

Midland County Road Commission

Sealed Proposals will be received at the office of the Board of Road Commissioners, County of Midland, at 2334 N. Meridian Road, Sanford, Michigan, 48657 until:

DATE: Friday March 16, 2018 at 10:00 AM

Item No. 1 - HMA PAVING

BID REQUIREMENTS:

The undersigned has examined the location(s) of the work described herein and is fully informed as to the nature of the work and conditions relating to its performance and understands the quantities shown are approximate and are subject to either increase or decrease at no change in unit prices.

The undersigned hereby proposes to furnish all necessary equipment, tools, apparatus, and other means of construction, do all of the work, furnish all materials except as otherwise specified herein; and, for the unit prices named in the itemized bid, to complete the work herein described in strict accordance with the plans and the requirements of these bid documents.

The undersigned further proposes to perform extra work (for items that are not included with the itemized bid) that may be authorized by the Midland County Road Commission. Compensation for extra work will be made on the basis of an agreed upon unit price prior to performing the extra work.

MIX DESIGN AND JMF:

A mix design and JMF signed by a qualified independent source must be submitted and approved by Midland County Road Commission prior to start of work. Submissions must be received 1 week before the start of work. The selected contractor will be required to submit one mix design and one JMF per mix type awarded. Any changes to these after initial approval, must be approved prior to the start of work, by the County Highway Engineer. Mix samples will be taken by Midland County Road Commission employees, or other certified sampler and tested by a qualified tester. Samples will be random and at the Engineers discretion.

SPECIFICATIONS:

All materials, equipment, and construction methods used on the project(s) shall be in accordance with the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction (in particular section 501), supplemental specifications, Midland County Road Commission Special Provisions and the HMA Application Estimate.

Mainline unit price includes paving of all radius areas of intersecting roads, cul-de-sac, up to 3 foot extension into all paved driveways to create a smooth transition, and 1 foot extension for gravel driveways.

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Placement of gravel on shoulders of various roads is required. The shoulders will vary in width (1'-5') depending on the existing road conditions. The locations for shoulders and the amount of gravel to be used will be determined by the Engineer. Gravel shoulders shall be placed within 5 working days after paving at each specified location. Payment will be made per ton of material used and will include cost for traffic control, placement, compaction, and excess moisture deduction per MDOT Specification Section 109. All materials used shall meet the requirements as set forth in the 2012 MDOT Standard Specifications Section 307.

The Midland County Road Commission shall not allow the cleaning or maintenance of any equipment or tools within the right of way of any county roads or streets.

The MCRC will prepare the listed roads prior to the Contractor paving. The Contractor will be required to sweep the surface and apply SS-1h tack coat at a uniform application rate of 0.05 to 0.15 gallon/square yard prior to paving where applicable. This work is considered incidental to and included in the unit prices quoted.

PROGRESS SCHEDULE:

Begin all work after receiving notice of award of contract from the County, and after the County provides notification that the base preparation work has been completed and paving can begin.

All paving shall be done on Monday through Friday or as approved by the Engineer. No paving shall be allowed on Saturday, Sunday or Holidays without prior approval of the Engineer. Requests to vary from the above schedule must be made in writing 72 hours in advance.

All items of work shall be completed by **October 30, 2018**, unless a different date is authorized by the County.

Contractor is required to have a Preconstruction Meeting with Midland County Road Commission before any work begins.

MAINTAINING TRAFFIC:

A minimum of 1 lane 1 direction traffic shall be maintained at all times during construction in accordance with Section 812 of the MDOT 2012 Standard Specifications for Construction, and as specified herein.

The Contractor shall furnish, erect, and maintain barricades, drums and lights adjacent to the work and provide traffic regulators as detailed in attached Figure 6H-10 as a minimum standard for low volume roads. Medium and high volume roadways will require more extensive traffic control measures and traffic control plan must be submitted and approved by the Engineer prior to construction activities. The barricades, drums, and lights shall be furnished, erected and maintained in accordance with the requirements of Section 812 of the MDOT 2012 Standard Specifications for Construction.

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All signs, barricades, warning lights, traffic regulators and other traffic control devices shall be in accordance with the 2011 edition of the Michigan Manual of Uniform Traffic Control Devices (MMUTCD), as amended and shall be the responsibility of the Contractor.

