PROJECT REPORT

Cadman Materials > North Everett Plant

CADMAN
HEIDELBERGCEMENT Group

Notice of Construction Application for Dryer Replacement and RAP Upgrade

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. EXECUTIVE SUMMARY

Cadman Materials (Cadman) operates an asphalt material plant located at 222 West Marine View Drive, Everett, WA 98201 (the North Everett plant). Currently the North Everett plant is operating under Notice of Construction (NOC) 6643, which was issued on September 12, 1996. NOC 6642 limits the use of reclaimed asphalt pavement (RAP) to 15% of the total feed at the North Everett plant.

Cadman proposes to replace the existing dryer and the mixer at the North Everett plant, as well as to increase the RAP ratio in the feed and add the ability to use recycled asphalt shingles (RAS). After the change, the maximum production rate at the North Everett plant will be at 400 tons per hour (tph).

This NOC application is prepared in accordance with Puget Sound Clean Air Agency (PSCAA) Regulation I, Section 6.03, including the following elements:

- Section 2. Project Description
- Section 3. Emission Calculations
- Section 4. Regulatory Review
- Section 5. Best Available Control Technology (BACT) Review
- Section 6. Dispersion Modeling Analysis
- Appendices
  - Appendix A: NOC Application Forms and Associated Documents
  - Appendix B: Emission Calculations and Supporting Documentation
  - Appendix C: Modeling Files and Supporting Documentation

2. PROJECT DESCRIPTION

Cadman operates the North Everett plant under NOC 6643. Currently, the operations at the North Everett plant include the following:

- Aggregates and other raw materials stored in stock piles outdoors;
- Aggregates are loaded through hoppers and conveyors to the rotary dryer;
- The rotary dryer is equipped with a burner rated at 115 million BTU per hour (MMBtu/hr) for drying the mixed aggregates;
- RAP is added to heated aggregates between the dryer and the mixer.
- Asphalt cement (oil) is added in the mixer;
- Mixed hot asphalt product is then loaded to the storage silos, or loaded to trucks at the bottom of the mixer;
- Truck loading is also possible through the storage silos.

The current operations are in batch mode. The rotary dryer, the mixer, the storage silos and truck loading are controlled by a baghouse rated at 80,000 cubic feet per minute (cfm). NOC 6643 sets throughputs limits and production limits, specifically the use of RAP at a maximum of 15% of total feed.

The proposed project includes the following elements:

- Removal of the existing dryer and the mixer.
- Installation of a single counterflow drum mixer (drum mixer).
- Relocation of the existing RAP feeding equipment.
- Installation of new RAS feeding equipment.
- Installation of new RAP and RAS feed bins and associated conveyors[1].
- Cadman proposes to use up to 40% of RAP and up to 5% of RAS in the feed upon completion of the project.

Process flow diagrams for pre-project and post-project configurations are provided in Appendix A.[2] The storage silos and truck loading from the silos will not be affected by this project.

[1] Existing screens will be reused.

[2] Note that the air flows from the storage silos will be sent to the baghouse as part of this project.

Project emissions are calculated for replacing the rotary dryer with the drum mixer. Facility-wide potential to emit (PTE) calculations are prepared in order to demonstrate that post-project emissions from the facility will be below major source thresholds.

This section describes the methodologies and assumptions used to calculate emissions from each source at the facility. Detailed emission calculations are provided in Appendix B.

3.1. PROJECT EMISSIONS

The proposed project will replace the current rotary dryer, hot screen and the mixer with a new drum mixer. With the proposed change, the North Everett plant will switch from a batch mix plant to a counterflow drum mix plant. The following emission calculation methodologies for the new drum mixer are applied:

- Emissions from the drum mixer are based on the proposed maximum values for hourly (400 tons per hour) and annual (350,000 tons per year) asphalt production.
- Volatile Organic Compound (VOC) and Sulfur Dioxide (SO_2) emissions from the drum mixer are calculated using emission factors obtained from AP-42 Section 11.1, Tables 11.1-7 and 11.1-8. Emission factors for Nitrogen Oxides (NO_x) and Carbon Monoxide (CO) are based on proposed BACT limits of 32 and 311 ppm, respectively, corrected to 7% O_2.
- Particulate Matter (PM) emissions from the asphalt production process, including the drum mixer and silo filling, are controlled by a fabric filter. Particulate emissions from these units and processes are quantified using the design flow rate and outlet loading of the baghouse at 80,000 acfm and 0.02 grain per dry standard cubic foot (gr/dscf), respectively.
- Particle size distribution for particulate emissions from the fabric filter is obtained from AP-42 Section 11.1, Table 11.1-4 and is used to determine the portion of PM emissions that are less than 10 µm in aerodynamic diameter (PM_{10}) and the portion of PM emissions that are less than 2.5 µm in aerodynamic diameter ($PM_{2.5}$).
- Speciated hazardous air pollutant (HAP) emissions are calculated using the emission factors from AP-42 Section 11.1, Tables 11.1-10 and 11.1-12.

Detailed emission calculations for the new drum mixer are provided in Appendix B. Note that the new burner will be rated at 125 MMBtu/hr because of the standard ratings available for the burners. The new burner will be operated at 115 MMBtu/hr or less due to the design of the North Everett plant.

Post-project CO emissions assuming continuous operation will result in annual emission rate higher than 100 tons per year (tpy). Therefore, Cadman is proposing a synthetic minor limit of 99 tons of CO.

3.2. FACILITY-WIDE EMISSIONS

Facility-wide emission calculations are performed to compare against the Prevention of Significant Deterioration (PSD) and Title V major source thresholds. Emission calculations are performed for the following equipment and operations:

- Silo filling & Loadout
- Haul Roads
- Storage Piles

Facility wide criteria pollutant and HAP emissions are summarized in Table 3-1. The calculation of Washington Toxic Air Pollutants (TAPs) is discussed in Section 4.6.1. Detailed emission calculations are provided in Appendix B.

3.2.1. Silo Filling and Load-out

VOC emissions from hot mix asphalt (HMA) silo filling are calculated according to AP-42 Section 11.1, Table 11.1-14. The emission factor equation for total organic carbon (TOC) is used; per AP-42 Table 11.1-16, 100% of TOC from HMA silo filling is VOC. The default value of -0.5% is used for V, the asphalt loss-on-heating value, obtained from footnote to Table 11.1-14. An asphalt temperature of 325°F is used, which is the average temperature of HMA from the drum mix dryer.

Silo filling operations are controlled by the baghouse, so particulate emissions from silo filling are not calculated separately.

Emissions of particulates, VOC, and CO are determined from HMA load-out operations using emission factors calculated according to AP-42 Section 11.1, Table 11.1-14. Load-out emission factor calculations assume the default value for HMA loss-on-heating and that HMA is the same temperature during loadout as it is during silo filling. HAP emissions from HMA load-out are calculating using the emission factor formulae in Table 11.1-14 in conjunction with speciation profiles from Tables 11.1-15 and 11.1-16.

3.2.2. Haul Roads

Dust emissions from paved haul roads are calculated according to AP-42 Section 13.2.1, Equation 1. All haul roads at the facility are paved; no unpaved roads are used to transport process materials. Particulate size multipliers are obtained from AP-42 Table 13.2.1-1. A roadway surface silt loading value of 3 g/m^2 is used per U.S. EPA Emission Assessment Report for HMA Plants.[3] HMA traveling the haul route have an empty vehicle weight of 15 tons and a capacity of 15 tons, resulting in an average truck weight of 22.5 tons while traveling the haul route. The maximum vehicles per hour and maximum vehicles per day are based on the HMA truck capacity and the proposed maximum production values of 400 tons per hour and 350,000 tons per year. The rainfall mitigation effect is calculated using AP-42 Section 13.2.1-1, Equations 2 and 3, and precipitation data from Everett Station,[4] as well as the mean number of days per year with measureable precipitation from AP-42 Figure 13.2.1-2.

3.2.3. Storage Piles

Dust emissions are expected to occur from aggregate storage piles via material handling and wind erosion.

Aggregate pile material handling dust emissions are calculated according to AP-42 Section 13.2.4, Equation 1. Particle size multipliers for PM_{10} and $PM_{2.5}$ emissions are obtained from Section 13.2.4.3. A mean wind speed value of 9.13 m/s is obtained from meteorological data observed at Snohomish County Airport (Paine Field). The moisture content of materials stored in piles ranges from 1% to 10%. A moisture content of 1% is conservatively used to calculate material handling emissions.

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[3] Hot Mix Asphalt Plants – Emission Assessment Report, U.S. EPA, EPA-454/R-00-019, December 2000.

[4] Precipitation data for Everett Station is obtained from NOAA Online Weather Data using the NOWData tool, https://w2.weather.gov/climate/xmacis.php?wfo=sew

Aggregate pile wind erosion emissions are calculated using equation 2-12 from U.S. EPA Fugitive Dust Background Document.[5] The pile material silt content is obtained from AP-42 Section 13.2.4, Table 13.2.4-1 for crushed limestone products. The number of days with greater than 0.01 inches precipitation per year is obtained from AP-42 Figure 13.2.1-2. The percentage of time with wind speed exceeding 12 miles per hour is determined from meteorological data at Snohomish County Airport (Paine Field). PM_{10} and $PM_{2.5}$ emissions are determined based on PM emissions using the ratios of the particle size multipliers for each particle size provided for Equation 1 in AP-42 Section 13.2.4.

[5] Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures, U.S. EPA, September 1992.

Table 3-1. Facility Wide Potential-to-Emit Summary

Emission Unit	VOC (tpy)	NO_x (tpy)	CO [1] (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	Combined HAPs (tpy)	Maximum Individual HAP [2] (tpy)
Stack Emissions								
Drum Mixer	5.60	25.20	--	0.60	18.02	12.61	0.95	0.54
HMA Silo Filling [3]	2.13	--	--	--	--	--	0.03	1.47E-02
Total Stack Emissions	*7.73*	*25.20*	--	*0.60*	*18.02*	*12.61*	*0.98*	*0.56*
Fugitive Emissions								
Load-Out [4]	0.68	--	--	--	0.09	0.09	0.02	6.40E-04
Haul Roads	--	--	--	--	1.33	0.33	--	--
Storage Pile Drop Points	--	--	--	--	1.41	0.21	--	--
Storage Pile Wind Erosion	--	--	--	--	0.23	0.03	--	--
Total Fugitive Emissions	*0.68*	--	--	--	*3.05*	*0.66*	*0.02*	*6.40E-04*
Total	**8.42**	**25.20**	**99.00**	**0.60**	**21.08**	**13.28**	**0.99**	**0.56**
Title V Major Source Threshold	100	100	100	100	100	100	25	10
Below Title V Major Source Threshold?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

1 CADMAN is requesting a synthetic minor limit on CO emissions of 99 tpy to maintain minor source status with respect to Title V.
2 The maximum individual HAP is formaldehyde.
3 Asphalt storage silos are controlled by the baghouse. Therefore, PM_{10} and $PM_{2.5}$ emissions from silo filling are not calculated separately.
4 Load-out PM_{10} and $PM_{2.5}$ emissions are conservatively assumed equivalent to load-out total PM emissions.

The North Everett plant is located in Everett, WA, which is in an attainment area for all criteria pollutants. The following section analyzes the regulatory requirements potentially applicable to the emission sources identified for the proposed project.

4.1. NOC APPLICABILITY

A NOC permit application must be filed and an approval order issued by PSCAA is required prior to the construction, reconstruction, or modification of an affected facility per PSCAA Regulation I, Section 6.03. The proposed project involves construction of new emitting equipment, and a change in an existing limit of NOC 6643. Therefore, the proposed project is considered a modification to the existing facility, which requires an NOC application to be approved prior to construction.

4.2. PSD APPLICABILITY

A project in an attainment area is subject to the PSD permitting program under Washington Administrative Code (WAC) 173-400-700 if the project is either a "major modification" to an existing "major source," or is a new major source itself.

The North Everett plant is not a listed source category with a major source threshold of 100 tpy. Therefore, the major source threshold for the North Everett plant is 250 tpy for any regulated pollutant. Table 3-1 shows that the post-project facility-wide PTE are below the 250 tpy thresholds. Therefore, a PSD review is not required.

4.3. TITLE V OPERATING PERMITS

PSCAA is responsible for the Title V Air Operating Permit program in its jurisdiction. The provisions of the operating permit program are set forth in Regulation I, Section 7. The PTE for the North Everett plant will not exceed the Title V major source thresholds for all regulated pollutants except for CO, as shown in Table 3-1. Cadman requests a synthetic minor emission limit of 99 tons for CO. Therefore, a Title V operating permit will not be required for the North Everett plant. Compliance with the synthetic minor limit will be demonstrated through monthly tracking of actual natural gas combustion fired and emission calculations each month.

4.4. NEW SOURCE PERFORMANCE STANDARDS (NSPS)

WAC 173-400-115 adopts federal NSPS by reference. NSPS apply to certain types of equipment that are newly constructed, modified, or reconstructed after a given applicability date. A discussion of NSPS subparts potentially relevant to this project is provided below.

4.4.1. NSPS Subpart I

Subpart I applies to hot mix asphalt facilities. According to 40 CFR 60.90:

> *For the purpose of this subpart, a hot mix asphalt facility is comprised only of any combination of the following: dryers; systems for screening, handling, storing, and weighing hot aggregate; systems for loading, transferring, and storing mineral filler, systems for mixing hot mix asphalt; and the loading, transfer, and storage systems associated with emission control systems.*

The North Everett plant is a hot mix asphalt facility and was constructed after June 11, 1973. Therefore, the North Everett plant is subject to NSPS Subpart I. 40 CFR 60.92(a), which establishes an emission limit of 0.04 grain per dry standard cubic foot (gr/dscf) for particulate matter and a 20% opacity limit.

The proposed project will not affect the applicability of NSPS Subpart I, and Cadman will continue to operate the North Everett plant in compliance with the applicable limits.

4.5. NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

National Emission Standards for Hazardous Air Pollutants (NESHAPs) have been established in 40 CFR Part 61 and Part 63 to control emissions of HAPs from stationary sources. The applicability of NESHAP rules often depends on a facility's major source status with respect to HAP emissions. Under 40 CFR Part 63, a major source is defined as "any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year or more of any HAP or 25 tons per year or more of any combination of HAP."

The North Everett plant is not a major source of HAP based on its PTE, as shown in Table 3-1. Additionally, there is no applicable source category under 40 CFR Part 61 or 63 for a hot mix asphalt plant. Therefore, NESHAP does not apply to the North Everett plant.

4.6. STATE AND LOCAL REGULATORY APPLICABILITY

4.6.1. Washington Toxic Air Pollutant Regulations

Per PSCAA Regulation I Section 6.01(a), PSCAA adopts by reference the requirements of the Washington TAP program provided WAC 173-460, excluding references to de minimis emission values in WAC 173-460-150. WAC 173-460 establishes a small quantity emission rate (SQER) and an acceptable source impact level (ASIL) for each listed TAP. If the total project-related TAP emissions increase exceeds its respective SQER, further determination of compliance with the ASIL is required.

Per WAC 173-460-040(2), the TAP review is performed for the drum mixer since this is the only emission unit that is modified in this project. The project emission increase is determined following the methodologies below:

- Pre-project emissions for the batch mix dryer, hot screen and the mixer are based on emission factors from AP-42 Tables 11.1-9 and 11.1-12. Hourly emissions are based on the current production limit in NOC 6643 (350 tph), and annual emissions are based on the average of actual production rates in 2017 and 2018.
- Post-project emissions for the drum mixer are based on emission factors from AP-42 Tables 11.1-10 and 11.1-12. Hourly emissions are based on the proposed drum mixer capacity of 400 tph, and annual emissions are based on the maximum annual production rate of 350,000 tons per year.
- Daily emission increase assumes that the hourly emission increase continues for a 24-hour period.

A summary of TAP emissions for this project is provided in Table 4-1. There are 16 TAPs showing an emission increase due to this project. Detailed emission calculations are provided in Appendix B.

