October 22, 2014

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATION
DEPARTMENT OF ADMINISTRATION

DIVISION OF PURCHASES BID NO. 189

RHODE ISLAND DEPARTMENT OF TRANSPORTATION

RHODE ISLAND CONTRACT NO.2014-CH-074

FEDERAL-AID PROJECT NO. FAP Nos: NHP-0001(111), NHPG-0001(112), NHPG-HSIP(013)

Improvements to US Route 1 in Charlestown

US Route 1 (Post Road) STA. 11+20 to US Route 1 (Post Road) STA. 223+90 and five locations along Old Post Rod in Charlestown and South Kingstown.

CITY/TOWN OF Charlestown, South Kingstown

COUNTY OF WASHINGTON

NOTICE TO PROSPECTIVE BIDDERS

ADDENDUM NO. 2 Prospective bidders and all concerned are hereby notified of the following changes in the Plans, Specifications, Proposal and Distribution of Quantities for this contract. These changes shall be incorporated in the Plans, Specifications, Proposal and Distribution of Quantities, and shall become an integral part of the Contract Documents.

A. Contract Documents

1. General Provision - Contract Specifics

   a. Page CS 7

      Delete Page CS 7 in its entirety and replace with Page CS 7 (R-1) attached to this Addendum No. 2. The requirements of micromilling and paving operations have been revised.

   b. Appendix D

      Insert new Coastal Resources Management Council (CRMC) Assent attached to this Addendum No. 2. The CRMC Assent has been added.

2. Specifications - Job Specifics

   a. Index Pages JS-i (R-1) and JS-ii (R-1)

      Delete Index Pages JS-i (R-1) and JS-ii (R-1) in their entirety and replace with revised Index Pages JS-i (R-2) and JS-ii (R-2) attached to this Addendum No. 2. The index has been revised.

   b. Page JS 15 through Page JS 40

      Delete Page JS 15 through Page JS 40 in their entirety and replace with revised Page JS 15 (R-1) through Page JS 40 (R-1) attached to this Addendum No. 2. The job specific specifications of Dense Graded Hot Mix Asphalt pavements have been revised.

   c. Pages JS 45 through JS 48

Delete Pages JS 45 through JS 48 in their entirety and replace with revised Pages JS 45 (R-1) through JS 48 (R-1), attached to this Addendum No. 2. The job specific specification Paver Placed Elastomeric Surface Treatment Overlay has been revised.

d. Page JS 63

Delete Page JS 63 (R-1) in its entirety and replace with revised Page JS 63 (R-2), attached to this Addendum No. 2. The liquid asphalt cement and diesel fuel price adjustments have been revised.

e. Page JS 74

Insert new Page JS 74 attached to this Addendum No. 2. The job specific specification Warm Mix Additive has been added.

B. Distribution of Quantities

1. Index Page 3

Delete Index Page 3 in its entirety and replace with revised Index Page 3 (R-1) attached to this Addendum No. 2. The index has been revised.

2. Page 104

Delete Page 104 in its entirety and replace with revised Page 104 (R-1) attached to this Addendum No. 2. Item Code 414.9901 has been added.

C. Clarification

1. Warm Mix Additive

The minimum acceptable bid price for Item 414.9901 Warm Mix Additive is $1.50 each.

RI Department of Transportation
Chief Engineer

No drainage structure or paved waterway shall be blocked by the new pavement overlay. The new pavement shall be graded towards the inlet opening and towards paved waterways or catch basins adjacent to the shoulder. This task shall be considered incidental to the pavement laying operation and there shall be no separate payment for this work.

The Contractor shall submit a paving schedule to the Engineer seven (7) days prior to the proposed paving start date.

The existing pavement surface will be micro milled with equipment designed specifically for grinding asphalt surfaces to close tolerances without tearing and gouging the surface.

All micro milled areas are to be paved within 10 calendar days after milling operations are complete.

A 25 foot ski is required for micro milling operations.

On US Route 1, the Contractor shall remove the existing pavement to a depth of 1.75 inches, and place 1.75 inches of Friction Course over the milled surface. The contractor shall perform additional micro milling at the direction of the Engineer, a leveling course may be required to be placed on the additional milled surfaces. The locations of additional milling shown on the Plans are for estimating purpose only. Actual location may vary and shall be determined in the field by the Engineer.

All other roadways included in the contract shall be resurfaced with the pavement treatment as specified on the plans. Location of leveling course and second milling are shown on the plans for estimating purposes only. The exact locations will be determined in the field by the Engineer.

Pavement shall be removed to the existing edge of pavement in areas of curb and guardrail. This task shall be considered incidental to the micro milling operation and there shall be no separate payment for this work.

Notch wedge joints are required for paving operations.

Longitudinal drop-offs for hot mix asphalt will be permitted.

The Contractor shall apply the asphalt emulsion tack coat to the existing pavement. No tack coat shall be left exposed to traffic. Therefore, the Contractor shall apply the tack coat only to the area which the Contractor expects to complete the final riding surface course by the end of the day's operations.

The paving of ramps must be completed in such a way that no tack coat shall track onto the new main line pavement.

18. RIDEABILITY

Pavement smoothness will be determined by the Engineer for all travel lanes. Price adjustments will only be made to the unit price of the hot mix asphalt placed in the travel lanes as determined by the Job Specific Specification 413, Rideability.

State of Rhode Island and Providence Plantations
Coastal Resources Management Council
Oliver H. Stedman Government Center
4808 Tower Hill Road, Suite 116
Wakefield, RI 02879-1900

(401) 783-3370
Fax (401) 783-3767

ASSENT

CRMC File No.: 2014-07-086 CRMC Assent No.: A2014-07-086

Whereas, of

RI Department of Transportation
Two Capitol Hill
Attn: Peter A. Healey, P.E. Chief Civil Engineer
Providence, RI 02903

has applied to the Coastal Resources Management Council for assent to: conduct highway improvements to Route 1; and represents that they are the owner(s) of the riparian rights attached to the property involved and submitted plans of the work to be done.

Now, said Council, having fully considered said application in accordance with all the regulations as set forth in the Administrative Procedures Act does hereby authorize said applicant, subject to the provisions of Title 46, Chapter 23 of the General Laws of Rhode Island, 1956, as amended, and all laws which are or may be in force applicable thereto: **conduct highway improvements to Route 1; located at Route 1, Charlestown, RI,** in accordance with said plans submitted to this Council and approved by this Council. In accordance with revisions to RIGL 46-23-6.3 Expiration Tolling Periods (as amended effective June 26, 2013), all work being permitted must be completed on or before **July 1, 2018** after which date this assent is null and void, (unless written application requesting an extension is received by CRMC sixty (60) days prior to expiration date).

Applicant agrees that as a condition to the granting of this assent, members of the Coastal Resources Management Council or its staff shall have access to applicant's property to make on-site inspections to insure compliance with the assent.

Licensee shall be fully and completely liable to State, and shall waive any claims against State for contribution or otherwise, and shall indemnify, defend, and save harmless State and its agencies, employees, officers, directors, and agents with respect to any and all liability, damages (including damages to land, aquatic life, and other natural resources), expenses, causes of action, suits, claims, costs (including testing, auditing, surveying, and investigating costs), fees (including attorneys' fees and costs), penalties (civil and criminal), and response, cleanup, or remediation costs assessed against or imposed upon Licensee, State, or the Property, as a result of Licensee's control of the Property, or Licensee's use, disposal, transportation, generation and/or sale of Hazardous Substances or that of Licensee's employees, agents, assigns, sublicensees, contractors, subcontractors, permittees, or invitees.

Nothing in this assent shall be construed to impair the legal rights of this granting authority or of any person. By this assent the granting authority by no manner, shape, or form assumes any liability or responsibility implied, or in fact, for the stability or permanence of said project; nor by this assent is

there any liability implied or in fact assumed or imposed on the granting authority. Further, the granting authority by its representatives or duly authorized agents shall have the right to inspect said project at all times including, but not limited to, the construction, completion, and all times thereafter.

This Assent is granted with the specific proviso that the construction authorized therein will be maintained in good condition by the owner thereof, his heirs, successors, or assigns for a period of fifty (50) years from the date thereof, after which time this permission shall terminate necessitating either complete removal or a new application.

Permits issued by the CRMC are issued for a finite period of time, confer no property rights, and are valid only with the conditions and stipulations under which they are granted. Permits imply no guarantee of renewal, and may be subject to denial, revocation, or modification.

If this matter appeared before the full Council, a copy of the legal decision from this proceeding may be acquired by contacting the CRMC office in writing.

A copy of this Assent shall be kept on site during construction.

Application for future alteration of the shoreline or other construction or alteration within the CRMC jurisdiction shall be submitted to the CRMC for review prior to commencing such activity.

All applicable policies, prohibitions, and standards of the RICRMP shall be upheld.

All local, state or federal ordinances and regulations must be complied with.

Please be advised that as a further conditions of this Assent, it is hereby stipulated that you and/or your agents shall comply at all times with Federal and State Water Quality Standards and other State standards and regulations regarding water quality, and shall exercise such supervision over and control of these facilities to prevent the dumping or discarding or refuse, sanitary wastes and other pollutants in the tidal waters, either from vessels docked at said facilities or from land adjacent thereto.

No work that involves alteration to wetlands or waters of the United States shall be done under this Assent until the required Federal Permit has been obtained.

Non-compliance with this assent shall result in legal action and/or revocation of this permit.