No lane closures shall be allowed or work performed over the Memorial Day, 4th of July, and Labor Day holiday periods, which are defined below:

- Memorial Day – 6:00PM Wed May 23, 2018 thru 6:00AM Tues May 29, 2018
- 4th of July – 3:00PM Tues July 3, 2018 thru 6:00AM Mon July 9, 2018
- Labor Day – 6:00PM Wed Aug 29, 2018 thru 6:00AM Tues Sept 4, 2018

Temporary pavement markings shall be Type NR tape and shall be placed in a single line of 4' strips spaced 50' center-to-center for each course of HMA paving for passing zones and a double line of 4' strips spaced 50' center-to-center for each course of HMA paving for no-passing zones.

The furnishing, placement and maintaining of traffic control devices and traffic regulators will not be paid for separately but is considered included with payment for HMA___ and Shoulder Class II.

BASE PREPARATION:

The existing road surface will be prepared for paving by the County and/or its designated Contractor. Paving work on these projects will be performed on a prepared aggregate base or a crushed HMA base as noted in the bid documents. The County will maintain the prepared base in a graded and compacted condition until such time paving will be performed. Contractor delays may require the County to regrade or prepare the base at the expense of the Contractor.

If temporary patch exists (ie. new culvert crossing) on a section of road to be surfaced, Contractor shall coordinate with County 72 hours in advance of paving operations and County will prepare the area. Contractor will be required to place HMA base in the prepared location ahead of the mainline paving. The cost of the HMA base shall be paid by the ton as HMA ___.

Note: The Contractor may be required to perform some minor base preparation work in some locations such as the removal of temporary aggregate transitions and minor grading. This work, if required will not be paid separately, but is considered included with payment for HMA___.

BID GUARANTEES:

The undersigned agrees, if selected as successful bidder, to provide a certified or cashier's check, on an open solvent bank, or bid bond in the amount of not less than 5% payable to the Midland County Board of Road Commissioners or may elect to allow 5% retainage from each billing cycle. In either case the funds will be released within 30 days after final acceptance of all paving projects in the program for the year.

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INSURANCE REQUIREMENTS:

The successful bidder shall furnish proof of insurance prior to beginning work on the project(s). The following minimum requirements must be included on the certificate of insurance.

1. \$1,000,000 - General Aggregate – General Liability
2. \$1,000,000 – Personal Injury – General Liability
3. \$500,000 – Policy Limit – Worker’s Compensation
4. \$100,000 – Each Accident – Worker’s Compensation
5. \$1,000,000 – Automobile Liability – Combined single limit for each accident, bodily injury per accident, and property damage per accident, and in an amount not less than \$500,000 for bodily injury per person.

The additional insured information must also be included to read as follows:

“ADDITIONAL INSURED: The Board of County Road Commissioners for Midland County, the Midland County Road Commission, and its officers, agents, and employees”.

SAFETY PROGRAM:

The successful bidder will be required to furnish a safety program prior to beginning work on the project(s).

DELAYED ACCEPTANCE, FINAL INSPECTION AND PAYMENT TO CONTRACTOR:

A minimum of 14 days after completion of the HMA paving work, the Road Commission Engineer and Construction Supervisor (or designated representatives) will inspect the project(s) with the Contractor. If deficiencies are found (including smoothness requirements per 501.03.H), corrective work is required. Complete all corrective work within seven working days of the inspection, or by an agreed upon date. All costs associated with completing this corrective work, to the satisfaction of the Road Commission, will be borne by the Contractor.

Provide detailed invoicing separately for each road segment. MCRC will provide job numbers for each location and job number is required to be referenced on the invoice.

Final acceptance shall not be granted until all materials and test results pertaining to the project(s) are deemed to be satisfactory.

The Road Commission will not pay the Contractor for the work performed on the project until after the inspection is completed, corrective work is completed (if necessary), and the project is accepted by the Road Commission.

Midland County Road Commission

MEASUREMENT AND PAYMENT:

The completed work, including all materials, labor and equipment, as measured, will be paid for at the contract unit price for the following items (pay item), as shown on the itemized bid list for each project

<u>Contract Item</u>	<u>Pay Unit</u>
HMA, 13A, Modified.....	Ton
HMA, Wedging, Partial Lane.....	Ton
HMA Wedging, Full Lane.....	Ton
HMA, 36A, Modified.....	Ton
HMA, Ultra-Thin, Medium Volume, Modified.....	Ton
Shoulder, Class II.....	Ton

HMA ____, HMA Ultra Thin, and Shoulder Class II will be paid for by the Ton, based on delivery load tickets received for materials delivered and placed on the project(s).

