1/8/21

RUSTIC ROAD – From Pickerel Lake Road to West 7,062 ft.

Project:

1.33 miles

Project Stations:
10+50 P.O.B.
81+15 P.O.E

Reconstruct:
Embankment, CIP
Earth Excavation
Subgrade Undercutting
6 inch Aggregate base
Culverts
2 inch HMA Paving
Gravel Shoulders
Restoration

Project Dates:

Project Start Date: 10 days after all Contracts are executed, submittals from contractor, and written notice to agency two weeks before work is scheduled to start.
Project Completion Date: Before October, 1st 2021. Once started, a continuous effort must be made to complete as soon as possible to minimize road closure or detour times.

Project Submittals:

The following shall be submitted to the Road Commission Engineer for approval prior to project start:

1. Material Source List (MDOT Form 501)
2. Progress Schedule (must be submitted within 5 days of Contract award)
3. See the Special Provision for Acceptance of HMA Mixtures on Township Projects for submittal requirements (must be submitted prior to paving).

General Note:

All work being performed will be conducted in the safest manner possible and appropriate PPE worn at all times. All work shall be done in accordance with the Michigan Department of Transportation 2012 Standard Specification for Construction. Contractor assumes all responsibilities for Quality Control (QC) to assure the plans and specifications are met per the contract and to provide

professional craftsmanship in each task being performed. Any errors in plans or discrepancies found in the field shall be brought to the engineer's attention immediately.

For protection of underground utilities, and in conformance with Public act 53 of 1974, the contractor shall call MISS DIG a minimum of three full working days, excluding Saturdays, Sundays and Holidays, prior to beginning work in areas where public utilities have not been previously located. All MISS DIG participating members will be thus routinely notified. This does not relieve the Contractor from notifying utility owners who may not participate in the MISS DIG alert system

Trenching:

The Contractor shall trench the shoulder each side prior to HMA Crushing and Shaping to remove all topsoil. Trenched material may be used on the front slope. See typical sections for details on trench dimensions.

Earth Excavation and Embankment:

Earth Excavation will be paid at plan quantity, any changes must be approved by engineer. Embankment, LM material shall all meet MDOT Granular Material Class II requirements.

HMA Base Crushing and Shaping:

The contractor shall grade the pulverized material to the cross slope and width indicated on the typical section, watered and compacted. After crushing and shaping, the grade will be proof rolled with a full water truck (loaded tandem) or approved other by engineer, and inspected by contractor and engineer for weak or deflecting areas and paid for as part of HMA Base Crushing and Shaping prior to placing new aggregate base.

Pay limits for HMA Crushing are specified on the Typical Sections.

Aggregate Base:

Aggregate base shall meet MDOT specifications. The contractor will grade and compact the aggregate base material after placement per MDOT specifications. The Road Commission will hire independent testing lab for materials test and moisture/density for the compaction on aggregate base placement to ensure it meets specifications. Also a visual inspection and a proof roll performed with inspector present, on the aggregate base prior to HMA placement. At no time will there be less than the minimum aggregate thickness shown on plans to bring grade up to meet proper slope.

When road projects have steep hills, it is the contractors choice or unless specified to use a Dense-Grade Aggregate 22A 100% crushed or a 21 AA maybe used. Aggregate base will have a moisture content no greater than optimal and be compacted to at least 98% and graded with proper cross slope. The structural integrity of the aggregate base shall not be compromised during paving

operations. If rutting or distortion occurs, operations will be stopped until repaired. Payment for use of a modified material to aid in operations is incidental unless otherwise noted for payment under "Aggregate Base."

The Contractor shall provide an electronic scale ticket for each load delivered to the job. All scale tickets shall meet MDOT requirements. The Contractor shall provide current scale certification to the Road Commission prior to hauling material. Loader scales will not be accepted.

HMA Paving:

HMA 4E1 or LVSP shall have a design Asphalt Performance Grade of 58-28. See the included Special Provision for Acceptance of HMA Mixture on Township Projects for HMA mixture specifications. At no time will the application rate be less than the thickness required per plan documents.

