4018721.40	205.10	3.66	0.15	1.70	5.49	3.66
HMALO3	Asphalt Loadout 3	664115.00	4018723.70	205.00	3.66	0.15	1.70	5.49	3.66
HMALO4	Asphalt Loadout 4	664117.90	4018726.20	204.90	3.66	0.15	1.70	5.49	3.66
HMALO5	Asphalt Loadout 5	664106.10	4018716.50	205.20	3.66	0.15	1.70	5.49	3.66
DP4	C3 to Pile	664654.40	4018963.90	196.80	23.62	0.25	0.36	35.43	0.77
DP5	Pile to C4	664655.20	4018944.70	196.30	0.30	0.25	0.14	0.45	0.30
DP6	C15 and C4 to C5	664655.50	4018923.60	196.20	0.30	0.25	0.14	0.45	0.30
DP7	Screen to C5a	664625.90	4018923.80	198.50	1.37	0.25	0.64	2.05	1.38
DP8	C5a to C6	664626.00	4018921.10	198.50	0.30	0.25	0.14	0.45	0.30
DP9	C6 to C7	664625.70	4018891.80	198.30	0.30	0.25	0.14	0.45	0.30
DP10	C7 to Pile	664625.50	4018872.00	197.90	6.93	0.25	0.36	10.39	0.77
DP11	Screen to C8	664623.30	4018931.20	198.70	1.37	0.25	0.64	2.05	1.38
DP12	Screen to C10	664623.30	4018933.10	198.60	1.37	0.25	0.64	2.05	1.38
DP13	C8 to C9	664610.90	4018930.30	199.50	0.30	0.25	0.14	0.45	0.30
DP14	C10 to C11	664614.20	4018932.60	199.30	0.30	0.25	0.14	0.45	0.30
DP15	C11 to C12	664612.70	4018934.90	199.40	0.30	0.25	0.14	0.45	0.30
DP16	CR2 to C13	664593.70	4018930.70	200.50	0.53	0.25	0.25	0.79	0.54
DP17	CR3 to C13	664600.20	4018939.70	200.10	0.53	0.25	0.25	0.79	0.54
DP18	C13 to C14	664605.60	4018947.30	199.80	0.30	0.25	0.14	0.45	0.30
DP19	C14 and C38 to C16	664604.00	4018964.90	200.00	0.30	0.25	0.14	0.45	0.30
DP20	SC2 to C17	664575.40	4018964.70	201.20	1.68	0.25	0.78	2.52	1.68

Model ID	Source Description	X-Utm (m)	Y-Utm (m)	Elevation (m)	Release Height (m)	Init. Sigma-Y (m)	Init. Sigma-Z (m)	Drop Height AGL (m)	Drop Distance (m)
DP21	SC2 to C21	664573.40	4018954.10	201.20	0.30	0.25	0.14	0.45	0.30
DP22	SC2 to C19	664578.90	4018953.50	201.10	0.30	0.25	0.14	0.45	0.30
DP23	CR4 to C20	664588.80	4018940.50	200.70	0.30	0.25	0.14	0.45	0.30
DP24	C20 to C13	664601.80	4018942.50	200.00	0.30	0.25	0.14	0.45	0.30
DP25	SC4 to C22	664541.20	4018917.10	200.80	0.30	0.14	0.14	0.45	0.30
DP26	SC4 to C24	664539.40	4018917.10	200.80	0.30	0.14	0.14	0.45	0.30
DP27	SC4 to C27	664538.00	4018917.70	200.80	0.30	0.14	0.14	0.45	0.30
DP28	C22 to C23	664540.70	4018882.00	200.30	0.30	0.14	0.14	0.45	0.30
DP29	C23 to Pile	664540.30	4018864.70	199.90	4.80	0.14	0.36	7.20	0.77
DP30	C24 to C25	664539.20	4018911.30	200.80	0.30	0.14	0.14	0.45	0.30
DP31	C25 to C26	664489.80	4018881.80	200.00	0.30	0.14	0.14	0.45	0.30
DP32	C26 to Pile	664483.10	4018866.40	200.60	4.80	0.14	0.36	7.20	0.77
DP33	C27 to C28	664537.80	4018912.30	200.70	0.30	0.14	0.14	0.45	0.30
DP34	C28 to C29	664451.20	4018912.60	198.60	0.30	0.14	0.14	0.45	0.30
DP35	C29 to Pile	664444.60	4018896.30	199.80	4.80	0.14	0.36	7.20	0.77
DP36	C17 to C18	664576.50	4018969.00	201.20	1.52	0.25	0.71	2.28	1.53
DP37	C18 to Pile	664567.00	4018969.30	201.30	3.20	0.21	0.36	4.80	0.77
DP38	Finemaster to C32	664576.50	4018996.00	201.70	0.30	0.21	0.14	0.45	0.30
DP39	C32 to C33	664528.50	4018996.60	199.70	0.30	0.21	0.14	0.45	0.30
DP40	C33 to Pile	664529.00	4019013.80	199.00	6.48	0.21	0.36	9.72	0.77
DP41	Pile to C30	664637.70	4019037.10	200.00	0.30	0.21	0.14	0.45	0.30
DP42	SC5 to C36	664602.50	4019025.60	201.70	0.30	0.14	0.14	0.45	0.30
DP43	C36 to C37	664593.00	4019043.20	200.40	0.30	0.14	0.14	0.45	0.30
DP44	C37 to Pile	664590.20	4019060.00	199.00	4.80	0.14	0.36	7.20	0.77
DP45	SC5 to C34	664583.90	4019018.30	201.70	0.30	0.14	0.14	0.45	0.30
DP46	C34 to C35	664539.70	4019045.80	198.00	0.30	0.14	0.14	0.45	0.30
DP47	C35 to Pile	664525.50	4019055.50	197.40	6.48	0.14	0.36	9.72	0.77

