WSDOT Standard Practice for HMA Mix Designs QC 8

Standard Practice for Development, Submittal and Approval of Hot Mix Asphalt Mix Designs

1. Scope

1.1 This standard specifies requirements and procedures for evaluation and approval of Hot Mix Asphalt mix designs for the Qualified Products List.

1.2 This standard may involve hazardous materials, operations and equipment. It does not address all of the safety problems associated with their use. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 WSDOT Standards

2.1.1 *Standard Specifications for Road, Bridge, and Municipal Construction* M 41-10

2.1.2 *Materials Manual* M 46-10

3. Terminology

3.1 **AASHTO** – American Association of State Highway and Transportation Officials

3.2 **ASA** – Aggregate Source Approval

3.3 **ASTM** – American Society of Testing and Materials

3.4 **Bituminous Materials Section** – Testing Laboratory at the WSDOT State Materials Laboratory

3.5 **Business Days** – All weekdays, excluding state and federal holidays

3.6 **Contractor/Producer** – The Contractor, Producer or production facility that has the capacity for producing HMA meeting WSDOT *Standard Specifications*.

3.7 **HMA** – Hot Mix Asphalt

3.8 **Materials Quality Assurance Section** – Office responsible for managing the Qualified Products List at the WSDOT State Materials Laboratory

3.9 **PG** – Performance Graded asphalt binder

3.10 **QPL** – Qualified Products List

3.11 **RAS –** Recycled Asphalt Shingles

3.12 **RAP –** Reclaimed Asphalt Pavement

3.13 **State Materials Laboratory** – 1655 S. 2nd Avenue SW, Tumwater, WA 98512-6951

3.14 **WSDOT** – Washington State Department of Transportation

3.15 **Replacement QPL Mix Design –** QPL HMA mix design that directly replaces the existing or previous QPL HMA mix design, consisting of the same class of mix, gyration level, binder grade, supplier, and aggregate source.

4. Significance and Use

4.1 This standard specifies procedures for designing, submitting, evaluating and approving HMA mix designs for inclusion to the QPL.

5. Mix Design Development

5.1 The Contractor/Producer or designee shall develop a HMA mix design in accordance with Section 5-04.2(1) of the *Standard Specifications*. The HMA mix design aggregate structure, asphalt binder content, anti-stripping additive, rutting susceptibility and indirect tensile strength shall be determined in accordance with WSDOT SOP 732, FOP for AASHTO T 324 and WSDOT FOP for ASTM D 6931 and meet the requirements of Sections 9-03.8(2) and 9-03.8(6) of the *Standard Specifications*.

5.1.1 The Contractor/Producer's mix design %Gmm Ndesign must be 96.0 ± 0.2% at the optimum percent binder (Pb).

6. Submission to the WSDOT Qualified Products List

6.1 Once the HMA mix design has been developed, the Contractor/Producer shall contact the Bituminous Materials Section at HMAMD@wsdot.wa.gov or 360-709-5429 to initiate the HMA mix design submittal process. Replacement QPL HMA mix designs can be submitted up to six months prior to the existing QPL HMA mix design expiration date and still retain the original QPL HMA mix design date (month and day) on the new QPL HMA mix design.

6.2 To initiate the mix design submittal process, the Contractor/Producer shall provide the following:

- Company contact and billing information
- A completed copy of WSDOT Form 350-042
- A completed WSDOT Product Submittal Application Form
- ASA Report for the aggregate source(s)
- QPL Contractor/Producer Product Information page(s) for the PG asphalt binder and the anti-stripping additive
- Certification on the source of the recycled materials and applicable documentation per *Standard Specifications* Sections 5-04.2 and 9-03.21(1) for mix designs containing RAP and/or RAS
- Provide the testing and certification for toxicity characteristics in accordance with *Standard Specification* Section 9-03.21(1) for the RAS and RAP submitted with the mix design. The testing and certification shall be no older than 30 calendar days from when the mix design samples are received at the State Materials Laboratory.

6.3 Once the information from Step 6.2 is received the Bituminous Materials Section will assign a QPL evaluation tracking number. This will initiate the timeline associated with each step of the mix design evaluation process in Section 6 of this plan, as shown in Table 1.

6.4 The Bituminous Materials Section will review the mix design submittal (WSDOT Form 350-042) and all documentation provided to ensure it is complete and meets specification requirements. If the mix design submittal is complete and meets specification, the Bituminous Materials Section will prepare the initial letter with Cost estimate and email to the State Materials Laboratory Business Office. Mix design submittals that are incomplete or do not meet the specification requirements will be rejected and require resubmittal in accordance with Section 6.2 of this plan. All timelines in Table 1 will restart with resubmittal of mix designs.