HMA APPLICATION TABLE					
Label	**Mix**	**Application Rate** (Lbs/Syd)	**Design Performance Grade**	**Comments**	**Pay Item**
	HMA,4E1, LVSP	varies	58-28	Mainline/Other	HMA, 4E1
1	AWI = 220 for all HMA,4E1				
2	Apply HMA Bond Coat at 0.10 gallons per square yard between paving courses or as directed by the Engineer. Tack all joints day of paving. Paid for as part of other HMA items.				

HMA Application Rates:

Driveways and intersections varies to match pavement:

220 – 330 lbs/Syd

Paving steep hills (7% or greater), when specified on plans for mainline:

330 lbs/Syd

Application rate at 165 lbs/Syd paving courses.

When paving steep hills it is the responsibility of the contractor to provide the engineer with a means and method plan for review. The finished product must meet all specifications for compaction and no deviations that effect ride quality. If at any point during paving, the HMA or aggregate base becomes disturbed, operations will be stopped until the HMA or aggregate base is repaired at the contractor's expense.

Construction joints are not acceptable unless shown on the plans or approved by the engineer.

Intersections:

Intersections shall be blended when the aggregate base is placed, paid for as part of Approach Cl I. Intersection shall be saw cut as shown on plans or as directed by the engineer (payment included as part of Pavt, Rem.). Any additional gravel needed to shape the paved approach areas shall be paid for as part of Approach Cl. The Contractor is responsible to ensure positive drainage in all approaches.

The Contractor will be responsible for repairing, at the Contractor's expense, standing water or other drainage related issues. Tack all saw cut joints the day HMA is to be placed.

Driveways:

Gravel Driveways shall be blended when the shoulder material is placed, paid for as part of Approach Cl II. Paved driveways shall be blended when the overlay is placed. Driveways shall be blended 4.0' – 6.0' from the edge of the roadway, or as directed by the Engineer. Paved driveways shall be cut 30.0 feet from the centerline of existing pavement (payment included as part of Pavt, Rem.) Any additional gravel needed to shape the paved approach areas shall be paid for as part of Approach Cl 1. Driveway approaches shall be paved after mainline paving. The Contractor is responsible to ensure positive drainage in all approaches. The Contractor will be responsible for repairing, at the Contractor's expense, rough transitions, standing water or other drainage related issues.

The Contractor shall be responsible to maintain access to driveways after paving. On any driveway that has more than 4 inches of drop off the Contractor shall provide a gravel apron that reduces the drop off to a maximum of 4 inches on the day of paving or the next calendar day. If the Contractor fails to provide such access, the Road Commission will levy liquidated damages of $200.00 per calendar day that a drop off exceeds 4 inches in any driveway.

Gravel Shoulders:

Contractor shall place Shoulder, Cl II material that meets MDOT specification, width placed per plans or as directed by the engineer. Shoulder, CL II material shall be a 100% crushed limestone material that meets specifications for Shoulder, Cl II (23A). When placing shoulder aggregate, material shall be placed directly on the shoulder. No shoulder material may be placed on the asphalt. Shoulder material shall be flushed to the edge of pavement and blended to the existing shoulder on the outside. Shoulder material shall have proper moisture content and can be wheel rolled with heavy equipment or compacted by other acceptable means approved by the engineer to achieve specified density and to have a smooth sealed finish. The Contractor is responsible to ensure positive drainage on gravel shoulders. The Contractor will be responsible for repairing, at the Contractor's expense, standing water or other drainage related issues.

The Contractor shall provide an electronic scale ticket for each load delivered to the job. All scale tickets shall meet MDOT requirements. The Contractor shall provide current scale certification to the Road Commission prior to hauling material. Loader scales will not be accepted. Any exceptions shall be noted on the bid sheet for the project.

The Contractor shall schedule shoulder material placement in a timely manner to reduce the time that an edge drop off exists. The Contractor shall place shoulder material within 7 calendar days of paving completion. If the Contractor fails to place shoulder material, the Road Commission will levy liquidated damages of $200.00 per calendar day that the edge drop off exists.