Table 4-1. Project TAP Emission Summary

TAP [1]	CAS #	Project Emissions [2] (lb/avg. period)	SQER (lb/avg. period)	Averaging Period	Modeling Required?
Benzene	71-43-2	95.49	6.62	year	**Yes**
Benzo(a)anthracene	56-55-3	0.07	1.74	year	No
Benzo(a)pyrene	50-32-8	3.38E-03	0.174	year	No
Benzo(b)fluoranthene	205-99-2	0.03	1.74	year	No
Benzo(k)fluoranthene	207-08-9	0.01	1.74	year	No
Chrysene	218-01-9	1.24E-02	17.4	year	No
Ethyl Benzene	100-41-4	--	76.8	year	No
Formaldehyde	50-00-0	977	32	year	**Yes**
Hexane, n-	110-54-3	9	92	24-hr	No
Indeno(1,2,3-cd)pyrene	193-39-5	2.41E-03	1.74	year	No
Methyl Chloroform	71-55-6	0.46	131	24-hr	No
Naphthalene	91-20-3	26.23	5.64	year	**Yes**
Toluene	108-88-3	----	657	24-hr	No
Arsenic	7440-38-2	0.13	0.0581	year	**Yes**
Cadmium	7440-43-9	0.05	0.0457	year	**Yes**
Cobalt	7440-48-4	2.50E-04	0.013	24-hr	No
Copper	7440-50-8	2.60E-04	0.219	1-hr	No
Hexavalent Chromium	18540-29-9	0.15	0.00128	year	**Yes**
Lead	7439-92-1	0.09	16	year	No
Manganese	7439-96-5	0.02	0.00526	24-hr	**Yes**
Mercury	7439-97-6	--	0.0118	24-hr	No
Selenium	7782-49-2	--	2.63	24-hr	No
CO [3]	630-08-0	--	50.4	1-hr	No
NO_2 [3]	10102-44-0	--	1.03	1-hr	No
SO_2	7446-09-05	--	1.45	1-hr	No

1 Only TAPs emitted by the new drum mixer are shown.
2 Project emissions are determined by the difference of post-project emissions and the pre-project emissions. Emission decreases are not reported.
3 CO and NO_2 emissions are not expected to have any increase because the burner size does not change.

As shown in Table 4-1, all but 7 TAPs emitted from the North Everett plant are in compliance with their respective SQERs. Dispersion modeling analysis is performed to demonstrate compliance with the ASILs for the 7 TAPs with project emissions exceeding the SQERs, which is provided in Section 6.

4.6.2. Local Regulatory Applicability

The following general PSCAA regulations are relevant to the North Everett plant:

- Registration with PSCAA under Regulation I, Section 5.03 being a source subject to NSPS Subpart I.
- Report annual emissions if actual emissions exceed the thresholds (PSCAA Regulation I, Section 5.05(b)).
- Develop and implement an operation and maintenance plan (PSCAA Regulation I, Section 5.05(c)).
- Air contaminant sources shall not exceed an opacity of 20% for more than three minutes in a given hour, (PSCAA Regulation I, Section 9.03(a)).

- A fuel burning source shall not cause or allow the emission of SO_2 in excess of 1,000 ppm by volume on a dry basis, one hour average, and corrected to seven percent oxygen for fuel burning equipment (PSCAA Regulation I, Section 9.07).
- A fuel burning source shall not cause or allow the emission of particulate matter in excess of 0.05 grains per dry standard cubic feet (gr/dscf), corrected to seven percent oxygen for fuel combusted other than wood (PSCAA Regulation I, Section 9.09).
- The manufacturing process should result in particulate matter emissions in excess of 0.05 gr/dscf (PSCAA Regulation I, Section 9.09).
- Air contaminants shall not be emitted in sufficient quantities and of such characteristics and duration as is, or is likely to be, injurious to human health, plant or animal life, or property, or which unreasonably interferes with enjoyment of life and property (PSCAA Regulation I, Section 9.11).
- Reasonable precautions should be employed to minimize emissions from fugitive dust (PSCAA Regulation I, Section 9.15).
- Features, devices, control equipment, and machines shall not be operated unless such equipment is maintained in good working order (PSCAA Regulation I, Section 9.20).

5. BEST AVAILABLE CONTROL TECHNOLOGY

Under WAC 173-400-113, Ecology requires all new sources or modifications to existing sources to use BACT for all pollutants not previously emitted or whose emissions would increase as a result of the new source or modification. A BACT analysis is included in this section for all emission units subject to NOC permitting.

5.1. DRUM MIXER

The current rotary dryer is equipped with a baghouse rated at 80,000 cfm with an emission limit of 0.02 gr/dscf of air flow. Based on knowledge of limits set on similar facilities within the state, Cadman proposes keeping the 0.02 gr/dscf limit as the BACT for filterable PM. Additionally, the limit of up to 40% of RAP and up to 5% of RAS would also limit the potential PM emissions.[6] Cadman also proposes a total particulate matter limit of 0.028 gr/dscf based on recently issued NOC permits.[7]

Available control technologies for NO_X emissions from a combustion source typically includes low NO_X burners, using natural gas as the fuel, best management practices to ensure efficient combustion. Add-on controls, such as selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR) are also available. However, these types of add-on controls are not commonly seen for hot asphalt mix plants. Additionally, the new drum mixer burner will be a low NO_X burner with a NO_X emission performance level lower than 41 ppm corrected to 3% oxygen.[8] This limit is also in line with recently issued NOC permits from PSCAA.[7] Therefore, Cadman proposes the low NO_X burner firing natural gas with 41 ppm limit at 3% oxygen, and best management practices to ensure efficient combustion as BACT for NO_X.

Available control technologies for CO emissions typically include good combustion practices to ensure complete combustion. The new drum mixer burner will have a vendor expected level of performance less than 400 ppm CO corrected to 3% oxygen[8], which is in line with recently issued NOC permits from PSCAA. Cadman proposes the 400 ppm at 3% oxygen as the BACT for CO.

VOC emissions from the drum mixer are primarily driven by the processing temperature in the drum mixer and how fast it condenses out of the stack. However, temperature of the asphalt product is also an important aspect in the specifications. Cadman proposes best management practices to control the temperature in the dryer while maintaining the required temperature for the asphalt product.

5.2. MATERIAL TRANSFERS

The RAS and RAP bins, and associated conveyors and screens will result in fugitive PM emissions. Since RAS and RAP materials are coated with asphalt cement, PM emissions are expected to be negligible. Cadman proposes best management practices to reduce the fugitive PM emissions, including using enclosures where applicable.

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[6] Per Section 11.1.1.3 of AP-42, "A counterflow drum mix plant can normally process RAP at ratios up to 50 percent with little or no observed effect upon emissions".

[7] NOC 11613 issued to Puget Paving, and NOC 11328 issued to ICON Materials, for a burner approximately at 100 MMBtu/hr. The limits are 311 ppm CO and 32 ppm NO_X corrected to 7% oxygen.

[8] Cadman has not determined the vendor for the new dryer mixer burner yet. One vendor estimates emissions less than 30 ppm at 3% O_2 and the other estimates emissions less than 25 ppm at 7% O_2.

As discussed in Section 4.6.1, air dispersion modeling is performed for the TAPs showing emissions greater than their respective SQER. This section discusses the methodologies applied for the air dispersion modeling analysis and presents the results for the TAP analysis.

6.1. MODEL SELECTION

The American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee (AERMIC) modeling system, the most recent AERMOD dispersion model version 18081 with Plume Rise Model Enhancements (PRIME) advanced downwash algorithms, is used as the dispersion model in the air quality analysis.

6.2. METEOROLOGICAL DATA

The modeling analysis is performed using five years of representative meteorological data (2011 to 2015) for the AERMOD dispersion model. The meteorological data is processed using the most recent AERMET version 18081 with all regulatory default options. Data were obtained from the following sources:

- Surface meteorological data (wind speed, wind direction, temperature) correspond to readings from the meteorological station at the Paine Filed Airport (Station ID 24222).
- Upper air data correspond to the nearest upper air station, Quillayute State Airport (Station ID 94240).

The 1-min ASOS data is used wherever available. Note that the 2011 through 2015 data was used, because the National Weather Service (NWS) has identified a calibration error in wind data starting November 29, 2016 at 12 PM through 2 PM March 19, 2019. Trinity contacted the modeler with Washington State Department of Ecology (Ecology), Dr. Ranil Dhammapala, and confirmed that 2011 through 2015 would be the most appropriate years for this project. Email confirmation from Dr. Ranil Dhammapala is provided in Appendix C.

6.3. COORDINATE SYSTEM

The location of the emission sources, structures, and receptors for this modeling analysis are represented in the Universal Transverse Mercator (UTM) coordinate system using the North American 1983, CONUS (NAD83) projection. The UTM grid divides the world into coordinates that are measured in north meters (measured from the equator) and east meters (measured from the central meridian of a particular zone, which is set at 500 km). UTM coordinates for this analysis are based on UTM Zone 10. The location of the North Everett plant is approximately 5,318,481 meters Northing and 558,588 meters Easting in UTM Zone 10.

6.4. TERRAIN ELEVATIONS

Terrain elevations for receptors, buildings, and sources are determined using National Elevation Dataset (NED) supplied by the United States Geological Survey (USGS). The NED is a seamless dataset with the best available raster elevation data of the contiguous United States. NED data retrieved for this model have a grid spacing of 1/3 arc-second or 10 m. The AERMOD preprocessor, AERMAP version 11103, is used to compute model object elevations from the NED grid spacing. AERMAP also calculates hill height data for all receptors. All data obtained from the NED files are checked for completeness and spot-checked for accuracy.

6.5. RECEPTOR GRIDS

Per Ecology's guidance on TAP review, six (6) square Cartesian receptor grids are used in the air dispersion modeling analysis. The modeled receptor grid extends approximately 10,000 meters from the emission source.

- A grid containing 12.5-meter spaced receptors and extending roughly 150 meters;
- A grid containing 25-meter spaced receptors extending from 150 meters to 400 meters;
- A grid containing 50-meter spaced receptors extending from 400 meters to 900 meters;
- A grid containing 100-meter spaced receptors extending from 900 meters to 2,000 meters;
- A grid containing 300-meter spaced receptors extending from 2,000 meters to 4,500 meters;
- A grid containing 600-meter spaced receptors extending from 4,500 meters to 6,000+ meters.

In addition, 12.5-meter spaced receptors are included along the facility property line, where Cadman has operation control. Figure 6-1 shows the modeled ambient air boundary in purple.

6.6. BUILDING DOWNWASH

Emissions from each source are evaluated in terms of their proximity to nearby structures. The purpose of this evaluation is to determine if stack discharges might become caught in the turbulent wakes of these structures. Wind blowing around a building creates zones of turbulence that are greater than if the buildings were absent. The concepts and procedures expressed in the GEP Technical Support document, the Building Downwash Guidance document, and other related documents are applied.

Figure 6-1 shows the modeled building in blue. The building height is 80 ft. Other shorter structures are not included for building downwash purposes.

6.7. POINT SOURCE

The drum mixer emissions are controlled by a baghouse, and the exhaust is vented through the main stack. Current configuration on the flow through the stack includes 80,000 cfm induced flow from the baghouse fan and an additional 9,000 cfm makeup air from the asphalt storage silos. Following completion of the project, the 80,000 cfm baghouse fan will provide air for all processes controlled by the baghouse, resulting in a total post-project flow rate of 80,000 cfm. A pre-project stack and post-project stack are therefore modeled to account for the difference in pre- and post-project stack flow rates. The pre- and post-project stacks are modeled as point sources, each with a unit emission rate of 1 g/s. Stack location information is provided in Table 6-1, and modeled parameters are provided in Table 6-2.

Table 6-1. Point Source Location

Model Unit ID	Description	UTM Easting (m)	UTM Northing (m)	Elevation (m)
PRE_DRY	Pre-project asphalt dryer stack	558,588	5,318,481	0.74
POST_DRY	Post-project asphalt dryer stack	558,588	5,318,481	0.74

Table 6-2. Point Source Parameters

Source ID	Height (ft)	Height (m)	Temperature [a] (F)	Temperature [a] (K)	Flow Rate [b] (acfm)	Velocity (ft/s)	Velocity (m/s)	Diameter (ft)	Diameter (m)
PRE_DRY	88	26.82	220	377.59	89,000	118.04	35.98	4	1.22
POST_DRY	88	26.82	220	377.59	80,000	106.10	32.34	4	1.22

[a] The exhaust temperature ranges from 220 to 240 °F, and 220 °F is conservatively used.
[b] Flow rate is determined based on pre- and post-project process design.

Figure 6-1. Modeled Objects

6.8. MODEL RESULTS

Because the pre- and post-project model scenarios each involves only one stack, a unit emission rate of 1 gram per second (g/s) is modeled for each stack. At each receptor, the model results are scaled for each scenario and pollutant using the corresponding process throughput and pollutant emission factor. The project concentration increase is determined by subtracting the pre-project scaled concentration from the post-project scaled concentration for each year and each receptor. The model results are determined based on the maximum concentration increase across all receptors and modeled years for each pollutant. The post-processing of model results was performed in an Excel spreadsheet, which is provided in Appendix C.

The model results are summarized in Table 6-3, which shows all TAPs are in compliance with the respective ASIL. Modeling files are provided in Appendix C.

Table 6-3. Model Results Summary

Pollutant	Pre-Project Emission Rate (g/s)	Post-Project Emission Rate (g/s)	Averaging Period	Maximum Modeled Concentration Increase ($\mu g/m^3$)	ASIL ($\mu g/m^3$)	In Compliance with ASIL?
Benzene	5.90E-04	1.96E-03	year	0.0042	0.0345	Yes
Formaldehyde	1.56E-03	1.56E-02	year	0.042	0.167	Yes
Naphthalene	7.58E-05	4.53E-04	year	0.0011	0.0294	Yes
Arsenic	9.69E-07	2.82E-06	year	0.000006	0.000303	Yes
Cadmium	1.29E-06	2.06E-06	year	0.000003	0.000238	Yes
Hexavalent Chromium	1.01E-07	2.27E-06	year	0.0000064	0.00000667	Yes
Manganese	3.04E-04	3.88E-04	24-hr	0.004	0.04	Yes

APPENDIX A: APPLICATION FORMS AND ASSOCIATED DOCUMENTS

1. NOC Application Form

2. Equipment Forms

3. SEPA Checklist

4. Process Flow Diagrams

Appendix A
1. NOC Form

AGENCY USE ONLY	NOC#:	REG#:	Date Fee Pd:	Eng. Assigned:

Puget Sound Clean Air Agency

1904 Third Avenue, Suite 105 | Seattle, WA 98101-3317

Phone 206-343-8800 | 206-343-7522 Fax

Need assistance? Free translation services available at 206-343-8800

Español 中文 Tiếng Việt 한국어 Tagalog русский

NOTICE OF CONSTRUCTION APPLICATION FOR ORDER OF APPROVAL

The following information must be submitted as part of this application packet before an Agency engineer is assigned to review your project.

SECTION 1. FACILITY INFORMATION

Business Name Cadman Materials			
Equipment Installation Address 222 West Marine View Drive	City Everett	State WA	Zip 98201
Is the business registered with the Agency at this equipment installation address? ☒ Yes. Current Registration or AOP No. 18019 ☐ No, not registered ☐ Unknown			
Business Owner Name Cadman Materials			
Business Mailing Address 7554 185th Ave. NE	City Redmond	State WA	Zip 98052
Type of Business Asphalt and Concrete Production Facility			
NAICS Code 324121	NAICS Description Asphalt Paving Mixture and Block Manufacturing		
Contact Name (for this application) Christy McDonough	Phone (425) 698-3226	Email christy.mcdonough@lehighhanson.com	
Provide a 1-2 sentence simple description of this project: This project proposes to add a drum mixer dryer that would replace the current rotary dryer and mixer. Additionally, Cadman proposes to increase the ratio of RAP and add RAS in the raw materials.			