CAUTION:

The limits of authorized work shall be only for that which was approved by the CRMC. Any activities or alterations in which deviate from the approved plans will require a separate application and review. If the information provided to the CRMC for this review is inaccurate

or did not reveal all necessary information or data, then this permit may be found to be null and void. Plans for any future alteration of the shoreline or construction or alteration within the 200' zone of CRMC jurisdiction or in coastal waters must be submitted for review to the CRMC prior to commencing such activity.

Permits, licenses or easements issued by the Council are valid only with the conditions and stipulation under which they are granted and imply no guarantee of renewal. The initial application or an application for renewal may be subject to denial or modification. If an application is granted, said permit, license and easement may be subject to revocation and/or modification for failure to comply with the conditions and stipulations under which the same was issued or for other good cause.

ATTENTION: ALL STRUCTURES AND FILLED AREAS IN THE TIDAL, COASTAL, OR NAVIGABLE WATERS OF THE STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS ARE SUBJECT TO:

1. The Superior Property Rights of the State of Rhode Island and Providence Plantations in the Submerged and Submersible Lands of the Coastal, Tidal, and Navigable Waters;
2. The Superior Navigation Servitude of the United States;
3. The Police Powers of the State of Rhode Island and the United States to regulate Structures in the Tidal, Coastal, or Navigable Waters.

THE SUBMERGED AND SUBMERSIBLE LANDS OF THE TIDAL, COASTAL, AND NAVIGABLE WATERS OF THE STATE ARE OWNED BY THE STATE AND HELD IN TRUST FOR THE PUBLIC. CONVEYANCE OF THESE LANDS IS ILLEGAL; TITLES PURPORTING TO TRANSFER SUCH LANDS ARE VOID. ASSENTS THAT INVOLVE THE FILLING OR USE OF THE STATES SUBMERGED LANDS ARE GRANTED WITH THE PROVISO THAT IT IS SUBJECT TO THE IMPOSITION OF A USAGE FEE TO BE ESTABLISHED BY THE COASTAL RESOURCES MANAGEMENT COUNCIL.

SPECIFIC STIPULATIONS OF APPROVAL

General Stipulations

A. The approved plans shall be those entitled "Plan, Profile, and Sections of Proposed Improvements to U.S. Route 1 (Post Road)" dated July 7, 2014, and prepared by Green International Affiliates, Inc. Except as stipulated or modified herein, all details and specifications thereon shall be strictly adhered to. Any and all changes require written approval from this office.

Earthwork Stipulations

A. The approved soil erosion and sediment control plan shall be that entitled "Soil Erosion and Sediment Control Plan for: Improvements to US Route 1 (Post Road) and Portions of Old Post Road" received July 25, 2014, and prepared by Green International Affiliates, Inc.

B. The standards and specifications set forth in the most recent RI Soil Erosion and Sediment Control Handbook (RISESCH) shall be strictly adhered to.

C. No operations of heavy equipment shall occur on the coastal feature, in coastal waters, or in any areas designated as setback or coastal buffer zone in accordance with CRMP Sections 140 and 150.

D. Prior to initiation of any grading, construction, or earthwork activity, a line of staked haybales and/or silt fence in accordance with RISESCH Standard "ST" shall be placed along the downslope perimeter of the proposed area of construction. This line shall not be located on a coastal feature nor within a stipulated buffer zone. Bales and/or silt fence shall be "toed in" 4 inches to prevent the underwash of sediments. This line shall be maintained by the replacement of bales as needed and by the proper upland disposal of accumulated sediments until permanent site revegetation is established. No soils nor any other materials shall be allowed to enter beyond this line, neither temporarily nor permanently.

E. Silt fences shall be constructed of woven (not extruded) materials to minimize clogging and subsequent failure.

F. Upon successful stabilization of exposed soils, all haybales and stakes shall be removed from site and disposed of at a suitable, legal upland location.

G. All catch basins and drains in the area into which sediment laden waters may flow shall be ringed with haybales staked and toed in 4 inches or protected per Standard "SD" of the RISESCH. These controls shall be properly maintained by timely removal of accumulated sediment and replacement of bales as needed.

H. There shall be no stockpiling or disposal of soils, construction materials, debris, etc., on the coastal feature, within 50 feet of the inland edge of the coastal feature, in coastal waters, or in any areas designated as a CRMC setback or coastal buffer zone.

I. All excess excavated materials, excess soils, excess construction materials and debris shall be removed from the site and disposed of at an inland landfill or a suitable and legal upland location outside of CRMC jurisdiction. No materials shall be deposited on the coastal feature, within 50 feet of the inland edge of the coastal feature, in coastal waters, or in any areas designated as a CRMC setback or coastal buffer zone.

J. All fill materials shall be clean, free of debris and rubble, and free of materials which may cause pollution of surface waters or groundwater.

K. All areas of exposed soil which are disturbed by construction and related activities shall be revegetated as immediately as is physically possible so as to minimize erosion and sedimentation. If the season is not conducive to immediate revegetation, all exposed soils shall be temporarily stabilized with hay mulch, jute mat netting or similar erosion control materials. Soil stabilization methods shall be employed during, as well as after, the construction phase to the maximum extent possible.

L. Excavation and grading shall be limited to the area approved. Excess earthwork beyond that authorized by this assent is not permitted.

M. There shall be no discharge or disposal of hazardous wastes or hazardous materials which may be associated with construction machinery, etc. on the site of in the waterway. All used oil, lubricants, construction chemicals, etc. shall be disposed of in full compliance with applicable State and Federal regulations.

In Witness Whereof, said Coastal Resources Management Council have hereto set their hands and seal this 2nd day of October in the year two-thousand-fourteen.

Jeffrey M. Willis, Deputy Director
Coastal Resources Management Council

/kc

State of Rhode Island and Providence Plantations

COASTAL RESOURCES MANAGEMENT COUNCIL

NOTICE OF

ASSENT

CRMC Assent No.: A2014-07-086 Date: October 2, 2014

This certifies that RI Department of Transportation has permission to conduct highway improvements to Route 1.

situated at Route 1

Plat No. _____ Lot No. _____

Said construction operations to be done in accordance with an approved assent on file in the Offices of the Coastal Resources Management Council and subject further to all the provisions of the building ordinances of the :

City/Town of **Charlestown**

and to all the applicable State, Local and Federal provisions. This assent shall expire on July 1, 2018.

Kathleen Caduto

Official Designee
Coastal Resources Management Council

THIS CARD MUST BE DISPLAYED IN A CONSPICUOUS PLACE ON THE PREMISES.
FAILURE TO DISPLAY WILL RESULT IN LEGAL ACTION.

Addendum 2

SPECIFICATIONS - JOB SPECIFIC
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414.	Warm Mix Additive	JS-74

JOB SPECIFIC
R.I. CONTRACT NO. 2014-CH-074
SECTION 401

CODE 401.9901
HOT MIX ASPHALT – MODIFIED CLASS 12.5

CODE 401.9902
HOT MIX ASPHALT – CLASS 4.75 FOR PATCHING

CODE 401.9903
HOT MIX ASPHALT - CLASS 19.0

CODE 401.9904
HOT MIX ASPHALT - CLASS 4.75 LEVELING COURSE

Remove Section 401 in its entirety and replace it with the following:

SECTION 401

DENSE GRADED HOT MIX ASPHALT (HMA) PAVEMENTS

401.01 DESCRIPTION. This work consists of constructing HMA pavements on prepared foundations in conformity with the dimensions and details indicated on the Plans, and in accordance with these Specifications. These Specifications are applicable to all types of Dense Graded HMA pavements irrespective of aggregate gradation, grade of performance graded asphalt binder (PGAB), or pavement use.

The HMA shall be composed of a mixture of aggregate, PGAB, and filler if required. The aggregate shall be sized, graded and combined in such proportions that the resulting mixture meets the gradation requirements of the job mix formula (JMF).

401.02 MATERIALS.

401.02.1 Aggregates. Aggregates shall meet the applicable requirements of **Subsection M.03.02.2** of these Specifications and AASHTO M 323.

401.02.2 Performance Graded Asphalt Binder (PGAB). All grades shall conform to AASHTO M 320 and MP 19. The PGAB shall meet the requirements of PG 64-28, Grade S with the exception of both Class 19.0 and mixes designated as "Base Course" which shall incorporate PG 64-22 Grade S for mixes with less than 15% RAP. Both Class 19.0 and "Base Course" mixes with 15 to 25 percent RAP shall incorporate PG 58-28 Grade S.

Should a class of HMA be designated as "Modified", the binder shall meet the requirements of PG 64-28, Grade V. The nonrecoverable creep compliance versus percent recovery of the binder shall be plotted and must fall above the curve in Figure X2.1 in Appendix X2 of AASHTO TP-70.

Should a class of HMA be designated as "with WMA" the Contractor shall use a WMA (Warm Mix Additive). WMA shall conform to Section 414 of these specifications.

401.02.3 Mix Design. HMA mixes shall conform to AASHTO M 323, "Standard Specification for Superpave Volumetric Mix Design". The design procedure shall follow AASHTO R 35 "Standard Practice for Superpave Volumetric Design for Hot-Mix Asphalt (HMA)". The optimum binder content (OBC) shall be determined as follows:

a) The OBC for Class 4.75, Class 9.5, and Class 12.5 when not designated as "Base Course" shall be determined using PG 64-28 Grade S.

b) The OBC for Class 4.75, Class 9.5, and Class 12.5 when designated as "Base Course" with less than 15 percent RAP shall be determined using PG 64-22 Grade S.

c) The OBC for Class 4.75, Class 9.5, and Class 12.5 when designated as "Base Course" with 15 to 25 percent RAP shall be determined using PG 58-28 Grade S.

d) The OBC for Class 19.0 with less than 15 percent RAP shall be determined using PG 64-22 Grade S.

e) The OBC for Class 19.0 with 15 to 25 percent RAP shall be determined using PG 58-28 Grade S.