Topsoil Shoulders:

Contractor shall place Topsoil, LM material per plan or as specified by the engineer. When placing the topsoil, material shall be placed directly on the shoulder. No shoulder material may be placed on the asphalt. Shoulder material shall be flushed to the edge of pavement and blended to the existing shoulder on the outside. Shoulders shall be wheel rolled with heavy equipment for density.

Restoration Items:

When placing the topsoil, material shall be placed directly on the shoulder. Topsoil material may not be placed on the asphalt. Shoulder material shall be flushed to the edge of gravel shoulder and blended to the existing shoulder on the outside. Topsoil shall be wheel rolled with heavy equipment for density.

Contractor shall place Topsoil Surface, Furn, 3 inch on all disturbed surfaces per plan. Contractor shall use a seeding mixture that is applicable for residential lawn areas. The price for Seed, Fertilizer and Mulch shall include seed, fertilizer, mulch and tackifier along with all costs of application. Slope Restoration Type A is to follow MDOT SP 12RC816(A265). Submit seed mix and fertilizer data to the engineer 3 days prior to application.

A sample fertilizer bag and seed ticket, from the materials used on the project, must be submitted to the Engineer within 7 days of completion of restoration.

Mailboxes:

Relocate all mailboxes as indicated on the Driveway Details. Replace posts as directed by the Engineer. The Contractor is responsible to install the mailboxes at the appropriate height. All posts must meet MDOT requirements for mailbox posts (see Special Detail R-74-D).Cost for relocation of mailboxes, replacement posts, replacement mailboxes and disposal of old posts and mailboxes will be included in the pay item **Mailbox Relocation**.

Pavement Markings:

Pavement Markings shall be placed in accordance with the 2011 Michigan Manual of Uniform Traffic Control Devices. All zoning shall be the responsibility of the contractor. Payment for zoning shall be included in the items for pavement markings.

Traffic Control:

All traffic control, signing and traffic control items shall be paid for as **Traffic Control.** Traffic will be maintained by the Contractor in accordance with the 2011 Michigan Manual of Uniform Traffic Control Devices.

Project Quantities:

Mobilization	1	LS
Culv, Rem, Less than 24 inch	13	Ea
Culv, Rem, 24 inch to 48 inch	2	Ea
Embankment, CIP	1065	Cyd
Excavation, Earth, Modified	4510	Cyd
Erosion Control, Check Dam, Stone	500	Ft
Erosion Control, Maintenance, Sed Rem	75	Cyd
Erosion Control, Silt Fence	1000	Ft
Subbase, CIP	1990	Cyd
Aggregate Base, Modified	4235	Syd
HMA Base Crushing and Shaping	17,745	Syd
HMA Base Crushing and Shaping, Special	1035	Syd
Maintenance Gravel	100	Ton
Approach, Cl I	210	Ton
Approach, Cl ll	192	Ton
Trenching	116	Sta
Shoulder, Cl II, Modified	350	Ton
Geotextile, Stabilization	4615	Syd
Culv, Cl A, CMP 15 inch	468	Ft
Culv, Cl A, CMP 24 inch	56	Ft
Culv, Cl A, CMP 30 inch	48	Ft
Underdrain, Subbase, 6 inch	2130	Ft
HMA, 4E1	2090	Ton
HMA Approach	68	Ton
HMA Valley Gutter	411	Ft
Post, Mailbox, Modified	24	Ea
Fence, Moving	250	Ft
Post, Steel, 3 lb	430	Ft
Sign, Type IIB	16	Sft
Sign, Type IIIA	13.25	Sft
Sign, Type IIIB	128.50	Sft