SECTION 2: REQUIRED APPLICATION PACKET ATTACHMENTS

1) **$1,150 filing fee** (nonrefundable)

☒ PAY BY CHECK – Attached and made payable to **Puget Sound Clean Air Agency**

☐ PAY BY CREDIT – Accounting technician will contact person identified below for payment information

Contact Name:	Contact Number:

2) **Detailed Project Description**

The project description must include a detailed description of the project, a list of process and control equipment to be installed or modified, a description of how the proposed project will impact your existing operations (if applicable), and measures that will be taken to minimize air emissions.

Detailed description of the proposed project included in packet?

☒ YES, attached. ☐ NO, not attached. This application is incomplete.

NOTICE OF CONSTRUCTION APPLICATION FOR ORDER OF APPROVAL

SECTION 2: REQUIRED APPLICATION PACKET ATTACHMENTS (CONT)

3) **Process flow diagram**
☒ YES, attached. ☐ NO, not attached. This application is incomplete

4) **Emission estimate**. Emission rate increases for all pollutants.
☒ YES, attached. ☐ NO, not attached. This application is incomplete.

5) **Environmental Checklist** (or a determination made by another Agency under the State Environmental Policy Act)
www.pscleanair.org/DocumentCenter/View/170
☒ YES, attached. ☐ NO, not attached. This application is incomplete..

6) Attach **equipment form**(s) applicable to your operation. Forms are available online at
www.pscleanair.org/178/Apply-for-Notice-of-Construction-Permit
☒ YES, attached. ☐ NO, not attached. This application is incomplete.

SECTION 3: PROCESS AND CONTROL EQUIPMENT (attach additional pages if necessary)

Process Equipment		Does this equipment have air pollution control equipment?	Air Pollution Control Equipment	
# of Units	Equipment Type & Design Capacity		# of Units	Equipment Type
1	Drum Dryer	☒ Yes ☐ No	1	Fabric filter (baghouse)
		☐ Yes ☐ No		
		☐ Yes ☐ No		

SECTION 4: CERTIFICATION STATEMENT

I, the undersigned, certify that the information contained in this application and the accompanying forms, plans, specifications, and supplemental data described herein is, to the best of my knowledge, accurate and complete.

Christy McDonough Digitally signed by Christy McDonough Date: 2019.05.21 12:56:42 -07'00'
Signature

5/21/19
Date

Christy McDonough
Printed Name

Environmental Manager - Washington
Title

SECTION 5: APPLICATION SUBMITTAL

☒ **EMAIL application and attachments to:**
NOC@pscleanair.org

-OR-

☐ **MAIL application, payment, and attachments to:**
Puget Sound Clean Air Agency
ATTN: NOC Application Submittal
1904 3rd Ave, Suite 105 - Seattle, WA 98101

THIS SECTION FOR AGENCY USE ONLY						
Eng. Assigned (Compliance Mgr)	Eng. Rec'd (Eng)	Web description (Eng)	Completeness review (Eng)	Routed for OA Prep (Eng)	OA signed (Compliance Mgr)	OA mailed (Admin)
Date:	Date:	Date:	Date:	Date:	Date:	Date:

Appendix A
2. Equipment Forms

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Puget Sound Clean Air Agency

PUGET SOUND CLEAN AIR AGENCY

Additional Notice of Construction Application Requirements for

ASPHALT BATCH PLANTS

General

Description of Equipment and its Purpose *[Specify the type of batching (drum mix, pugmill batch mix with weigh hopper/mixer beneath hot bins, or pugmill continuous mix with separate mixer and metered feed) and its purpose (wholesale or retail).]*
Continuous Process Drum Mixer. Retail Sales.
Identify which of the following categories the project fits into:

1. New Construction *(New construction also includes existing, unpermitted equipment or processes*)
2. Reconstruction *(Reconstruction means the replacement of components of an existing facility to such an extent that the fixed capital cost of the new components exceeds 50% of the fixed capital cost that would be required to construct a comparable entirely new facility)*
3. Modification *(Modification means any physical change in, or change in the method of operation of, a source, except an increase in the Hours of Operation or production rates (not otherwise prohibited) or the use of an alternative fuel or raw material that the source is approved to use under an Order of Approval or operating permit, that increases the amount of any air contaminant emitted or that results in the emission of any air contaminant not previously emitted)*
4. Amendment to Existing Order of Approval Permit Conditions

Date of Equipment Manufacture (month/yr) *[This is the date when the unit was built by the manufacturer.]*
TBD - new drum mixer

Estimated Hours of Operation (hr/day, day/wk, wk/yr) *[Estimate the hours of operation for the new batch plant - not necessarily the entire facility.]*
8 hrs/day, 5 days/wk, 50 wks/yr

Estimated Installation Date [*Estimate the date when the new batch plant will be put into service.]*
As soon as possible

Estimated Removal Date *[Estimate the date when the new batch plant will be taken out of service.]*
NA

Asphalt Properties

Estimated Annual Production (ton/yr) *[Estimate the total annual asphalt production of the new batch plant.]*
350,000

Estimated Cutback Asphalt (ton/yr) *[Estimate the total annual cutback asphalt (cold mix) production of the new batch plant]*
4,800

Maximum Recycled Asphalt per Batch (%) *[Specify the maximum fraction of recycled asphalt to be used per batch.]* 40%

Design ***[Most design information is available from the manufacturer or vendor. Submittal of a brochure, scale drawing or process and instrumentation diagram will facilitate the review of the permit application.]***

Make & Model *[Specify the manufacturer and model of the batch plant - not the serial number.]*
Custom built; TBD for the new drum mixer

Rated Capacity (ton/hr) *[Specify the maximum amount of asphalt cement that can be produced per hour by the new equipment.]*
400

Type of Fuel *[Specify natural gas, propane, #2 fuel oil, waste oil, or other (be specific).]*
Natural gas

Estimated Annual Fuel Usage (Million cu ft/yr, thousand gal/yr) *[Estimate how many million cubic feet of gaseous fuel or thousands of gallons of liquid fuel will be burned annually. Alternatively, specify how many billion Btu/yr.]*
50,000 to 200,000 MMBtu/yr

Nitrogen Oxide Emission Controls *[Specify if using low-NOx burners, staged combustion, or flue gas recirculation]*
Low NOx burner

Type of Control Equipment *[Specify baghouse or venturi scrubber and complete the appropriate permit form for baghouses or Venturi scrubbers.]*
Baghouse

Emission Points Connected to Control Equipment *[Specify which hot aggregate, mineral filler, and hot mix asphalt emission points are ducted to the control equipment (e.g., rotary dryer, hot elevator, weigh hopper, hot mix storage, truck loading).]*
Drum Mixer, Dropout Box, Drag Slag Conveyor, Silos and Batchers

Number of Water Sprays *[Specify the number of water sprays located at each feed hopper, belt transfer point, crusher inlet and outlet, and shaker screen.]*
None

Water Pressure (psig) *[Specify the water pressure (in pounds per square inch) supplied by the pump]*
NA

Total Water Flowrate (gal/hr) *[Specify the hourly water use by the water sprays.]*
NA

Emissions Estimate (lb/hr, lb/yr) *[Estimate the emissions of each pollutant and include your calculations. Emission factors are available from http://www.epa.gov/ttn/chief/ap42/index.html. Controlled emissions (from a baghouse) should equal (0.01)(amount collected).]*
See application report

Operation and Maintenance

Describe Methods Used Facility-Wide for Dust Control *[Specify if: access roads are paved, graveled or surfaced with rip-rap; a wheel wash is used for vehicles exiting the property; a water truck is used for vehicular traffic on unpaved areas; and if sprinklers are used for storage piles]*
Paved road, paved stoarge areas, covered RAP and RAS stockpiles, water truck, truck tarp policy.

Describe Preventive Maintenance *[Specify the periodic maintenance recommended by the manufacturer and its frequency]*
Daily, weekly and annual inspections - detailes are available in the Maintenance and Inspection schedules

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PUGET SOUND CLEAN AIR AGENCY

Additional Notice of Construction Application Requirements for

BAGHOUSES AND CARTRIDGE-TYPE DUST COLLECTORS

General

Equipment or Process Being Controlled *[Specify the source(s) of the particulate matter to be controlled. If the source(s) are also new, complete the applicable permit forms]*
See process flow diagram

Identify which of the following categories the project fits into:

1. New Construction *(New construction also includes existing, unpermitted equipment or processes*)
2. Reconstruction *(Reconstruction means the replacement of components of an existing facility to such an extent that the fixed capital cost of the new components exceeds 50% of the fixed capital cost that would be required to construct a comparable entirely new facility)*
3. Modification *(Modification means any physical change in, or change in the method of operation of, a source, except an increase in the Hours of Operation or production rates (not otherwise prohibited) or the use of an alternative fuel or raw material that the source is approved to use under an Order of Approval or operating permit, that increases the amount of any air contaminant emitted or that results in the emission of any air contaminant not previously emitted)*
4. Amendment to Existing Order of Approval Permit Conditions

Estimated Hours of Operation (hr/day, day/wk, wk/yr) *[Estimate the hours of operation for the new baghouse - not necessarily the entire facility]*
8 hrs/day, 5 days/wk, 50 wks/yr

Estimated Installation Date *[Estimate the date when the new baghouse will be put into service]*
Existing

Inlet Gas Stream Characteristics *[Pretreatment (e.g., heating or dilution) is necessary if the temperature is not 50-100 °F above the dewpoint.]*
Pretreated to be above dew point before start of the process

Particulate Concentration (lb/hr, gr/acf, or gr/dscf) [*Specify the amount of particulate matter being vented to the baghouse in pounds per hour, grains per actual cubic foot, or grains per dry standard cubic foot. (One pound contains 7000 grains.)]*
NA

Flowrate (acfm) *[Specify the air flowrate in actual cubic feet per minute. This is usually determined from the fan performance 'curve' based upon the expected static pressure caused by the sum of the pressure losses from each component in the ductwork, including the baghouse]*
80,000 cfm

Average Temperature (ºF) *[Specify the average expected temperature of the air going into the baghouse in degrees Fahrenheit.]*
250

Maximum Temperature (ºF) *[Specify the maximum expected temperature of the air going into the baghouse in degrees Fahrenheit.]*
275

Moisture (% by volume) [*Specify the moisture (water vapor) concentration of the air going into the baghouse in percent.]*
5%

Design *[Most design information is available from the manufacturer or vendor. Submittal of a brochure, scale drawing or process and instrumentation diagram will facilitate the review of the permit application]*

Make & Model *[Specify the manufacturer and model of the baghouse - not the serial number]*
H&R Mechanical

Filter Fabric Material *[Specify the type of fabric material used. Common bag materials include modacrylic (e.g., Dynel), cotton, wool, polypropylene, nylon polyamide (e.g., Nylon 6 & 66), acrylic (e.g., Orlon), polyester (e.g., Dacron, Creslan), nylon aromatic (e.g., Nomex), fluorocarbon (e.g., Teflon, TFE), and fiberglass. Also specify whether it is woven or felted, and any type of treatments (e.g., heat setting) or finishes applied to the fabric (e.g., Teflon, Gore-tex, silicone).]*
Nomex

Filter Cleaning Method *[Specify either mechanically shaken, reverse air, or pulse-jet.]*
Pulse Jet

Air to Cloth Ratio *[Specify the air to cloth ratio of the baghouse. This is the airflow (acfm) divided by the total surface area of fabric exposed to dust. The surface area of an individual bag is equal to 3.14159 x bag diameter x bag length. The surface area of a pleated cartridge generally must be obtained from the manufacturer or distributor. The total surface area is just the individual bag or cartridge surface area times the number of bags or cartridges cleaning the exhaust.]* (acfm/ft2)
6.5:1

Baghouse Configuration *[Specify whether the baghouse equipped with an induced draft fan on the clean side (negative pressure) or with a forced draft fan on the dirty side (positive pressure)]*
Induced draft

Method Used to Design/Size the Baghouse *[Specify the method used to select this design and size of baghouse. If design calculations were performed, they should be submitted. If the design and sizing was based on similar (successful) applications, list the facilities and the city and state where they are located]*
NA - not affected by project

Stack

Stack Height (ft) *[Specify the height of the top of the stack above ground level - not above the building or sea level]*
88 ft

Stack Diameter or Rectangular Cross-Sectional Dimensions (inches) *[Specify the internal dimensions - not the external dimensions]*
48 inches

Exhaust Flowrate (acfm) *[Specify the airflow in actual cubic feet per minute*]
80,000 acfm

Exhaust Temperature (ºF) *[Specify the temperature of the exhaust leaving the stack]*
220 F

Distance to Nearest Property Line (ft) *[Specify the distance from the base of the stack to the nearest property line.]*
See application report

Height, Length and Width of Buildings (ft) *[Specify the approximate dimensions of any buildings that are >40% of the stack height and are located within 5 building heights from the stack]*
See application report

Operation and Maintenance

Method Used to Establish Cleaning Frequency *[Specify the method used to establish the duration between bag cleanings. If a timer is used, specify the timer setting and the criteria for selecting the time interval. If cleaning is actuated by the pressure differential, specify the criteria for selecting the pressure drop.]*
Timer at 8s, and pressure drop on average at 2 inches of water

Describe Preventive Maintenance *[Specify the intended inspection frequencies for visible emissions, fallout and pressure drop across the filters, viewing of the interior 'clean side' for leaks, filter wear and strength, assuring that the gauge is not plugged. Also specify the records to be kept (e.g., records of all inspections and repairs, the age of each filter and its fabric type; amount of dust collected per month), and specify the spare parts to be kept on-site]*
Daily, weekly and annual inspections and maitenance. Details are available in the Maintenance and Inspection schedules.

Methods Used to Prevent Emissions From Handling and Disposal of Dust *[Specify the equipment, procedures, and methods used to prevent emissions from the handling and disposal of dust. Is the baghouse equipped with a rotary airlock? Is the receiving hopper completely enclosed? How is the dust hopper emptied without causing emissions?]*
Rotary Airlock is installed on the Baghouse Discharge, Baghouse Dust is returned to drum mixer via an enclosed screw conveyor. Fugitive Dust Air Fan is installed on Silos Batchers, and Drag Slat conveyor routed to the Baghouse. Feed Bins are located in an enclosed structure with roof and walls on 3 sides. All processing equipment is installed inside an Enclosed Building including the baghouse.

Maintenance and Inspection Schedule for the North Everett Asphalt Plant

All operation and control equipment will be inspected as set forth in the following schedule. All deficiencies shall be reported promptly to the plant foreman to be added to the plant repair schedule.

