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City of Norwich, N.Y.
Street Rehabilitation Program – Street Grinding & Paving 2025
Contract No. CN1-P-25

ADDENDUM NO. 1:

April 04, 2025

To all holders of Contract Documents, please note the following addenda:

Contract Documents

Item #1: Contract No. CN1-P-25

Contract Documents:

As indicated in the Table of Contents, page 6, and any other reference in the project documents:

Page 6 of the Table of Contents references at the bottom of the page under Appendices:

Appendices
Appendix A
NYSDOT STANDARD SPECIFICATIONS
SECTION 404 HOT MIX ASPHALT (HMA) PAVEMENT

Shall be DELETED and REPLACED with the following:

Appendices
Appendix A
NYSDOT STANDARD SPECIFICATIONS
SECTION 402 HOT MIX ASPHALT (HMA) PAVEMENT

Page 6 of the Table of Contents shall be replaced with the attached updated Page 6 of the Table of Contents.

Item #2: Contract No. CN1-P-25 - Technical Specifications Section 3 - Pavement

Contract Technical Specifications Section 3 - Pavement:

Complete Technical Specification Section Shall be DELETED and REPLACED with the following updated Technical Specification included as part of this addendum:

Contract Technical Specifications Section 3 - Pavement:

Item #3: Contract No. CN1-P-25 – Appendix A – NYSDOT Standard Specification Section 404 – Hot Mix Asphalt (HMA) Pavements

Appendix A– NYSDOT Standard Specification Section 404 – Hot Mix Asphalt (HMA) Pavements

Complete Appendix A Shall be DELETED and REPLACED with the updated Appendix A included as part of this addendum:

Appendix A– NYSDOT Standard Specification Section 402 – Hot Mix Asphalt (HMA) Pavements

Item #4: Contract No. CN1-P-25 – Exhibits – Street System Map

Street System Map

Complete Exhibit – Street System Map Shall be DELETED and REPLACED with the updated Street System Map included as part of this addendum:

Street System Map

Item #5: Contract No. CN1-P-25 – Exhibits – Pavement Details

Pavement Details

Complete Exhibit – Pavement Details Shall be DELETED and REPLACED with the updated Pavement Details included as part of this addendum:

Pavement Details

Respectfully Submitted,

DELAWARE ENGINEERING, D.P.C.

Derrick P. Wilcox, P.E.

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Attachments:

Table of Contents Page 6
Technical Specification Section 3 – Pavement
Appendix A – NYSDOT Specification Section 402 Hot Mix Asphalt (HMA) Pavements
Exhibit – Street System Map
Exhibit – Pavement Details

Table of Contents Page 6

Technical Specification Section 3 – Pavement

SECTION 3
PAVEMENT

PART 1 - GENERAL

This work shall consist of the construction of hot mix asphalt in accordance with the New York State Department of Transportation; Standard Specifications Construction and Materials, Section 403. Contractor shall supply all material and labor, services, submittals, etc. under this section for paving.

1.01 Materials

A. Hot mix asphalt per NYSDOT standard specifications and Appendix A (immediately following this section) for specifications. **Formulate all HMA mixture using a PG Binder 64V-22 (NYSDOT #702-64V22).**

1. Base (general work and trench restoration): Type 1
   Base (new street or box-out): Base Mix (37.5mm).
   NYSDOT Item number 402.377904
2. Binder (general work and trench restoration): Type 3
   Binder (new street or box-out): Binder Mix (25.0mm)
   NYSDOT Item number 402.257904
3. Top Course (general work): Type 7
   Top Course (Ground Streets): Fine Surface Mix (9.5mm)
   NYSDOT Item number 402.097304
   -402.0973 – 9.5mm F3 Top Course HMA, 70 Series Compaction.
   Top Course (New Street or box-out): Fine Surface Mix (9.5mm). **NYSDOT Item number 402.097304**

Thickness to be as shown on the Contract Drawings.

1.02 Equipment

A. Paver shall meet the following minimum specifications:
   1. Ability to pave a varying width of 10 feet to 14 feet at pavement depths varying from 3/4 to 8 inches.
   2. Adjustable screed, auger, and tamper assembly.
   3. Heated screeds.
   4. Hopper with minimum capacity of 4 tons.
   5. Power plant for self-powered operation.

B. The roller shall be a 2 drum vibratory type roller with a minimum weight of 10 tons.

C. See Appendix A for information.

1.03 Submittals

A. Provide the following submittals:
   1. Source of hot mix asphalt
   2. Mix designs.

1.04 Execution

A. Placing and Compaction

1. The pavement materials shall be uniformly spread with a mechanical spreader, where feasible. When the material is to be place in restricted areas or the quantity is too small to warrant the use of a mechanical spreader, it may be spread with the use of a non-mechanical spreaders and with hand lutes, but extreme care shall be taken to prevent segregation. The temperature of the material, when placed shall not be less than that allowed in the NYSDOT Standard Specifications and no material shall be placed when the temperature of the surface on which the material is to be laid is less than 40 degrees F. or the weather is inclement.