Sign, Type II, Rem, Modified	1	Ea
Sign, Type III, Rem, Modified	5	Ea
Pavt. Mrkg, Waterborne, 4 inch, White	14,065	Ft
Pavt. Mrkg, Waterborne, 4 inch, Yellow	9094	Ft
Barricade, Type III, High Intensity, Lighted, Furn	3	Ea
Barricade, Type III, High Intensity, Lighted, Oper	3	Ea
Channelizing Device, 42 inch, Furn	150	Ea
Channelizing Device, 42 inch, Oper	150	Ea
Lighted Arrow, Type C, Furn	2	Ea
Lighted Arrow, Type C, Oper	2	Ea
Minor Traf Devices	1	LSUM
Sign, Type B, Temp, Prismatic, Furn	550	Sft
Sign, Type B, Temp, Prismatic, Oper	550	Sft
Traffic Regulator Control	1	LSUM
Riprap, Plain	15	Syd
Slope Restoration	71	Sta

Bid Sheet

Board of Emmet County Road Commissioners
2265 East Hathaway Road
Harbor Springs, MI 49740

Gentlemen:

The undersigned proposes to furnish any and all materials, labor, and equipment necessary for the reconstruction of this road as spelled out in the “Invitation to Bid” for the prices below.

Project:
RUSTIC ROAD

Item	Quantity	Unit	Unit Price	Total
Mobilization	1	LS		
Culv. Rem, Less than 24 inch	8	Ea		
Culv. Rem, 24 inch to 48 inch	13	Ea		
Embankment, CIP	1065	Cyd		
Excavation, Earth, Modified	4510	Cyd		
Erosion Control, Check Dam, Stone	500	Ft		
Erosion Control, Maint, Sediment Removal	75	Cyd		
Erosion Control, Silt Fence	1000	Ft		
Subbase, CIP	1990	Cyd		
Aggregate Base, Modified	4235	Ton		
HMA Base Crushing and Shaping	17,745	Syd		
HMA Base Crushing and Shaping, Special	1035	Syd		
Maintenance Gravel	100	Ton		
Approach, Cl I	210	Ton		

Approach, Cl ll	192	Ton		
Trenching	116	Sta		
Shoulder, Cl II, Modified	350	Ton		
Geotextile, Stabilization	4615	Syd		
Culv, Cl A, CMP 15 inch	468	Ft		
Culv, Cl A, CMP 24 inch	56	Ft		
Culv, Cl A, CMP 30 inch	48	Ft		
Underdrain, Subgrade, 6 inch	2130	Ft		
HMA, 4E1	2090	Ton		
HMA Approach	68	Ton		
HMA Spillway	40	Syd		
HMA Valley Gutter	411	Ft		
Post, Mailbox, Modified	24	Ea		
Fence, Moving	250	Ft		
Post, Steel, 3 lb	430	Ft		
Sign, Type IIB	16	Sft		
Sign, Type IIIA	13.25	Sft		
Sign, Type IIIB	128.50	Sft		
Sign, Type II, Rem, Modified	1	Ea		
Sign, Type III, Rem, Modified	5	Ea		
Pavt. Mrkg, Waterborne, 4 inch, White	14,065	Ft		
Pavt. Mrkg, waterborne, 4 inch, Yellow	9094	Ft		

Barricade, Type III, High Intensity, Lighted, Furn	3	Ea		
Barricade, Type III, High Intensity, Lighted, Oper	3	Ea		
Channelizing Device, 42 inch, Furn	150	Ea		
Channelizing Device, 42 inch, Oper	150	Ea		
Lighted Arrow, Type C, Furn	2	Ea		
Lighted Arrow, Type C, Oper	2	Ea		
Minor Traf Devices	1	LSUM		
Sign, Type B, Temp, Prismatic, Furn	550	Sft		
Sign, Type B, Temp, Prismatic, Oper	550	Sft		
Traffic Reg. Control	1	LS		
Riprap, Plain	15	Syd		
Paved Ditch, HMA	15	Syd		
Slope Restoration	71	Sta		
TOTAL PROJECT COST ESTIMATE =				

Bidder: _____ Address: _____

_____ _____

Signature: _____ Phone No.: _____

Printed Name: _____ Date: _____

Title: _____

Subcontractor Certification

For

RUSTIC ROAD

This project will not have any work completed by subcontractor(s).