The effective voids in the mineral aggregate ($VMA_{effective}$) and a volumetric phase diagram shall be submitted for each asphalt content during the mix design process. Mix designs shall be developed and signed by an individual certified in "Superpave HMA Mix Design" by the Asphalt Institute. Mix Designs shall be submitted no later than two weeks prior to the date when production of the mixture is scheduled to begin and shall be accompanied by a copy of that individual's certification. No mixture may be produced for State projects until the mix design is approved by the Engineer. Mix designs shall be submitted on forms provided by the Engineer.

The following specific requirements and exceptions to AASHTO M 323 shall apply.

a. The specific gravity, absorption and consensus properties of the aggregates shall be obtained from RIDOT's most recent sampling and testing or from a laboratory accredited to perform AASHTO T 84 and T 85.

b. The implementation of the recommendations of Section 4.2 of AASHTO R 35 is required.

c. The mix shall be coarse graded as defined in Section 6.1.3 of AASHTO M 323.

d. The dust to binder ratio ($P_{0.075}/P_{be}$) shall be 0.5 – 1.0. The effective binder content shall be used to calculate this ratio.

e. In addition to the sieves listed in Table 3 of AASHTO M 323, the 0.600 mm, 0.300 mm and 0.150 mm sieves are required. The 50.0 mm and 37.5 mm sieves are not required.

f. Class 19.0 and mixes designated as "Base Course" shall be designed with a 0%, 10%, 15%, 20% or 25% RAP content. RAP shall not be used in any other mix.

g. $N_{initial}$ shall be 6, N_{design} shall be 50 and N_{max} shall be 75 gyrations.

h. A moisture susceptibility test is not required.

i. The design VMA, VFA, air voids and minimum optimum binder content (OBC) shall meet the following criteria:

Table 1 – HMA Properties

Class of Mix	VMA (minimum)	VFA	Air Voids	Minimum OBC
4.75	17.5%	70% - 80%	4%	7.0
9.5	16.5%	70% - 80%	4%	6.0
12.5	15.5%	70% - 80%	4%	5.5
19.0	14.5%	70% - 80%	4%	5.0

The following procedures shall be adhered to for each mix design:

- Three aggregate trial blends shall be submitted for acceptance before beginning the mix design procedure.

The procedures for mix design submittals shall include:

- All trial mixture data and calculations determined per Section 9 of AASHTO R 35 shall be submitted on forms provided by the Engineer. The Engineer will determine which trial mixture shall be used for the mix design procedure.
- After the mix design is completed it shall be submitted to the Engineer for review and approval.
- The correction factors for each mix for each ignition furnace in the plant lab shall be provided.

The two gyratory cores (AASHTO T 308) and the theoretical maximum specific gravity sample (AASHTO T 209) at the optimum binder content shall be submitted to the Engineer.

Before beginning production of a new HMA mix, a successful plant trial batch shall be performed for that mix and the results forwarded on forms provided by the Engineer.

Should a change in sources of materials be made, a new mix design shall be established before the new material is used. When unsatisfactory results or other conditions make it necessary, the Contractor shall establish a new mix design and submit it to the Engineer for approval.

401.02.4 Quality Assurance.

a. Process Control. The Contractor shall exercise process control over all production operations. This shall require the constant monitoring of equipment, materials, and production activity such as testing and analysis to ensure that the HMA meets all applicable requirements and is produced within the allowable tolerances.

b. Acceptance Testing. Acceptance testing will be conducted by the Engineer.

1. Gradation, Binder Content and Air Void Content

The gradation requirements in Table 2 apply to mixes with and without pay adjustments:

Table 2 – Gradation Requirements

	Class 19.0	**Class 12.5**	**Class 9.5**	**Class 4.75**
25.0mm (1")	100%	100%	100%	100%
19.0mm (3/4")	90% - 100%	100%	100%	100%
12.5mm (1/2")	90% max	90% - 100%	100%	100%
9.5mm (3/8")	-	90% max	90% - 100%	95% - 100%
4.75mm (#4)	-	-	90% max	85% - 100%
2.36mm (#8)	± 5% from design	± 5% from design	± 5% from design	-
1.18mm (#16)	-	-	-	±5% from design
0.075mm (#200)	≥2%	≥2%	≥2%	≥2%
Control Sieve	2.36mm (#8)	2.36mm (#8)	2.36mm (#8)	1.18mm (#16)

During production of a specific mix, if two consecutive tests do not meet the gradation requirements of Table 2 or one test exceeds double the tolerance on the control sieve, the plant shall cease production of that HMA mix. Production will be allowed to resume after the Contractor completes a successful trial batch for that class of mix, as approved by the Engineer.

The plant shutdown criteria in Table 3 shall apply for binder content and air voids that exceed the following tolerances:

Table 3 – Plant Shutdown Criteria

Pay Adjustments	**Shutdown Criteria**	**One Test**	**Two Consecutive Tests**
With Pay Adjustments	Optimum Binder Content	±0.6%	-
	Design Air Voids	±2.0%	-
Without Pay Adjustments	Optimum Binder Content	±0.6%	±0.4%
	Design Air Voids	±2.0%	±1.0%

Production will be allowed to resume after the Contractor completes a successful trial batch for that class of mix, as approved by the Engineer.

2. Mix Production – Lots and Sublots

A standard sublot is 600 tons for HMA sampled at the plant for each production run. A standard lot for each mix is five sublots. A sample will be randomly selected and tested for each sublot. At least three sublots will be used when calculating pay adjustments.

If the quantity of HMA needed to finish a production run is projected by the Contractor to be less than the standard sublot size of 600 tons, the projected tonnage may be used to select a random sample. If the projected tonnage is not produced or a random sample is unable to be taken, the Engineer may select a sample at the end of the run or at the paver. If no sample is taken, the tonnage will be added to the previous sublot.

Additional samples may be taken at the discretion of the Engineer.

Gyratory cores and theoretical maximum density samples will be retained by the Engineer for a minimum of two weeks after the results are reported to the Contractor.

3. Adjustments to Lots

If one or two sublots are tested after the end of the final standard lot, they will be added to that lot. Three or more sublots tested after the end of the final standard lot will constitute a separate lot. Test results for each sublot will be weighted based on tonnage to determine the final pay adjustment for the lot.

4. Plant Pay Adjustments

(a) If a class of HMA is designated with "Pay Adjustments", the pay adjustments for deviation from the optimum binder content (established by the mix design) in Table 4 and the design air void content in Table 5 will apply:

Table 4 – OBC Pay Adjustments

Deviation from Optimum Binder Content	**Pay Adjustment**
Less than or equal to 0.1 %	+2%
0.2%	+1%
0.3%	0%
0.4%	-5%
0.5%	-15%
0.6%	-30%
0.7%	-40%
Greater than 0.7 %	-50% or Remove and Replace*

Table 5 – Air Void Pay Adjustments

Deviation from Design Air Void Content	Pay Adjustment
Less than or equal to 0.5%	+1%
0.6% to 1.0%	0%
1.1% to 1.5%	-5%
1.6% to 2.0%	-10%
2.1% to 2.5%	-30%
2.6% to 3.0%	-40%
Greater than 3.0%	-50% or Remove and Replace*

* The decision to make 50% payment or Remove and Replace will be made by the Engineer

Note: All deviation values will be rounded to the nearest 0.1% before applying pay adjustments.

(b) Calculation of Pay Adjustments for Production Binder and Air Void Content

For each test, absolute deviations will be used when determining binder and air void content pay adjustments. Absolute deviations are the values of deviation regardless of sign (±).

The weighted average of the absolute deviations from the optimum binder content of all of the sublots in each lot will be used to determine the appropriate pay adjustments for the lots. The same will apply for air void content. No payment will be made for any pavement that is removed.

All other tolerances shall conform to the RI Standard Specifications.

c. Independent Assurance Testing. This testing will be performed by the Department in accordance with the Rhode Island Department of Transportation publication entitled "Schedule for Sampling, Testing and Certification of Materials."

401.03 CONSTRUCTION METHODS.

401.03.1 HMA Mixing Plant. Mixing plants shall be of sufficient capacity and coordinated to adequately handle the proposed production of HMA. The storage yard shall be maintained neat and orderly and the separate stockpiles shall be readily accessible for sampling.

a. Requirements for All Plants.

1. Equipment for Preparation of PGAB. Tanks provided for the storage of PGAB shall be equipped to heat and hold the material at the required temperatures. The heating shall be accomplished by steam coils, electricity, or other approved means such that no flame shall be in contact with the tank. The circulating system for the PGAB shall be designed to assure proper and continuous circulation during the operating period. Provision shall be made for measuring storage tanks. An adequate sampling valve shall be provided to ensure the safe and proper sampling of the PGAB.

2. Cold Feed Bins. The plant shall include no fewer than three (3) storage bins of sufficient

capacity to supply the mixer when it is operating at full capacity. Bins shall be arranged to assure separate and adequate storage of appropriate fractions of the mineral aggregates without comtamination. They shall also be so constructed that samples can be readily obtained. Separate dry storage shall be provided for filler or hydrated lime when used and the plant shall be equipped to feed such material into the mixer.