Model ID	Source Description	X-Utm (m)	Y-Utm (m)	Elevation (m)	Release Height (m)	Init. Sigma-Y (m)	Init. Sigma-Z (m)	Drop Height AGL (m)	Drop Distance (m)
DP48	SC5 to C31	664584.30	4019011.40	201.80	0.30	0.14	0.14	0.45	0.30
DP49	C31 to C32	664569.30	4018996.90	201.40	0.30	0.14	0.14	0.45	0.30
DP50	SC5 to C39	664609.80	4019009.70	201.70	0.30	0.14	0.14	0.45	0.30
DP51	C39 and C14 to C15	664615.40	4018961.50	199.30	0.30	0.21	0.14	0.45	0.30
DP52	SC5 to C38	664601.90	4019009.00	201.80	0.30	0.14	0.14	0.45	0.30
SC1	SC-1	664626.10	4018931.70	198.40	5.79	0.84	5.39	8.68	11.59
SC2	SC-2	664576.60	4018959.40	201.10	4.57	1.21	4.25	6.85	9.14
SC3	SC3	664539.80	4018922.50	200.80	7.01	1.44	6.52	10.51	14.02
AGGRE	AggreSand Screen	664600.60	4019017.80	201.70	4.11	0.84	3.83	6.16	8.23
RAPSCN	Screen	664085.70	4018740.70	205.00	2.90	0.72	2.69	4.35	5.78
DP61	Screen to Drum Conveyor	664085.70	4018740.60	205.00	4.04	0.18	0.43	6.06	0.92
RAPCR1	Crusher	664072.00	4018747.50	204.90	2.14	0.43	1.98	3.21	4.26
DP62	Drop to Drum	664086.90	4018726.90	205.00	7.92	0.18	0.07	11.88	0.15
DP63	Transfer to Screen Conveyor	664072.70	4018739.70	204.90	2.44	0.18	0.07	3.66	0.15
DP64	Asphlat Drop 2	664060.50	4018719.80	204.40	2.44	0.18	0.28	3.66	0.60
DP65	Drop from Crusher	664072.40	4018743.00	204.90	2.44	0.18	0.28	3.66	0.60
DP66	Ashpalt Plant Drop 1	664085.30	4018744.60	205.00	2.44	0.18	0.28	3.66	0.60
DP67	HMA Conveyors to Stockpiles	664126.00	4018798.80	203.70	2.44	0.18	0.28	3.66	0.60
DP1	CR4860 to C1	664738.00	4018973.80	177.00	2.59	0.25	1.21	3.88	2.60
DP2	C1 to C2	664738.50	4018944.70	177.00	0.30	0.25	0.14	0.45	0.30
DP3	C2 to C3	664770.70	4018964.60	177.00	0.30	0.25	0.14	0.45	0.30
CR4860	Crusher 4860	664737.80	4018979.10	177.00	6.56	2.51	6.10	9.84	13.12
CRPITB	Crusher Pit B	665197.40	4018559.50	163.00	6.56	2.51	6.10	9.84	13.12
DP1B	DP1B	665207.30	4018553.60	163.00	2.59	0.25	1.21	3.88	2.60

Model ID	Source Description	X-Utm (m)	Y-Utm (m)	Elevation (m)	Release Height (m)	Init. Sigma-Y (m)	Init. Sigma-Z (m)	Drop Height AGL (m)	Drop Distance (m)
DP2B	DP2B	665235.40	4018503.70	163.00	0.30	0.25	0.14	0.45	0.30
DP3B	DP3B	665117.50	4018555.60	177.10	0.30	0.25	0.14	0.45	0.30

Table A4. Modeled Release Parameters for Rectangular Area Sources

Model ID	Source Description	Easting (X) (m)	Northing (Y) (m)	Base Elevation (m)	Release Height (m)	Easterly Length (m)	Northerly Length (m)	Angle from North (degs)	Initial Vert. Dimension (m)	Area (acres)
SYP1	Asphalt Stock	664033.90	4018807.70	203.80	2.10	54.90	22.40	85.20	1.98	0.30387
SYP2	Concrete Stock	664070.80	4018815.50	203.60	2.10	23.80	60.00	50.30	1.98	0.35286
1UPRD7	Pit A	664751.20	4019001.70	192.80	3.60	11.20	119.70	0.00	3.40	0.33127
2UPRD7	Pit A	664763.70	4019121.40	184.50	3.60	11.20	469.60	90.00	3.40	1.29962
3UPRD7	Pit A	665222.00	4019110.50	177.00	3.60	160.80	11.20	90.00	3.40	0.44502
4UPRD7	Pit A	665220.80	4018959.40	177.00	3.60	145.50	11.20	180.00	3.40	0.40267
5UPRD7	Pit A	665075.70	4018961.00	177.00	3.60	11.20	101.20	0.00	3.40	0.28007
1UPRD8	Pit B	665215.40	4017737.20	178.00	3.60	199.50	11.20	-115.0	3.40	0.55212
2UPRD8	Pit B	665133.70	4017917.60	170.50	3.60	503.40	11.20	-82.90	3.40	1.39317
3UPRD8	Pit B	665197.10	4018419.40	163.00	3.60	434.60	11.20	-60.60	3.40	1.20276
4UPRD8	Pit B	665401.50	4018805.70	163.00	3.60	107.10	11.20	36.90	3.40	0.29640
5UPRD8	Pit B	665483.30	4018739.40	163.00	3.60	292.40	11.20	95.20	3.40	0.80922