_____	_____
Contractor Name	Contractor Representative Printed Name
_____	_____
Date	Contractor Representative Signature

Subcontractor:_____

Items of Work:

_____	_____
_____	_____
_____	_____
_____	_____

Subcontractor:_____

Items of Work:

_____	_____
_____	_____
_____	_____
_____	_____

Include additional sheets if necessary for subcontractors.

EMMET COUNTY ROAD COMMISSION
SPECIAL PROVISION
FOR
ACCEPTANCE OF HMA MIXTURE ON TOWNSHIP PROJECTS

ECRC: BAG 01/22/2018

a. **Description**

This Special Provision provides acceptance-testing requirements for use on this project. The HMA mixture shall be provided to meet the requirements of the standard specifications for construction except where modified herein. The HMA mixture quality assurance and acceptance shall conform to Section 501 of the 2012 Michigan Department of Transportation Standard Specifications for Construction except where modified herein. The MDOT HMA Production Manual, current edition, applies to this work.

b. **Submittals**

The following items shall be submitted to the Engineer before payment will be issued.

1. Job Mix Formula (MDOT Form 1911) for the project for review and approval by the Engineer. The Contractor shall not place any HMA without an approved JMF.
   i. Fine Aggregate Angularity
   ii. RAP Tiering based on JMF values
   iii. Fines to Asphalt Ratio (based on Effective Asphalt Content)
   iv. Soft Particle Percentage of each JMF Aggregate Type
2. Quality Control Plan.
3. A copy of all Contractor Quality Control Tests submitted within 7 working days of project completion.
4. A copy of the Bill of Lading or Delivery Ticket for the Asphalt Binder for the project. The Bill of Lading must include the type of material that was previously hauled in the delivery tank.

c. **Materials**

Aggregates, mineral filler (if required), and asphalt binder shall be combined as necessary to produce a mixture proportioned within the master gradation limits and meeting the uniformity tolerances listed in Table 1 and the quality assurance testing tolerances in Table 2 of this special provision. The master gradation range is to be used for establishing mix design only. Topsoil, clay or loam shall not be added to aggregates used in plant produced HMA mixtures.

The maximum Percentage of Soft Particles for any HMA mixture shall be 5%.

Table A: HMA MIXTURE TARGETS AND PARAMETERS

HMA Mix Type	VMA Min. on any give Test (a.c)	VMA Target (c)	Asphalt Binder Content Minimum JMF	Asphalt Binder Content Min. on any given test (a)	Fines to Asphalt Ratio Max. on JMF (b)
4E1	14.0	Based on mix design parameters, the contractor shall establish & state their VMA Target on the mix design JMF, and shall adhere to the VMA Min.	5.80	5.50	1.10
5E1	15.0		6.10	5.80	1.10
Ultra-thin	15.5		6.00	5.70	1.20

a. The HMA parameter minimum is per any given QC/QA test, regardless of Tolerances listed in Table 2 of this Special Provision.
b. Value based on Pbe (Effective Asphalt Percent) for each given mix and JMF
c. VMA values are based on the Gsb (Bulk Specific Gravity) of the given HMA mixture not the Gse (Effective Specific Gravity).

Table B: HMA Mixture Targets and Parameters Cont'd (Ultra-Thin)

Superpave Air Voids (%)	4.5
Superpave Gyrations	35
Fine Aggregate Angularity (Min.)	40.0
Percent Crush (Min. %)	50.0
Aggregate Wear Index (AWI)	220
Sieve Size	**Total % Passing**
1/2 inch	100
3/8 inch	99-100
No. 4	75-95
No. 8	55-75
No.30	25-45
No. 200	3-8

d. **Asphalt Binder**
Liquid Asphalt binder shall be a Performance Graded (PG) binder as specified in the bid documents and/or approved by the Road Commission.

e. **Air Voids**
Design air voids will be 4.0% and shall be regressed to 3.0% in production by the addition of virgin liquid asphalt (4E1 and 5E1).