3. Cold Aggregate Feeder. The plant shall be provided with accurate mechanical means for uniformly feeding the aggregate into the drier so that uniform production and temperature will be obtained.

4. Drier. The plant shall include a drier or driers which continuously agitate the aggregate during the heating and drying process.

5. PGAB Control Unit. Satisfactory means, either by weighing or metering, shall be provided to obtain the proper amount of PGAB in the mix within the tolerance specified. Means shall be provided for checking the quantity or rate of flow of PGAB into the mixer.

6. Thermometric Equipment. An armored thermometer of adequate range in temperature reading shall be fixed in the PGAB feed line at a suitable location near the charging valve at the mixer unit.

The plant shall also be equipped with either an approved dial-scale, mercury-actuated thermometer, an electric pyrometer, or other approved thermometric instrument so placed at the discharge chute of the drier as to register automatically the temperature of the exiting material.

The Engineer may require replacement of any malfunctioning or inconsistent thermometer by an approved temperature sensing and recording apparatus for better regulation of the temperature of the material.

7. Dust Collector. The plant shall be equipped with a dust collector constructed to waste or return uniformly all or any part of the material collected as directed.

8. Truck Scales. When required, the HMA shall be weighed on approved scales furnished by the Contractor or on public scales at the Contractor's expense. Such scales shall be tested at least every 60 days or whenever the Engineer deems necessary to assure their accuracy.

9. Scales. Scales shall be so located as to be easily readable from the operator's normal work station; otherwise a remote readout shall be supplied.

All plant scales, including truck scales, shall be certified at the expense of the Contractor by a competent and experienced scales technician as follows:

(a) Annually prior to use in State work.

(b) At intervals of not more than 60 calendar days.

(c) At any time ordered by the Engineer.

10. Safety Requirements. Adequate and safe access to sampling points shall be provided. Guarded ladders to other plant units shall be placed at all points where accessibility to plant operations is required. Accessibility to the top of truck bodies shall be provided by a platform or other suitable device, placed in an acceptable location near the testing laboratory, to enable the Engineer to obtain samples and mixture temperature data. All gears, pulleys, chains, sprockets, and other dangerous moving parts shall be thoroughly guarded and protected. A clear, clean and unobstructed passage shall be maintained at all times in and around the truck loading area.

11. HMA Holding Bin. HMA may be stored in surge and storage systems designed for that purpose. Each surge and storage system must meet the requirements of AASHTO M156, unless otherwise permitted by the Engineer, and may be inspected by the Department to determine acceptance at specific holding times.

Acceptance shall be based upon the ability of the holding bin to hold and discharge mixtures within the quality criteria specified by the mix design and these Specifications.

b. Requirements for Batching Plants.

1. Automatic Proportioning. The plant shall be equipped with automatic proportioning devices. Such devices shall include equipment for accurately proportioning the various components of the mixture by weight in the proper sequence. PGAB and aggregates shall be proportioned by weight. Additives, if required, may be proportioned by volume or weight. The plant shall be equipped to automatically control the sequence and timing of mixing operations. There shall be auxiliary interlock cutoff circuits to interrupt and stop the automatic cycling of the batching operations at any time an error in weighing occurs, when an aggregate bin becomes empty, or when there is a malfunction of any portion of the control system.

2. Recording Equipment. The plant shall be equipped with a digital recorder which will automatically print the following data on delivery tickets:

(a) Batch weights of each size aggregate. Weights printed may be individual or cumulative.

(b) Total weight of aggregates in batch. The weight printed for the last aggregate batched shall be the total weight of aggregates in the batch when cumulative weights are used.

(c) Weight of PGAB in batch.

(d) Weight of total batch.

(e) Total weight of batches in truck.

(f) Total weight of PGAB in all batches in truck.

(g) Date mixed.

(h) The time each batch or load began or the time each was completed.

When silos are utilized, the requirements for delivery tickets shall conform to **Para. c; Requirements for Drum Dryer Mixing Plants**, of this Subsection. In addition, automated batch plant printout tickets generated in accordance with **Para. b** of this Subsection shall be given to the plant inspector and maintained on file.

There shall be sufficient copies of delivery tickets to provide a copy for the plant inspector and a copy for the Resident Engineer for permanent project record. The following information shall also be included on delivery slips:

(i) Name of customer.

(j) Name of project and contract number.

(k) Name of driver and truck number.

(l) Class of HMA.

(m) Additives.

3. Equipment Failure. If at any time the automatic proportioning or recording devices become inoperable, the plant may be allowed to batch and mix HMA for a period of not more than 48 hours from the time of the breakdown, if approved by the Engineer. Written permission of the Engineer will be required for periods of operation without automatic proportioning facilities longer than 48 hours.

4. Screens. Plant screens, capable of screening all aggregates to the specified sizes and proportions and having normal capacities in excess of the full capacity of the mixer, shall be provided.

5. Hot Aggregate Bins. Hot bin storage of sufficient capacity to ensure uniform and continuous operation shall be provided. The bins shall be arranged to ensure separate and adequate storage of appropriate fractions of the aggregate. Each bin shall be provided with overflow pipes, of such size and at such locations as to prevent backing up of material into other compartments or bins. Each bin shall be provided with its individual outlet gate, constructed so that when closed there shall be no leakage. The gates shall cut off quickly and completely. Bins shall be equipped with adequate tell-tale devices to indicate the position of the aggregates in the bins at the lower quarter points. Adequate and convenient facilities shall be provided for obtaining aggregate samples from each hot bin.

6. Aggregate Scales. Scales for any weigh box or hopper shall be of the springless dial type, having a full complement of index pointers and shall be of a standard make and design. They shall be accurate to 0.50 percent, have minimum graduations not greater than 0.50 percent and shall be readable and sensitive to 0.25 percent or less. The preceding percentages are based on total batch weight.

7. Batching Controls. Batching controls shall be electrically interlocked with the scales to prevent cycling or recycling of batching until scales tare zero.

The batching controls shall meet the following tolerances with respect to the various components weighed in each batch:

Combined Aggregate Components:	±1.5 percent of total batch weight
PGAB:	±0.1 percent of total batch weight

The total weight of the batch shall not vary more than plus or minus 2 percent from the theoretical design weight.

8. Time Locking Device. The mixer shall have an accurate time locking device to control the operation of a complete mixing cycle by locking the weigh box gate, after charging the mixer, until the closing of the mixer discharge gate at the completion of the cycle. It shall lock the PGAB feed throughout the dry mixing period and shall lock the mixer discharge gate throughout the dry and wet mixing periods. The dry mixing period is defined as the interval of time between the opening of the weigh box gate and the commencement of application of the PGAB. The wet mixing period is the interval of time between the commencement of application of the PGAB and the opening of the mixer discharge gate.

The control of the timing shall be flexible and capable of being set at intervals of not more than five seconds throughout the cycles up to three minutes. Changes in mixing time shall be made only when ordered by the Engineer.

9. Weigh Box or Hopper. The equipment shall include a means for accurately weighing each size of aggregate in a weigh box or hopper suspended on scales and of ample size to hold a full batch without hand raking or running over. The gate shall close tightly so that no material is allowed to leak into the mixer while a batch is being weighed.

10. PGAB Control. The equipment used to measure the PGAB shall be accurate to plus or minus 0.5 percent. The PGAB bucket shall be a non-tilting type with a loose sheet metal cover. The length of the discharge opening trough, bucket or spray bar shall be not less than three-fourths the length of the mixer and it shall discharge directly into the mixer. The PGAB bucket, its discharge valve or valves and spray bar shall be adequately heated. Steam jackets, if used, shall be efficiently drained and all connections shall be so constructed that they will not interfere with the efficient operation of the PGAB scales. The capacity of the PGAB bucket shall be at least 15 percent in excess of the weight of PGAB required in any batch. The plant shall have an adequately heated quick-acting, non-drip, charging valve located directly over the PGAB bucket.

The indicator dial shall have a capacity of at least 15 percent in excess of the quantity of PGAB used in a batch. The controls shall be constructed so that they may be locked at any dial setting and will automatically reset to that reading after the addition of PGAB to each batch. The dial shall be in full view of the mixer operator. The flow of PGAB shall be automatically controlled so that it will begin when the dry mixing period is over. All of the PGAB required for one batch shall be discharged in not more than 15 seconds after the flow has started. The size and spacing of the spray bar openings, trough

or PGAB bucket shall provide a uniform application of PGAB the full length of the mixer. The section of the PGAB line between the charging valve and the spray bar shall be provided with a valve and outlet for checking the meter when a metering device is substituted for a PGAB bucket.

11. Mixer. The batch mixer shall be capable of producing a uniform mixture within the job mix tolerances. If not enclosed, the mixer box shall be equipped with a dust hood to prevent loss of dust.

The clearance of blades from all fixed and moving parts shall not exceed one inch unless the maximum diameter of the aggregate in the mix exceeds 1¼-inches, in which case the clearance shall not exceed 1½-inches.

12. Access to the mixer platform shall be by adequate and safe stairways. A hoist or pulley system shall be provided to raise scale calibration equipment, sampling equipment, and other similar equipment from the ground to the mixer platform and return. There shall be adequate and unobstructed space on the mixer platform.

c. Requirements for Drum Dryer Mixing Plants.