All changes and deficiencies will be documented in the Baghouse and Plant Maintenance Monitoring Log

Operating Equipment

Sand and Gravel Supply system (4 sand/crush rock bins, belt conveyors to dryer)

Daily visual Safety and Maintenance inspections will be performed

- Inspections shall include but not limited to the following:
  - Condition of Bins
  - Spillage at Transfer Points
  - Belt tracking and idler condition
  - Transfer Point Delivery to Dryer Weekly

Operations and Safety Inspections

- The following items will be visibly inspected
  - Walkways and Stairs
  - Overhead Hazards
  - Machine/Conveyor Guards
  - Housekeeping
  - Conveyor Emergency Stops
  - Portable Ladders
  - Propane/Oxy.-Acet. Tanks
  - Fire Extinguishers
  - Electrical Cords
  - First Aid Kits
  - Customer Hazards
  - Warning Signs
  - Lockout Stations
  - Head and Tail Pulley Condition

- Scheduled Annual Maintenance (End of Business Year)
  - In areas where needed

Drum Mixer

- Daily visual Safety and Maintenance inspections will be performed
  - Inspections shall include but not limited to the following:
    - Transfer Point Delivery to Dryer / Drum
    - Condition of trunnion bearings
    - Condition of front and rear burner seals
- Weekly Operations and Safety Inspections
  - The following items will be visibly inspected
    - Walkways and Stairs
    - Overhead Hazards
    - Machine/Conveyor Guards
    - Housekeeping
    - Portable Ladders
    - Propane/Oxy.-Acet. Tanks
    - Fire Extinguishers
    - Electrical Cords
    - First Aid Kits
    - Warning Signs
    - Lockout Stations
- Scheduled Annual Maintenance (End of Business Year)
  - Condition of flights and shell
  - Other areas where needed

Burner

- Weekly Operations and Safety Inspections
  - The following items will be visibly inspected
    - Sequencing of Valves
    - Lubricate tertiary air fan (Monthly)
- Scheduled Annual Maintenance (End of Business Year)
  - Burner Tuning by outside contractor

Hot Mix Asphalt (HMA) Storage Silos

- Daily visual Safety and Maintenance inspections will be performed
  - Inspections shall include but not limited to the following:
    - Fill and Inspect Pneumatic Oilers
    - Inspect Blue Smoke Scavenger Decking
    - Inspect Condition of Transfer System
    - Visual Inspection for leaks

  Weekly Operations and Safety Inspections
  - The following items will be visibly inspected
    - Walkways and Stairs
    - Machine/Conveyor Guards
    - Housekeeping
    - Propane/Oxy.-Acet. Tanks
    - Fire Extinguishers
    - Electrical Cords
    - First Aid Kits
    - Warning Signs
    - Lockout Stations
- Scheduled Annual Maintenance (End of Business Year)
  - In areas where needed

Control Equipment

Scavenger Ducting and Baghouse

Daily visual Safety and Maintenance inspections will be performed
- Inspections shall include but not limited to the following:
  - Check and Record Magnehelic Gauge Readings
  - Monitor Photohelic Gauge Readings
  - Check Main Out Stack for Opacity•
  - Visual Inspect Condition of Ducting
  - Electrical Cords
  - First Aid Kits
  - Warning Signs
  - Lockout Stations

- Scheduled Annual Maintenance (End of Business Year)
  - In areas where needed

Appendix A
3. SEPA Checklist

pscleanair.org
Puget Sound Clean Air Agency

Puget Sound Clean Air Agency
1904 Third Avenue, Suite 105 | Seattle, WA 98101-3317
Phone 206-343-8800 | 206-343-7522 Fax

ENVIRONMENTAL CHECKLIST

Because of the State Environmental Policy Act, the action for which you are filing a Notice of Construction and Application for Approval to this Agency requires the completion of an environmental checklist.

BUT: If you can answer "yes" to either of the following statements with respect to the action being proposed, the attached checklist need not be completed:

1. I have obtained a State, City, or County Permit and filled out an environmental checklist.

   ☐ **Yes** ☒ **No**

   If yes, complete the following:

   State, City or County Department: _____

   Date the checklist was completed: _____

   Attach a copy of the checklist

2. An environmental checklist or assessment has previously been filled out for another agency.

   ☐ **Yes** ☒ **No**

   If yes, complete the following:

   Agency: _____

   Date the checklist was completed: _____

   Attach a copy of the checklist

If your answers are NO to both of the above statements, you must complete the attached environmental checklist.

Prepared by:

Signature _____

Name Hui Cheng

Position Senior Consultant

Agency/Organization Trinity Consultants

Date Submitted 5/21/2019

ENVIRONMENTAL CHECKLIST

Date: 5/1/19

Proponent: Puget Sound Clean Air Agency

Project, Brief Title: North Everett Dryer Replacement

Purpose of Checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for Applicants:

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use “not applicable” or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of Checklist for Nonproject Proposals:

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of Sections A, B, and C plus section D: Supplemental Sheet for Nonproject Actions.

Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Section B: Environmental Elements that do not contribute meaningfully to the analysis of the proposal.

ENVIRONMENTAL CHECKLIST

A. BACKGROUND

1. Name of proposed project, if applicable: North Everett Plant Dryer Replacement and RAP Upgrade			
2. Name of Applicant Cadman Materials			
3. Applicant Address 7554 185th Ave. NE, Suite 100	City Redmond	State WA	Zip 98052
Applicant Phone (425) 698-3226	Applicant Email christy.mcdonough@lehighhanson.com		
Contact Person Christy McDonough	Title Environmental Manager - Washington		
Company/Firm Lehigh Hanson			
4. Date Checklist Prepared 4/2/19	**5.** Agency Requesting Checklist PSCAA		
6. Proposed timing or schedule (including phasing, if applicable). Fall 2019			
7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? ☐ Yes ☒ No. If yes, explain.			
8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. None			
9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? ☒ Yes ☐ No. If yes, explain. Cadman submitted an NOC application for construction a concrete batching plant at the site. The project is currently on hold. However, this project is not affected by the concrete batching plant project proposed for the site.			
10. List any government approvals or permits that will be needed for your proposal, if known. None			

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page.

This project proposes to replace the existing dryer and mixer at the North Everett Plant with a drum mixer. Cadman also proposes to increase the ratio of RAP in the raw materials and add the use of RAS in the raw materials.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

222 West Marine View Drive
Everett, WA 98201

Section 7, Township 29 N, Range 5 E

B. ENVIRONMENTAL ELEMENTS

1. EARTH

a. General description of the site:

☒ flat ☐ rolling ☐ hilly ☐ steep slopes ☐ mountains

☐ other _____

b. What is the steepest slope on the site (approximate percent slope)?

The general topography of the site is level. The elevation of the site surface is ~16 ft MLLW.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them, and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

The site is built on fill material that was placed there many years ago.

d. Are there surface indications or history of unstable soils in the immediate vicinity? ☐ Yes ☒ No. If yes, describe.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

None

f. Could erosion occur as a result of clearing, construction, or use? ☐ Yes ☒ No. If yes, generally describe.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

100%

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

None, since there is no history or likeliness of erosion

ENVIRONMENTAL CHECKLIST

2. AIR

a. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke, greenhouse gases) during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities, if known.

Combustion emissions and volatile compounds are expected from asphalt heating and mixing in the drum mixer. Quantities of emissions are provided in Section 2 of the NOC application.
Construction emissions like dust and fuel combustion products will be emitted, but are expected to be in minimal amount.

b. Are there any off-site sources of emissions or odor that may affect your proposal? ☐ Yes ☒ No.
If yes, generally describe.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

The asphalt plant is equipped with a baghouse, which will remain the control technology for the replacement drum mixer. Additionally, the performance of the burner will reduce the CO and NOX emissions.

3. WATER

a. Surface

1. Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands) ? ☒ Yes ☐ No. If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

The site is located on the Port Gardner Channel of the Snohomish River, which connects with Puget Sound.

2. Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? ☐ Yes ☒ No. If yes, please describe and attach available plans.

3. Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

None

4. Will the proposal require surface water withdrawals or diversions? ☐ Yes ☒ No.
Give general description, purpose, and approximate quantities if known.

5. Does the proposal lie within a 100-year floodplain? ☐ Yes ☒ No. If yes, note location on the site plan.

6. Does the proposal involve any discharges of waste materials to surface waters? ☐ Yes ☒ No. If yes, describe the type of waste and anticipated volume of discharge.

b. Ground Water

1. Will groundwater be withdrawn from a well for drinking water or other purposes? ☐ Yes ☒ No. If yes, give a general description of the well, proposed uses and approximate quantities withdrawn from the well.

Will water be discharged to groundwater? ☐ Yes ☒ No. If yes, give general description, purpose, and approximate quantities, if known.

2. Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: domestic sewage; industrial, containing the following chemicals...; agricultural; etc.). Describe the general size of the systems, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

None

c. Water Runoff (including storm water)

1. Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? ☐ Yes ☐ No. If yes, describe.

All stormwater runoff is collected via catch basins and overland flow. Runoff from the 6-month and 24-hour storm and lesser flows is routed to a wet vault and wetpond. Bypass runoff from larger storms and treated water from the wetpond is discharged through NPDES permitted outfalls into the Snohomish River.

2. Could waste material enter ground or surface waters? ☐ Yes ☒ No. If yes, generally describe.

No, waste materials are covered to prevent runoff and the storage area is paved with an impermeable class of Hot Mix Asphalt.

3. Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? ☐ Yes ☒ No. If yes, describe.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, impacts, if any:

Recycled materials like RAS and RAP will be covered, which helps to eliminate the material contact with stormwater. The plant is paved to avoid further contact with ground soil.

ENVIRONMENTAL CHECKLIST

4. PLANTS				
a. Check the types of vegetation found on the site:				
Deciduous Trees:	☐ Alder	☐ Maple	☐ Aspen	☐ other (specify):
Evergreen Trees:	☐ Fir	☐ Cedar	☐ Pine	☐ other (specify):
☒ Shrubs				
☒ Grass				
☐ Pasture				
☐ Crop or Grain				
☐ Orchards, Vineyards, or other permanent crops				
☐ Other types of Vegetation (specify):				
Wet Soil Plants:	☐ Cattail	☐ Buttercup	☐ other (specify):	
	☐ Bulrush	☐ Skunk Cabbage		
Water Plants:	☐ Water Lily	☐ Eelgrass	☐ Milfoil	☐ other (specify):
b. What kind and amount of vegetation will be removed or altered? None				
c. List threatened or endangered species known to be on or near the site. None known				
d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any: No proposed landscaping for this project.				
e. List all noxious weeds and invasive species known to be on or near the site. Himalayan blackberry along the shoreline				

ENVIRONMENTAL CHECKLIST

5. ANIMALS

a. Indicate birds and other animals that have been observed on or near the site or are known to be on or near the site.

Birds:	☐ Hawk	☐ Heron	☒ other (specify): seagulls, osprey, shorebirds
	☐ Eagle	☐ Songbirds	
Mammals:	☐ Deer	☐ Bear	☐ other (specify):
	☐ Elk	☐ Beaver	
Fish:	☐ Bass	☒ Salmon	☐ Trout
	☐ Hearing	☐ Shellfish	☐ other (specify):

b. List any threatened or endangered species known to be on or near the site.

Salmon

c. Is the site part of a migration route? ☒ Yes ☐ No. If yes, explain.

The off-loading area is in the vicinity of the salmon migration route, and Pacific Flyway for migratory birds.

d. Proposed measures to preserve or enhance wildlife, if any:

The stormwater system is designed to eliminate any impact on surface waters.

e. List any invasive animal species known to be on or near the site.

None known

6. ENERGY AND NATURAL RESOURCES

a. What kinds of energy (electric, natural gas, oil, woodstove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Natural gas and electricity are currently being used as a heat source for the production of asphalt and pavement mixtures. This project does not expect to increase the energy to be used from previously permitted levels.

b. Would your project affect the potential use of solar energy by adjacent properties? ☐ Yes ☒ No. If yes, generally describe.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

High efficiency gas burner with thermal insulation for the building

ENVIRONMENTAL CHECKLIST

7. ENVIRONMENTAL HEALTH

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste that could occur as a result of this proposal? ☐ Yes ☒ No.
If yes, describe:

No change due to this project

2. Describe any known or possible contamination at the site from present or past uses.

None

3. Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

None affected by this project

4. Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

Toxic air pollutants (TAPs) emissions are expected from the drum mixer, but there is not an expected increase in any of these pollutants from previously permitted levels.

5. Describe special emergency services that might be required.

None

6. Proposed measures to reduce or control environmental health hazards, if any:

Follow required procedures for spill response and best management practices for operations

b. Noise

1. What types of noise exist in the area that may affect your project (for example, traffic, equipment, operation, other)?

None that would affect operation

2. What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example, traffic, construction, operation, other)? Indicate what hours noise would come from the site.

No change due to this project

3. Proposed measures to reduce or control noise impacts, if any:

The asphalt plant is located inside of a building

8. LAND AND SHORELINE USE

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? ☐ Yes ☒ No. If yes, describe.

The current use of the site is production of hot mix asphalt. The property is surrounded on the north, south, and west sides by water. The Port Gardner Channel is immediately west of the site, and small inlets and bays are located north and south of the site. The mouth of the Snohomish River is approximately 0.25 miles north of the site. This project will not affect any land use.

b. Has the project site been used as working farmlands or working forest lands? ☐ Yes ☒ No. If yes, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

1. Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? ☐ Yes ☒ No. If yes, how?

c. Describe any structures on the site.

There is a transfer span and conveyor constructed perpendicular to the shoreline. The hot mix asphalt production facility is completely enclosed in a building that is 100' x 100', to reduce potential air pollution and noise impacts. There is also a storage structure with secondary containment for liquid asphalt that is ~52' x 40'. The feeder bin is also covered and is ~8' x 60'. None of the structures exceed a height of 80'.

d. Will any structures be demolished? ☐ Yes ☒ No. If yes, what?

e. What is the current zoning classification of the site?

Maritime Services Multi-use

f. What is the current comprehensive plan designation of the site?

Waterfront Industrial

g. If applicable, what is the current shoreline master program designation of the site?

Urban industrial shoreline designation

h. Has any part of the site been classified as a critical area by the city or community? ☐ Yes ☒ No. If yes, specify.

None

i. Approximately how many people would reside or work in the completed project?

Approximately 6 employees; no change due to this project

j. Approximately how many people would the completed project displace?

None

k. Proposed measures to avoid or reduce displacement impacts, if any:

N/A

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

None

m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any:

None

9. HOUSING

a. Approximately how many units would be provided, if any? Indicate whether high- middle- or low-income housing.

N/A

b. Approximately how many units, if any, would be eliminated? Indicate whether high- middle- or low-income housing.

N/A

c. Proposed measures to reduce or control housing impacts, if any:

none

10. AESTHETICS

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

There would be no new structures required for this project.

b. What views in the immediate vicinity would be altered or obstructed?

None

c. Proposed measures to reduce or control aesthetic impacts, if any:

None affected by this project

11. LIGHT AND GLARE

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

The proposed project will not produce any light or glare, it will all be completed within an existing building.

b. Could light or glare from the finished project be a safety hazard or interfere with views?

No

c. What existing off-site sources of light or glare may affect your proposal?

None

d. Proposed measures to reduce or control light and glare impacts, if any:

None for this project

12. RECREATION

a. What designated and informal recreational opportunities are in the immediate vicinity?

American Legion Memorial Park and a golf course.

b. Would the proposed project displace any existing recreational uses? ☐ Yes ☒ No. If yes, describe.

c. Proposed measures to reduce or control impacts on recreation, including recreational opportunities to be provided by the project or applicant, if any:

None affected by this project

13. HISTORIC AND CULTURAL PRESERVATION

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site?
☐ Yes ☒ No. If yes, specifically describe.

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

None

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

N/A

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

N/A

14. TRANSPORTATION

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on-site plans, if any.

West Marine View Drive; access is to the north of the nearby Jen-Weld facility.

b. Is site or affected geographic area currently served by public transit? ☐ Yes ☒ No. If yes, generally describe. If not, what is the approximate distance to the nearest transit stop?

Currently there is no public transit available on West Marine View Drive. The closest transit stop is on Broadway, which is approximately 1 mile away from the site.

c. How many parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?

Parking capacity would not change as a result of this project.

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? ☐ Yes ☒ No. If yes, generally describe (indicate whether public or private).

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? ☐ Yes ☒ No. If yes, generally describe.

This project will increase RAP use, which is brought to the site via truck.

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?

Not affected by the proposed project

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? ☐ Yes ☒ No. If yes, generally describe.

h. Proposed measures to reduce or control transportation impacts, if any:

None for proposed project.

15. PUBLIC SERVICES

a. Would the project result in an increased need for public services (for example, fire protection, police protection, public transit, health care, schools, other)? ☐ Yes ☒ No. If yes, generally describe.

b. Proposed measures to reduce or control direct impacts on public services, if any:

No impact on public services

16. UTILITIES

a. Indicate utilities currently available at the site:

☒ Electricity	☒ Natural gas	☒ Water	☒ Refuse Service
☒ Telephone	☒ Sanitary Sewer	☒ Septic System	☐ Other (specify):

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity that might be needed.

