



<b>Contract Information</b>			
Contract Number	State Route	Section	Date
Project Engineer		Region	
HMA Paving Contractor		Submitted By	
HMA Class	Gradation Levels	HMA Evaluation Method	ESALs (millions)
3/8 Inch    3/4 Inch 1/2 Inch    1 Inch	N Initial:    N Design:    N Max:	Statistical    Commercial Replacement Mix Design? MD	
RAP to be used in production Yes    No		RAP stockpile tonnage	RAS to be used in production Yes    No
			RAS stockpile tonnage

<b>Asphalt Binder Information</b>			
Asphalt Binder Supplier	Asphalt Binder Specific Gravity (Gb)	Asphalt Binder Grade	Proposed Pb
Mixing Temperature Range	Compaction Temperature Range	Anti-Strip Type	*Anti-Strip %

\* If Required by Contract

**Contractor Aggregate Structure and Aggregate Test Data**

In the table below provide the "Material" identification (3/4"-0, #4-0, etc.), "Source" (J-199, E-320, etc.), "Ratio" (45%, 20%, etc.), and the percent passing each sieve for each stockpile used in the mix design as well as the combined gradation and the specification requirements for the class of HMA used. Report all stockpile gradations to the nearest tenth of a percent. Report the combined gradation to the nearest whole percent except the U.S. No. 200, which must be reported to the nearest tenth of a percent.

Material							Combined Gradation	Specification Requirements
Source								
Ratio								
1 1/2" Square								
1" Square								
3/4" Square								
1/2" Square								
3/8" Square								
U.S. No. 4								
U.S. No. 8								
U.S. No. 16								
U.S. No. 30								
U.S. No. 50								
U.S. No. 100								
U.S. No. 200								
Gsb Coarse								
Gsb Fine								
Gsb Blend								
Sand Equiv.								45 Min.
Uncompacted Void Content								<3m ESALs, 40 Minimum >3m ESALs, 44 Minimum
Coarse Fracture								90% Minimum

# Fractured Faces,    Single    Double (Must Check One)

### Additional Information for High RAP and/or RAS HMA Mix Designs (If Applicable)

In the tables below, provide the required information for HMA mix designs containing > 20% Recycled Asphalt Pavement(RAP) and/or any amount of Recycled Asphalt Shingles (RAS). Testing shall be performed in accordance with AASHTO R 29 to establish a true grade for each asphalt component and the final blend. HMA mix designs that contain higher levels of RAP and/or any amount of RAS will not be accepted for verification testing at the State Materials Laboratory without the information completed below. Warm Mix Asphalt (WMA) mix designs will not be accepted with > %20 RAP and/or any amount of RAS.

#### Blended Asphalt and Recycled Material Information

Grade of Virgin Asphalt Binder (PGAB)	Pb Virgin Asphalt Binder (PGAB) by Wt of Mix	Pb of RAP
Recycling Agent	% Recycling Agent by Wt. of Binder	Pb of RAS
% Asphalt Binder Contributed from RAP by Wt. of Mix	% Asphalt Binder Contributed from RAS by Wt. of Mix	% Total Quantity Asphalt Binder Contributed from RAP & RAS by Wt. of Binder (40%) max
Pba RAP	Gb RAP	Gmm RAP
Pba RAS	Gb RAS	Gmm RAS

Property	Virgin PGAB T <sub>c</sub> Test Temp	Virgin PGAB Spec Test data	Lab Blend Specification
Original High Temp, DSR, kPa			min 1.00
Rolling Thin Film Oven High Temp, DSR, kPa			min 2.20
Pressure Aging Vessel @ 90 or 100°C Int. Temp, DSR, kPa			max 6000
Pressure Aging Vessel @ 90 or 100°C Low Temp, BBR, Stiffness, MPa			max 300
Pressure Aging Vessel @ 90 or 100°C Low Temp, BBR, m-value			min 0.300