1. Proportioning. Aggregates and PGAB shall be proportioned by dry weight of the aggregate. Additives, if required, may be proportioned by volume or weight. The cold aggregate feeder shall be synchronized with the PGAB delivery system. Satisfactory means shall be provided to ensure positive interlocking control between each cold bin, the cold aggregate feeder, and the PGAB delivery system. This interlocking control shall be such that production is interrupted if one or more cold bins becomes empty, or the flow of either aggregate or PGAB is obstructed.

2. Recording Equipment. The plant shall be equipped with a digital recording device approved by the Engineer by which the proportion of aggregate supplied by each cold bin, the flow rates by weight of dry aggregate and of PGAB, and the cumulative weights of dry aggregate and of PGAB incorporated in the mix are automatically printed. These printed records, showing the date and time of printing, shall be provided to the Engineer at the start and at the end of each production period and at any other times or intervals of time as requested.

The plant shall also have a computerized scale system consisting of a weight batcher and/or a truck scale. Delivery tickets shall be printed on an automatic digital recorder which will print the following information on delivery tickets:

(a) Date loaded.

(b) Net weight of mixture in truck. When a truck scale is used the net weight of the mixture shall be automatically calculated by weighing the truck both empty and full.

(c) Time of each load.

There shall be sufficient copies of delivery tickets to provide a copy for the plant inspector and a copy for the Resident Engineer for permanent project record. The following information shall also be

included on delivery slips:

(a) Name of customer.

(b) Name of project and contract number.

(c) Truck identification and name of driver.

(d) Class of HMA.

(e) Additives.

3. Equipment Failure. If at any time the automatic recording device or the computerized scale system become inoperable, the plant may be allowed to produce HMA for a period of not more than 48 hours from the time of the breakdown, if approved by the Engineer. Approval will not be granted unless a satisfactory arrangement is made by the Contractor to weigh the mix. Written permission of the Engineer will be required for periods of operation longer than 48 hours during which any required automatic system is not functioning properly.

4. Aggregate Storage. Sufficient storage space shall be provided for each stockpile of various sized aggregates which shall be kept separated until they have been introduced into the cold bins that feed the drier. A minimum of four cold feed bins shall be required.

5. Cold Feed System. The plant shall have a device at each cold bin to feed the aggregate accurately and uniformly. No gravity type feeders will be permitted. Each adjustment opening shall be provided with indicators graduated to allow proportioning. Each cold bin gate shall be interlocked in such a manner that production is interrupted if one or more cold bins becomes empty or the flow is obstructed.

A mineral filler bin, when required, shall be added to the standard plant cold feed bins, and shall feed the mineral filler at adjustable rates accurately and uniformly. The feeder shall be interlocked so that production is interrupted if the bin becomes empty or the flow is obstructed.

The weighing equipment for all aggregates including mineral filler shall consist of a continuous weighing device either as it is proportioned by the individual feeders or after all materials have been deposited on a common belt. Belt scales shall meet the requirements of N.B.S. Handbook 44 and shall be installed according to the scale manufacturer's recommendations.

The plant shall have an adjustable feed rate control for each aggregate cold bin feeder and mineral filler feeder. The plant shall proportion the total aggregate quantity to the drum mixer with such accuracy and uniformity that the variation of material per interval of time shall not exceed an amount equal to 1.5 percent of the total weight of HMA per interval of time.

An automatic aggregate sampling device shall be provided which will divert a representative combined aggregate sample, including mineral filler, into a hopper or container for the purpose of gradation testing. The container shall cut the full width and depth of the aggregate flow. The sampling point shall be after the aggregate is proportioned and prior to its mixing with PGAB.

6. PGAB Control Unit. The PGAB shall be proportioned by a meter accurate to 0.1 percent. A flow switch designed to interrupt production if the PGAB flow is discontinued shall be installed in the delivery line between the meter and the mixer.

The PGAB delivery system shall be coupled with the aggregate delivery system to automatically maintain the required proportions as the aggregate flow varies. The delivery tolerance for PGAB shall be ±0.2 percent of the total mixture weight.

7. Plant Calibration. The cold feed and PGAB delivery systems shall be calibrated to insure that the plant is operating within the allowable tolerances. A procedure acceptable to the Engineer and in accordance with the manufacturer's recommendations shall be followed. These calibrations shall be performed prior to the start of each paving season, and at any other time as directed by the Engineer.

8. Mixer Unit. The plant shall include a continuous mixer unit having an automatic burner control and capable of producing a uniform mixture within the job mix tolerances. The mixture shall be discharged into a HMA holding bin meeting the requirements of **Para. a.11** of this Subsection.

The moisture content of the mixture upon discharge from the mixer shall not exceed 1.5 percent by weight.

401.03.2 Hauling Equipment. Trucks or other equipment used for hauling HMA shall have tight, clean, smooth metal beds which have been thinly coated with an approved release agent. No diesel fuel or other material is to be applied to any portion of the vehicle that comes into contact with the HMA. Any hauling equipment not complying with these Specifications will be immediately rejected along with its load of HMA. Each truck shall have a cover of canvas or other suitable material of such size as to protect the mixture from the weather. Truck beds shall be securely covered and, if necessary, insulated to ensure delivery of the mixture at the specified temperature. Cleaning of equipment, vehicles, and truck beds in areas to be paved is prohibited. Any HMA placed in areas where cleaning takes place is subject to rejection by the Engineer.

a. Material Transfer Vehicle (MTV). A material transfer vehicle (MTV) is required for the construction of all HMA friction, surface, intermediate and base courses on all limited access highways. When friction course is used, both the friction course and the underlying layer must be placed using an MTV.

The MTV shall independently deliver HMA from the hauling equipment to the paving equipment. A paving hopper insert with a minimum capacity of 14 tons shall be installed in the hopper of conventional paving equipment when a MTV is used.

As a minimum, the MTV shall have a high capacity truck unloading system which will receive HMA from the hauling equipment; a storage system in the MTV with a minimum capacity of 15 tons of HMA; and a discharge conveyor with the ability to swivel to either side to deliver the mixture to the paver while allowing the MTV to operate from an adjacent lane. In addition, the paving operation must contain a remixing system to blend the mixture prior to placement. The speed of the paver and MTV shall be adjusted to coordinate with the availability of HMA. Failure to keep the MTV supplied with HMA may be cause to cease paving operations for that production. However, more than 2 stoppages shall result in

paving being ceased for that production.

When an MTV is to be used on a project, the Contractor shall further investigate the possible movement of the fully or partially loaded MTV on the project. If there are any structures on the project that the fully or partially loaded MTV will traverse, the Contractor shall request an Overweight Permit Check from the Department. Such a request shall be made in writing, and shall include the axle configuration, weights, and the project limits. Operations shall not begin until this permission is received from the Department and one copy forwarded to the Engineer.

The following is a statewide list of limited access highways (Included are travel lanes, auxiliary lanes, climbing lanes, acceleration and deceleration lanes, ramps, collector/distributor roads, service roads, and shoulders greater than 8 feet).:

I-95	Connecticut State Line to Massachusetts State Line
I-195	I-95 to Massachusetts State Line
I-295	I-95 to Massachusetts State Line
US Route 1	Prosser Trail to Wakefield Cut-Off
RI Route 4	Route 1 to I-95
US Route 6	Route 102 to Route 101; Route 10 to I-295
RI Route 10	Park Avenue to Route 6
US Route 6/RI Route 10	Magnolia Street Bridge to I-95
RI Route 24	Route 114 to Massachusetts State Line
RI Route 37	Natick Avenue to Post Road
RI Route 78	Route 1 to Connecticut State Line
RI Route 99	Route 146 to Mendon Road
East Shore Expressway	I-195 to Wampanoag Trail
RI Route 114	East Shore Expressway to Forbes Street
RI Route 138	Route 1 to Admiral Kalbfus Road
RI Route 146	I-95 to Reservoir Road
RI Route 146	Route 146A to Massachusetts State Line
RI Route 403	Route 4 to Quonset Point

Airport Connector I-95 to Post Road

Henderson Bridge Access Roadway Waterman Street/So. Angell Street to Broadway

401.03.3 Pavers. Unless otherwise shown on the Plans, mixtures shall be spread by means of a mechanical self-powered paver capable of spreading the mixture true to line, grade and crown as approved by the Engineer.

HMA pavers shall be self-contained, power-propelled units, provided with activated vibratory screed and solid vibratory screed extenders and capable of spreading and finishing courses of plant mixed HMA in lane widths applicable to the specified typical section and thickness shown on the Plans. Pavers used for shoulders and similar construction shall be capable of spreading and finishing courses of HMA in the widths, depths and cross slopes indicated on the Plans.

When laying mixtures, the paver shall be capable of being operated at forward speeds consistent with satisfactory laying of the mixture.

The paver shall be equipped with a receiving hopper having sufficient capacity for a uniform spreading operation. The hopper shall be equipped with a distribution system to place the mixture uniformly in front of the screed.

a. Screeding. The screed and screed extenders shall continually vibrate while placing the mixture and shall effectively produce a finished surface of the required evenness and texture without tearing, shoving or gouging the mixture. The screed shall be heated to maintain the HMA at the required placement temperature. Unless otherwise permitted by the Engineer, the screed extenders shall not extend more than two feet from the edge of the augers or auger extensions.