None affected by the project.

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.	
Signature	Christy McDonough Digitally signed by Christy McDonough Date: 2019.05.21 12:58:08 -07'00'
Name	Christy McDonough
Position	Environmental Manager - Washington
Agency/Organization	Lehigh Hanson
Date Submitted	21 May 2019

D. SUPPLEMENTAL SHEET FOR NON-PROJECT ACTIONS

(Do not use this sheet for project actions)

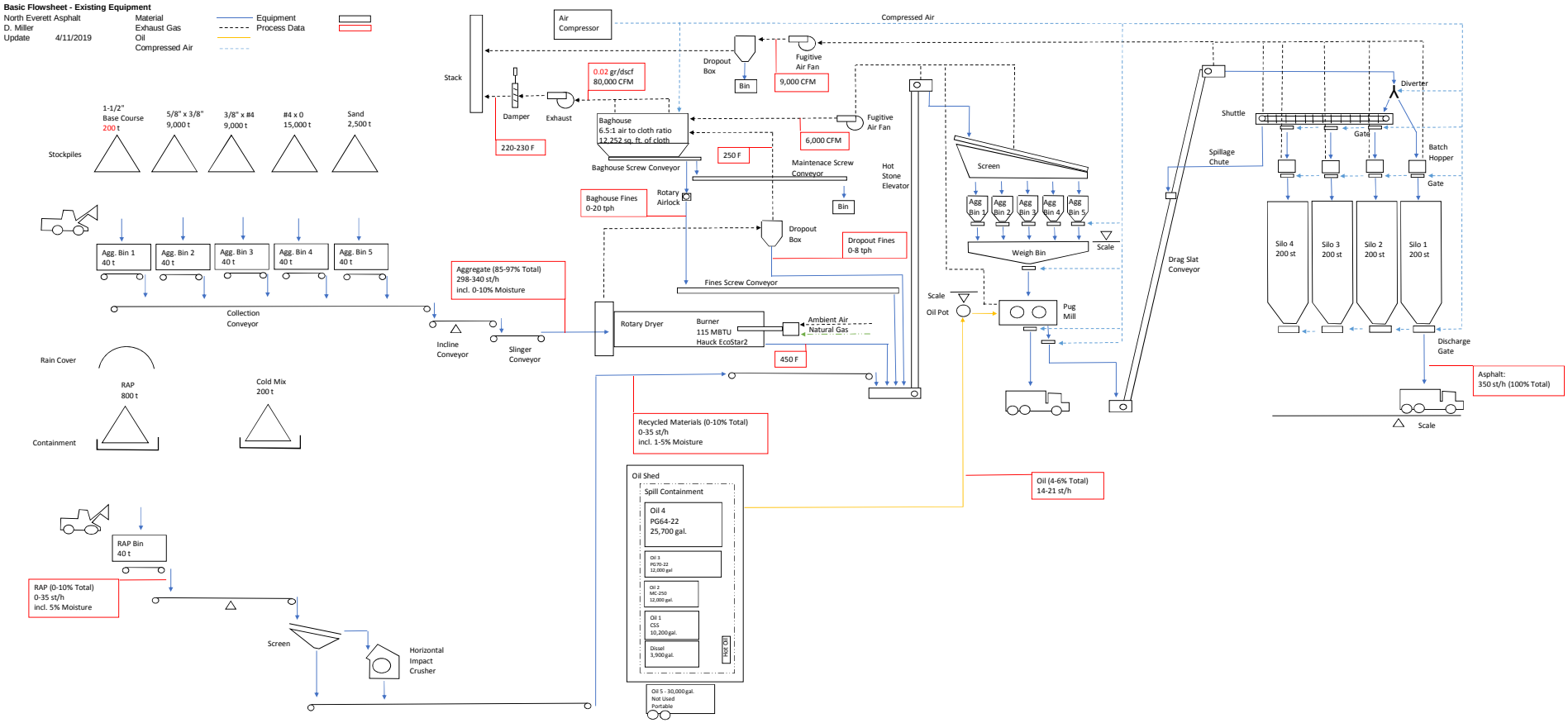
Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment in section B of this checklist.

When answering these questions, be aware of how the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substance; or production of noise?
Proposed measures to avoid or reduce such increases are:
2. How would the proposal be likely to affect plants, animals, fish, or marine life?
Proposed measures to protect or conserve plants, animals, fish, or marine life are:
3. How would the proposal be likely to deplete energy or natural resources?
Proposed measures to protect or conserve energy and natural resources are:
4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?
Proposed measures to protect such resources or to avoid or reduce impacts are:
5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

Proposed measures to avoid or reduce shoreline and land use impacts are:
6. How would the proposal be likely to increase demands on transportation or public services and utilities?
Proposed measures to reduce or respond to such demand(s) are:
7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

Appendix A
4. Process Flow Diagrams

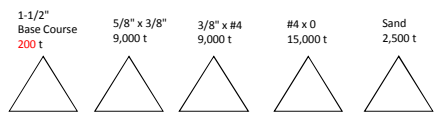

Basic Flowsheet - Existing Equipment
North Everett Asphalt
D. Miller
Update 4/11/2019
Material
Exhaust Gas
Oil
Compressed Air
Equipment
Process Data
Air Compressor
Compressed Air
Stack
Dropout Box
Bin
Fugitive Air Fan
9,000 CFM
0.02 gr/dscf
80,000 CFM
Damper
Exhaust
220-230 F
Baghouse
6.5:1 air to cloth ratio
12,252 sq. ft. of cloth
Fugitive Air Fan
6,000 CFM
250 F
Baghouse Screw Conveyor
Maintenace Screw Conveyor
Hot Stone Elevator
Baghouse Fines
0-20 tph
Rotary Airlock
Bin
Dropout Box
Dropout Fines
0-8 tph
Stockpiles
1-1/2" Base Course 200 t
5/8" x 3/8" 9,000 t
3/8" x #4 9,000 t
#4 x 0 15,000 t
Sand 2,500 t
Agg. Bin 1 40 t
Agg. Bin 2 40 t
Agg. Bin 3 40 t
Agg. Bin 4 40 t
Agg. Bin 5 40 t
Collection Conveyor
Aggregate (85-97% Total)
298-340 st/h
incl. 0-10% Moisture
Incline Conveyor
Slinger Conveyor
Fines Screw Conveyor
Rotary Dryer
Burner
115 MBTU
Hauck EcoStar2
Ambient Air
Natural Gas
450 F
Rain Cover
RAP
800 t
Cold Mix
200 t
Containment
Recycled Materials (0-10% Total)
0-35 st/h
incl. 1-5% Moisture
Oil Shed
Spill Containment
Oil 4
PG64-22
25,700 gal.
Oil 3
PG70-22
12,000 gal
Oil 2
MC-250
12,000 gal.
Oil 1
CSS
10,200 gal.
Diesel
3,900 gal.
Oil Pot
Oil 5 - 30,000 gal.
Not Used
Portable
Oil (4-6% Total)
14-21 st/h
RAP Bin
40 t
RAP (0-10% Total)
0-35 st/h
incl. 5% Moisture
Screen
Horizontal Impact Crusher
Screen
Agg Bin 1
Agg Bin 2
Agg Bin 3
Agg Bin 4
Agg Bin 5
Weigh Bin
Scale
Scale
Oil Pot
Pug Mill
Drag Slat Conveyor
Shuttle
Diverter
Spillage Chute
Gate
Batch Hopper
Gate
Silo 4 200 st
Silo 3 200 st
Silo 2 200 st
Silo 1 200 st
Discharge Gate
Asphalt:
350 st/h (100% Total)
Scale

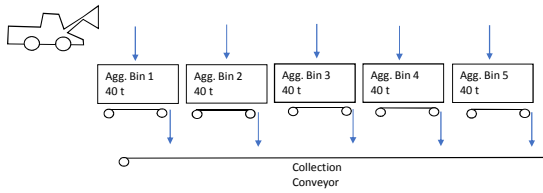
Basic Flowsheet - Proposed Equipment

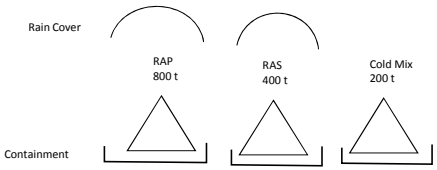
North Everett Asphalt
D. Miller
Update 4/11/2019

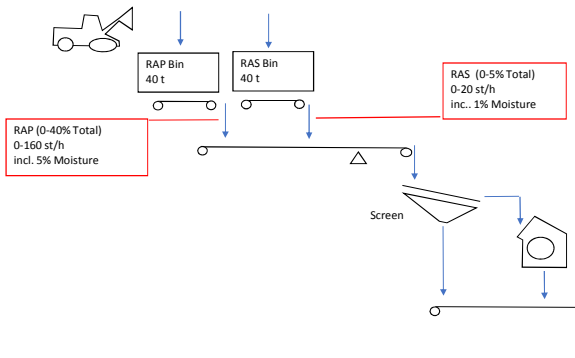
Material
Exhaust Gas
Oil
Compressed Air

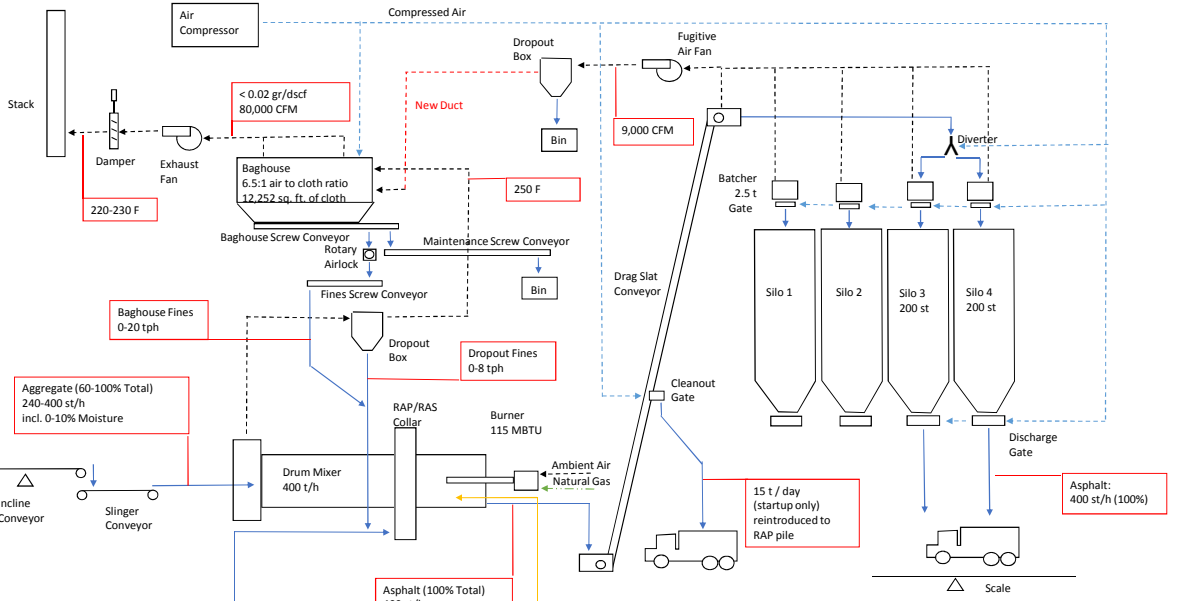
Equipment
Process Data











APPENDIX B: EMISSION CALCULATIONS AND SUPPORTING DOCUMENTATION

1. Emission Calculation Tables

2. Vendor Provided Information (NovaStar and Talon II)

Appendix B
1. Emission Calculations

Table B-1. Post-Project Facility-Wide Criteria Pollutant Emissions

Source	VOC (tpy)	NO_x (tpy)	CO [1] (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	Combined HAPs (tpy)	Maximum Individual HAP [2] (tpy)
Stack Emissions								
Drum Mixer	5.60	25.20	--	0.60	18.02	12.61	0.95	0.54
HMA Silo Filling [3]	2.13	--	--	--	--	--	0.03	1.47E-02
Total Stack Emissions	*7.73*	*25.20*	--	*0.60*	*18.02*	*12.61*	*0.98*	*0.56*
Fugitive Emissions								
Load-Out [4]	0.68	--	--	--	0.09	0.09	0.02	6.40E-04
Haul Roads	--	--	--	--	1.33	0.33	--	--
Storage Pile Drop Points	--	--	--	--	1.41	0.21	--	--
Storage Pile Wind Erosion	--	--	--	--	0.23	0.03	--	--
Total Fugitive Emissions	*0.68*	--	--	--	*3.05*	*0.66*	*0.02*	*6.40E-04*
Total	**8.42**	**25.20**	**99.00**	**0.60**	**21.08**	**13.28**	**0.99**	**0.56**
Title V Major Source Threshold	100	100	100	100	100	100	25	10
Below Title V Major Source Threshold?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

[1] CADMAN is requesting a synthetic minor limit on CO emissions of 99 tpy to maintain minor source status with respect to Title V.

[2] The maximum indiviual HAP is formaldehyde.

[3] Asphalt storage silos are controlled by the baghouse. Therefore, PM_{10} and $PM_{2.5}$ emissions from silo filling are not calculated separately.

[4] Load-out PM_{10} and $PM_{2.5}$ emissions are conservatively assumed equivalent to load-out total PM emisisons.

Table B-2a. Production and Equipment Capacities

Parameter		Value
Asphalt production rate [1]	(pre-project)	350 tons/hr
Asphalt production rate [1]		146,475 tons/yr
Asphalt production rate	(post-project)	400 tons/hr
Asphalt production rate		350,000 tons/yr
NG burner capacity		115 MMBtu/hr
Baghouse flow capacity		80,000 acfm
Baghouse exit concentration		0.02 gr/dscf
Maximum Hours of Operation		8,760 hours/year

[1] Pre-project hourly production rate is based on current permit limit, and annual production rate is the average of 2017 and 2018 actual production rates.

Table B-2b. Post-Project Drum Mixer Emissions - Criteria Pollutants

Pollutant	Emission Factor [1]	Units	Emissions (lb/hr)	Emissions (tpy)
VOC	0.032	lb/ton	12.80	5.60
NO_x [2]	0.050	lb/MMBtu	5.75	25.20
CO [2,3]	0.296	lb/MMBtu	34.05	149.13
SO_2	0.0034	lb/ton	1.36	0.60
PM_{10} [4]	--		4.11	18.02
$PM_{2.5}$ [4]	--		2.88	12.61

[1] Emission factors obtained from AP-42 Chapter 11.1, Tables 11.1-7 and 11.1-8 for emissions from Drum Mix Hot Mix Asphalt Plants with a natural gas-fired dryer.

[2] Emission factors for NO_x and CO are based on BACT limits of 32 and 311 ppm, respectively, corrected to 7% O_2.

[3] Annual emissions shown are the true potential-to-emit for CO. CADMAN is requesting a synthetic minor limit on CO emissions of 99 tpy to maintain minor source status with respect to Title V.

[4] Particle size distribution for dust emissions from drum mix dryer controlled by fabric filter are obtained from AP-42 Chapter 11.1, Table 11.1-4.