HMA Wedging Partial Lane shall be used as determined by the Engineer for lane sections requiring wedging from the ¼ crown to the outside edge of paved surface and paid for by the Ton based on delivery load tickets received for materials delivered and placed on the project(s).

HMA Wedging Full Lane shall be used as determined by the Engineer for lane sections requiring wedging full width from centerline to the outside edge of paved surface and paid for by the Ton based on delivery load tickets received for materials delivered and placed on the project(s).

Temporary Pavement Markings, Type NR will not be paid for separately but included in the price per ton of HMA ____.

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Midland County Road Commission

	<u>Pay Unit</u>	<u>Unit Price</u>	<u>Estimated Quantity</u>
HMA, 13A, Modified	Ton	_____	13,400
HMA Wedging, Partial Lane	Ton	_____	3,900
HMA, Wedging, Full Lane	Ton	_____	11,500
HMA 36A, Modified	Ton	_____	1,900
HMA, Ultra-Thin, Medium Volume, Modified	Ton	_____	1,800
Shoulder, Class II	Ton	_____	4,700

Company Name: _____

Street Address: _____

City: _____ State: _____ Zip Code: _____

Telephone No.: _____ Fax No.: _____

Email Address: _____

Printed Name: _____

Signature: _____

Date: _____

MIDLAND COUNTY ROAD
COMMISSION
SPECIAL PROVISION
FOR
**MARSHALL HOT MIX ASPHALT MIXTURE
HMA (Type), MODIFIED**

MCRC:AB

1 of 2

2/1/2018

a. Description. Furnish hot mix asphalt (HMA) mixture, designed using Marshall Mixture Design Methods, in accordance with the standard specifications except as modified by this special provision.

b. Mix Design. Submit the mix design for evaluation in accordance with the Department's HMA Production Manual. Use a 50 blow Marshall hammer when compacting mixtures for developing Marshall mix designs.

c. Recycled Mixtures. Substituting reclaimed asphalt pavement (RAP) for a portion of the new material required to produce HMA mixture is allowed provided that the mixture is designed and produced to meet all criteria specified herein, unless otherwise prohibited. RAP materials must be in accordance with the standard specifications and **not to exceed a maximum of 15%**.

d. Materials. Table 1 provides the mix design criteria and volumetric properties. Table 2 provides the required aggregate properties. Use aggregates of the highest quality available to meet the minimum specifications. Use the mixture designation number shown in the contract item name when determining mix design properties from Tables 1 and 2. **Binder shall be Performance Grade 58-28** in accordance with section 904 of the 2012 Mdot Standard Specifications.

e. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

Pay Item	Pay Unit
HMA, (<u>Type</u>), Mod.....	Ton

Table 1: Mix Design Criteria and Volumetric Properties

	Mixture No.				
	2C	3C	4C	13A	36A
Target Air Void, % (a)	3.00	4.00	4.00	4.00	4.00
VMA (min) (b)	11.00	13.00	14.00	14.00	15.00
VFA	65-78	65-78	65-78	65-78	65-78
Fines to Binder Ratio (max) (c)	1.2	1.2	1.2	1.2	1.2
Flow (0.01 inch)	8 -16	8 -16	8 -16	8 -16	8 -16
Stability (min), lbs	1200	1200	1200	900	900
a. Lower target air voids by 1.00% if used in a separate shoulder paving operation. Consider reducing air void targets to 3.00% for lower traffic volume roadways when designing 13A and 36A mixtures for local agency use. b. VMA calculated using Gsb of the combined aggregates. c. Ratio of the weight of aggregate passing the No. 200 sieve to total asphalt binder content by weight; including fines and binder contributed by RAP.					

NOTE: Air Voids must meet (a.) from table above.