Table A5. Modeled Release Parameters for Polygon-Shaped Area Sources

Model ID	Source Description	X-utm (m)	Y-utm (m)	Elev. (m)	Release Ht. (m)	Number of Vertices	Area (m^2)	Area (acres)
ROADP2	Quarry Gate Paved	664378.20	4018790.00	201.50	3.60	5	1284.2	0.317
ROADP1	Asphalt/Concrete Paved	664149.00	4018609.00	206.10	3.60	24	14083.3	3.480
QSP1	Quarry Stockpile 1	664625.30	4018871.00	197.80	6.50	11	3727.4	0.921
QSP2	Quarry Stockpile 2	664540.10	4018873.20	200.10	4.80	11	992.2	0.245
QSP3	Quarry Stockpile 3	664485.80	4018873.20	200.20	4.80	11	952.2	0.235
QSP4	Quarry Stockpile 4	664446.90	4018903.70	199.20	4.80	11	918.7	0.227
QSP5	Quarry Stockpile 5	664518.90	4018997.30	199.20	4.80	11	971.7	0.240
QSP6	Quarry Stockpile 6	664530.80	4019051.60	197.50	4.80	11	933.8	0.231
QSP7	Quarry Stockpile 7	664590.90	4019052.90	199.60	4.80	11	944.7	0.233
ROADU2	To Ponds B and C	664039.50	4018641.30	205.40	3.60	11	4258.5	1.052
ROADU1	Asphalt Unpaved	664037.80	4018687.70	204.60	3.60	15	11092.0	2.741
ROADU3	Quarry/Stockpile Yard	664749.50	4019097.00	193.70	3.60	18	20729.4	5.122
ROADU9	Pit B Access Road	665172.90	4018582.80	181.80	3.60	15	9055.0	2.237

Table A6. TSP, PM_{10}, and $PM_{2.5}$ Modeled Hourly Emission Rates (lb/hr)

Model ID	Type	Source Description	TSP	PM_{10}	$PM_{2.5}$ (24-hour)	PM2.5 (Annual)
PGEN1	POINT	Power Engine 1	1.444E-01	1.444E-01	1.444E-01	1.444E-01
PGEN2	POINT	Power Engine 2	1.444E-01	1.444E-01	1.444E-01	1.444E-01
PGEN3	POINT	Power Engine 3	1.203E-01	1.203E-01	1.203E-01	1.203E-01
CD1	POINT	Asphalt Plant Baghouse	8.250E+00	5.750E+00	5.425E+00	1.239E+00
IES4	POINT	Asphalt Heater	2.800E-02	2.800E-02	9.000E-03	8.571E-03
IES5	POINT	Liquid Asphalt Heater	2.600E-02	2.600E-02	8.000E-03	7.860E-03
HMASILO1	POINT	Asphalt Silo 1 Vent	2.900E-02	2.900E-02	2.100E-02	5.752E-03
HMASILO2	POINT	Asphalt Silo 2 Vent	2.900E-02	2.900E-02	2.100E-02	5.752E-03
HMASILO3	POINT	Asphalt Silo 3 Vent	2.900E-02	2.900E-02	2.100E-02	5.752E-03
HMASILO4	POINT	Asphalt Silo 4 Vent	2.900E-02	2.900E-02	2.100E-02	5.752E-03
HMASILO5	POINT	Asphalt Silo 5 Vent	2.900E-02	2.900E-02	2.100E-02	5.752E-03
CD2	POINT	Concrete Plant Baghouse	1.107E+00	4.280E-01	4.280E-01	4.281E-01
GEN1	POINT	Quarry Generator	1.100E-02	1.100E-02	1.100E-02	1.150E-02
GEN1A	POINT	Quarry Generator	1.100E-02	1.100E-02	1.100E-02	1.150E-02
GEN2	POINT	Quarry Generator	4.000E-03	4.000E-03	4.000E-03	4.106E-03
GEN3	POINT	Quarry Generator	1.445E-02	1.445E-02	1.445E-02	1.445E-02
GEN4	POINTHOR	Quarry Generator	4.100E-03	4.100E-03	4.100E-03	4.100E-03
GEN5	POINT	Quarry Generator	1.478E-02	1.478E-02	1.478E-02	1.478E-02
GEN7	POINT	Quarry Generator	1.150E-02	1.150E-02	1.150E-02	1.150E-02
HMALO1	VOLUME	Asphalt Loadout 1	2.600E-02	2.600E-02	2.200E-02	6.000E-03
HMALO2	VOLUME	Asphalt Loadout 2	2.600E-02	2.600E-02	2.200E-02	6.000E-03
HMALO3	VOLUME	Asphalt Loadout 3	2.600E-02	2.600E-02	2.200E-02	6.000E-03
HMALO4	VOLUME	Asphalt Loadout 4	2.600E-02	2.600E-02	2.200E-02	6.000E-03
HMALO5	VOLUME	Asphalt Loadout 5	2.600E-02	2.600E-02	2.200E-02	6.000E-03
CRGEN3	POINT	Crusher Generator 3	1.450E-02	1.400E-02	1.400E-02	1.445E-02
CRGEN5	POINT	Crusher Generator 5	1.480E-02	1.500E-02	1.500E-02	1.478E-02
CRGEN7	POINT	Crusher Generator 7	1.150E-02	1.100E-02	1.100E-02	1.150E-02