3. Rolling shall take place immediately after placement of the pavement and shall continue until satisfactory compaction is achieved. The roller shall have a minimum weight of 10 tons. Hand tamping or mechanical compacting equipment shall be used on all areas inaccessible to rollers.

4. The contractor shall schedule all paving work in that when paving a street, that the entire street is paved in its entirety within the same day, prior to mobilizing or starting to pave a new street.

5. See Appendix A for HMA information.

6. See Appendix B for Escalator Clause

PART 2 – PAYMENT

Payment shall be included in Work Item 1.02.

END OF SECTION

Appendix A – NYSDOT Specification Section 402 Hot Mix Asphalt (HMA) Pavements

- The layer in which the material was placed
- The location and traffic volume
- Laboratory test results
- Field test results, such as density

If the subject material is left in-place, it will be assigned a QAF of 0.85. If determined the subject material will not be left in-place, the Contractor shall remove and replace the material at no additional cost to the State.

401-4 METHOD OF MEASUREMENT. The quantity will be the number of tons delivered as determined from the automated proportioning system, the delivery vehicle weigh system, or the HMA holding bin weigh system. The measurement or calculation will be the quantity based on the measured amount and reported to the nearest 0.01 of a ton.

SECTION 402 - HOT MIX ASPHALT (HMA) PAVEMENTS

(Last Revised Mayy, 2021)

402-1 DESCRIPTION. These specifications apply to all plant mixed Hot Mix Asphalt (HMA) produced at a production facility under Section 401 *Plant Production*, irrespective of aggregate gradation, type, and amount of HMA material or use.

This work will consist of providing, placing, and performing density monitoring of one or more courses of HMA pavement constructed on the prepared foundation in accordance with the contract documents or as directed by the Engineer.

402-2 MATERIALS

402-2.01 General. Aggregate and Performance Graded (PG) Binder shall be from suppliers listed in the Department's Approved List for Fine and Coarse Aggregates and Performance Graded (PG) Binders for Hot Mix Asphalt (HMA) Paving, respectively. Mineral filler shall meet the requirements of §703-08.

A PG Binder grade and the Design Estimated Traffic in 80 kN ESALs will be specified by Special Note in the contract documents.

402-2.02 Composition of Mixtures. HMA mixture shall meet the requirements of §401-2 of the Standard Specifications and the mixture design procedure as written in Materials Method (MM) 5.16, *Hot Mix Asphalt Mixture (HMA) Design and Mixture Verification Procedures*.

The Contractor shall be responsible for the quality and performance of the mixture created from approved components.

402-2.03 Warm Mix Technology. The Contractor may elect to use Warm Mix Asphalt (WMA) technology in the production of Hot Mix Asphalt as a compaction aid at no additional cost to the State. The mixture shall meet the requirements of Section 404 Warm Mix Asphalt (WMA) Pavements of the Standard Specifications, except the mixing, delivery, and compaction temperatures shall meet the requirements of this Standard Specification.

The WMA technology shall appear on the Approved List for *Technologies for Warm Mix Asphalt*. The use of WMA shall comply with the latest technology supplier's "Production, Testing, and Compaction Details" from the Approved List.

402-3 CONSTRUCTION DETAILS.

Prepave Meeting. The Engineer will conduct a prepave meeting prior to any asphalt mixture placement. The attendees at this meeting will include the Regional Materials Engineer, Paving Superintendent, Chief Inspector or Paving Inspector(s), HMA Plant Representative, Density Gauge Operator, (depending on the compaction method used) and a Work Zone Traffic Control (WZTC) representative. The participants should be prepared to discuss the steps necessary to complete the work successfully.

Participants will review all aspects of the requirements including, but not limited to, the following:

- Asphalt mixture delivery temperature
- Equipment and setup
- Mix codes to assure correct mixture is delivered
- Gauge operator certification
- Proper construction practice to provide quality product
- WZTC Activities
- Anticipated mixture production, delivery rate, and paving speed.

Certified Gauge Operator. When a density gauge is used to monitor pavement density, the Contractor shall provide a certified operator with a current Density Gauge Inspector Certification from the Associated General Contractors (NY Chapter), or its equivalent, as determined by the Director of the Materials Bureau.

402-3.01 Temperature and Seasonal Limitations.

A. Surface Temperature.

1. Surface Temperature. Asphalt mixture shall be placed only when the pavement surface temperature is equal to or greater than those specified in Table 402-1 *Temperature Requirements.*

TABLE 402-1 TEMPERATURE REQUIREMENTS

Nominal Compacted Lift Thickness	Surface Temperature Minimum
≤ 1 in	50°F
1 in < Thickness ≤ 3 in	45°F
> 3 in	40°F

2. Temperature Measurement. The Contractor shall furnish a surface thermometer capable of reading surface temperature to the nearest 1°F for the exclusive use of the Engineer. The Engineer will measure pavement surface temperatures on the surface where the mixture is to be placed. The controlling temperature will be the average of three readings taken at locations 25 feet apart utilizing a surface thermometer covered by insulation for 10 minutes or until a constant temperature is reached.