Table 2: Aggregate Properties

	Mixture No.				
	2C	3C	4C	13A	36A
	Percent Passing Indicated Sieve or Property Limit				
1½ inch	100				
1 inch	91-100	100			
¾ inch	90 max.	91-100	100	100	
½ inch	78 max.	90 max.	91-100	75-95	100
⅜ inch	70 max.	77 max.	90 max.	60-90	92-100
No. 4	52 max.	57 max.	67 max.	45-80	65-90
No. 8	15-40	15-45	15-52	30-65	55-75
No. 16	30 max.	33 max.	37 max.	20-50	
No. 30	22 max.	25 max.	27 max.	15-40	25-45
No. 50	17 max.	19 max.	20 max.	10-25	
No. 100	15 max.	15 max.	15 max.	5-15	
No. 200	3-6	3-6	3-6	3-6	3-10
Crushed (min), % (MTM 117)	90	90	90	25	60
Soft Particle (max), % (a)	12.0	12.0	8.0	8.0	8.0
Angularity Index (min) (b)	4.0	4.0	4.0	2.5	3.0
L.A. Abrasion (max), % loss (c)	40	40	40	40	40
Sand Ratio (max) (d)	-	-	-	50	50
<p>a. The sum of the shale, siltstone, structurally weak, and clay-ironstone particles must not exceed 8.0 percent for aggregates used in top course. The sum of the shale, siltstone, structurally weak, and clay-ironstone particles must not exceed 12.0 percent for aggregates used in base and leveling courses.</p> <p>b. The fine aggregate angularity of blended aggregates, determined by MTM 118, must meet the minimum requirement. In mixtures containing RAP, the required minimum fine aggregate angularity must be met by the virgin material. NAA fine aggregate angularity must be reported for information only and must include the fine material contributed by RAP if present in the mixture.</p> <p>c. Los Angeles abrasion maximum loss must be met for the composite mixture, however, each individual aggregate must be less than 50</p> <p>d. Sand ratio for 13A and 36A no more than 50% of the material passing the No. 4 sieve is allowed to pass the No. 30 Sieve.</p>					

MIDLAND COUNTY ROAD COMMISSION
SPECIAL PROVISION
FOR
HMA, Ultra-Thin, Modified

MCRC: AB

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2/1/2017

- a. **Description.** This guide specification provides acceptance testing requirements for use on HMA Ultra-Thin Overlay mixture.
- b. **Materials.** The HMA and materials shall meet the following requirements:
 1. **Bond Coat.** The bond coat material will be emulsified asphalt conforming to the requirements of Section 904 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, Type SS-1h.
 2. **HMA Ultra-Thin Overlay.** The Ultra Thin HMA Overlay shall be composed of a mixture of aggregate, asphalt binder, and if required, mineral filler, as listed in Table 1.
- c. **Recycled Mixtures.** Substituting reclaimed asphalt pavement (RAP) for a portion of the new Material required to produce HMA mixture is allowed provided that the mixture is designed and produced to meet all criteria specified herein, unless otherwise prohibited. RAP materials must be in accordance with the standard specifications and to **not exceed a maximum of 15%.**

Table 1 - HMA Ultra-Thin Overlay Mixture Requirements

Parameter	Low Volume Comm. ADT <380	Medium Volume Comm. ADT 380 - 3400	High Volume Comm. ADT >3400
Marshall Air Voids %	4.5	4.5	5.0
VMA % (min.) based on Gsb	15.5	15.5	15.5
Fines/Binder % Max.	1.2	1.4	1.4
Flow (0.01 in.)	8-16	8-16	8-16
Stability Min. (lbs)	1200		

1. **Aggregate Gradation and Physical Properties.** The combined gradation of the aggregate portion of the mixture, including the mineral filler, shall be within the limits of Table 2. The physical properties of the combined aggregates shall meet the criteria of Table 3.

Table 2 - HMA Ultra-Thin Overlay Aggregate Gradation

Sieve Size	Total Passing Percent by Weight
½ inch	100
3/8 inch	99-100
No. 4	75-95
No. 8	55-75
No. 30	25-45
No. 200	3-8

Table 3 - HMA Ultra-Thin Overlay Aggregate Physical Requirements

Parameter	Low Volume Comm. ADT <380	Medium Volume Comm. ADT 380 - 3400	High Volume Comm. ADT >3400
Percent Crush (min.)	50%	75%	95%
Angularity Index (MTM 118) (min.)	2.5	3.0	4.0
L.A abrasion loss (max.)	40	35	35
Aggregate Wear Index (AWI)	(a)	(a)	(a)
a. AWI of 220 is required for projects with less than or equal to 2000 ADT, projects with ADT greater than 2000 the minimum AWI requirement is 260.			