PM_{10} 30%

$PM_{2.5}$ 21%

Table B-2c. Post-Project Drum Mixer HAP Emissions

Pollutant	CAS No.	HAP?	Post-Project Emissions (lb/hr)	Post-Project Emissions (tpy)
2,2,4-Trimethylpentane	540-84-1	Yes	1.60E-02	7.00E-03
2-Methylnaphthalene	91-57-6	Yes - POM	2.96E-02	1.30E-02
Acenaphthene	83-32-9	Yes - POM	5.60E-04	2.45E-04
Acenaphthylene	208-96-8	Yes - POM	3.44E-03	1.51E-03
Anthracene	120-12-7	Yes - POM	8.80E-05	3.85E-05
Benzene	71-43-2	Yes	1.56E-01	6.83E-02
Benzo(a)anthracene	56-55-3	Yes - POM	8.40E-05	3.68E-05
Benzo(a)pyrene	50-32-8	Yes - POM	3.92E-06	1.72E-06
Benzo(b)fluoranthene	205-99-2	Yes - POM	4.00E-05	1.75E-05
Benzo(e)pyrene	192-97-2	Yes - POM	4.40E-05	1.93E-05
Benzo(g,h,i)perylene	191-24-2	Yes - POM	1.60E-05	7.00E-06
Benzo(k)fluoranthene	207-08-9	Yes - POM	1.64E-05	7.18E-06
Chrysene	218-01-9	Yes - POM	7.20E-05	3.15E-05
Ethyl Benzene	100-41-4	Yes	9.60E-02	4.20E-02
Fluoranthene	206-44-0	Yes - POM	2.44E-04	1.07E-04
Fluorene	86-73-7	Yes - POM	1.52E-03	6.65E-04
Formaldehyde	50-00-0	Yes	1.24E+00	5.43E-01
Hexane, n-	110-54-3	Yes	3.68E-01	1.61E-01
Indeno(1,2,3-cd)pyrene	193-39-5	Yes - POM	2.80E-06	1.23E-06
Methyl Chloroform	71-55-6	Yes	1.92E-02	8.40E-03
Naphthalene	91-20-3	Yes	3.60E-02	1.58E-02
Perylene	198-55-0	Yes - POM	3.52E-06	1.54E-06
Phenanthrene	85-01-8	Yes - POM	3.04E-03	1.33E-03
Pyrene	129-00-0	Yes - POM	2.16E-04	9.45E-05
Toluene	108-88-3	Yes	6.00E-02	2.63E-02
Xylene, mixed or all isomers	1330-20-7	Yes	8.00E-02	3.50E-02
Total PAH HAPs	--	Yes	7.60E-02	3.33E-02
Antimony	7440-36-0	Yes	7.20E-05	3.15E-05
Arsenic	7440-38-2	Yes	2.24E-04	9.80E-05
Beryllium	7440-41-7	Yes	-	-
Cadmium	7440-43-9	Yes	1.64E-04	7.18E-05
Chromium	7440-47-3	Yes	2.20E-03	9.63E-04
Cobalt	7440-48-4	Yes	1.04E-05	4.55E-06
Lead	7439-92-1	Yes	2.48E-04	1.09E-04
Manganese	7439-96-5	Yes	3.08E-03	1.35E-03
Mercury	7439-97-6	Yes	9.60E-05	4.20E-05
Nickel	7440-02-0	Yes	2.52E-02	1.10E-02
Selenium	7782-49-2	Yes	1.40E-04	6.13E-05
		Total HAP [1]:	2.18	0.95

[1] Individual PAH species are considered to be included in the Total PAH HAPs emission factor.

Table B-2d. HAP/TAP Project Emission Increases - Drum Mixer Replacement

Pollutant	CAS No.	HAP?	TAP?	Pre-Project Emission Factor [1] (lb/ton)	Post-Project Emission Factor [2] (lb/ton)	Pre-Project Emissions [5] (lb/hr)	(tpy)	Post Project Emissions (lb/hr)	(tpy)	Emission Increase [5] (lb/hr)	(tpy)	Avg Period [6]	SQER [6] (lb/avg period)	Project Emissions	Modeling Required?
2,2,4-Trimethylpentane	540-84-1	Yes	No	--	4.00E-05	-	-	0.02	7.00E-03	0.02	7.00E-03	--	--	--	--
2-Methylnaphthalene	91-57-6	Yes - POM	No	7.10E-05	7.40E-05	0.02	5.20E-03	0.03	1.30E-02	4.75E-03	7.75E-03	--	--	--	--
Acenaphthene	83-32-9	Yes - POM	No	9.00E-07	1.40E-06	3.15E-04	6.59E-05	5.60E-04	2.45E-04	2.45E-04	1.79E-04	--	--	--	--
Acenaphthylene	208-96-8	Yes - POM	No	5.80E-07	8.60E-06	2.03E-04	4.25E-05	3.44E-03	1.51E-03	3.24E-03	1.46E-03	--	--	--	--
Acetaldehyde	75-07-0	Yes	Yes	0.00032	--	0.11	0.02	-	-	-	-	year	71	-	No
Anthracene	120-12-7	Yes - POM	No	2.10E-07	2.20E-07	7.35E-05	1.54E-05	8.80E-05	3.85E-05	1.45E-05	2.31E-05	--	--	--	--
Benzaledehyde	100-52-7	No	No	0.00013	--	0.05	9.52E-03	-	-	-	-	--	--	--	--
Benzene	71-43-2	Yes	Yes	0.00028	0.00039	0.10	0.02	0.16	0.07	0.06	0.05	year	6.62	95.49	Yes
Benzo(a)anthracene	56-55-3	Yes - POM	Yes	4.60E-09	2.10E-07	1.61E-06	3.37E-07	8.40E-05	3.68E-05	8.24E-05	3.64E-05	year	1.74	0.07	No
Benzo(a)pyrene	50-32-8	Yes - POM	Yes	3.10E-10	9.80E-09	1.09E-07	2.27E-08	3.92E-06	1.72E-06	3.81E-06	1.69E-06	year	0.174	3.38E-03	No
Benzo(b)fluoranthene	205-99-2	Yes - POM	Yes	9.40E-09	1.00E-07	3.29E-06	6.88E-07	4.00E-05	1.75E-05	3.67E-05	1.68E-05	year	1.74	0.03	No
Benzo(e)pyrene	192-97-2	Yes - POM	No	--	1.10E-07	-	-	4.40E-05	1.93E-05	4.40E-05	1.93E-05	--	--	--	--
Benzo(g,h,i)perylene	191-24-2	Yes - POM	No	5.00E-10	4.00E-08	1.75E-07	3.66E-08	1.60E-05	7.00E-06	1.58E-05	6.96E-06	--	--	--	--
Benzo(k)fluoranthene	207-08-9	Yes - POM	Yes	1.30E-08	4.10E-08	4.55E-06	9.52E-07	1.64E-05	7.18E-06	1.19E-05	6.22E-06	year	1.74	1.24E-02	No
Butyraldehyde	78-84-2	No	No	3.00E-05	--	1.05E-02	2.20E-03	-	-	-	-	--	--	--	--
Chrysene	218-01-9	Yes - POM	Yes	3.80E-09	1.80E-07	1.33E-06	2.78E-07	7.20E-05	3.15E-05	7.07E-05	3.12E-05	year	17.4	0.06	No
Crotonaldehyde	4170-30-3	No	No	2.90E-05		1.02E-02	2.12E-03	-	-	-	-	--	--	--	--
Dibenz(a,h)anthracene	53-70-3	Yes - POM	Yes	9.50E-11	--	3.33E-08	6.96E-09	-	-	-	-	year	0.16	-	No
Ethyl Benzene	100-41-4	Yes	Yes	0.0022	0.00024	0.77	0.16	0.10	0.04	-	-	year	76.8	-	No
Fluoranthene	206-44-0	Yes - POM	No	1.60E-07	6.10E-07	5.60E-05	1.17E-05	2.44E-04	1.07E-04	1.88E-04	9.50E-05	--	--	--	--
Fluorene	86-73-7	Yes - POM	No	1.60E-06	3.80E-06	5.60E-04	1.17E-04	1.52E-03	6.65E-04	9.60E-04	5.48E-04	--	--	--	--
Formaldehyde	50-00-0	Yes	Yes	0.00074	0.0031	0.26	0.05	1.24	0.54	0.98	0.49	year	32	976.61	Yes
Hexanal	66-25-1	No	No	2.40E-05	--	8.40E-03	1.76E-03	-	-	-	-	--	--	--	--
Hexane, n-	110-54-3	Yes	Yes	--	0.00092	-	-	0.37	0.16	0.37	0.16	24-hr	92	8.83	No
Indeno(1,2,3-cd)pyrene	193-39-5	Yes - POM	Yes	3.00E-10	7.00E-09	1.05E-07	2.20E-08	2.80E-06	1.23E-06	2.70E-06	1.20E-06	year	1.74	2.41E-03	No
Methyl Chloroform	71-55-6	Yes	Yes	--	4.80E-05	-	-	0.02	8.40E-03	0.02	8.40E-03	24-hr	131	0.46	No
Naphthalene	91-20-3	Yes	Yes	3.60E-05	9.00E-05	1.26E-02	2.64E-03	0.04	0.02	0.02	1.31E-02	year	5.64	26.23	Yes
Perylene	198-55-0	Yes - POM	No	--	8.80E-09	-	-	3.52E-06	1.54E-06	3.52E-06	1.54E-06	--	--	--	--
Phenanthrene	85-01-8	Yes - POM	No	2.60E-06	7.60E-06	9.10E-04	1.90E-04	3.04E-03	1.33E-03	2.13E-03	1.14E-03	--	--	--	--
Pyrene	129-00-0	Yes - POM	No	6.20E-08	5.40E-07	2.17E-05	4.54E-06	2.16E-04	9.45E-05	1.94E-04	9.00E-05	--	--	--	--
Quinone	106-51-4	Yes	No	0.00027	--	0.09	0.02	-	-	-	-	--	--	--	--
Toluene	108-88-3	Yes	Yes	0.001	0.00015	0.35	0.07	0.06	0.03	-	-	24-hr	657	-	No
Xylene, mixed or all isomers	1330-20-7	Yes	No	0.0027	0.0002	0.95	0.20	0.08	0.04	-	-	--	--	--	--
Total PAH HAPs	--	Yes	No	0.00011	0.00019	0.04	8.06E-03	0.08	0.03	0.04	0.03	--	--	--	--
Antimony	7440-36-0	Yes	No	--	1.80E-07	-	-	7.20E-05	3.15E-05	7.20E-05	3.15E-05	--	--	--	--
Arsenic	7440-38-2	Yes	Yes	4.60E-07	5.60E-07	1.61E-04	3.37E-05	2.24E-04	9.80E-05	6.30E-05	6.43E-05	year	0.0581	0.13	Yes
Barium	7440-39-3	No	No	1.50E-06	5.80E-06	5.25E-04	1.10E-04	2.32E-03	1.02E-03	1.80E-03	9.05E-04	--	--	--	--
Beryllium	7440-41-7	Yes	Yes	1.50E-07	0.00E+00	5.25E-05	1.10E-05	-	-	-	-	year	0.08	-	No
Cadmium	7440-43-9	Yes	Yes	6.10E-07	4.10E-07	2.14E-04	4.47E-05	1.64E-04	7.18E-05	-	2.71E-05	year	0.0457	0.05	Yes
Chromium	7440-47-3	Yes	No	5.70E-07	5.50E-06	2.00E-04	4.17E-05	2.20E-03	9.63E-04	2.00E-03	9.21E-04	--	--	--	--
Cobalt	7440-48-4	Yes	Yes	--	2.60E-08	-	-	1.04E-05	4.55E-06	1.04E-05	4.55E-06	24-hr	0.013	2.50E-04	No
Copper	7440-50-8	No	Yes	2.80E-06	3.10E-06	9.80E-04	2.05E-04	1.24E-03	5.43E-04	2.60E-04	3.37E-04	1-hr	0.219	2.60E-04	No
Hexavalent Chromium	18540-29-9	No	Yes	4.80E-08	4.50E-07	1.68E-05	3.52E-06	1.80E-04	7.88E-05	1.63E-04	7.52E-05	year	0.00128	0.15	Yes
Lead	7439-92-1	Yes	Yes	8.90E-07	6.20E-07	3.12E-04	6.52E-05	2.48E-04	1.09E-04	-	4.33E-05	year	16	0.09	No
Manganese	7439-96-5	Yes	Yes	6.90E-06	7.70E-06	2.42E-03	5.05E-04	3.08E-03	1.35E-03	6.65E-04	8.42E-04	24-hr	0.00526	0.02	Yes
Mercury	7439-97-6	Yes	Yes	4.10E-07	2.40E-07	1.44E-04	3.00E-05	9.60E-05	4.20E-05	-	1.20E-05	24-hr	0.0118	-	No
Nickel	7440-02-0	Yes	No	3.00E-06	6.30E-05	1.05E-03	2.20E-04	0.03	1.10E-02	0.02	1.08E-02	--	--	--	--
Phosphorus [3]	7723-14-0	No	No	--	2.80E-05	-	-	1.12E-02	4.90E-03	1.12E-02	4.90E-03	--	--	--	--
Silver	7440-22-4	No	No	--	4.80E-07	-	-	1.92E-04	8.40E-05	1.92E-04	8.40E-05	--	--	--	--
Selenium	7782-49-2	Yes	Yes	4.90E-07	3.50E-07	1.72E-04	3.59E-05	1.40E-04	6.13E-05	-	2.54E-05	24-hr	2.63	-	No
Thallium	7440-28-0	No	No	--	4.10E-09	-	-	1.64E-06	7.18E-07	1.64E-06	7.18E-07	--	--	--	--
Zinc	7440-66-6	No	No	6.80E-06	6.10E-05	2.38E-03	4.98E-04	0.02	1.07E-02	0.02	1.02E-02	--	--	--	--
CO [4]	630-08-0	No	Yes	--	--	-	-	-	-	-	-	1-hr	50.4	-	No
NO_2 [4]	10102-44-0	No	Yes	--	--	-	-	-	-	-	-	1-hr	1.03	-	No
SO_2 [5]	7446-09-05	No	Yes	0.0046	0.0034	1.61	0.34	1.36	0.60	-	0.26	1-hr	1.45	-	No

[1] Speciated emission factors for emissions from the pre-project batch mix dryer are obtained from U.S. EPA, Hot Mix Asphalt Plants, AP-42 Section 11.1, March 2004, Table 11.1-9 and Table 11.1-11. The emission factors for natural gas-fired dryer, hot screens, and mixer are used.

[2] Speciated emission factors for emissions from the post-project drum mixer are obtained from U.S. EPA, Hot Mix Asphalt Plants, AP-42 Section 11.1, March 2004, Table 11.1-10 and Table 11.1-12. Emission factors for natural gas-fired dryer with fabric filter are used.

[3] Per footnote to Table 11.1-12, phosphorous measured by Method 29 in the development of AP-42 Section 11.1 emission factors is not elemental phosphorus, and is therefore not considered a HAP.

[4] Because the combustion capacity of the drum mix dryer will not increase due to the project, emissions of carbon monoxide and nitrogen oxides will not increase.

[5] Pre-project SO_2 emission factor obtained from AP-42 Table 11.1-5. Post-project SO_2 emission factor obtained from AP-42 Table 11.1-7, consistent with facility-wide criteria pollutant emission calculations.

[6] Pre-project emissions are conservatively estimated based on actual production rates in 2017 and 2018. If the pre-project emissions are higher than the post-project emissions, the emission increase is shown as zero.

[7] Small quantity emission rates (SQERs) and their associated averaging periods are obtained from WAC 173-460-150. If a pollutant's emission increase is greater than its respetctive SQER, a dispersion modeling analysis is required.

Table B-3a. HMA Silo Filling VOC Emissions

Emission unit	EF [1] (lb/ton)	Maximum Production (tons/hr)	(tons/yr)	VOC Emissions [2] (lb/hr)	(tpy)
HMA Silos	0.0122	400	350,000	4.87	2.13

[1] Emission factors calculated per AP-42 Table 11.1-14 for HMA load-out and silo filling operations.

E (lb/ton HMA) = $0.0504 * -V * e^{((0.0251) * (T + 460) - 20.43)}$

-0.5 = V, % loss-on-heating. Default value from footnote a to AP-42 Table 11.1-14 is used.

325 = T, °F HMA Mix Temperature. Asphalt temperature exiting the drum mixer is approximately 350 °F. It is assumed that the asphalt cools to 325°F prior to entering the silo.

[2] Per AP-42 Table 11.1-16, 100% of TOC from HMA silo filling is VOC.