Model ID	Type	Source Description	TSP	PM_{10}	$PM_{2.5}$ (24-hour)	PM2.5 (Annual)
BGEN1	POINT	Quarry Generator	1.100E-02	1.100E-02	1.100E-02	1.150E-02
BGEN1A	POINT	Quarry Generator	1.100E-02	1.100E-02	1.100E-02	1.150E-02
BGEN2	POINT	Quarry Generator	4.000E-03	4.000E-03	4.000E-03	4.106E-03
BGEN4	POINT	Quarry Generator	4.100E-03	4.100E-03	4.100E-03	4.100E-03
GEN3	VOLUME	Crusher GEN3	1.445E-02	1.445E-02	1.445E-02	1.445E-02
GEN5	VOLUME	Crusher GEN5	1.478E-02	1.478E-02	1.478E-02	1.478E-02
GEN7	VOLUME	Crusher GEN7	1.150E-02	1.150E-02	1.150E-02	1.150E-02
DP4	VOLUME	C3 to Pile	1.680E-01	5.500E-02	1.600E-02	8.000E-03
DP5	VOLUME	Pile to C4	1.400E-01	4.600E-02	1.300E-02	7.000E-03
DP6	VOLUME	C15 and C4 to C5	1.400E-01	4.600E-02	1.300E-02	7.000E-03
DP7	VOLUME	Screen to C5a	2.800E-02	9.000E-03	3.000E-03	1.000E-03
DP8	VOLUME	C5a to C6	2.800E-02	9.000E-03	3.000E-03	1.000E-03
DP9	VOLUME	C6 to C7	2.800E-02	9.000E-03	3.000E-03	1.000E-03
DP10	VOLUME	C7 to Pile	2.800E-02	9.000E-03	3.000E-03	1.000E-03
DP11	VOLUME	Screen to C8	5.600E-02	1.800E-02	5.000E-03	3.000E-03
DP12	VOLUME	Screen to C10	5.600E-02	1.800E-02	5.000E-03	3.000E-03
DP13	VOLUME	C8 to C9	5.600E-02	1.800E-02	5.000E-03	3.000E-03
DP14	VOLUME	C10 to C11	5.600E-02	1.800E-02	5.000E-03	3.000E-03
DP15	VOLUME	C11 to C12	5.600E-02	1.800E-02	5.000E-03	3.000E-03
DP16	VOLUME	CR2 to C13	5.600E-02	1.800E-02	5.000E-03	3.000E-03
DP17	VOLUME	CR3 to C13	5.600E-02	1.800E-02	5.000E-03	3.000E-03
DP18	VOLUME	C13 to C14	1.340E-01	4.400E-02	1.200E-02	7.000E-03
DP19	VOLUME	C14 and C38 to C16	1.440E-01	4.700E-02	1.300E-02	7.000E-03
DP20	VOLUME	SC2 to C17	4.200E-02	1.400E-02	4.000E-03	2.000E-03
DP21	VOLUME	SC2 to C21	7.100E-02	2.300E-02	7.000E-03	4.000E-03
DP22	VOLUME	SC2 to C19	2.200E-02	7.000E-03	2.000E-03	1.000E-03
DP23	VOLUME	CR4 to C20	2.200E-02	7.000E-03	2.000E-03	1.000E-03
DP24	VOLUME	C20 to C13	2.200E-02	7.000E-03	2.000E-03	1.000E-03
DP25	VOLUME	SC4 to C22	2.400E-02	8.000E-03	2.000E-03	1.000E-03