In addition, the sum of the shale, siltstone, ochre, coal, clay-ironstone and particles which are structurally weak or are found to be non-durable in service shall not exceed 8.0 percent.

- Performance Graded (PG) Asphalt Binder. Binder selection is based on present day two-way commercial ADT as listed in Table 4. The PG binder shall meet all the requirements in Section 904 of the 2012 MDOT Standard Specifications for Construction.

Table 4 - Asphalt Binder Selection for HMA Ultra-Thin Overlay

Low Volume Comm. ADT <380	Medium Volume Comm. ADT 380 - 3400	High Volume Comm. ADT >3400
PG 64 -22*	PG 64 -28P**	PG 70-22P*
* In areas North of M-46, May use PG 58-28 (Low) or PG 70-28P (High)		
** May use another "readily available" polymer modified (P) grade.		

d. **Construction.**

- Bond Coat Application. The bond coat material will be applied to completely cover the prepared surface at a rate of 0.05 - 0.15 gal/yd².
- Mixture Application Rate. The target application rate shall be as directed by the engineer to address special circumstances.
- Mix Design and JMF. A mix design and JMF must be submitted and approved prior to start of work. Submissions must be received one week before the start of work. The selected contractor will be required to submit one mix design and one JMF per mix type awarded. Any changes to these after initial approval, must be approved prior to the start of work, by the County Highway Engineer. Mix samples will be taken by Midland County Road Commission employees, or other certified sampler and tested by a qualified tester. Samples will be random and at the owners discretion. Mix Design and JMF are required for HMA, Wedging.
- Quality Control. The Contractor shall provide and follow a Quality Control (QC) plan for the Ultra Thin HMA Overlay that will maintain adequate QC for production and construction processes applicable to this specification and the contract documents. For QC purposes, the Contractor must perform at least one QC test per day for gradation, AC content, and air voids. The Owner shall be provided a copy of the QC plan for review, prior to mix production and placement.

After the job-mix-formula is established, the aggregate gradation and the binder content of the HMA mixture furnished for the work shall be maintained within the Range 1 uniformity tolerance limits permitted for the job-mix-formula specified in Table 5. However, if deviations are predominantly either below or above the job-mix-formula, the Owner may order alterations in the plant to bring the mixture to the job-mix-formula. If two consecutive aggregate gradations on one sieve, or binder contents as determined by the QC tests, are outside Range 1 but within Range 2 tolerance limits, the Contractor shall suspend all operations. Contract time will continue during these times when the plant is down. Before resuming any production, the Contractor shall propose, for the Owner's approval, all necessary alterations to the materials or plant so that the job-mix-formula can be maintained. The Owner, after evaluating for effects on AWI and mix design properties, will approve or disapprove such alterations. **MAX. 15% RAP.**

Table 5 – Uniformity Tolerance Limits (for QC and Acceptance)

PARAMETER	* Range 1	Range 2
Air Voids**	± 0.5	± 1.0
Binder Content	± 0.30	± 0.40
% Passing # 8 and Larger Sieves	± 4.0	± 6.0
% Passing # 30 Sieve	± 3.0	± 5.0
% Passing # 200 Sieve	± 1.0	± 2.0
* This range allows for normal mixture and testing variations. The mixture shall be proportioned to test as closely as possible to the Job-Mix-Formula.		
** Air Void limits apply to QC testing and are optional for Acceptance testing.		

5. Crushed Particle Content. The crushed particle content of the aggregate used in the HMA mixture shall not be more than 10 percentage points above or below the crushed particle content used in the job-mix-formula nor less than the minimum specified for the aggregate in the project documents.
6. Density. Thoroughly compact the mixture immediately after placement using the number of rollers method.

Number of Rollers Method. The number of compactive and finish rollers used shall be as specified in Table 6 based on the square yards per hour of Ultra Thin HMA Overlay being placed.

Table 6-Number of Roller Method

Average Laydown Rate, square yards per hour	Number of Rollers Required	
	Compaction Rollers	Finish Rollers
Less than 800	1	1*
801 – 2000	1	1
2001 – 5500	2	1
5501 – 7200	3	1

*The compaction roller may be used as the finish roller also.

e. **Rejected Mixtures.** If for any one mixture, two consecutive aggregate gradations on one sieve or binder contents as determined by acceptance tests exceed the uniformity tolerance of Range 2 under Table 5, or do not meet the minimum requirements for crushed particle content specified in the project documents, the mixture will be rejected. If such mixtures are placed in a pavement, the remaining portions of the failing acceptance samples (split sample) will be sent to an independent Laboratory to confirm the acceptance test results. If the Laboratory's results do not confirm the acceptance test results, then no price adjustments will be made for the mixture involved. If the Laboratory's results confirm the acceptance test results and if, in the Owner's judgment, the defective mixture can remain in place, the contract unit price for the defective mixture involved, as determined from acceptance tests, will be decreased on the following basis: The contract unit price for material outside of Range 2 will be decreased 50 percent.