Table B-3b. Asphalt Silos Speciated HAP Emissions

Substance	CAS No.	Speciation Profile [1]	Emission Rate [2] (lb/hr)	Emission Rate [2] (tpy)
Organic Volatile-Based Compounds				
Benzene	71-43-2	0.032%	1.56E-03	6.82E-04
Bromomethane	74-83-9	0.0049%	2.39E-04	1.05E-04
Carbon Disulfide	75-15-0	0.016%	7.80E-04	3.41E-04
Chloroethane	75-00-3	0.004%	1.95E-04	8.53E-05
Chloromethane	74-87-3	0.023%	1.12E-03	4.91E-04
Ethyl Benzene	100-41-4	0.038%	1.85E-03	8.10E-04
Formaldehyde	50-00-0	0.690%	3.36E-02	1.47E-02
Hexane, n-	110-54-3	0.100%	4.87E-03	2.13E-03
Isooctane	540-84-1	0.00031%	1.51E-05	6.61E-06
Methylene Chloride	75-09-2	0.00027%	1.32E-05	5.76E-06
Styrene	100-42-5	0.0054%	2.63E-04	1.15E-04
Toluene	108-88-3	0.062%	3.02E-03	1.32E-03
Xylene, mixed or all isomers [3]	1330-20-7	0.257%	1.25E-02	5.48E-03
Total HAPs		**1.233%**	**0.06**	**0.03**

[1] Speciation profile from U.S. EPA, Hot Mix Asphalt Plants, AP-42 Section 11.1, March 2004, Table 11.1-16, excluding the species that are non-VOC or non-HAP. Particulate matter emissions are controlled by the baghouse; therefore, the emissions from controlled organic PM-based HAPs are assumed to be negligible.

[2] Volatile HAP emissions are determined based on the speciation data presented in AP-42 Table 11.1-16 and the VOC emissions calculated according to AP-42 Table 11.1-14.

[3] Emission factors for m-, o-, and p-xylene are combined.

Table B-3c. HMA Load-Out Critieria Pollutant Emissions

Pollutant	EF [1] (lb/ton)	Maximum Production (tons/hr)	(tons/yr)	Emissions (lb/hr)	(tpy)
PM	0.0005	400	350000	0.21	0.09
VOC [2]	0.0039	400	350000	1.56	0.68
CO	0.0013	400	350000	0.54	0.24

[1] Emission factors calculated per AP-42 Table 11.1-14 for HMA load-out operations.

-0.5 = V, % loss-on-heating. Default value from footnote a to AP-42 Table 11.1-14 is used.

325 = T, °F HMA Mix Temperature, Conservatively assumed the same as silo filling temperature

[2] Per AP-42 Table 11.1-16, 94% of TOC from HMA load-out is VOC.

Table B-3d. Load-Out Speciated HAP Emissions

Substance	**EF [1] (lb/ton)**	**Speciation Profile [1]**	**Emission Rate [2] (lb/hr)**	**Emission Rate [2] (tpy)**
Organic PM	0.0003			
Total PAH HAPs		5.93%	8.09E-03	3.54E-03
Phenol		1.18%	1.61E-03	7.04E-04
TOC	0.0042			
Formaldehyde		0.088%	1.46E-03	6.40E-04
Total volatile organic HAPs		1.50%	2.50E-02	1.09E-02
Total HAPs [4]			0.03	0.02

[1] Emission factors calculated per AP-42 Table 11.1-14 for HMA load-out operations, using the same assumptions as the criteria pollutants (see table above).

[2] Speciation profile is obtained from Tables 11.1-15 and 11.1-16.

[3] Emission rates are based on the maximum hourly and annual production rates.

Table B-4. Paved Road Emissions

Paved Truck Route	PM Emission Factor, E [1] (lb/VMT)	PM_{10} Emission Factor, E [1] (lb/VMT)	$PM_{2.5}$ Emission Factor, E [1] (lb/VMT)	Maximum Vehicles Per Hour [2]	Maximum Vehicles Per Year [2]	Truck Route Maximum Round Trip (ft)	Vehicle Miles Traveled per Hour (VMT/hr)	Vehicle Miles Traveled per Year (VMT/yr)	PM Emissions [3] (lb/hr)	PM Emissions [3] (tpy)	PM_{10} Emissions [3] (lb/hr)	PM_{10} Emissions [3] (tpy)	$PM_{2.5}$ Emissions [3] (lb/hr)	$PM_{2.5}$ Emissions [3] (tpy)
HMA Truck Route	0.72	0.14	0.04	26.67	23,333	4,782	24	21,132	13.94	6.63	2.79	1.33	0.68	0.33

[1] Emission factor E is calculated according to AP-42 Section 13.2.1 for emissions from paved roads, equation 1:

E (lbs/VMT) = Hourly Paved Road Emission Factor, $[k * (sL)^{0.91} * (W)^{1.02}]$

0.011 = k, PM size multiplier (lb/VMT) from AP-42 Table 13.2.1-1.

0.0022 = k, PM_{10} size multiplier (lb/VMT) from AP-42 Table 13.2.1-1.

0.00054 = k, $PM_{2.5}$ size multiplier (lb/VMT) from AP-42 Table 13.2.1-1.

3 = sL, roadway surface silt loading (g/m^2) EPA Emission Assessment Report for HMA Plants (EPA 454/R-00-019)

22.5 = W, average truck weight (tons)

[2] Maximum vehicles per hour and maximum vehicles per year are based on truck capacity and maximum asphalt production values:

HMA Truck Capacity: 15 tons

Max Hourly Production: 400 tons/hr

Max Annual Production: 350,000 tons/yr

[3] Hourly and annual emissions account for natural mitigation due to precipitation according to AP-42 Section 13.2.1 equations 2 and 3:

Hourly emissions (lb/hr) = E * (1-1.2P/N) * VMT/hr

Annual emissions (tpy) = E * (1-P/4N) * VMT/yr

5 = P, minimum number of days per month with measurable precipitation for Everett Station, NOAA Online Weather Data, NOWData tool, https://w2.weather.gov/climate/xmacis.php?wfo=sew

180 = P, mean number of days per year with measurable precipitation, AP-42 Figure 13.2.1-2.

744 = N, number of hours in period for hourly rainfall mitigation effect

365 = N, number of days in period for annual rainfall mitigation effect

Table B-5a. Aggregate Pile Material Handling

Pile	Maximum Throughput [1] (tons/hr)	(tons/yr)	PM Emissions [2] (lb/hr)	(tpy)	PM_{10} Emissions [2] (lb/hr)	(tpy)	$PM_{2.5}$ Emissions [2] (lb/hr)	(tpy)
5/8" x 3/8" Stockpile	50	40,867	0.68	0.28	0.32	0.13	0.05	0.02
3/8" x #4 Stockpile	80	65,954	1.09	0.45	0.52	0.21	0.08	0.03
#4 x 0 Stockpile	225	188,150	3.07	1.29	1.45	0.61	0.22	0.09
Sand Stockpile	50	41,474	0.68	0.28	0.32	0.13	0.05	0.02
1 1/2 Base Course	2	1,264	0.02	0.01	0.01	0.00	0.00	0.00
RAP Stockpile	160	87,146	2.19	0.60	1.03	0.28	0.16	0.04
RAS Stockpile	20	10,520	0.27	0.07	0.13	0.03	0.02	0.01
Total	587	435,376	8.01	2.97	3.79	1.41	0.57	0.21

[1] Maximum hourly pile throughput is based on a total production rate of 400 tons HMA per hour. Maximum annual throughput is estimated based on Cadman's projection of 500,000 tons HMA per year.

[2] Emissions calculated using emission factor determined according to AP-42 Section 13.2.4 for aggregate handling and storage piles.

E (lb/VMT) $= k\,(0.0032) \times (U/5)^{1.3}/(M/2)^{1.4}$

0.74 = k, PM size multiplier

0.35 = k, PM_{10} size multiplier

0.053 = k, $PM_{2.5}$ size multiplier

9.13 = U, mean wind speed (m/s) (average from 2011-2015 at Snohomish County Airport (Paine Field))

1 = M, conservatively low estimate for moisture content of pile materials (actuals between 1-10%)

Table B-5b. Pile Wind Erosion

Pile	Area [1] (acres)	PM Emissions [2] (lb/hr)	(tpy)	PM_{10} Emissions [3] (lb/hr)	(tpy)	$PM_{2.5}$ Emissions [3] (lb/hr)	(tpy)
Combined stockpiles	2	0.11	0.49	0.05	0.23	0.01	0.03

[1] Pile area is estimated using Google Earth imagery. Footprint area is used to estimate the total exposed area.

[2] PM Emissions are calculated using emission factors determined according to Equation 2-12 from the EPA document "Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures" dated 9/1992.

e_{TSP} (lb/acre-day) $= 1.7 * (s/1.5) * [\,(365-p) / 235\,] * (f/15)$

1.6 = s, silt content obtained from AP-42 Table 13.2.4-1 (%) for crushed limestone as an estimate for aggregates

180 = p, number of days with > 0.01 in. precipitation per year

14.01 = f, percentage of time that the unobstructed wind speed exceeds 12 mph at the mean pile height (%) obtained from surface meteorological data from 2011-2015 at Snohomish County Airport (Paine Field).

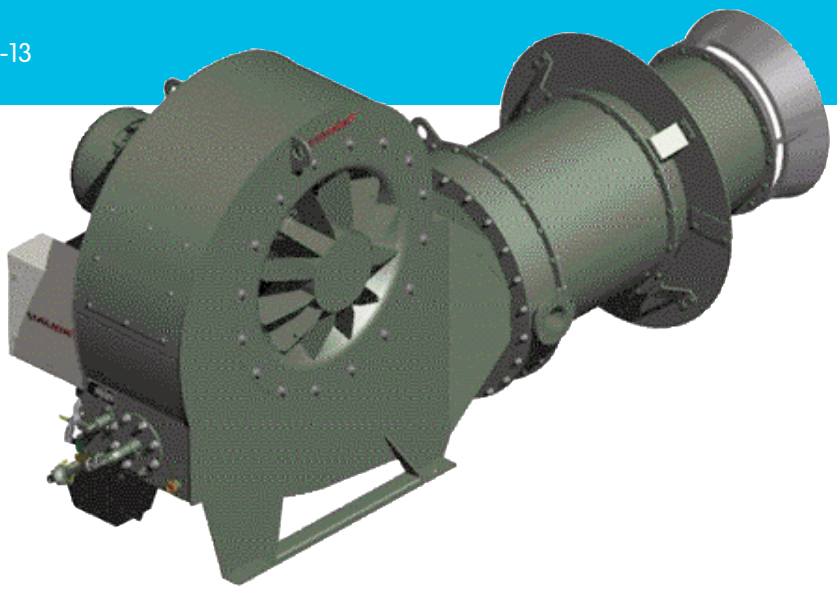
[3] PM_{10} and $PM_{2.5}$ emissions are determined based on PM emissions using the ratios of the particle size multipliers for each particle size provided for Equation 1 in AP-42 Section 13.2.4.

Appendix B
2. Vendor Information - NovaStar

NovaStar

Ultra Low NOx Burner for Aggregate Drying

NS-1
Edition 3-13



- Ultra low NOx emissions of that meet most stringent air quality standards without FGR or water injection on natural gas and vaporized propane
- Precise air flow control via VFD and low horsepower design offers significant energy savings
- Compact modular design suitable for stationary or portable plants
- Standard and long-nose variations available to suit all drum types
- Advanced construction for ease of installation and maintenance
- Sealed-in design for ultra quiet operation and maximum fuel efficiency

* *For California Markets*

Emissions less than 4.3 ppm NOx and 42 ppm CO (19% O_2) compliant with San Joaquin Air Quality District standards, Rule 4309

Emissions less than 36 ppm NOx and 400 ppm CO (3% O_2) compliant with South Coast Air Quality District standards

www.hauckburner.com

Utilizing the latest patented lean burn premix technologies, the NovaStar offers design and performance advantages with service accessibility and ease of installation.

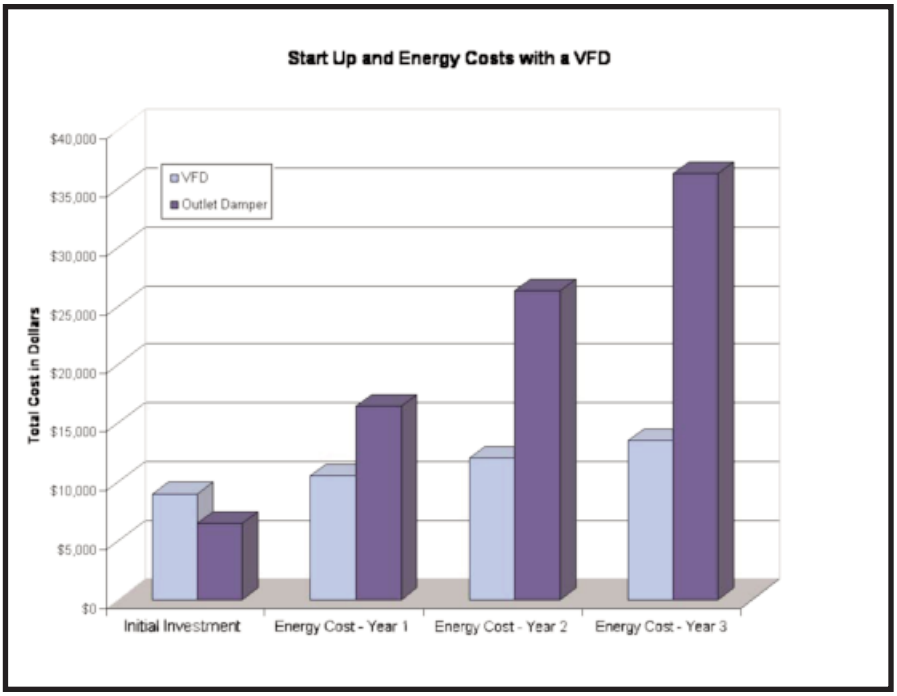
Available in various sizes the NovaStar is ready to meet your production needs and even the most stringent air quality standards with ultra low nitrogen oxide (NOx) emissions on gaseous fuels without the added expense of flue gas recirculation (FGR) technology. (For California markets, see notation on page 1.)

The NovaStar employs variable frequency drive (VFD) technology for precise air flow control over its entire operating range. Combining precise air flow control with real time fuel flow measurement results in maximum efficiency and cost savings. The use of this VFD technology offers energy savings via reduced electricity consumption as illustrated in the adjoining chart.

The burner can be easily operated and effectively managed with PLC-based control provided by Hauck's BCS products.

The burner produces a compact flame making it suitable for all drum sizes and types. This further reduces emissions by completing all combustion within the short combustion zone eliminating flame quenching from process materials.

NovaStar NS150 firing natural gas at 140 MMBtu/hr



Savings based on 2000 hour season at 14 cents per kWh with variable duty cycle times.

For additional information on this product, visit our website at:

www.hauckburner.com

Hauck Manufacturing Company
POB 90
Lebanon, PA 17042

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F +1 717-273-9882
info@hauckburner.com

Eclipse, Inc.
1665 Elmwood Road
Rockford, IL 61103
USA

T +1 815.877.3031

January 1, 2016

Eclipse, Inc. makes the following statements of estimated emissions levels for the products of combustion from the Hauck NovaStar series burners.

Emissions are based on adequate flame volume, i.e. the burner flame path shall be unobstructed and shall be equal to or greater than the predicted flame diameter and length including a clean combustion zone with no material veiling through the flame; no contaminants in the aggregate such as blasting, fertilizer, or any organic nitrogen containing compounds, and no contaminants in the process beyond our control.

The drum must be properly maintained to not allow excessive air infiltration. Combustion air shall be supplied at ambient temperature.

The fuel shall be free of fuel-bound nitrogen unless otherwise specified; NOx emissions may exceed those listed if the fuel contains substantial amounts fuel bound nitrogen. It must be recognized that test results in general, and NOx levels in particular, are difficult to obtain accurately and are always subject to error.