Model ID	Type	Source Description	TSP	PM_{10}	$PM_{2.5}$ (24-hour)	PM2.5 (Annual)
DP26	VOLUME	SC4 to C24	2.800E-02	9.000E-03	3.000E-03	1.000E-03
DP27	VOLUME	SC4 to C27	2.000E-02	6.000E-03	2.000E-03	1.000E-03
DP28	VOLUME	C22 to C23	2.400E-02	8.000E-03	2.000E-03	1.000E-03
DP29	VOLUME	C23 to Pile	2.400E-02	8.000E-03	2.000E-03	1.000E-03
DP30	VOLUME	C24 to C25	2.800E-02	9.000E-03	3.000E-03	1.000E-03
DP31	VOLUME	C25 to C26	2.800E-02	9.000E-03	3.000E-03	1.000E-03
DP32	VOLUME	C26 to Pile	2.800E-02	9.000E-03	3.000E-03	1.000E-03
DP33	VOLUME	C27 to C28	2.000E-02	6.000E-03	2.000E-03	1.000E-03
DP34	VOLUME	C28 to C29	2.000E-02	6.000E-03	2.000E-03	1.000E-03
DP35	VOLUME	C29 to Pile	2.000E-02	6.000E-03	2.000E-03	1.000E-03
DP36	VOLUME	C17 to C18	4.200E-02	1.400E-02	4.000E-03	2.000E-03
DP37	VOLUME	C18 to Pile	4.200E-02	1.400E-02	4.000E-03	2.000E-03
DP38	VOLUME	Finemaster to C32	4.200E-02	1.400E-02	4.000E-03	2.000E-03
DP39	VOLUME	C32 to C33	5.600E-02	1.800E-02	5.000E-03	3.000E-03
DP40	VOLUME	C33 to Pile	5.600E-02	1.800E-02	5.000E-03	3.000E-03
DP41	VOLUME	Pile to C30	5.600E-02	1.800E-02	5.000E-03	3.000E-03
DP42	VOLUME	SC5 to C36	7.000E-03	2.000E-03	1.000E-03	3.500E-04
DP43	VOLUME	C36 to C37	7.000E-03	2.000E-03	1.000E-03	3.500E-04
DP44	VOLUME	C37 to Pile	7.000E-03	2.000E-03	1.000E-03	3.500E-04
DP45	VOLUME	SC5 to C34	1.400E-02	5.000E-03	1.000E-03	1.000E-03
DP46	VOLUME	C34 to C35	1.400E-02	5.000E-03	1.000E-03	1.000E-03
DP47	VOLUME	C35 to Pile	1.400E-02	5.000E-03	1.000E-03	1.000E-03
DP48	VOLUME	SC5 to C31	1.400E-02	5.000E-03	1.000E-03	1.000E-03
DP49	VOLUME	C31 to C32	1.400E-02	5.000E-03	1.000E-03	1.000E-03
DP50	VOLUME	SC5 to C39	4.000E-03	1.000E-03	3.000E-04	2.000E-04
DP51	VOLUME	C39 and C14 to C15	1.440E-01	4.700E-02	1.300E-02	7.000E-03
DP52	VOLUME	SC5 to C38	1.100E-02	3.000E-03	1.000E-03	1.000E-03
SC1	VOLUME	SC-1	2.640E+00	8.880E-01	6.000E-02	2.600E-02
SC2	VOLUME	SC-2	1.980E+00	6.660E-01	4.500E-02	1.900E-02

Model ID	Type	Source Description	TSP	PM_{10}	$PM_{2.5}$ (24-hour)	PM2.5 (Annual)
SC3	VOLUME	SC3	1.001E+00	3.370E-01	2.300E-02	1.000E-02
AGGRE	VOLUME	AggreSand Screen	8.800E-01	2.960E-01	2.000E-02	9.000E-03
RAPSCN	VOLUME	Screen	1.625E+00	5.660E-01	8.600E-02	3.600E-02
DP61	VOLUME	Screen to Drum Conveyor	1.950E-01	7.200E-02	5.000E-03	5.000E-03
RAPCR1	VOLUME	Crusher	3.510E-01	1.560E-01	2.400E-02	1.000E-02
DP62	VOLUME	Drop to Drum	1.950E-01	7.200E-02	5.000E-03	5.000E-03
DP63	VOLUME	Transfer to Screen Conveyor	1.950E-01	7.200E-02	5.000E-03	5.000E-03
DP64	VOLUME	Asphlat Drop 2	1.950E-01	7.200E-02	5.000E-03	5.000E-03
DP65	VOLUME	Drop from Crusher	1.950E-01	7.200E-02	5.000E-03	5.000E-03
DP66	VOLUME	Ashpalt Plant Drop 1	1.950E-01	7.200E-02	5.000E-03	5.000E-03
DP67	VOLUME	HMA Conveyors to Stockpiles	1.950E-01	7.200E-02	5.000E-03	5.000E-03
DP1	VOLUME	CR4860 to C1	1.680E-01	5.500E-02	1.600E-02	8.000E-03
DP2	VOLUME	C1 to C2	1.680E-01	5.500E-02	1.600E-02	8.000E-03
DP3	VOLUME	C2 to C3	1.680E-01	5.500E-02	1.600E-02	8.000E-03
CR4860	VOLUME	Crusher 4860	1.440E+00	6.480E-01	1.200E-01	5.100E-02
CRPITB	VOLUME	Crusher Pit B	1.440E+00	6.480E-01	1.200E-01	5.100E-02
DP1B	VOLUME	DP1B	1.680E-01	5.500E-02	1.600E-02	8.000E-03
DP2B	VOLUME	DP2B	1.680E-01	5.500E-02	1.600E-02	8.000E-03
DP3B	VOLUME	DP3B	1.680E-01	5.500E-02	1.600E-02	8.000E-03
SYP1	AREA	Asphalt Stock	1.191E-01	5.632E-02	8.530E-03	2.723E-03
SYP2	AREA	Concrete Stock	1.010E-01	4.794E-02	7.253E-03	7.253E-03
1UPRD7	AREA	Pit A	7.959E-01	2.032E-01	2.032E-02	9.693E-03
2UPRD7	AREA	Pit A	3.122E+00	7.973E-01	7.973E-02	3.803E-02
3UPRD7	AREA	Pit A	1.069E+00	2.730E-01	2.730E-02	1.302E-02
4UPRD7	AREA	Pit A	9.674E-01	2.470E-01	2.470E-02	1.178E-02
5UPRD7	AREA	Pit A	6.729E-01	1.718E-01	1.718E-02	8.195E-03
1UPRD8	AREA	Pit B	1.160E+00	2.961E-01	2.961E-02	1.413E-02
2UPRD8	AREA	Pit B	2.926E+00	7.473E-01	7.473E-02	3.566E-02