If three consecutive aggregate gradations on one sieve, or bitumen contents as determined by field tests are outside Range 1 but within Range 2 tolerance limits, the mixture produced from the time the third sample was taken until the gradation, or bitumen content is corrected back to Range 1 will be decreased in contract unit price by 10 percent. Field tests indicating that mixtures are subject to the 10 percent penalty will be confirmed in the same manner as mixtures subject to the 50 percent penalty as described herein.

The Owner may take into account the Contractor's QC test results when making acceptance decisions and price adjustments.

f. **Measurement and Payment.** The completed work as measured will be paid for at the contract unit price for the following contract item:

<u>Contract Item (Pay Item)</u>	<u>Pay Unit</u>
HMA, Ultra-Thin, Medium Volume, Modified	Ton

Payment for HMA, Ultra-Thin, Medium Volume, Modified includes all materials, equipment, labor for preparing the surface, tack coat, placing the HMA, Ultra-Thin Overlay mixture and complying with all requirements. The placement includes placement of a single course of mixture for full width coverage as specified in the plans.

SPECIAL PROVISION
FOR
**ACCEPTANCE OF HOT MIX ASPHALT MIXTURE ON MIDLAND COUNTY ROAD
COMMISSION PROJECTS OTHER THAN ULTRA-THIN**

MCRC:AB

2/1/2018

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a. Description. This special provision provides sampling and testing requirements for Midland County Road Commission (herein referred to as MCRC) projects using the roller method and density gauge testing. Provide the hot mix asphalt (HMA) mixture in accordance with the requirements of the standard specifications and MCRC Special Provisions, except where modified herein.

b. Materials. Provide aggregates, mineral filler (if required), and asphalt binder to produce a mixture proportioned within the master gradation limits shown in the contract, and meeting the uniformity tolerance limits in Table 1.

Table 1: Uniformity Tolerance Limits for HMA Mixtures

Parameter		Top, Leveling and Base Course(s)	
Number	Description	Range 1 (a)	Range 2
1	% Binder Content	-0.10 to +0.30	-0.10 to +0.50
2	% Passing	# 8 and Larger Sieves	±4.0
		# 30 Sieve	±3.0
		# 200 Sieve	±1.0
3	Crushed Particle Content (b)	Below 10%	Below 15%
4	Air Void, %	±0.50	±0.60
	VMA	±0.50	±0.60
<p>a. This range allows for normal mixture and testing variations. The mixture must be proportioned to test as closely as possible to the Job-Mix-Formula (JMF).</p> <p>b. Deviation from JMF</p>			

Parameter number 4 for 2018 is a pilot program only and no penalties will be assessed.

Parameter number 2 as shown in Table 1 is aggregate gradation. Each sieve will be evaluated on one of the three gradation tolerance categories. If more than one sieve is exceeding Range 1 or Range 2 tolerances, only the one with the largest exceedance will be counted as the gradation parameter.

The master gradation should be maintained throughout production; however, price adjustments will be based on Table 1. Aggregates which are to be used in plant-mixed HMA mixtures must not contain topsoil, clay, or loam.

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c. Construction. Engineer is defined as the County Engineer or the Technician designated by the Engineer, acting directly or through authorized representatives, who is responsible for engineering supervision of the construction when the County is the awarding authority.

Submit a Mix Design and a JMF, signed by a qualified independent source, to the Engineer. Do not begin production and placement of the HMA until receipt of the Engineer's approval of the JMF. Maintain the binder content, aggregate gradation, and the crushed particle content of the HMA mixture within the Range 1 uniformity tolerance limits in Table 1.

At the Pre-Production or Pre-Construction meeting, the Engineer will determine the method of sampling to be used. Ensure all sampling is done in accordance with *MTM 313 (Sampling HMA Paving Mixtures)*. Samples are to be taken from separate hauling loads.