6.5 The State Materials Laboratory Business Office will provide the following to the Contractor/Producer:

- QPL evaluation tracking number
- Initial letter detailing mix design evaluation
- Cost sheet for mix design evaluation detailing submittal requirements and associated charges
- Reimbursable Agreement and Statewide Vendor Forms (if needed)

6.6 After the contractor returns the Reimbursable Agreement and Statewide Vendor Form to the Business Office and Bituminous Materials Section, the Bituminous Materials Section will contact the Contractor/Producer to schedule the QPL HMA mix design materials delivery date.

6.6.1 The Contractor shall submit representative samples of aggregate, RAP and RAS (if required), totaling 700 pounds proportioned to match the Contractor's proposal to the State Materials Laboratory for testing.

For example, if the Contractor's proposal consists of five stockpiles with the following blending ratio:

Material	Ratio
¾″ – #4	20%
½″ – #8	30%
#4 – 0	30%
RAP	15%
RAS	5%

Calculate the amount of aggregate needed from each stockpile in the following manner:

Material		Pounds of Aggregate Needed Per Stockpile
¾″ – #4	700 lbs x 0.20	140 pounds
½″ – #8	700 lbs x 0.30	210 pounds
#4 – 0	700 lbs x 0.30	210 pounds
RAP	700 lbs x 0.15	105 pounds
RAS	700 lbs x 0.05	35 pounds

6.6.2 Transport aggregate in bags or other containers so constructed as to preclude loss or contamination of any part of the sample, or damage to the contents from mishandling during shipment. The weight limit for each bag or container of aggregate is 30 pounds maximum.

6.6.3 Each aggregate bag or container shall be clearly marked or labeled with suitable identification including the contract number, aggregate source identification and size of stockpile material.

When RAS will be used in the HMA mix design the contractor shall provide 40 dried RAS samples proportioned into individual 16 to 24-ounce aluminum containers (See Pictures of acceptable container in Figure 1). The RAS samples shall be representative of the RAS stockpile being reduced per WSDOT Errata to FOP for AASHTO R 47 in the WSDOT Materials Manual. In addition to the sample identification outlined in 6.6.3, the RAS containers shall be marked with indelible markings noting the weight of the material to the 0.1 grams. The required weights

of the RAS containers will be given to the contractor at the time of mix design submittal acceptance. RAS samples that do not meet the above requirements will result in rejection of the RAS mix design.

The RAS materials shall be accompanied by a test report from a certified testing laboratory verifying that the RAS materials submitted for mix design testing is non detect for asbestos utilizing Polarized Light Microscopy (PLM) 1000 point count test. The laboratory testing for asbestos content shall meet the certification requirements of Standard Specifications Section 9-03.21(1)A Reclaimed Asphalt Shingles and provide a copy of their laboratory certification along with the test results. The RAS materials shall also be accompanied by the Safety Data Sheet as outlined in Standard Specifications Section 9-03.21(1)A Recycled Asphalt Shingles.

WSDOT may independently test mix design samples for asbestos containing materials.

Figure 1 Pictures of acceptable 16 to 24-ounce aluminum container with lid off and on

6.7 The Bituminous Materials Section will notify the Contractor/Producer when the mix design materials have been received, logged-in and a calendar day completion will be provided to the Contractor/Producer as specified in Section 6.9.

6.7.1 Mix design materials that are non-representative and/or out of specification will be rejected and require resubmittal of all mix design material. Mix design materials that are rejected and not picked up by the Contractor/Producer within 2 working days of the receipt of rejection will be disposed of. All timelines in Table 1 will restart with resubmittal of mix design materials. When WSDOT elects to independently test mix design samples for asbestos containing materials, the mix design will not be accepted until WSDOT receives the results of its independent laboratory testing.

6.8 A priority queue will be established by the Bituminous Materials Section for HMA mix design evaluations.

6.8.1 Preference will be given to mix designs submitted for WSDOT contracts.

6.8.2 HMA mix design evaluations for WSDOT contracts will be completed within 25 calendar days after the notification in Section 6.7.

6.8.3 HMA mix design evaluations that are not for WSDOT contracts, replacement HMA mix designs or HMA mix design evaluations containing RAS materials will be completed approximately 40 calendar days after the notification in Section 6.7.