Model ID	Type	Source Description	TSP	PM_{10}	$PM_{2.5}$ (24-hour)	PM2.5 (Annual)
3UPRD8	AREA	Pit B	2.526E+00	6.451E-01	6.451E-02	3.079E-02
4UPRD8	AREA	Pit B	6.226E-01	1.590E-01	1.590E-02	7.587E-03
5UPRD8	AREA	Pit B	1.700E+00	4.341E-01	4.341E-02	2.071E-02
ROADP2	AREAPOLY	Quarry Gate Paved	3.832E-01	7.654E-02	1.875E-02	1.233E-02
ROADP1	AREAPOLY	Asphalt/Concrete Paved	5.197E-01	1.041E-01	2.548E-02	1.665E-02
QSP1	AREAPOLY	Quarry Stockpile 1	1.772E-01	8.431E-02	1.275E-02	1.275E-02
QSP2	AREAPOLY	Quarry Stockpile 2	4.646E-02	2.213E-02	3.370E-03	2.953E-03
QSP3	AREAPOLY	Quarry Stockpile 3	3.915E-01	1.851E-02	2.804E-03	2.804E-03
QSP4	AREAPOLY	Quarry Stockpile 4	3.777E-01	1.786E-02	2.705E-03	2.705E-03
QSP5	AREAPOLY	Quarry Stockpile 5	3.995E-01	1.889E-02	2.861E-03	2.861E-03
QSP6	AREAPOLY	Quarry Stockpile 6	3.839E-01	1.816E-02	2.750E-03	2.750E-03
QSP7	AREAPOLY	Quarry Stockpile 7	3.884E-01	1.837E-02	2.782E-03	2.782E-03
ROADU2	AREAPOLY	To Ponds B and C	4.901E-03	1.251E-03	1.251E-04	5.982E-05
ROADU1	AREAPOLY	Asphalt Unpaved	6.955E-01	1.769E-01	1.769E-02	8.469E-03
ROADU3	AREAPOLY	Quarry/Stockpile Yard	7.683E+00	1.958E+00	1.958E-01	9.361E-02
ROADU9	AREAPOLY	Pit B Access Road	1.710E-01	4.355E-02	4.355E-03	1.962E-03

Table A7. TSP, PM_{10}, and $PM_{2.5}$ Operating Scenarios and Source Groups

		Six Operating Scenarios Represented by Modeled Source Groupings					
Model ID	**Description**	**AGEN1**	**AGEN1A**	**ACRUSH**	**BGEN1**	**BGEN1A**	**BCRUSH**
PGEN1	Power Engine 1	PGEN1	PGEN1	PGEN1	PGEN1	PGEN1	PGEN1
PGEN2	Power Engine 2	PGEN2	PGEN2	PGEN2	PGEN2	PGEN2	PGEN2
PGEN3	Power Engine 3	PGEN3	PGEN3	PGEN3	PGEN3	PGEN3	PGEN3
CD1	Asphalt Plant Baghouse	CD1	CD1	CD1	CD1	CD1	CD1
IES4	Asphalt Heater	IES4	IES4	IES4	IES4	IES4	IES4
IES5	Liquid Asphalt Heater	IES5	IES5	IES5	IES5	IES5	IES5
HMASILO1	Asphalt Silo 1 Vent	HMASILO1	HMASILO1	HMASILO1	HMASILO1	HMASILO1	HMASILO1
HMASILO2	Asphalt Silo 2 Vent	HMASILO2	HMASILO2	HMASILO2	HMASILO2	HMASILO2	HMASILO2
HMASILO3	Asphalt Silo 3 Vent	HMASILO3	HMASILO3	HMASILO3	HMASILO3	HMASILO3	HMASILO3
HMASILO4	Asphalt Silo 4 Vent	HMASILO4	HMASILO4	HMASILO4	HMASILO4	HMASILO4	HMASILO4
HMASILO5	Asphalt Silo 5 Vent	HMASILO5	HMASILO5	HMASILO5	HMASILO5	HMASILO5	HMASILO5
CD2	Concrete Plant Baghouse	CD2	CD2	CD2	CD2	CD2	CD2
GEN1	Quarry Generator	GEN1	****	****	****	****	****
GEN1A	Quarry Generator	GEN1A	GEN1A	****	****	****	****
GEN2	Quarry Generator	GEN2	GEN2	****	****	****	****
GEN3	Crusher GEN3	GEN3	GEN3	GEN3	GEN3	GEN3	GEN3
GEN4	Quarry Generator	GEN4	GEN4	****	****	****	****
GEN5	Crusher GEN5	GEN5	GEN5	GEN5	GEN5	GEN5	GEN5
GEN7	Crusher GEN7	GEN7	GEN7	GEN7	GEN7	GEN7	GEN7
HMALO1	Asphalt Loadout 1	HMALO1	HMALO1	HMALO1	HMALO1	HMALO1	HMALO1
HMALO2	Asphalt Loadout 2	HMALO2	HMALO2	HMALO2	HMALO2	HMALO2	HMALO2
HMALO3	Asphalt Loadout 3	HMALO3	HMALO3	HMALO3	HMALO3	HMALO3	HMALO3
HMALO4	Asphalt Loadout 4	HMALO4	HMALO4	HMALO4	HMALO4	HMALO4	HMALO4
HMALO5	Asphalt Loadout 5	HMALO5	HMALO5	HMALO5	HMALO5	HMALO5	HMALO5
DP4	C3 to Pile	DP4	DP4	DP4	DP4	DP4	DP4