B. Seasonal Limits. Top Course on mainline and shoulders shall be placed between April 1 and November 30 for the counties of Dutchess, Orange, Putnam, Rockland, Westchester, Nassau, Suffolk, and the City of New York. For all other counties, Top Course shall be placed between April 15 and October 31. When placing Top Course HMA outside the seasonal limitations, the Contractor shall provide a limited warranty against defects in such work. Performance of the warranty should be in accordance with Materials Procedure (MP) 402-01, *Warranty Requirements for Hot Mix Asphalt*

(HMA) Top Course. Unless specified elsewhere in this specification or contract documents, these seasonal limits do not apply for any other HMA course placement.

C. Temporary HMA Placements. HMA mixture placement for temporary detours, which will not become part of the permanent pavement, are not subject to the temperature and seasonal limitations, but must be approved by the Engineer when placed outside temperature and seasonal limits. Any damaged areas identified by the Engineer on the temporary HMA placements shall be repaired within one workday after the notification.

D. Miscellaneous HMA Placements. The Engineer may allow the placement of HMA mixtures for curbs, driveways, sidewalks, gutters, and other incidental construction below the minimum temperature and outside the seasonal limits to expedite the completion of the work.

E. Scheduling HMA Placement. The Contractor shall schedule paving operations such that all HMA mixture placements are completed within the temperature and seasonal limitations. Should paving operations not be completed within temperature and seasonal limitations, the Contractor shall provide all temporary materials and work necessary such as shimming of castings and protrusions, drainage of the roadway, providing acceptable rideability, and other work for adequate work zone traffic control. This shall be at no additional cost to the State.

When the approved schedule indicates that Base or Binder course, which will be permanently incorporated into the work, is to be left open to traffic over the winter, the Contractor shall apply joint adhesive to all the joints in accordance with Section 418 *Asphalt Pavement Joint Adhesive*.
When the anticipated top course is not placed within the seasonal limits as scheduled, the Contractor shall apply joint adhesive over the exposed joints in the Binder course at least 2 inches wide centered on the exposed joint at no additional cost to the State.

The Contractor shall repair damaged areas to the Base or Binder course left over the winter prior to placing subsequent course(s) at no additional cost to the State.

402-3.02 HMA Pavers. Paver shall be capable of spreading and finishing courses of HMA mixture in lane widths, shoulders, or similar construction applicable to the specified typical section and thicknesses shown on the plans. When a paver is found to be defective either before or during its use, it shall be repaired or replaced immediately. The paver shall meet the following requirements:

- Self-powered with an activated screed or strike-off assembly.
- Capable of operating at forward speeds consistent with satisfactory placement of the mixtures.
- Have a receiving hopper with enough capacity for uniform spreading operation and with automatic flow controls to place the mixture uniformly in front of the screed.
- Heat the screed or strike-off assembly as necessary to produce a finished surface of the required smoothness and texture without tearing, shoving or gouging the mixture.
- When screed extensions are necessary for placement of mainline pavement, the extensions shall be of the same design as the main screed.
- The auger and tunnel extensions shall be mounted on the paver when the screed is extended more than 1 foot for fixed paving widths wider than 12 feet.
- When used for placing the initial paving course, Base, Binder, and Top Courses, the paver shall be equipped with automatic transverse slope and longitudinal grade screed controls that can be operated from either side of the paver. The controls shall automatically adjust the screed and increase or decrease the mat thickness to compensate for irregularities in the existing surface. The controls shall

also be capable of maintaining the proper transverse slope and be readily adjustable so transitions and super-elevated curves can be satisfactorily paved. The controls shall be capable of operating from suitable fixed or moving references as prescribed in §402-3.06 *Spreading and Finishing*. The transverse slope and longitudinal grade screed controls of the HMA paver may be manually adjusted according to the requirements of §402-3.06 *Spreading and Finishing.*

- Automatic screed controls are not required for shoulders, temporary detours, behind curbs, where existing grades at roadway intersection or drainage structure must be met, or in other areas where its use is impractical.

402-3.03 Hauling Equipment. HMA transport trucks shall have clean, smooth, tight metal beds with waterproof covers for transporting HMA mixtures to the work site. A waterproof cover shall be mounted in such a manner that it covers the entire load and overlaps the vehicle's sideboards and back by a minimum of 6 inches and is fastened except for live-bottom trucks that has channelized tarp system. The inside surface of the vehicle body may be lightly coated with a release agent listed on the Approved List for Release Agents. The use of petroleum products or solvents as release agents is prohibited. All hauling equipment is subject to the approval of the Engineer.

402-3.04 Rollers. Contractor shall use vibratory, oscillatory, static steel wheel type, or pneumatic tire rollers capable of compacting HMA mixture and weighing at least 8 tons. The Engineer will inspect rollers prior to the start of paving operations to determine acceptability. The rollers should be in good mechanical condition, and capable of operating at speeds slow enough to avoid displacement of the mixture. Rollers that result in excessive crushing of aggregate shall not be used.

All rollers shall have either a sticker or a plate installed on the roller indicating the recommended settings for amplitude, frequency, and tire pressure (pneumatic) for the thickness of pavement being rolled. Vibratory rollers shall be set up such that they produce a minimum of 12 impacts per foot during the compaction process.