The paver shall be equipped with automatic screed controls with sensors for either or both sides of the paver, capable of sensing grade from an outside reference line, sensing the transverse slope of the screed and providing the automatic signals which operate the screed to maintain the desired grade and transverse slope. The sensor shall be capable of operating from a ski-type device or reference beam of not less than 25 feet in length. The sensor shall also have the capability of operating from a reference line unless the ski-type device or reference beam can ride on an adjacent, newly placed lift of HMA. A reference line shall also be used for the first course placed over in-place, recycled material.

Reference lines for the control of horizontal alignment shall be provided by the Contractor subject to the approval of the Engineer.

When a reference line is used for automatic grade control, the Contractor shall furnish and install all pins, brackets, tensioning devices, wire and accessories necessary for satisfactory operation of the automatic control equipment using a taut stringline set to grade for reference.The transverse slope controller shall be capable of maintaining the screed at the desired slope within plus or minus 0.1 percent. The paver shall be equipped with automatic feeder controls, properly adjusted to maintain a uniform depth of materials ahead of the screed.

b. Manual Operation. Manual operation will be permitted in the construction of irregularly shaped and minor areas, on plant mixed seal courses, or where otherwise directed.

401.03.4 Conditioning of Existing Surfaces. Surfaces of curbs, gutters, vertical faces of existing pavements, and all structures to be in contact with the HMA shall be given a thin, even coating of tack coat. Care shall be taken to avoid the splattering of surfaces which will not be in contact with the HMA.

When a tack coat is required, the type and grade and the application methods shall conform to the applicable provisions of both **SECTION M.03; MATERIALS** and **SECTION 403; ASPHALT EMULSION TACK COAT**, of these Specifications.

401.03.5 Spreading and Finishing. The mixture shall be laid upon an approved cleaned surface, spread and struck off to the grade and elevation established. HMA pavers shall be used to distribute the mixture either over the entire width or over such partial width as may be practicable.

The practices and guidelines for placing HMA as outlined in Asphalt Institute Publication MS-22, "Construction of Hot Mix Asphalt Pavements" shall be adhered to unless otherwise permitted by the Engineer.

Unnecessary walking on the uncompacted HMA mat shall not be allowed.

Before beginning a new lane, the screed shall be heated to the proper operating temperature and any clumps of cold material in the paver hopper shall be removed.

No trucks or other equipment shall be allowed on freshly placed HMA unless specifically permitted by the Engineer.

On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impracticable, the mixture shall be placed as close to its final position as possible. It shall then be spread, raked, and luted by hand tools in a manner which will minimize segregation and result in the required compacted thickness.

Unless otherwise directed by the Engineer, any layer of HMA, called for on side streets or driveways must be placed to a distance of at least three feet beyond the gutter line at the same time that layer is being placed on the adjacent project roadway.

a. HMA Designated for "Bridge Decks". When HMA is being placed on a surface which is covered with a waterproofing membrane, the following precautions shall be observed:

1. No traffic other than paving equipment shall be allowed on the membrane.

2. The paver must be moved carefully on and off the membrane. Initial proper adjustment of the paver to the correct depth is very important to prevent tearing the membrane. The Contractor shall be responsible for making any repairs to the membrane or to the HMA overlay necessary to correct damage caused by the paving operation, all at its expense.

3. Any and all tears of the membrane by the paver or trucks shall be repaired immediately to the satisfaction of the Engineer. Vehicle tires shall be clean of any rocks or materials that would puncture the membrane.

4. Truck drivers shall not make quick stops and starts, nor turn the wheels while parked, nor cross the deck at an angle.

401.03.6 Compaction. Immediately after the HMA has been spread, struck off, and surface irregularities adjusted, it shall be thoroughly and uniformly compacted by rolling.

The surface shall be rolled when the mixture is in the proper condition and when rolling does not cause undue displacement, cracking, and shoving.

Two rollers are required for all paving operations that exceed a daily total of 500 tons, except in the case of driveway, sidewalk and bridge deck paving operations. The number, weight and type of roller(s) shall be sufficient to compact the mixture to the required density before it reaches the minimum compaction temperature. Vibratory rollers used for compaction shall be operated in the vibratory mode. All rollers used for compaction shall have a minimum operating weight of ten tons or greater. The use of equipment which results in excessive crushing of the aggregate will not be permitted.

The speed of a static weight, steel wheel roller, pneumatic tire roller, or vibratory roller shall not exceed five miles per hour.

Rollers shall not be parked on HMA. When reversing direction, the action shall be smooth, not abrupt. The drive wheel shall approach the new mix, not the tiller wheel.

When a vibratory roller is used for finish rolling, it shall be used in the static mode. Finish rolling shall continue until all roller marks are eliminated.

The motion of the rollers shall be slow enough at all times to avoid displacement of the hot mixture and any displacement resulting from reversing the direction of the rollers, or from any other cause, shall be satisfactorily corrected. The wheels of steel-wheel rollers shall be kept moist and clean to prevent adhesion of the fresh material, but an excess of water will not be permitted.

If satisfactory density cannot be obtained in any lift, and if the Engineer determines it to be structurally inadequate and/or incapable of maintaining material integrity, the Contractor shall remove and replace any such area at its own expense.

Any mixture that becomes loose and broken, mixed with dirt, or is in any way defective shall be removed and replaced with fresh hot mixture, which shall then be compacted to conform to the surrounding area. Any area showing an excess or deficiency of PGAB shall be removed and replaced. Said removal and replacement shall be at the Contractor's expense.

For HMA not designated as with "Pay Adjustments" in-place density shall be a minimum of 92% of the theoretical maximum density obtained at the plant and will be determined using a nuclear density

gauge or in-place cores.

If a class of HMA is designated as for "Bridge Decks", an oscillatory roller with a minimum operational weight of 8 tons shall be used. For HMA designated as for "Bridge Decks" and with "Pay Adjustments" the pay adjustments will only apply to binder content and air voids.

If a class of HMA is designated as for "Leveling" it shall be placed with a paver. A pneumatic roller with a minimum operational weight of 8 tons shall be used. For HMA designated as for "Leveling" and with "Pay Adjustments" the pay adjustments will only apply to binder content and air voids.

If a class of HMA is designated as for "Patching", "Miscellaneous Work" or "Paved Waterways" it shall be placed by hand. A vibratory plate compactor or roller shall be used. A hand tamper may be used only if requested, and such request is approved by the Engineer.

a) In-Place Density for classes of HMA designated as with "Pay Adjustments"

Cores not taken under the direction of and witnessed by the Engineer will not be used for acceptance. The location of all cores will be determined by the Engineer. Each lot and sublot for in-place density cores will be matched as near as practical to each production lot and sublot used at the plant.

All cores shall be extracted after completion of rolling operations and before the paved section is open to traffic. The Engineer will take immediate possession of the cores upon extraction. If the Contractor does not obtain cores before a sublot is open to traffic, no bonus (pay adjustment resulting in more than 0%) will be paid for the sublot but disincentives will still apply. The cores will be retained by the Engineer for a minimum of 4 weeks after the results are reported to the Contractor.

The Contractor may extract its own cores for QC purposes to monitor in-place density and production quality; such cores will not be used for acceptance.

1. Mat Density

Under the direction and witness by the Engineer, two stratified, randomly selected cores (4" +0"/-0.25" diameter) shall be extracted from the mat by the Contractor for each sublot greater than or equal to 450 tons. One core shall be taken for sublots less than 450 tons. The center of each core used to determine mat density will be at least one foot away from the edge of pavement and any transverse or longitudinal joints or drainage structures.

2. Joint Density

One joint density core shall be extracted for every 3000' or less when a joint is formed. Joint cores shall be extracted so that the center is within two inches of the middle of the sloped portion of a notched-wedge joint or within one inch of the middle of a butt joint.

3. In-Place Density Pay Adjustments

The pay adjustments from Table 6 will be made for in-place mat density:

Table 6 – Mat Density Pay Adjustments

In-Place Mat Density	Pay Adjustment
95.0% and greater	+2%
94.0% to 94.9%	+1%
93.0% to 93.9%	0%
92.0% to 92.9%	-5%
91.0% to 91.9%	-15%
90.0% to 90.9%	-25%
89.0% to 89.9%	-35%
Below 89.0%	Remove and Replace

The pay adjustments from Table 7 will be made for in-place joint density:

Table 7– Joint Density Pay Adjustments

In-Place Joint Density	Pay Adjustment
93.0% and greater	+2%
92.0% to 92.9%	+1%
91.0% to 91.9%	0%
90.0% to 90.9%	-5%
89.0% to 89.9%	-15%
88.0% to 88.9%	-25%
87.0% to 87.9%	-35%
Below 87.0%	-100%

Note: All density values will be rounded to the nearest 0.1% before applying pay adjustments.

In the event material is required to be removed and replaced, the Engineer will determine the limits of the removal. The required in-place density will be 1% less for the first lift placed on gravel subbase.

4. Calculation of Pay Adjustments for In-Place Density

(i.) For Mat Density:

For each sublot, the bulk specific gravity (G_{mb}) of the mat density core(s) will be averaged and then compared to the corresponding plant theoretical maximum specific gravity (G_{mm}) to calculate the in-place density for each sublot. The weighted average of the sublot densities in a lot will be used to determine the appropriate pay adjustment for that lot. Lot pay adjustments will be applied to the respective quantity of HMA in each lot.

(ii.) For Joint Density:

For joint density pay adjustment purposes, a joint lot will be defined as 5 joint density results. However, if one or two joint density results are remaining after the final full joint lot is formed, they will be added to the previous joint lot. Three or more joint density results remaining after the final full joint lot will constitute a separate joint lot.