Model ID	Description	Six Operating Scenarios Represented by Modeled Source Groupings					
		AGEN1	**AGEN1A**	**ACRUSH**	**BGEN1**	**BGEN1A**	**BCRUSH**
DP5	Pile to C4	DP5	DP5	DP5	DP5	DP5	DP5
DP6	C15 and C4 to C5	DP6	DP6	DP6	DP6	DP6	DP6
DP7	Screen to C5a	DP7	DP7	DP7	DP7	DP7	DP7
DP8	C5a to C6	DP8	DP8	DP8	DP8	DP8	DP8
DP9	C6 to C7	DP9	DP9	DP9	DP9	DP9	DP9
DP10	C7 to Pile	DP10	DP10	DP10	DP10	DP10	DP10
DP11	Screen to C8	DP11	DP11	DP11	DP11	DP11	DP11
DP12	Screen to C10	DP12	DP12	DP12	DP12	DP12	DP12
DP13	C8 to C9	DP13	DP13	DP13	DP13	DP13	DP13
DP14	C10 to C11	DP14	DP14	DP14	DP14	DP14	DP14
DP15	C11 to C12	DP15	DP15	DP15	DP15	DP15	DP15
DP16	CR2 to C13	DP16	DP16	DP16	DP16	DP16	DP16
DP17	CR3 to C13	DP17	DP17	DP17	DP17	DP17	DP17
DP18	C13 to C14	DP18	DP18	DP18	DP18	DP18	DP18
DP19	C14 and C38 to C16	DP19	DP19	DP19	DP19	DP19	DP19
DP20	SC2 to C17	DP20	DP20	DP20	DP20	DP20	DP20
DP21	SC2 to C21	DP21	DP21	DP21	DP21	DP21	DP21
DP22	SC2 to C19	DP22	DP22	DP22	DP22	DP22	DP22
DP23	CR4 to C20	DP23	DP23	DP23	DP23	DP23	DP23
DP24	C20 to C13	DP24	DP24	DP24	DP24	DP24	DP24
DP25	SC4 to C22	DP25	DP25	DP25	DP25	DP25	DP25
DP26	SC4 to C24	DP26	DP26	DP26	DP26	DP26	DP26
DP27	SC4 to C27	DP27	DP27	DP27	DP27	DP27	DP27
DP28	C22 to C23	DP28	DP28	DP28	DP28	DP28	DP28
DP29	C23 to Pile	DP29	DP29	DP29	DP29	DP29	DP29
DP30	C24 to C25	DP30	DP30	DP30	DP30	DP30	DP30
DP31	C25 to C26	DP31	DP31	DP31	DP31	DP31	DP31
DP32	C26 to Pile	DP32	DP32	DP32	DP32	DP32	DP32

Model ID	Description	Six Operating Scenarios Represented by Modeled Source Groupings					
		AGEN1	**AGEN1A**	**ACRUSH**	**BGEN1**	**BGEN1A**	**BCRUSH**
DP33	C27 to C28	DP33	DP33	DP33	DP33	DP33	DP33
DP34	C28 to C29	DP34	DP34	DP34	DP34	DP34	DP34
DP35	C29 to Pile	DP35	DP35	DP35	DP35	DP35	DP35
DP36	C17 to C18	DP36	DP36	DP36	DP36	DP36	DP36
DP37	C18 to Pile	DP37	DP37	DP37	DP37	DP37	DP37
DP38	Finemaster to C32	DP38	DP38	DP38	DP38	DP38	DP38
DP39	C32 to C33	DP39	DP39	DP39	DP39	DP39	DP39
DP40	C33 to Pile	DP40	DP40	DP40	DP40	DP40	DP40
DP41	Pile to C30	DP41	DP41	DP41	DP41	DP41	DP41
DP42	SC5 to C36	DP42	DP42	DP42	DP42	DP42	DP42
DP43	C36 to C37	DP43	DP43	DP43	DP43	DP43	DP43
DP44	C37 to Pile	DP44	DP44	DP44	DP44	DP44	DP44
DP45	SC5 to C34	DP45	DP45	DP45	DP45	DP45	DP45
DP46	C34 to C35	DP46	DP46	DP46	DP46	DP46	DP46
DP47	C35 to Pile	DP47	DP47	DP47	DP47	DP47	DP47
DP48	SC5 to C31	DP48	DP48	DP48	DP48	DP48	DP48
DP49	C31 to C32	DP49	DP49	DP49	DP49	DP49	DP49
DP50	SC5 to C39	DP50	DP50	DP50	DP50	DP50	DP50
DP51	C39 and C14 to C15	DP51	DP51	DP51	DP51	DP51	DP51
DP52	SC5 to C38	DP52	DP52	DP52	DP52	DP52	DP52
SC1	SC-1	SC1	SC1	SC1	SC1	SC1	SC1
SC2	SC-2	SC2	SC2	SC2	SC2	SC2	SC2
SC3	SC3	SC3	SC3	SC3	SC3	SC3	SC3
AGGRE	AggreSand Screen	AGGRE	AGGRE	AGGRE	AGGRE	AGGRE	AGGRE
ROADP2	Quarry Paved	ROADP2	ROADP2	ROADP2	ROADP2	ROADP2	ROADP2
ROADP1	Asphalt/Concrete Paved	ROADP1	ROADP1	ROADP1	ROADP1	ROADP1	ROADP1
QSP1	Quarry Stockpile 1	QSP1	QSP1	QSP1	QSP1	QSP1	QSP1
QSP2	Quarry Stockpile 2	QSP2	QSP2	QSP2	QSP2	QSP2	QSP2