The Engineer will sample and maintain possession of the sample. Each sample will be divided into two parts with one part being for initial testing and the other part being held for possible dispute resolution testing.

Obtain samples that are representative of the day's paving. Sample collection is to be spaced throughout the planned tonnage. One sample will be obtained in the first half of the tonnage and the second sample will be obtained in the second half of the tonnage. If planned paving is reduced or suspended, when paving resumes, the remaining sampling must be representative of the original intended sampling timing.

Ensure all persons performing testing are Bit Level One certified or Bit QA/QC Technician certified.

Ensure daily test samples are obtained, except, if the first test results show that the HMA mixture is in specification, the Engineer has the option of not testing additional samples from that day.

At the Pre-Production or Pre-Construction meeting, the Engineer will determine the test method for measuring asphalt content (AC) using *MTM 319 (Determination of Asphalt Content from Asphalt Paving Mixtures by the Ignition Method)* or *MTM 325 (Quantitative Extraction of Bitumen from HMA Paving Mixtures)*. Back calculation will not be allowed for determining asphalt content.

For production/mainline type paving, the mixture may be accepted by visual inspection up to a quantity of 500 tons per mixture type, per project (not per day). For non-production type paving defined as driveways, approaches, and patching, visual inspection may be allowed regardless of the tonnage.

The mixture will be considered out-of-specification, as determined by the acceptance tests, if for any one mixture, two consecutive tests per parameter, (for Parameter 2, two consecutive aggregate gradations on one sieve) are outside Range 1 or Range 2 tolerance limits. If a parameter is outside of Range 1 tolerance limits and the second consecutive test shows that the parameter is outside of Range 2, then it will be considered to be a Range 1 out-of-specification. Consecutive refers to the production order and not necessarily the testing order. Out-of-specification mixtures are subject to a price adjustment per the Measurement and Payment section of this special provision.

Contractor operations will be suspended when the mixture is determined to be out-of-specification, but contract time will continue to run. The Engineer may issue a Notice of Non-Compliance with Contract Requirements, if the Contractor has not suspended operations and taken corrective action. Submit a revised JMF or proposed alterations to the plant and/or materials to achieve the JMF to the Engineer. Effects on the Aggregate Wear Index (AWI) and mix design properties will be taken into consideration. Production and placement cannot resume until receipt of the Engineer's approval to proceed.

Pavement in-place density tests will be completed by the Engineer during paving operations and prior to traffic staging changes. Pavement in-place density acceptance testing will be completed by the Engineer prior to paving of subsequent lifts and being open to traffic.

Roller Method

The Engineer will use the Roller Method with a nuclear or non-nuclear density gauge to document achieving optimal density as discussed below.

Use of the density gauge requires establishing a rolling pattern that will achieve the required in-place density. The Engineer will measure pavement density with a density gauge using the Gmm from the JMF for the density control target.

Use of the Roller Method requires developing and establishing density frequency curves, and meeting the requirements of Table 2. A density frequency curve is defined as the measurement and documentation of each pass of the finished roller until the in-place density results indicate a decrease in value. The previous recording will be deemed the optimal density. The Contractor is responsible for establishing and documenting an initial or QC rolling pattern that achieves the optimal in-place density. When the density frequency curve is used, the Engineer will run and document the density frequency curve for each half day of production to determine the number of passes to achieve the maximum density. Table 5, located at the end of this special provision, can be used as an aid in developing the density frequency curve. The Engineer will perform density tests using an approved gauge per the manufacturer's recommended procedures, provided at no cost by the contractor.

Table 2: Minimum Number of Rollers Recommended Based on Placement Rate

Average Laydown Rate, Square Yards per Hour	Number of Rollers Required (a)	
	Compaction	Finish
Less than 600	1	1 (b)
601 - 1200	1	1
1201 - 2400	2	1
2401 - 3600	3	1
3601 and More	4	1

a. Number of rollers may increase based on density frequency curve.
b. The compaction roller may be used as the finish roller also.

After placement, roll the HMA mixture as soon after placement as the roller is able to bear without undue displacement or cracking. Start rolling longitudinally at the sides of the lanes and proceed toward the center of the pavement, overlapping on successive trips by at least half the width of the drum. Ensure each required roller is 8 tons minimum in weight unless otherwise approved by the Engineer.