#### Calculation for T<sub>c</sub>, Continuous Grade of Blended PG Binders

Condition	Method	Spec Criteria	Test Results		Test Results		T <sub>c</sub> (°C)
			T <sub>1</sub> (C°)	P <sub>1</sub> at T <sub>1</sub>	T <sub>2</sub> (C°)	P <sub>2</sub> at T <sub>2</sub>	
original DSR	T315	≥ 1.00					
RTFO DSR	T315	≥ 2.20					
PAV DSR	T315	≤ 6000					
PAV BBR S value	T313	≤ 300					
PAV BBR m value	T313	≥ 0.300					
% Recovery @ 3.2 kPa	T350	See Standard Spec 9-02.1(4)					
J <sub>nr</sub> @ 3.2 kPa	T350	See M332					

T<sub>c</sub> = Continuous Grading Temperature, °C

T<sub>1</sub> = Lower of the two test temperatures, °C

P<sub>1</sub> = Test result for the specification property in question at T<sub>1</sub>

T<sub>2</sub> = Higher of two test temperatures, °C

P<sub>2</sub> = Test result for the specification property in question at T<sub>2</sub>

AASHTO R29 True Grade =

AASHTO M320 PG Grade =

AASHTO M332 PG Grade =

WSDOT Spec for T350 % Recovery Met? (Yes, N/A) =


Contractor Mix Design Remarks:

### Contractor's HMA Mix Design Data

In the table below provide the HMA volumetric mix design data determined by performing WSDOT SOP 732. The Va, VMA, VFA, and Gmb values must be determined from replicate mixtures compacted to the appropriate Ndesign gyration level in accordance to section 8.2 of SOP 732, **back calculated values from replicate mixtures compacted to Nmax are not acceptable.**

#### Volumetric Data Determination

HMA Properties	-0.5% Pb Design	Pb Design	+0.5% Pb Design
Pb			
% Gmm @ Nini			
% Gmm @ Ndes (Va)			
% VMA @ Ndes			
% VFA @ Ndes			
Dust / Asphalt Ratio			
Pbe			
Gmm			
Gmb			
Gse			
Height @ Nini			
Height @ Ndes			

### Contractor's HMA Mix Design Proposal

In the table below provide the HMA volumetric mix design data that comes closest to, or intersects, 4.0 +/- 0.2% Va, from the testing performed via WSDOT SOP 732. This may be the same as the Pb design data from the table above. Also provide the % Gmm data developed from the replicate mixtures compacted to appropriate Nmax gyration level. Provide Hamburg Wheel-Track Device rut depth (mm) and Stripping Inflection Point (Pass/Fail) in accordance with WSDOT FOP for AASHTO T324 and Indirect Tensile Strength (psi) by performing WSDOT FOP for AASHTO D6931.

HMA Properties	Mix Design Proposal Data	Specification Requirements
Pb		
% Gmm @ Nini		
% Gmm @ Ndes (Va)		96.0
% VMA @ Ndes		
% VFA @ Ndes		
Dust / Asphalt Ratio		0.6 - 1.6
Pbe		
Gmm		
Gmb		
Gse		
% @ Gmm @ Nmax		≤98.0
Hamburg Wheel-Track Testing (mm)		
Stripping Inflection Point		Pass
Indirect Tensile Strength Test (psi)		

I certify this HMA job-mix formula (JMF) has been developed in accordance to WSDOT Standard Operating Procedure (SOP) 732 "Volumetric Design for Hot-Mix Asphalt (HMA)". The HMA JMF has been verified in accordance to section 10 of SOP 732 which consist of preparing replicate mixtures containing the selected design aggregate structure at each of the following binder contents: (1) the estimated design binder content, Pb (design); (2) 0.5 percent below Pb (design); (3) 0.5 percent above Pb (design). I am aware, in accordance to WSDOT Standard Practice QC 8, Approval of Hot Mix Asphalt Mix Designs for the Qualified Products List, that a response will be provided within 25 calendar days for WSDOT mix designs, and 40 calendar days for contracts outside of WSDOT.

Printed Name

Signature

Phone

Date