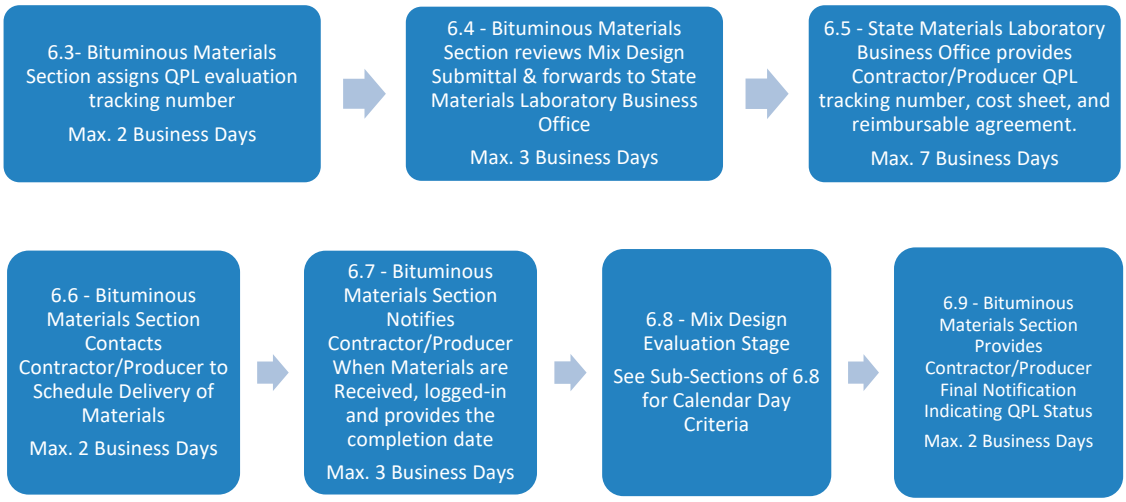
6.8.4 QPL HMA mix design revisions must be submitted to the Bituminous Materials Section in writing, and if approved, a new completion date will be determined by the Bituminous Materials Section.

6.8.5 The Bituminous Materials Section reserves the right to limit the number of HMA mix design evaluations accepted for non WSDOT contracts at any time. Workload and staffing will dictate the number of HMA mix design evaluations accepted at one time.

6.9 After the mix design evaluation is complete the Bituminous Materials Section will provide the status of the evaluation to the following:

- Final notification to the Contractor/Producer indicating QPL status after completion of the mix design evaluation.
- Notification to the Materials Quality Assurance Section, QPL Engineer, that the evaluation is complete, and direction to add the HMA Mix Design to the QPL if applicable.

Table 1 Timelines Associated with Each Step of the Mix Design Evaluation Process



7. Mix Design Evaluation

7.1 The HMA mix design submitted by the Contractor/Producer will be evaluated by the Bituminous Materials Section in accordance with Section 9-03.8(2) and 9-03.8(6) of the *Standard Specifications*. All communication from the Bituminous Materials Section will be to the Contractor's/Producer's contact as specified on WSDOT Form 350-042.

7.2 HMA mix designs will be placed on the QPL provided they meet the requirements of Section 9-03.8(2) and 9-03.8(6) of the *Standard Specifications*.

7.2.1 Voids in Mineral Aggregate (VMA) must be within 0.5% of the minimum specification in accordance with Section 9-03.8(2) of the *Standard Specifications* for the class of HMA evaluated.

7.2.2 % Gmm at N design must be within 1.5% of the specification in Section 9-03.8(2) of the *Standard Specifications* for the class of HMA evaluated.

7.2.3 Voids Filled with Asphalt (VFA) in Section 9-03.8(2) will not be part of the mix design evaluation.

7.3 A mix design that fails to meet the requirements listed in Section 7.2, 7.2.1 and 7.2.2 will not be accepted or placed on the QPL.

7.4 Adjustments to mix designs will not be allowed once they have been evaluated.

7.5 The Contractor/Producer will be issued a QPL mix design record providing the mix design is in compliance with Section 9 of this Standard Practice.

7.6 The QPL listing for HMA mix designs will show the following information:

- Company name
- HMA Class
- Aggregate Source(s)
- PG Grade
- PG Supplier

Anti-stripping additive brand and quantity (if applicable)

8. Referencing Mix Designs From The QPL

8.1 Requests for reference HMA mix designs for non WSDOT projects will be completed on WSDOT Form 350-041 and emailed to HMAMD@wsdot.wa.gov.

8.2 Reference HMA mix design reports will be issued for new mix designs on active and awarded WSDOT contracts once accepted and placed on the QPL.

8.3 Reference HMA mix design reports will be issued for current mix designs on active and awarded WSDOT contracts provided the HMA production history is in compliance with *Standard Specifications* Section 5-04.3(11)F.

9. Removal From The QPL

9.1 HMA mix designs will be automatically removed from the QPL in accordance with *Standard Specifications* Section 5-04.2(1).

9.2 HMA mix designs may be removed from the QPL if found in nonconformance with the *Standard Specifications* or this Standard Practice. Causes for removal from the QPL may include, but are not limited to the following:

- Failure to comply with requirements of Standard Practice QC 8.
- HMA mix designs that are out of compliance in accordance with *Standard Specifications*
- Section 5-04.3(11)F.
- Failure to notify WSDOT of changes in HMA production.
- Removal at the request of the Contractor/Producer
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10. Ignition Furnace Calibration Factor (IFCF) Samples

10.1 Each HMA mix design submitted for evaluation will have 12 IFCF samples produced for WSDOT as part of the QPL evaluation process. For Design Build contracts WSDOT will produce 16 IFCF samples produced for WSDOT as part of the QPL evaluation process.

10.2 The Contractor/Producer may elect to have 4 IFCF samples produced as part of the QPL evaluation process.