f. **Recycled Asphalt Materials**
Recycled Asphalt Pavement (RAP) is allowed in the HMA mixtures subject to the following requirements. The method for determining the binder grade in HMA mixtures incorporating RAP is divided into two categories designated Tier 1 and Tier 2. Each tier has a range of percentages that represent the contribution of the RAP toward total binder replacement. Binder replacement will be determined by weight. ***The use of Reclaimed Asphalt Pavement (RAP) shall be limited to Tier 1 (0% to 17%) RAP binder by weight of the total binder in the Ultra-Thin mixture, which will also use a PG 58-34 binder.***

Recycle Asphalt Shingles (RAS) are <u>not</u> allowed in the HMA mixture.

Tier 1 - 0.0% to 17.0% RAP binder by weight of the total binder in the mixture
No binder grade adjustment is required to compensate for the stiffness of the asphalt binder in the RAP.

Tier 2- 18.0% to 27.0% RAP binder by weight of the total binder in the mixture
The required asphalt binder grade must be at least one grade lower for the low temperature than the design binder grade required for the specific project mixture. For example, if the design binder grade for the mixture type is 58-28, the required grade for the binder in the HMA mixture containing >17.0% RAP would need to be a 58-34.

g. **Construction**
After the Job Mix Formula is established, the aggregate gradation 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 1. However, if deviations are predominantly either below or above the job-mix-formula, the Engineer may order alterations in the plant to bring the mixture to the job-mix-formula. If

two consecutive aggregate gradations on one sieve as determined by the field 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 Engineer's approval, all necessary alterations to the materials or plant so that the job-mix-formula can be maintained. The Engineer, after evaluating for effects on AWI and mix design, properties, will approve or disapprove such alterations.

Random liquid asphalt binder samples will be taken by the Engineer or Consultant. The Engineer reserves the right to test any or all samples taken.

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.

Quality assurance and acceptance testing will be as follows:

1. **Asphalt Mixture Sampling**
   Acceptance sampling and testing will be performed by the Engineer using the using the sampling method and testing option selected by the Engineer. Each day of production, random samples will be obtained for each mix type. Acceptance testing will be performed at a frequency specified by the Engineer.

   For each given day of production, if the daily mix tonnage per HMA mix type is under 500 tons, the Engineer reserves the right to test one sample and obtain a second sample for future testing if necessary. If the daily mix tonnage per HMA mix type is over 500 tons, The Engineer reserves the right to test one sample. If the first sample meets the Range 1 tolerances in Table 1 and Table 2, the Engineer can obtain a second sample and perform any of the following actions:

   a) Perform Full Quality Assurance testing
   b) Perform Volumetric Testing Only (Ignition or Extraction AC/Gmm, Air Voids, VMA)
   c) Retain custody of the sample for future testing if necessary

2. **Asphalt Binder Sampling**
   The Contractor shall obtain the asphalt binder sample, correctly label the sample container, and complete a Sample Identification (Bituminous Material Form 1923B). The form must be filled out correctly and completely, and signed before the sample is given to the Engineer. The daily asphalt binder sample must be taken from a sampling spigot located on the pipeline supplying asphalt binder to the plant, in a position between the asphalt binder pump and the point where the asphalt binder enters the mixture. Personnel safety is critical in selecting the position of the sampling spigot. Give the binder sample and completed Form 1923B to the Engineer.

   Daily Asphalt Binder Samples are to be in 1 pint (16 ounce), slip top, seamless ointment tin. The tin must be at least three quarters full. All containers must be labeled in a legible format with the following information.

   a) Project Name
   b) Binder Grade
   c.) Binder Supplier certificate number
   d) Supplier name, city and state
   e) Date sampled
   f.) Mix Type

The Engineer may request to witness the sampling of the asphalt binder upon visit to the HMA plant. The Engineer will complete the 1923B for the witness sample. The witness sample will be recorded as the daily asphalt binder sample. Any other asphalt binder samples from that same day will be discarded.