Calculation of in-place joint density will be determined using the G_{mb} of joint density cores and the project average plant G_{mm} of the respective mix. The average of the individual joint density results in a joint lot will be used to determine the appropriate pay adjustment for that joint lot. The calculation of material quantity used to construct the joints will be based on the joint core density, the specified thickness, a width of one foot and the length of the joint that each core represents. This quantity will be deducted from the total tonnage.

401.03.7 Joints. Placement of the HMA shall be as continuous as possible. Rollers shall not pass over the unprotected end of a freshly laid mixture unless authorized by the Engineer.

Both longitudinal and transverse joints in successive courses shall be staggered so as not to be one above the other. Longitudinal joints shall be staggered a minimum of 6 inches and shall be arranged so that the longitudinal joint in the top course being constructed shall be at the location of the line dividing the traffic lanes. Any HMA that falls on the cold side of the mat during paving operations shall be raked onto the hot joint. Care shall be taken to ensure that the material pushed onto the hot side of the joint remains in the joint area and is not broadcast over the pavement.

Unless otherwise permitted by the Engineer, a notched wedge joint shall be used. Longitudinal drop-offs will not be allowed on both sides of a lane. Joints shall be constructed so that the height of the notch is the same as the nominal maximum aggregate size. The width of the sloped portion of the joint shall be at least 6" for each inch of lift thickness if the joint will be exposed to traffic, but in all cases it shall be 12" minimum. Tack coat shall be applied to and shall completely cover the longitudinal notched wedge joint, using either a brush or the tack coat distribution truck. Transverse joints and joints at intersections shall be manually brushed with tack coat, leaving a completely covered face.

401.03.8 Pavement Samples. As directed, the Contractor shall cut samples from the compacted pavement for testing by the Engineer. Samples of the mixture shall be taken for the full depth of the course at the locations directed by the Engineer.

Where samples have been taken, new material shall be placed and compacted to conform to the surrounding area.

401.03.9 Surface Tolerances. At the Engineer's discretion the surface may be tested at selected locations, using an approved 10-foot straightedge furnished by the Contractor. The variation of the surface from the testing edge of the straightedge between any two contacts with the surface shall at no point exceed 1/4-inch. All humps or depressions exceeding the specified tolerance shall be corrected by removing defective work and replacing it with new material as directed.

401.03.10 Thickness Requirements. The thickness of a pavement shall be that as shown on the Plans and shall not vary from the specified thickness by more than that specified in **Subsection 401.04**, below, except as otherwise provided for in resurfacing existing pavements.

401.03.11 Weather Limitations. HMA shall not be placed on any wet surface, or when weather conditions otherwise prevent the proper handling or finishing of the HMA.

For lifts with a target compacted lift thickness less than or equal to 1.5" both the air and surface temperature in the shade shall be 45° F or greater. For lifts with a target compacted lift thickness greater than 1.5" both the air and surface temperature in the shade shall be 40° F or greater. If an approved WMA (warm mix additive) is used both the air and surface temperature in the shade shall be 35° F or greater regardless of lift thickness. No HMA shall be placed on frozen ground.

For projects that do not specify pay adjustments all rolling shall be completed before the temperature of the mat falls below 165° F. The HMA mat (not including WMA modified pavement) shall be at least 265° F when placed.

401.03.12 Cold Weather Paving. If the existing pavement is removed before the winter shutdown, the Contractor shall not close the project for the season until a new HMA layer has been placed and striped with temporary epoxy pavement markings.

401.03.13 Drop-Offs.

a. Longitudinal Drop-Offs. A longitudinal drop-off occurs along the outside edges of pavement and is the difference in elevation between the top of recently placed HMA pavement and the top of existing ground (or pavement).

1. For Posted Speeds of 35 mph or Less. Drop-offs greater than 3 inches but less than 5 inches shall be tapered to a maximum 1-to-1 slope to existing ground or pavement. Drop-offs 5 inches, or greater, shall be tapered to a maximum 4-to-1 horizontal to vertical slope to existing ground or pavement.

2. For Posted Speeds Greater than 35 mph. Longitudinal drop-offs will not be permitted within 2 feet of a travel lane. The first 2 feet adjacent to a travel lane must be at grade with the travel lane. However, should either the sequence of operation required by the Contract or the Contractor's approved sequence of operation result in overnight drop-offs greater than 3 inches occurring between 2 and 6 feet from the edge of a travel lane, then such drop-offs shall be tapered to a 4-to-1 horizontal to vertical slope to existing ground or pavement.

All tapers shall be constructed with HMA conforming to the requirements of this **SECTION 401** of these Specifications.

Longitudinal drop-offs within the roadway cross section will not be allowed except as otherwise detailed on the Plans or as described in a Special Provision.

Longitudinal drop-offs will not be paid for separately, but will be included in the contract unit price for HMA pavements as listed in the Proposal.

b. Transverse Drop-Offs. Transverse drop-offs occur as follows:

Pavement removal. A transverse drop-off occurs when pavement removal operations cease at the end of a working day. The drop-off is the difference in elevation between the bottom of the excavated pavement and the top of the existing pavement.

Pavement overlay. A transverse drop-off occurs when pavement overlay operations cease at the end of a working day. The drop-off is the difference in elevation between the top of the overlay pavement and the top of the existing pavement.

If traffic is allowed across either of these drop-offs during the period prior to the resumption of pavement removal or pavement overlay operations, tapers must be provided as follows:

1. For Posted Speeds of 35 mph or Less. Transverse drop-offs in place at the end of a working day shall be graded at a slope of 2 feet horizontal to 1 inch vertical.

2. For Posted Speeds Greater than 35 mph. Transverse drop-offs in place at the end of a working day shall be graded at a slope of 5 feet horizontal to 1 inch vertical.

All slopes shall be constructed with HMA conforming to the requirements of **SECTION 401** of these Specifications.

The Contractor shall place "BUMP" signs in accordance with the MUTCD (Manual on Uniform Traffic Control Devices) at each drop-off for each direction of traffic.

Prior to the resumption of pavement overlay operations the transition slope shall be removed as follows: The pavement overlay shall be saw cut back approximately 6 inches to expose a fresh, full thickness vertical face. This face shall be brush-painted or pressure sprayed with tack coat, after which the HMA paving may resume.

Transverse drop-offs will not be paid for separately, but will be included in the contract unit prices for HMA pavements as listed in the Proposal.

401.04 METHOD OF MEASUREMENT.

401.04.1 Measurement of HMA Pavement. HMA Pavements, will be measured by the number of tons actually placed in accordance with the Plans and/or as directed by the Engineer.

a. Determination of Thickness. The design thickness of each course as well as of the total HMA pavement structure shall be that indicated on the Plans, or as ordered by the Engineer.

Prior to the determination of placed thickness, the roadway shall exhibit acceptable workmanship and all defects shall have been corrected. The placed thickness of HMA pavement will be determined by cutting or coring holes to full depth. For courses with In-Place Density Cores specified, the average thickness of the Density Cores will be used to determine placed thickness.

For courses where In-Place Density Cores are not specified the following requirements apply: For projects with less than 1 paved lane mile, two cores will be taken. For projects with 1 to 2 paved lane miles, four cores will be taken. For projects with greater than 2 paved lane miles, two cores will be taken from each lane mile, except that there will be a minimum of ten cores for the project, all at the discretion of the Engineer.

Cores will be measured in accordance with ASTM D3549; Standard Test Method for Thickness or Height of Compacted HMA Paving Mixture Specimens. The depth measurement will be considered as applying for the full width of the lane. Measurements will be made at random locations determined by the Engineer and all information relative thereto will be recorded in the project records.

For the determination of thickness, a shoulder width of eight feet or greater will be considered to be a separate lane of the roadway. A shoulder width of less than eight feet will be considered part of the adjacent lane. The Contractor shall fill any holes cut or cored in the pavement with a compacted, dense HMA which is acceptable to the Engineer. If required by the Engineer, the Contractor shall maintain and control traffic while the pavement samples are being taken and while the holes are being filled and compacted. Payment will be made for the applicable traffic control item(s).

b. Adjustment of Tonnage Quantity.

The pavement thickness will be considered acceptable if both of the following requirements are met:

(a) The total HMA tonnage delivered and placed does not exceed the tonnage calculated from the approved area measured from the final surface course width by the project length and the pavement thickness specified in the Contract Documents by more than 5 percent.

and,

(b) When Specification Conformity Analysis (Federal Highway Administration Technical Advisory T5080.12; dated June 23, 1989) is applied to the entire roadway or sections thereof as determined by the Engineer, at least 80 percent of the total HMA pavement will have a thickness that meets the minimum pavement thickness. The minimum pavement thickness is that contained in the contract documents minus ½-inch, (e.g., a total pavement thickness of 7 inches will have a minimum pavement thickness requirement of 6.5 inches).

If the first requirement is not met, no payment will be made for all tonnage exceeding 5 percent, unless unusual field conditions are present and documented (e.g., pavement rutting).

If the second requirement indicates that the pavement thickness is deficient, the Contractor with permission of the Engineer shall place a correction course not less than one inch in depth after compaction, provided an acceptable grade and cross section can be achieved. Where an acceptable grade and cross section cannot be achieved through the above means, the Contractor shall reconstruct by cutting back and into the pavement a sufficient distance to permit the placement of an acceptable depth and place new material to achieve the proper depth, cross section and profile. These areas where a corrective course is placed or reconstruction of the pavement is performed, will be measured again as though originally constructed; no compensation will be made to the Contractor for the material removed or removal of materials and disposal thereof or for restoration of affected supporting base or adjacent construction, or for traffic control, adjusting all utility appurtenances in the roadway or for correcting pavement striping. Compensation will be made for the additional pavement correction course accepted in place.