402-3.05 Conditioning of Existing Surface. The Contractor shall use the provisions of Section 633 *Conditioning Existing Pavement Prior to Hot Mix Asphalt Overlay* to clean the surface of the existing pavement prior to the application of new asphalt mixture or when specified in the contract documents, to fill joints and cracks, and perform repairs. Any foreign material resulting from construction operations shall be cleaned at no additional cost to the State.

For filling the wheel ruts, the Contractor shall use Shim Course or 6.3 Top Course unless a specific asphalt mixture is specified. The mixture used for filling ruts shall be compacted with a minimum of three passes of a pneumatic rubber tire roller.

If the T&L course is specified in the contract documents using a specific mixture type, the Contractor shall place the course(s) with a minimum variable thickness to bring the surface of the existing pavement to the same transverse slope and longitudinal grade required for the finished pavement surface. If the mixture type is not specified, the Contractor shall use Table 402-2 *Mixture Selection for T&L Course*, to select the appropriate mixture type.

The selection of the mixture shall be such that dragging of stones at the thin edge is minimized, including when constructing wedges for super-elevation. If dragging is excessive in any T&L course, a different T & L mixture shall be selected for the application. The surface of this course will be tested in the same manner prescribed in §402-3.10 *Surface Tolerance*, except that the allowable variation from the true surface after compaction shall not exceed ⅜ inch.

TABLE 402-2 MIXTURE SELECTION FOR T&L COURSE	
Compacted Thickness Range (in)	**Mixture Type**
Thickness ≤ 1	6.3 Top Course or Shim
1 < Thickness ≤ 2	9.5 or 12.5 Top Course
2 < Thickness ≤ 3	19.0 or 25.0 Binder Course
3 < Thickness ≤ 5	25.0 Binder Course or 37.5 Base Course

402-3.06 Spreading and Finishing

A. Tack Coat. The Contractor shall apply tack coat, in accordance with Section 407 *Tack Coat*, between all HMA pavement lifts prior to placing HMA mixture regardless of time period between the lifts. Tack coat is not required on the surface of Permeable Base courses. Paving over a tack coat should not commence until the emulsion has broken (goes from brown to black) or is tacky when touched

B. Joint Adhesive. The Contractor shall apply joint adhesive in accordance with Section 418 *Asphalt Pavement Joint Adhesive* to all pavement joints butting against the new asphalt placement including curbs, median barriers or similar. The application of joint adhesive is for Top Course only unless it is specified for other courses in the contract documents or as required under §402-3.01E *Scheduling HMA Placement*.

C. HMA Mixture Temperature. HMA mixture temperature shall not exceed 325°F at the point of discharge of the haul vehicle, unless a higher temperature is approved by the Regional Materials Engineer.

D. HMA Mixture from Multiple Plants. HMA mixture from multiple plants shall not be supplied to a single paver.

E. Reference Line. The Contractor shall erect and maintain a taut reference line positioned at or near the pavement centerline or edge to guide the paver when the initial asphalt pavement course is laid for new or reconstructed pavement. The reference line shall be supported at approximately 25-foot intervals on tangent sections and at closer intervals on curves. The line shall be tensioned sufficiently to remove any sagging.

A moving reference of at least 30 feet can be used in lieu of a reference line with approval of the Engineer. The moving reference may be a floating beam, ski, or other suitable type such that the resulting pavement course surface is even. A short ski or shoe may also be used for the initial course with the approval of the Engineer if a satisfactory fixed reference such as a curb, gutter, or other reference is adjacent to the pavement.

A short ski may be used over any course in an adjacent lane that is used as the reference. If the proposed floating beam or the short ski does not produce the results similar to those obtained using a taut reference line, the use of the devices shall be discontinued, and a taut reference line shall be erected.

F. HMA Mixture Placement. The HMA paver shall be used to place the HMA mixture either over the entire width or over a partial width that is practical. The paver speed shall be coordinated with the rate of delivery of the mixture to provide a steady and continuous placement of the mixture without

interruption. The Contractor shall provide details of the anticipated mixture delivery rate and the anticipated paver speed at the prepave meeting.

The HMA mixture shall be placed on a clean, dry, tack-coated surface. If the areas to be paved are less than 1,000 square feet or small and scattered, the HMA mixture may be spread by hand or other method approved by the Engineer. For these areas, the mixture shall be dumped and spread such that the compacted thickness meets the thickness specifications located in the contract documents.

G. Top Course Texture and Color. The Top Course HMA mixture shall be supplied from a single plant for the duration of the work such that the pavement surface has a uniform color and texture, except when a contract includes multiple paving sites, or the paving length is more than 5 miles and supply from multiple plants to either end of the paving length is practical. In that case, the above requirement will apply to each paving site and locations at either end of the paving length as approved by the Engineer. Limits of each site will be subject to approval by the Engineer. If a plant breaks down, another plant may supply mixture if the aggregate used for producing the HMA mixture is from the same source, with the concurrence of the Engineer. When echelon paving is utilized, multiple plants may be used to supply mixture provided the aggregate used is from the same source. The provisions of §402-3.06 D *HMA Mixture from Multiple Plants* apply.