Model ID	Description	Six Operating Scenarios Represented by Modeled Source Groupings					
		AGEN1	**AGEN1A**	**ACRUSH**	**BGEN1**	**BGEN1A**	**BCRUSH**
QSP3	Quarry Stockpile 3	QSP3	QSP3	QSP3	QSP3	QSP3	QSP3
QSP4	Quarry Stockpile 4	QSP4	QSP4	QSP4	QSP4	QSP4	QSP4
QSP5	Quarry Stockpile 5	QSP5	QSP5	QSP5	QSP5	QSP5	QSP5
QSP6	Quarry Stockpile 6	QSP6	QSP6	QSP6	QSP6	QSP6	QSP6
QSP7	Quarry Stockpile 7	QSP7	QSP7	QSP7	QSP7	QSP7	QSP7
ROADU2	To Ponds B and C	ROADU2	ROADU2	ROADU2	ROADU2	ROADU2	ROADU2
RAPSCN	Screen	RAPSCN	RAPSCN	RAPSCN	RAPSCN	RAPSCN	RAPSCN
DP61	Screen to Drum Conveyor	DP61	DP61	DP61	DP61	DP61	DP61
RAPCR1	Crusher	RAPCR1	RAPCR1	RAPCR1	RAPCR1	RAPCR1	RAPCR1
DP62	Drop to Drum	DP62	DP62	DP62	DP62	DP62	DP62
DP63	Transfer to Screen Conveyor	DP63	DP63	DP63	DP63	DP63	DP63
DP64	Asphlat Drop 2	DP64	DP64	DP64	DP64	DP64	DP64
DP65	Drop from Crusher	****	****	DP65	DP65	DP65	DP65
SYP1	Asphalt Stock	SYP1	SYP1	SYP1	SYP1	SYP1	SYP1
SYP2	Concrete Stock	SYP2	SYP2	SYP2	SYP2	SYP2	SYP2
ROADU1	Asphalt Unpaved	ROADU1	ROADU1	ROADU1	ROADU1	ROADU1	ROADU1
DP66	Ashpalt Plant Drop 1	****	****	DP66	DP66	DP66	DP66
DP67	HMA Conveyors to Stockpiles	DP67	DP67	DP67	DP67	DP67	DP67
CRGEN3	Crusher Generator 3	CRGEN3	CRGEN3	CRGEN3	CRGEN3	CRGEN3	CRGEN3
CRGEN5	Crusher Generator 5	CRGEN5	CRGEN5	CRGEN5	CRGEN5	CRGEN5	CRGEN5
CRGEN7	Crusher Generator 7	CRGEN7	CRGEN7	CRGEN7	CRGEN7	CRGEN7	CRGEN7
ROADU3	Quarry/Stockpile Yard	ROADU3	ROADU3	ROADU3	ROADU3	ROADU3	ROADU3
DP1	CR4860 to C1	****	****	DP1	****	****	****
DP2	C1 to C2	****	****	DP2	****	****	****
DP3	C2 to C3	****	****	DP3	****	****	****
CR4860	Crusher 4860	****	****	CR4860	****	****	****

Model ID	Description	Six Operating Scenarios Represented by Modeled Source Groupings					
		AGEN1	**AGEN1A**	**ACRUSH**	**BGEN1**	**BGEN1A**	**BCRUSH**
BGEN1	Quarry Generator	****	****	****	BGEN1	****	****
BGEN1A	Quarry Generator	****	****	****	BGEN1A	BGEN1A	****
BGEN2	Quarry Generator	****	****	****	BGEN2	BGEN2	****
BGEN4	Quarry Generator	****	****	****	BGEN4	BGEN4	****
CRPITB	Crusher Pit B	****	****	****	****	****	CRPITB
DP1B	DP1B	****	****	****	DP1B	DP1B	DP1B
DP2B	DP2B	****	****	****	DP2B	DP2B	DP2B
DP3B	DP3B	****	****	****	DP3B	DP3B	DP3B
ROADU9	Pit B Access Road	****	****	****	ROADU9	ROADU9	ROADU9
1UPRD7	Pit A	1UPRD7	1UPRD7	1UPRD7	****	****	****
2UPRD7	Pit A	2UPRD7	2UPRD7	2UPRD7	****	****	****
3UPRD7	Pit A	3UPRD7	3UPRD7	3UPRD7	****	****	****
4UPRD7	Pit A	4UPRD7	4UPRD7	4UPRD7	****	****	****
5UPRD7	Pit A	5UPRD7	5UPRD7	5UPRD7	****	****	****
1UPRD8	Pit B	****	****	****	1UPRD8	1UPRD8	1UPRD8
2UPRD8	Pit B	****	****	****	2UPRD8	2UPRD8	2UPRD8
3UPRD8	Pit B	****	****	****	3UPRD8	3UPRD8	3UPRD8
4UPRD8	Pit B	****	****	****	4UPRD8	4UPRD8	4UPRD8
5UPRD8	Pit B	****	****	****	5UPRD8	5UPRD8	5UPRD8

Note: Sources excluded from an operating scenario and source grouping shown as '****'.