Determination of the quantity to be used for adjusted payment or exclusion for payment will be based on tons per square yard per inch thickness as determined using in-place density cores or 96% of the plant core (AASHTO T245) densities if in-place densities are not available.

Sweeping and cleaning, as included in the items covered by this section, refers to the normal removal of dust, debris, etc. only. Any sweeping and cleaning necessary due to construction being held over for the winter season, in accordance with the approved construction schedule, will be paid for separately.

Work described in **Subsection 401.03.4; Conditioning of Existing Surface**, will be paid for at the contract unit prices for the material used.

Tolerance Limitation. Pavement will be considered acceptable when meeting the specifications. Pavement that is not accepted will be excluded from the tolerance allowance. When delivery tickets are directly collected by the Engineer from each truck prior to placing in the hopper, the delivery tickets may be used in the determination of total tonnage delivered and placed. Delivery tickets not collected directly by the Engineer prior to placing in the hopper will not be used to determine tonnage.

When delivery tickets are not used to determine tonnage, the accepted total tonnage delivered and placed will be calculated according to the following formula: [final surface course width] x [project length] x [specified pavement thickness] x [the average unit weight of all acceptance density cores] = contract tonnage. If density cores are not required then 96% of the average unit weight of the plant produced acceptance gyratory cores shall be used.

Payment will be made at full contract unit bid prices with pay adjustments for all accepted HMA up to 105% of the contract quantity tonnage. Accepted HMA quantities above 105% and up to 110% of the contract quantity tonnage will be paid at 50% of the contract unit bid price with the resultant adjusted price further modified by additional pay adjustments as applicable according to the following formula: Pay adjustments will apply to 50% of the contract unit bid price for quantities above 105% and up to 110%.

401.05 BASIS OF PAYMENT. The accepted quantity of the HMA will be paid for at its respective contract unit price per ton as listed in the Proposal. The price so-stated constitutes full and complete compensation for all labor, materials and equipment, and for all incidentals required to finish the work, complete and accepted by the Engineer.

Pay adjustments for binder content, air voids and in-place density will be added together to determine a final pay adjustment for both the mat and the joint. If more than one pay adjustment is negative then only the most negative adjustment will be added to the remaining non-negative adjustments to determine the final pay adjustment. Pay adjustments will be applied to the unit bid price for the applicable item code.

DELETED

DELETED

JOB SPECIFIC
R.I. CONTRACT NO. 2014-CH-074

CODE 411.9901
PAVER PLACED ELASTOMERIC SURFACE TREATMENT OVERLAY

Delete **Section 411.02.1 Modified Asphalt Binder** from the Paver Placed Elastomeric Surface Treatment Specification No. 411.0100 in its entirety and replace with the following:

411.02.1 Asphalt Binder. This shall be either Modified Asphalt Binder with Rubber (411.02.1.1) or Modified Asphalt Binder (411.02.1.2).

The Contractor may use a WMA at his own discretion in which case it shall be provided at no additional cost to the State. All WMA shall be RIDOT approved and shall be added at a dosage rate recommended by the manufacturer.

411.02.1.1 Modified Asphalt Binder with Rubber. This shall consist of a blend of neat binder and crumb rubber, which are chemically bonded to produce a modified asphalt binder that complies with all the requirements of AASHTO M 320 for PG 64E-28. The modified asphalt binder shall not contain any particles of rubber or elastomeric material when tested in accordance with AASHTO T 44. It shall incorporate an aromatic VOC inhibitor to mitigate odors at a dosage rate that conforms to the manufacturer's recommendation. The modified asphalt binder shall contain no polyphosphoric acid. The elastic recovery at 10°C (AASHTO T301) shall be not less than 70%. The supplier of the modified asphalt binder shall certify the composition and PG grade of the modified asphalt binder.

a. Asphalt Cement. The high temperature grade (AASHTO M 320) of the neat asphalt cement shall not exceed PG 58-XX.

b. Anti-Stripping Agent. An anti-stripping agent that heat stable and approved by the Engineer may be added to the neat asphalt cement prior to blending with the crumb rubber. The dosage (not exceeding 1.0% by weight of asphalt cement) shall be within the manufacturer's specified range and shall be determined during the course of the mix design. (Note: Notwithstanding the addition of an anti-stripping agent, the asphalt binder grade shall be PG 64E-28.)

c. Crumb Rubber. The asphalt binder shall have a crumb rubber content of not less than 7% by weight of asphalt cement. The maximum size of the crumb rubber shall be 80 mesh.

d. Chemical Bonding Agent. The chemical bonding agent shall be heat stable and compatible with asphalt and rubber.

411.02.1.2 Modified Asphalt Binder with Polymer. This shall consist of a blend of neat binder and SBS polymer, which are chemically bonded to produce a modified asphalt binder that complies

with all the requirements of AASHTO M 320 for PG 64E-28. The modified asphalt binder shall not contain any particles of rubber or elastomeric material when tested in accordance with AASHTO T44. It shall incorporate an aromatic VOC inhibitor to mitigate odors at a dosage rate that conforms to the manufacturer's recommendation. The modified asphalt binder shall contain no polyphosphoric acid. The elastic recovery at 10°C (AASHTO T301) shall be not less than 70%. The supplier of the modified asphalt binder shall certify the composition and PG grade of the modified asphalt binder.

a. Asphalt Cement. The high temperature grade (AASHTO MP1a) of the neat asphalt cement shall not exceed PG 58-XX.

b. Anti-Stripping Agent. An anti-stripping agent that is heat stable and approved by the Engineer may be added to the neat asphalt cement prior to modification. The dosage (not exceeding 1.0% by weight of asphalt cement) shall be within the manufacturer's specified range and shall be determined during the course of the mix design. (Note: Notwithstanding the addition of an anti-stripping agent, the asphalt binder grade shall be PG 64E-28.)

c. Crumb Rubber. If used, the maximum size of crumb rubber in Modified Asphalt Binder with Polymer shall be 40 mesh.

In Section 411.02.3 Mix Design, insert the following after Item c:

d. The mix at the optimum modified asphalt binder content shall be tested for draindown in accordance with AASHTO T-305. The average percent draindown at the design mixing temperature shall not exceed 0.3%. The average percent draindown at a temperature 27°F above the design mixing temperature shall be reported.

In Section 411.03.7 Placement, insert the following after the first sentence:

The paver shall be equipped with thermostatically – controlled heaters for the screed. These heaters shall remain on throughout the paving process.

Delete Section 411.05 Basis of Payment from the Paver Placed Elastomeric Surface Treatment Specification No. 411.0100 in its entirety and replace with the following:

411.05 METHOD OF MEASUREMENT

Section 401.04 shall be used as the method of measurement.

411.05 BASIS OF PAYMENT

Section 401.05 shall be used as the basis of payment.

DELETED

DELETED

JOB SPECIFIC
R.I. CONTRACT NO. 2014-CH-074

CODE 938.1000
PRICE ADJUSTMENTS

DESCRIPTION.

a. Liquid Asphalt Cement.* The Base Price of Liquid Asphalt Cement as required to implement **Subsection 938.03.1** of the Standard Specifications is $630.00 per ton as of 10/15/2014.

* In the case of modified asphalt binder, this price adjustment provision shall only apply to the neat liquid asphalt component. This provision shall not apply to the modifier component, manufacture, storage, transportation or other associated costs.

b. Diesel Fuel. The Base Price of Diesel Fuel as required to implement **Subsection 938.03.2** of the Standard Specifications is $2.5655 per gallon as of 10/15/2014.

SECTION 414

WARM MIX ADDITIVE

414.01 DESCRIPTION. This work consists of incorporating a WMA (Warm Mix Additive) in HMA (Hot Mix Asphalt).

414.02 MATERIALS. One unit of WMA shall be added to each ton of HMA. All WMA shall be selected from the RIDOT Approved Materials List and shall be added at a dosage rate recommended by the manufacturer.

414.03 CONSTRUCTION METHODS. If HMA is designated as "with WMA", the Contractor shall use a WMA. If HMA is not designated as "with WMA", the Contractor may request to use a WMA at his own discretion and cost. Additionally, the Engineer may direct the Contractor to use a WMA. If a WMA is used it shall be for an entire day's production for that class of HMA.

414.04 METHOD OF MEASUREMENT. WMA will be measured by the number of units actually used in accordance with the specifications and/or as directed by the Engineer.

414.05 BASIS OF PAYMENT The accepted quantity of the WMA will be paid for at its respective contract unit price per each as listed in the Proposal.

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110	935.9902	**REMOVING BITUMINOUS SURFACE - COLD PLANING BY MICROMILLING, SECOND PASS**	**SY**			
		ROUTE 1 AND LOCATION 5				
		AS DIRECTED BY THE ENGINEER		22,270.00	0005	01
		Item 935.9902 Total:		**22,270.00**		
111	414.9901	**WARM MIX ADDITIVE**	**EACH**			
		ROUTE 1 AND OLD POST ROAD				
		CONTRACT LIMITS		29,275.00	0005	01
		Item 414.9901 Total:		**29,275.00**		