H. Wet Surface. Asphalt mixture shall not be placed on any wet surface. Wet surface is defined as one that is moistened, covered or soaked with water.

402-3.07 Compaction. The Contractor shall compact the HMA mixture sufficiently using the appropriate compaction method to achieve pavement densities of at least 93%, expressed as a percentage of the mixture's maximum theoretical density (MMTD).

The HMA mixture shall be compacted using rollers meeting the requirements of §402-3.04 *Rollers*. A minimum of two rollers, one for breakdown and one finish roller, shall be used unless the HMA mixture placement is on a bridge deck, bridge approaches, or other areas where one roller may be sufficient to achieve the required density. When paving multiple lanes simultaneously, the required number of rollers shall be increased proportionately for each additional full lane width unless otherwise approved by the Engineer. The HMA mixture shall be compacted immediately after placement, and when the mixture is in the proper condition such that the rollers do not cause displacement, cracking, or shoving. Initially, all courses shall be compacted with the roller traveling parallel to the centerline of the pavement, beginning at each edge and working toward the center. The super-elevated curves shall be compacted starting at the low-side edge and working toward the higher edge.

Any displacement caused by the roller, or any other causes, shall be corrected immediately using rakes and additional HMA mixture as required. The roller wheels shall be properly moistened with water, water mixed with small quantities of detergent, or other approved material, to prevent adhesion of the mixture to the rollers. The use of petroleum products or solvents are not allowed.

The HMA mixture along forms, curbs, headers, walls, and other areas not accessible to rollers shall be compacted with mechanical tampers, a trench roller, or a small vibratory roller with the approval of the Engineer.

The Contractor shall remove and replace any HMA mixture that becomes loose and broken, mixed with dirt, or is in any way defective and the new mixture shall be compacted to conform to the surrounding area. Any area showing an excess or deficiency of HMA material shall be corrected immediately.

Vibratory compaction is not allowed when HMA mixture is placed on structural bridge decks or other structures with less than 2 feet of cover over the structure or when specified in contract documents. The Contractor shall repair all damages which may occur to the highway components and adjacent property, including buried utility and service facilities, at no additional cost to the State. Steel wheel rollers running on static mode, pneumatic rollers or oscillatory rollers shall be used on the bridge decks.

The Contractor shall monitor pavement density for 60 and 70 Series compaction using density gauges meeting the provisions of §402-3.07E *Density Gauges*. The density gauge operator shall possess a current Density Gauge Inspector Certification from The New York State Associated General Contractors, or its equivalent, as determined by the Director, Materials Bureau. Any HMA placement under 60 and 70 Series monitored by a gauge operator whose certification is revoked for reasons outlined in the New York State Inspector Certification Program Manual under "Decertification", shall be evaluated in accordance with §402-3.14 *Pavement Evaluation*, using the results of pavement samples taken in accordance with §402-3.08 *Pavement Density Samples.*

A. 50 Series Compaction Method. All material placed on the traveled way and ramps which are 1500 feet or greater shall be subject to a pavement density Quality Adjustment Factor (QAF). A paving lot is defined as a day's placement of at least 200 tons. Each paving lot shall be equally divided into sublots in accordance with Materials Procedure (MP) 402-02 *Hot Mix Asphalt (HMA) Pavement Density Determination,* based on the quantity placed. When the quantity placed is less than 200 tons in a day, pavement samples are not required and the density QAF for that day will be 1.00 provided the procedures used to obtain pavement densities in these areas are similar to the previously placed pavement sections. For quantity of more than 200 tons but less than or equal to 2000 tons in a day, the Engineer will divide the lot into 4 equal sublots. When the quantity exceeds 2000 tons, the Engineer will select one additional pavement core location for up to every 500 tons over 2000 tons, up to a maximum of 8 cores for a lot. Ramps less than 1500 feet and shoulders will not be considered part of the traveled way and are not subject to coring.

The Engineer will mark a pavement core location in each sublot in accordance with §402-3.08A *Pavement Cores* once the compaction operation is completed, excluding the first 300 feet of the day's placement. The Contractor shall extract pavement cores at the marked locations in each sublot and fill the pavement core holes before the road is open to traffic in accordance with §402-3.08B *Filling Core Holes*. The pavement cores shall be extracted no later than the end of the following day's placement. The Contractor shall deliver the sealed pavement cores to the Regional Materials Laboratory in accordance with §402-3.08 E *Sample Delivery*. The Regional Laboratory will test core samples and determine the percent density using the maximum theoretical density samples taken in accordance with §402-3.08 C *Loose Mix Samples*. The results of this analysis will be used to determine the pavement density Quality Adjustment Factor (QAF) in accordance with MP 402-02 and submitted to the Engineer prior to the end of the next business day upon the delivery of the samples. The Engineer will apply the pavement density QAF to the material placed on that day excluding the first 300 feet in accordance with §402.4 *Method of Measurement*, Table 402-6, *Quality Adjustment Factors for 50 Series*.

When two consecutive lots are found to have a density QAF equal to or less than 0.85, the Contractor shall stop paving operations and provide a corrective action plan.