The Engineer may request a copy of the MDOT Binder Certification Documents. These copies must be presented to the Engineer when the respective daily binder samples and the 1923B forms are picked up at the plant. The Engineer will review these documents and communicate any problems that may arise.

3. **Mixture Testing**

Mixture samples will be tested to verify gradation, binder content and volumetric properties per Table 1 and Table 2 listed below.

If the Engineer elects not to perform Quality Assurance testing on a given day or a given project, the Contractor is still required to perform testing in accordance with Table 1 and Table 2 below. The Contractor's Quality Control test results shall be sent to the Engineer within 2 working days of each day's productions for a given HMA mixture.

TABLE 1: Quality Assurance / Control Tolerance Limits for HMA Mixtures

	TOP AND LEVELING COURSE	
PARAMETER	**Action Limits (Range 1)**	**Suspension Limits (Range 2)**
% Passing the #8 and Larger Sieves	+/- 5.0%	+/- 8.0%
% Passing #30 Sieve	+/- 4.0%	+/- 6.0%
% Passing #200 Sieve	+/- 1.0%	+/- 2.0%

TABLE 2: Quality Assurance / Control Testing Tolerances (±) from the JMF or Target Values

Parameter	**Double Tests per Lot (c)**	**Lot Average**
Binder Content (a)	0.30% (a)	0.50% (a)
Maximum Specific Gravity (Gmm)	0.013	0.020
Voids in Mineral Aggregate VMA (a,b)	0.75% (a, b)	0.80%
Air Voids (c)	0.60%	0.090%
Fines to Effective Asphalt Ratio	0.65-1.20	0.60-1.25
a) Refer to minimum parameters in Table A of this special provision. B) These given limits are (+/-) from given targets in Table A of this special provision. c) Limits are (+/-) from JMF/Target Value listed in Section e. of this special provision.		

4. **Density**

Pavement density will be measured by the Engineer, with a Nuclear Density Gauge, using the G_{MM} from the JMF for the density control target. The in-place density of the HMA mixture shall be at least 92.0% of the density control target. In place density will be calculated by averaging four QA density tests locations. Tests will not be taken within 12 inches of the pavement edges or joints.

h. **Rejected Mixtures**

1. **Gradation**

Action Limits - A range of values established in Table 1 - Uniformity Tolerance Limits for HMA Mixtures that, if exceeded on two consecutive tests, Contractor is required to take corrective action to bring the mixture produced onto conformance with the specifications.

Suspension Limits – Range of values established in Table 1 – Quality Assurance / Control Tolerance Limits for HMA Mixtures that, if exceeded on a single test, Contractor is required to suspend operations and determine, document, and correct the cause before resuming production. Prior to resuming production, the Engineer must be notified of the findings and approve corrective action prior to resuming production.

2. **Asphalt Binder**

If a liquid asphalt binder sample does not meet the required specification, the mix produced from the point of the last liquid asphalt binder sample meeting specification to the failed sample shall be considered defective and shall be replaced at the sole expense of the contractor.

3. **Volumetric Properties**

The acceptable tolerances for Binder Content, Gmm, VMA, Air Voids, and Fines to Pbe are listed in Table 2 above. Any HMA Mixture produced outside of these tolerances or any HMA Mixture that does not meet the requirements listed in the sub notes of Table 2 above will be subject to a negative adjustment or rejected. The resulting penalty will be a negative adjustment of 10% to 50% or remove / replace, to be determined by the Engineer.

4. **Pavement Density**

A negative 10% adjustment in the HMA Mixture contract price will be imposed if the pavement density (average of all gauge readings) is less than 92%, but equal to or greater than 91% or if 2 or more readings are less than 91%.

A negative 25% adjustment in the HMA Mixture contract unit price will be imposed if the pavement density (average of all gauge readings) is less than 91% but equal to or greater than 90%; or if 2 or more readings are less than 90%.

If the average density is less than 90%, the Contractor shall remove and replace the pavement at no cost to the Owner.