Ensure the initial breakdown roller is capable of vibratory compaction and is a maximum of 500 feet behind the paving operations. The maximum allowable speed of each roller is 3 miles per hour (mph) or 4.5 feet per second. Ensure all compaction rollers complete a minimum of two complete rolling cycles prior to the mat temperature cooling to 180 degrees Fahrenheit (F). Continue finish rolling until all roller marks are eliminated and no further compaction is possible. The Engineer will verify and document that the roller pattern has been adhered to. The Engineer can stop production when the roller pattern is not adhered to.

d. Measurement and Payment. The completed work, as described, will be measured and paid for using applicable pay items as described in subsection 501.04 of the Standard Specifications for Construction, or the contract, except as modified below.

If acceptance tests, as described in section c. of this special provision, show that a Table 1 mixture parameter exceeds the Range 1, but not the Range 2, tolerance limits, that mixture parameter will be subject to a 10 percent penalty. If acceptance tests, as described in section c. of this special provision, show that a Table 1 mixture parameter exceeds the Range 2 tolerance limits, that mixture parameter will be subject to a 25% penalty. The Contractors QA test results for the corresponding QA test must result in an overall payment greater than QA test results otherwise the QA test will not be allowed to be disputed. The dispute resolution sample will be sent to an independent lab selected by the MCRC, and the resultant dispute test results will be used to determine the penalty per parameter, if any. The independent lab must not have conflicts of interest with the Contractor or MCRC. If the dispute testing results show that the mixture parameter is out-of-specification, the Contractor will pay for the cost of the dispute resolution testing and the contract base price for the material will be adjusted, based on all test result parameters from the dispute tests, as shown in Table 3 and Table 4. If the dispute test results do not confirm the mixture parameter is out-of-specification, then the MCRC will pay for the cost of the dispute resolution testing and no price adjustment is required.

In all cases, when penalties are assessed, the penalty applies to each parameter that is out of specification.

Table 3: Penalty Per Parameter

Mixture Parameter out-of-Specification per Acceptance Tests	Mixture Parameter out-of-Specification per Dispute Resolution Test Lab	Price Adjustment per Parameter
NO	N/A	None
YES	NO	None
	YES	Outside Range 1 but not Range 2: decrease by 10%
		Outside Range 2: decrease by 25%

The quantity of material receiving a price adjustment is defined as the material produced from the time the first out-of-specification sample was taken until the time the sample leading to the first in-specification test was taken or production is ended for that run of material.

Each parameter of Table 1 is evaluated with the total price adjustment applied to the contract price based on a sum of the parameter penalties resulting in the highest total price adjustment as per Table 4. If the Engineer approves leaving the mixture in place, the total price adjustment for that quantity of material will be as per Table 4.

Table 4: Calculating Total Price Adjustment

Cost Adjustment as a Sum of the Highest Parameter Penalties		
Number of Parameters Out-of-Specification	Range(s) Outside of Tolerance Limits of Table 1 per Parameter	Total Price Adjustment
One	Range 1	10%
	Range 2	25%
Two	Range 1 & Range 1	20%
	Range 1 & Range 2	35%
	Range 2 & Range 2	50% or removal
Three	Range 1, Range 1 & Range 1	30%
	Range 1, Range 1 & Range 2	45%
	Range 1, Range 2 & Range 2	60% or removal
	Range 2, Range 2 & Range 2	75% or removal
Four	Range 1, Range 1, Range 1 & Range 1	40%
	Range 1, Range 1, Range 1 & Range 2	55% or removal
	Range 1, Range 1, Range 2 & Range 2	70% or removal
	Range 1, Range 2, Range 2 & Range 2	85% or removal
	Range 2, Range 2, Range 2 & Range 2	100% or removal

Table 5: Density Frequency Curve Development

Tested by: _____ Date/Time: _____

Route/Location:		Air Temp:
Control Section/Job Number:		Weather:
Mix Type:	Tonnage:	Gauge:
Producer:	Depth:	Gmm:

Roller #1 Type:

Pass No.	Density	Temperature	Comments
1			
2			
3			
4			
5			
6			
7			
8			
Optimum			

Roller #2 Type:

Pass No.	Density	Temperature	Comments
1			
2			
3			
4			
5			
6			
7			
8			
Optimum			

Roller #3 Type:

Pass No.	Density	Temperature	Comments
1			
2			
3			
4			
5			
6			
7			
8			
Optimum			

Summary: _____