The Contractor shall compact material on shoulders, widening, crossovers, bridges and ramps with a uniform full-width section of less than 1500 feet in length using the same roller pattern as traveled way. If the shoulder subbase is structurally insufficient to sustain the level of compaction such that the shoulder shows sign of distress during compaction, the compaction effort shall be decreased until no further damage occurs to the shoulder or subbase.

Multiple Paving Lots: When the work includes multiple paving operations such as echelon paving, each paving operation shall be considered a lot and evaluated separately. When the HMA is placed continuously during a calendar day or more, a new paving lot will be defined when the paving crew shift change occurs

B. 60 Series Compaction Method. This method requires the Contractor to monitor pavement density using a density gauge and pavement cores. The Contractor shall construct the pavement to achieve a pavement density of at least 93% of the mixture's maximum theoretical density (MMTD).

First day of Paving. The Contractor shall construct the pavement using an interim PTD. The interim PTD will be 94.5% of the MMTD. The first 300 feet shall be used to adjust the paving operation. The Contractor shall take density readings at every 200 feet along the length of the pavement for each paver pass, in accordance with MP 402-02. The density gauge readings shall be recorded on the appropriate BR form based on the type of gauge used. The Contractor shall ensure the density gauge readings meet the PTD. If the density readings at two consecutive locations fall below 97% of the PTD or if the moving average of the last 10 density readings falls below 98% of the PTD, the Contractor shall adjust the PTD.

At the end of the first day's placement, or when the paving operation is stopped as mentioned above, the Engineer will randomly select and mark 4 pavement core locations in accordance with §402-3.08, excluding the first 300 feet.

The Contractor shall take density gauge readings, in accordance with MP 402-02 at each pavement core location prior to extracting the cores. The Contractor shall fill Form BR 109 with density gauge readings, gauge type, model, and the serial number.

The Contractor shall extract pavement cores at the marked location in each sublot and fill the core holes before the road is opened to traffic. The density gauge readings and sealed pavement cores shall be delivered to the Regional Materials Laboratory in accordance with §402-3.08 *Pavement Density Samples*.

The Regional Materials Laboratory will determine the percent density using representative samples taken in accordance with §402-3.08 C *Loose Mix Samples*. The results of this analysis will be used to determine the actual Project Target Density (PTD). and the pavement density Quality Adjustment Factor (QAF) and the results will be submitted to the Engineer prior to the end of the next business day following the delivery of the samples.

The Engineer will apply the pavement density QAF to the material placed on that day excluding the first 300 feet in accordance with §402-4 *Method of Measurement*, Table 8, Quality Adjustment Factors for 60 Series. When the quantity placed is less than 200 tons in a day, the density QAF for that day will be 1.00.

Routine Paving: The Contractor shall compact the pavement using the calculated PTD. If the calculated PTD differs from the previous PTD by more than 2 lbs/ft^3, the Engineer will establish a new PTD. Density readings shall be taken every 200 feet along the length of the pavement for each paver pass, in accordance with MP 402-02. The density gauge readings shall be recorded on the appropriate BR form based on the type of gauge used. The minimum density reading shall be at least 97% of the PTD at a single test location and 98% of the PTD calculated as a moving average of the last 10 test locations. If density readings over two consecutive locations fall below 97% of the PTD or if the moving

average of the last 10 density gauge readings falls below 98% of the PTD, the Contractor shall stop routine paving operations. The Engineer will randomly select 4 cores over the entire day's paving. The Contractor shall take density gauge reading at each location, fill out Form BR 109, extract the cores, and deliver to the Regional Laboratory.

Coring Frequency: The Engineer will select 4 core locations every third day of paving after the first day of paving, in accordance with MP 402-02, excluding the first 300 feet. On non-coring days, the Engineer will request pavement samples for density verification of HMA placed under the following situations at no additional cost to the State.

- Insufficient number of density readings recorded, either at a specific location or at the required frequency.
- Paving completed after the only density gauge on site breaks down.
- Gauge readings do not seem to accurately represent the HMA density.

The Contractor shall extract the cores and deliver them to the Regional Materials Laboratory for analysis in accordance with §402-3.08E. The Regional Materials Laboratory will determine the PTD and the pavement density QAF.

The Engineer will apply the QAF in accordance with §402-4 *Method of Measurement*, Table 8 to the material placed on that day excluding the first 300 feet.

Density on shoulders, ramps, widening and crossovers shall be monitored with the same density gauge to ensure the PTD is achieved. If the shoulder subbase is structurally insufficient to sustain the level of compaction such that they show signs of distress, the Contractor shall decrease the compaction effort until no damage occurs to the shoulder or subbase.

Multiple Paving Sites. When the work includes multiple paving sites, each location shall be evaluated separately as described above.

C. 70 Series Compaction Method. The Contractor shall construct a test section in accordance with the provisions of *Test Section* below, prior to the placement of HMA mixture. The placement of HMA mixture, including the construction of the test section, shall not begin unless both a density gauge and a certified operator are present.