SOx emissions are based on a maximum 50% fuel-bound sulfur conversion efficiency with the remainder 50% assumed contained in the final product.

The emission levels in pounds per ton of aggregate are based on an input of 250,000 BTU/ton. All emission levels are for minimum 50% burner output (as percentage of maximum burner catalog rating) or higher. Emission levels may exceed those shown at lower firing rates.

Regards,

Ben Gatto
Engineering Manager, Hauck

HAUCK NOVASTAR EMISSIONS ESTIMATES

Natural Gas Fired NovaStar Emissions:

NOx	≤ 30 ppm corrected to 3% O2 dry	0.009 lbs/ton of aggregate
CO	≤ 395 ppm corrected to 3% O2 dry	0.082 lbs/ton of aggregate
VOC	≤ 105 ppm corrected to 3% O2 dry	0.030 lbs/ton of aggregate (VOC Weight based on C_3H_8)
SOx	None	No Sulfur in Fuel

Vaporous Propane Gas Fired NovaStar Emissions:

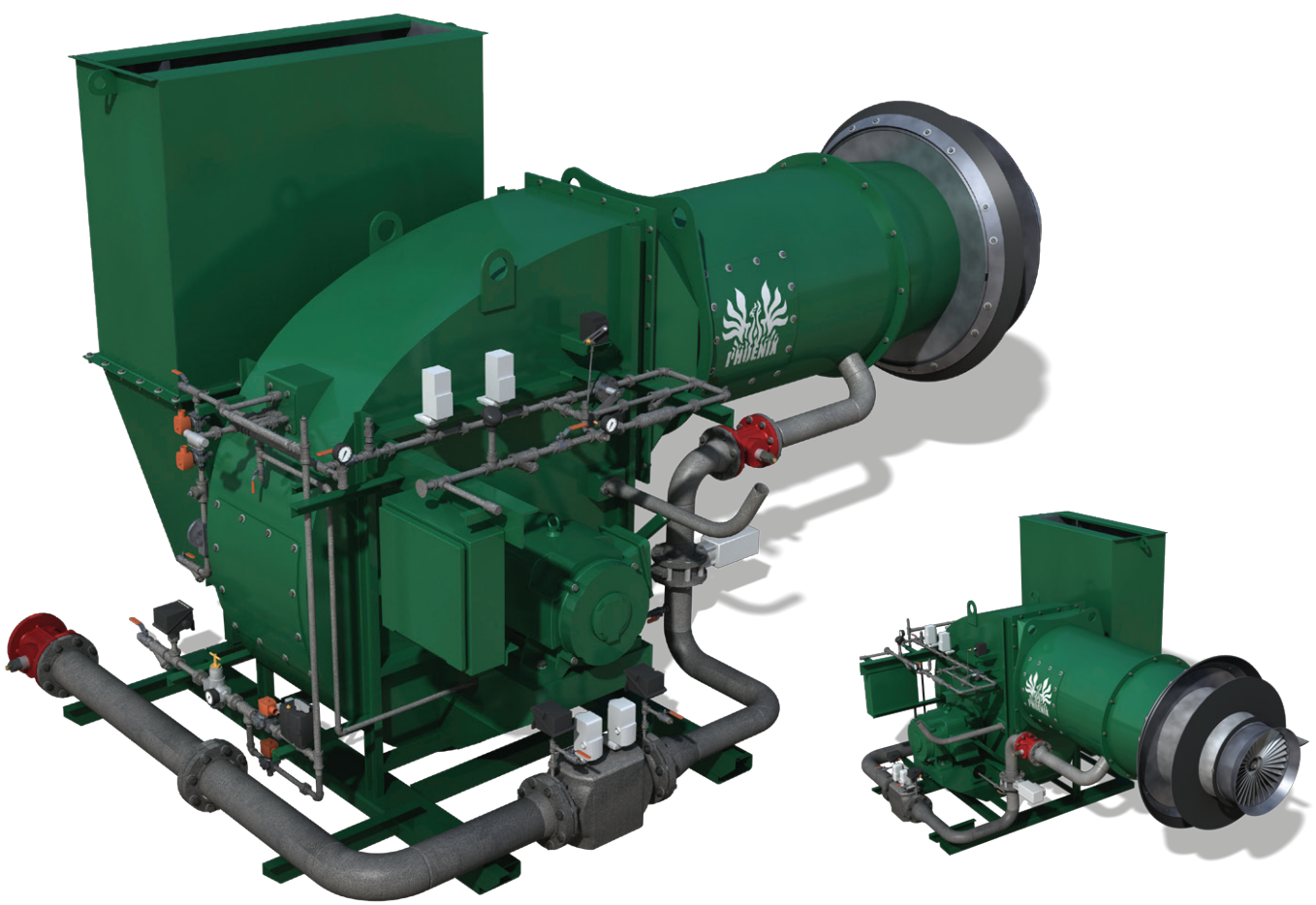
NOx	≤ 30 ppm corrected to 3% O2 dry	0.009 lbs/ton of aggregate
CO	≤ 395 ppm corrected to 3% O2 dry	0.085 lbs/ton of aggregate
VOC	≤ 105 ppm corrected to 3% O2 dry	0.031 lbs/ton of aggregate (VOC Weight based on C_3H_8)
SOx	None	No Sulfur in Fuel

Appendix B
2. Vendor Information - Talon II

ASTEC

PHOENIX® TALON II BURNER

The ASTEC Phoenix® Talon II utilizes the latest burner technology to deliver very low emissions combined with energy efficiency. With the optional silencing package, it's even possible to have a phone conversation on the burner platform while it is firing.



ASTEC, INC. an Astec Industries Company
4101 JEROME AVENUE • CHATTANOOGA, TN 37407 USA • +1.423.867.4210 • +1.423.867.4636 • astecinc.com

SCOTT 04/16

ADVANCED EMISSION REDUCTION

The Phoenix® family of burners are available in the asphalt industry using the most advanced technology to precisely and completely mix the air and gaseous fuel to achieve an advanced low NOx and CO method called lean burn premix. They employ a multiple, parallel, turbulent, tube mixer to achieve near perfect mixing of fuel and air.

PHOENIX® TALON II

ELECTRIC POWER EFFICIENCY

The variable speed main combustion blower drive helps provide precise firing rate control and uses significantly less electrical energy. It also eliminates the need for an air damper and for drive motor adjustments and maintenance.

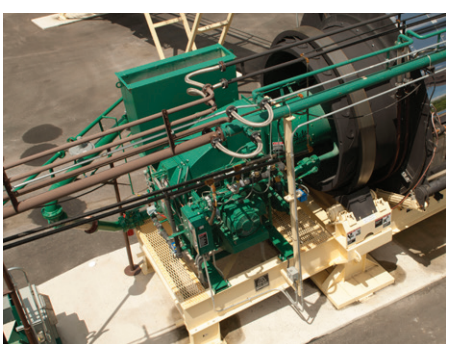
FIRING EFFICIENCY & COMPACT FLAME SIZE

High quality mixing of air and fuel creates the most compact flame available with a small combustion zone. This ensures that all of the fuel is combusted for peak efficiency without taking away valuable dryer heating capacity.

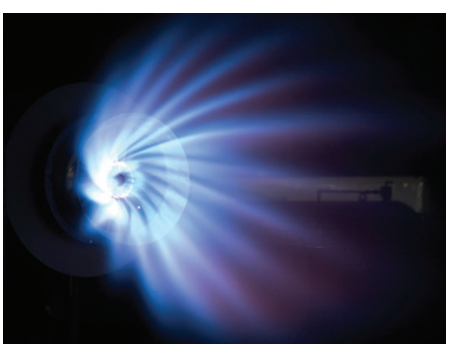
RELIABLE FIRING

For maximum reliability and start-up ease, ASTEC burners are thoroughly tested before shipping.

The spin vanes and other components of the nose ensure flame stability and optimum shape.



The Phoenix® Talon uses significantly less electric power than conventional burners due to the variable frequency drive used to control its combustion air blower and low body pressure.



The Phoenix® Talon's compact flame shape is compatible with most drums without complicated flame adjustment.

LOW EXCESS AIR FIRING SPECS

Model	Rated Capacity Millions of BTU/HR (with 20% XSA)	Nominal Aggregate Drying Capacity TPH (at 5% moisture)	Burner Air Capacity SCFH (millions)	Integral Blower Horsepower	Oil Atomizing Air Requirement SCFM (Low Fire / High Fire)
PT2 50	50	200	0.60	40	55 / 45
PT2 75	75	300	0.90	60	100 / 85
PT2 100	100	400	1.20	75	100 / 80
PT2 125	125	500	1.50	100	110 / 80
PT2 150	150	600	1.80	125	125 / 90

Above conditions are standard at 75° F at sea level. See detailed capacity, performance sheets for each size for more information and specific flows and pressures. Nominal aggregate drying capacity based on typical exhaust stack temperatures of 240° F, 0.2 BTU/Lbm F specific heat in the aggregate. Burner maximum design capacity is 100% of rated capacity. Advertised numbers are achievable in some conditions, but not guaranteed.

From: Catherine Sutton
To: Miller, Douglas (Redmond) USA
Cc: Joe Soelberg; Greg Fricks
Subject: RE: Phoenix Burners for Hot Mix Asphalt application
Date: Thursday, April 18, 2019 5:33:11 AM
Attachments: image001.png
image002.jpg
image003.png
image004.jpg

Doug,

Please refer to the document previously sent to you outlining the effect of the 9 physical factors on production rate.

As for emissions, you would see no difference because the calculations are based on hourly production rate, in this case 400 TPH. In actuality, you are correct that CO and NOx are dependent on firing rate. However, the emission factors we use are based on tons of mix produced (lb of pollutant/ton of mix). While there will be VOC emissions from the burner, they are overshadowed by the VOCs from the asphalt cement. The mixing process has a much greater effect on overall VOC emissions. I cannot provide VOC data on a replacement burner being outfitted onto an existing drum. The following table provides typical, though not guaranteed, emission performance levels for the Talon II burners when properly maintained and operated. Please note that NOx levels are based on combustion only and do not account for NOx emissions that may result from the presence of nitrates on blasted aggregated.

Phoenix Talon II[1]	
Natural Gas	
NOx	25
CO	155
#2 Oil	
NOx	40
CO	195

[1] values @ 7% O2

You may access a brochure and spec sheet for the Talon burners at our website (https://www.astecinc.com/literature.html; https://www.astecinc.com/service/service-home-page.html#manuals). You will need to go to both links.

Joe Soelberg will need to provide the quote for you. Greg and I are both in the Engineering department.

Thanks,

From: Miller, Douglas (Redmond) USA <douglas.miller@lehighhanson.com>
Sent: Wednesday, April 17, 2019 6:36 PM
To: Greg Fricks <gfricks@astecinc.com>
Cc: Joe Soelberg <jsoelberg@astecinc.com>; Catherine Sutton <csutton@astecinc.com>
Subject: RE: Phoenix Burners for Hot Mix Asphalt application

Hello Greg,

Regarding the burner requirements sheet sent:

- I would like to understand the sensitivity of the production rate and air flow to the moisture content table. Example, all these moisture scenarios can achieve a minimum 400 t/h (incl. 40% RAP) with a maximum of 80,000 acfm ?

Can you also provide the following:

- Expected emissions at this scenario or a not to exceed emissions (NOx, CO, VOC @ 7% 02)
- Product info on the PT125 model (datasheet, dimensional sheet, brochure)
- Quotation for a burner and system components (incl. PLC control panel, fan, drive, valve train, regulator, manifold, instrumentation, etc.., freight to Everett, WA)

Best Regards,
Doug

Douglas Miller
Project Engineer

Cadman / Lehigh Hanson
(Heidelberg Cement Group)

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Phone: +1 (360) 913-3741
Email: douglas.miller@lehighhanson.com

www.cadman.com
www.lehighhanson.com
www.heidelbergcement.com

From: Catherine Sutton [mailto:csutton@astecinc.com]
Sent: Wednesday, April 17, 2019 11:09 AM
To: Miller, Douglas (Redmond) USA <douglas.miller@lehighhanson.com>
Cc: Joe Soelberg <jsoelberg@astecinc.com>; Greg Fricks <gfricks@astecinc.com>
Subject: RE: Phoenix Burners for Hot Mix Asphalt application

APPENDIX C: MODELING FILES AND SUPPORTING DOCUMENTATION

1. Modeling Directory

2. Email from Dr. Ranil Dhammapala

Table C-1. Modeling Files Directory

Folder	File Name	Description
BPIP	Bpip input file Bpip output file Bpip summary file	Files for BPIP inputs and outputs.
Met Data	PAE*xx*.PFL PAE*xx*.SFC	Meteorological files as inputs to AERMOD, including the surface file and upper air file. "*xx*" indicates the year among 2011-2015.
TTC*xx*	Other_post_24-hr_1st_high.plt Other_post_annual.plt Other_pre_24-hr_1st_high.plt Other_pre_annual.plt	Plot files for pre- or post-project concentrations modeled at 1 g/s. "*xx*" indicates the year among 2011-2015.
NA	TTCxx.ami TTCxx.aml	AERMOD input and output files. "*xx*" indicates the year among 2011-2015.
NA	Model Results Processing.xlsx	Excel spreadsheet used to process the modeled results for each TAP.

From:	Dhammapala, Ranil (ECY)
To:	Hui Cheng
Cc:	Anna Henolson; Brian Holland
Subject:	RE: Paine Field Met Data Question
Date:	Wednesday, March 20, 2019 4:36:33 PM

Hi Hui,

Great work figuring this out! My strong recommendation is to use the older 5-yr data set ending in 2015. KPAE has 1-minute ASOS data so plan on running AERMINUTE to minimize calms.

I will check with NWS Seattle if they plan to back correct the data.

Regards

~*~

Ranil Dhammapala, PhD
Atmospheric Scientist
Air Quality Program, Washington Department of Ecology
P.O Box 47600, Olympia, WA 98504-7600
Tel: 360-407-6807   Fax: 360-407-7534
Email: ranil.dhammapala@ecy.wa.gov

~*~

From: Hui Cheng [mailto:hcheng@trinityconsultants.com]
Sent: Wednesday, March 20, 2019 4:25 PM
To: Dhammapala, Ranil (ECY) <rdha461@ecy.wa.gov>
Cc: Anna Henolson <AHenolson@trinityconsultants.com>; Brian Holland <bholland@trinityconsultants.com>
Subject: Paine Field Met Data Question

Hi Ranil,

Thanks for your time to discuss this issue we have! As discussed, I am working on a dispersion modeling project for a site located in Everett, WA that is basically on a dock. We have determined that most representative data would be from Paine Field Airport. During our review of the NWS data we discovered an issue with the wind data – the dominant wind direction has shifted starting 2017, while previous years remain a very consistent pattern in the wind roses. Please see attached the PPTX file with more details on it.

We reached out to NWS, and confirmed that the data was off since 11/29/2016 at 12 pm and stayed that way until 2 PM yesterday (3/19/2019). We have a couple of options in order to complete the modeling analysis for our project, but I would like to confirm with you which option makes more sense for permitting purposes.

1. Correct the wind data based on our best knowledge. See the email attached with our correspondence with our NWS contact. However, I am not sure whether NWS knows

exactly how different that was for the entire period starting 11/29/2016.

2. Use an older 5-year period for this project (i.e., 2011-2015 vs. 2014-2018). Given the consistencies in the wind patterns for older years, I think older dataset should still be representative in estimating the project impact.

We understand that further review may be warranted for the data starting late 2016 and corrections (if any) should be carefully performed. Can you please confirm that using older dataset (option 2) would be your preference for our project of interest?

We would also be interested in knowing whether NWS would consider back-correct the data in the archive. If you could keep us in the loop with any further development on this topic, that would be great! Thanks!

……

Hui Cheng, E.I.T
Senior Consultant

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