Test Section. On the first day of paving, the Contractor shall place and compact a test section on the mainline with a maximum of 1,500 linear feet in one lane to establish the Project Target Density (PTD) using the "peak" method. The location of the test section will be approved by the Engineer. The Contractor shall use the same equipment and procedures to be used in the construction of the remainder of the course. The first 300 feet of the test section shall be used to stabilize the paving operation. Initially, the mixture shall be compacted with a breakdown roller. The Engineer will select three random locations in accordance with MP 402-02 and mark these sites so that subsequent density testing can be performed at the same locations.

The Contractor shall make necessary vibratory and static passes to "peak" the pavement density such that the density gauge reading shall yield a density of at least 93% of the MMTD. The Contractor shall take density readings at the three selected sites after every additional machine pass until a "peak" density is achieved. A "peak" density is achieved when the increase in density is less than 2 lbs/ft^3 and it typically occurs when pavement is compacted at 175ºF or less. The Contractor shall stop further compaction if the pavement shows signs of distress.

The PTD is the average of the highest density reading from each of the random locations. The calculated PTD shall be used to monitor the pavement density. The Engineer may request pavement cores to verify the PTD in accordance with MP 402-02.

The Contractor shall begin routine paving only after the PTD has been established. Density readings shall be taken every 200 feet along the length of the pavement for each paver pass, at locations randomly selected by the Engineer, in accordance with MP 402-02. The readings shall be recorded on the appropriate BR form based on the type of gauge used. The minimum density reading shall be at least 97% of the PTD at a single test location and 98% of the PTD calculated as a moving average of the last 10 test locations.
If density gauge readings over two consecutive locations fall below 97% of the PTD or if the moving average of the last 10 density gauge readings falls below 98% of the PTD, stop routine paving operations and construct a new test section.

Density on shoulders, ramps, widening and crossovers shall be monitored with the same density gauge to ensure the PTD is achieved. The appropriate BR form based on the gauge shall be used to record the density readings in accordance with MP 402-02. If the shoulder subbase is structurally insufficient to sustain the level of compaction such that they show signs of distress, the Contractor shall decrease the compaction effort until no damage occurs to the shoulder or subbase.

The Engineer may request pavement samples for density verification of HMA placed under the following situations at no additional cost to the State.

- Insufficient number of density readings recorded, either at a specific location or at the required frequency.
- Paving completed after the only density gauge on site breaks down.
- Gauge readings do not seem to accurately represent the HMA density.

D. 80 Series Compaction Method. The Contractor shall place and compact HMA mixture using roller passes required in Table 402-3, *Number of Machine Passes*. The number of passes listed in Table 402-3 may be increased or decreased by the Engineer to obtain adequate density.

The Contractor shall complete all breakdown roller passes before the mat temperature falls below 250°F.
Ruts, ridges, roller marks, or other irregularities from the surface shall be removed using static rolling. All the turning of the rollers shall be performed on material which has at least one roller pass to minimize damage. The Engineer may approve alternate compaction procedures for areas where the specified procedures are not applicable. Oscillatory rollers may be used for either rolling option.

TABLE 402-3 NUMBER OF MACHINE PASSES[12]

Pavement Courses	Static Compaction[3]		Vibratory Compaction	
	Steel Wheel Rollers	Pneumatic Rollers	Vibratory Passes	Static Passes

≥3”	8	4	4	4
>1” to < 3”	6	3	3	3
≤ 1”	4	2	2	2
Type 5 Shim	2	-	-	-
Permeable Base[1]	2	-	-	-

1. For the Permeable Base course, compact the mixture between 140°F and 230°F.
2. A vibratory pass is defined as one movement of a roller over the pavement with both drums vibrating. A static pass is defined as one movement of a roller over the pavement.
3. Where Static Compaction is required, an Oscillatory Roller used in oscillation mode may be used in lieu of a pneumatic roller.

1. Static Compaction. The Contractor shall compact the HMA mixture using a 3-roller train. The rollers shall make passes at a uniform speed not to exceed 3 mph. The HMA mixture shall be compacted with steel-wheel rollers operating in a static mode with each pass overlapping the previous roller pass by one-half the width of the roller followed immediately with a pneumatic rubber-tired roller.

A steel-wheel roller shall be used for finish rolling the HMA mixture to remove all shallow ruts, ridges, roller marks, and other irregularities from the surface.

When the compaction procedure fails to produce acceptable results, the procedure shall be adjusted to obtain the desired results.

2. Vibratory Compaction. The Contractor shall compact the HMA mixture using a minimum of two rollers, one for breakdown and one finish roller, unless the HMA mixture placement is on a bridge deck, bridge approach, or other area where one roller may be sufficient to achieve the required density. When paving multiple lanes simultaneously, the required number of rollers shall be increased proportionally for each additional full lane width. The rollers shall make passes at a uniform speed to achieve a minimum of 12 impact per foot. The Contractor shall furnish a vibrating reed tachometer for the exclusive use of the Engineer. A vibrating reed tachometer shall have a frequency range of 1,000 vpm to 4,000 vpm with a minimum reed interval of 50 vpm between 1,000 vpm and 2,000 vpm and a minimum reed interval of 100 vpm between 2,000 vpm and 4,000 vpm.

The settings on the rollers shall be set to produce a minimum of 12 impacts per foot during the compaction process. Impacts are defined as the number of times a drum hits the pavement within one foot of travel. The Engineer will determine the impacts by using the following formula:

$$Impacts\ per\ foot = \frac{VPM}{Speed}$$

VPM = Frequency of the roller (vibration per minute)
Speed = Speed of the roller (feet per minute)

When satisfactory compaction is not obtained, or damage occurs to highway components and/or adjacent property using vibratory compaction equipment, the use of the vibratory compaction method shall be ceased, and the remainder of the work shall be completed using static

compaction methods in accordance with *1. Static Compaction*. This will be at no additional cost to the State.

If the number of roller passes are not being made or the roller setup does not provide the minimum impacts per foot consistently, the Contractor shall stop the paving operation and adjust the process as necessary to meet the requirements, and then restart the operation with the approval of the Engineer.

E. Density Gauges. The density gauges used for monitoring pavement density in accordance with MP 402-02 shall meet the following requirements:

1. Nuclear Density Gauge. A Safety Control plan shall be submitted at least two weeks prior to using the gauge. The nuclear density gauge shall meet the following requirements:

- Consist of a radioactive source, scaler, and other basic components housed in a single backscatter unit.
- Calibrated at least every two years.
- Operated by personnel trained in the principles of nuclear testing and safety practices.

2. Non-nuclear Density Gauge. The non-nuclear density gauge shall meet the following requirements:

- Capable of functioning in the temperature and moisture levels experienced during HMA mixture paving.
- Capable of determining the density of HMA pavements by measuring changes in the electromagnetic field resulting from the HMA compaction process.
- Calibrated at least every two years.

402-3.08 Pavement Density Samples

A. Pavement Cores. The Engineer will select pavement core locations randomly in accordance with MP 402-02 and outline a 10-inch diameter circle. The Contractor shall extract 6-inch diameter pavement cores from within the 10-inch diameter circles outlined by the Engineer. The Engineer will not designate pavement core locations before the rolling operation is completed and all compaction equipment has moved off the sublot designated for coring. The Contractor shall notify the Engineer immediately if a pavement core is in a location that is believed to not represent the sublot. If necessary, the pavement may be cooled so that the core samples are not damaged during coring. If the pavement core sample does not de-bond during coring, the Contractor shall not attempt to separate the core sample from the underlying layers. The Regional Materials Laboratory will separate the pavement core layer required for testing from the underlying material by sawing, if necessary.

1. Companion Cores - Taking companion cores in the testable area is not allowed.
2. Quality Control (QC) Cores - The Contractor may take up to 2 cores within the first 300 feet at the beginning of the first day's paving. Testing these cores shall be Contractor's responsibilities and the results can only be used for quality control (QC) purpose only. Any additional days of coring for QC must be approved by the Engineer.

B. Filling Core Holes. The Contractor shall fill the pavement core holes with a similar HMA mixture immediately after extracting the cores or before opening the lane to traffic. Any standing water in the

core holes shall be removed prior to backfilling. The core hole shall be filled in layers of 3 inches or less and each layer must be sufficiently compacted. The use of a shovel or similar method to compact the HMA is not allowed.

C. Loose Mix Samples.

1. **50 Series -** The Contractor shall take two loose mix samples either at the plant or at the project site for each day of paving on the traveled way. The samples must represent each day's placement. In addition, the Contractor shall provide the plant Quality Control Technician (QCT) and Quality Assurance Technician (QAT) mixtures maximum theoretical density (MMTD) results to the Regional Materials Engineer with the pavement core samples. The Department may take loose mix samples from the paver using MP 402-03 and use the results to supplement the daily MMTD when the QAT is not assigned at the plant.

2. **60 Series -** The Contractor shall provide the plant Quality Control Technician (QCT) and Quality Assurance Technician (QAT) MMTD results to the Regional Materials Engineer for each day of paving on the traveled way. The Department may take loose mix samples from the paver using MP 402-03 and the results used to supplement the daily MMTD when the QAT is not assigned at the plant.

3. **Joint Density -** The MMTD results representing the traveled way placement for 50 or 60 Series shall be used to determine percent density of the joint cores.

D. Securing Pavement Cores. The Engineer will secure and seal the pavement cores in accordance with MP 402-02 once they have been extracted from the pavement.

E. Sample Delivery. The Contractor shall deliver the pavement samples to the Regional Materials Laboratory no later than the end of the following day's placement. If these samples are not submitted for any paving lot within the required duration, a QAF of 1.00 or less will be assigned for that lot if a QAF is applicable. When, for any reason, a delay occurs in the delivery of the lot samples for three consecutive lots, the Engineer will stop paving operations until the samples are delivered and tested.

F. Unacceptable Pavement Cores. The pavement cores will not be tested by the Department if they are damaged during extraction, or during transport to the Regional Materials Laboratory, or missing security seals. In that case, the Engineer will select new pavement core location(s) within a foot forward of the original location(s) at the same offset. The Contractor shall extract pavement cores from the newly identified location(s).

G. Pavement Density Core Test Results. Upon receipt of test results of the pavement cores provided by the Regional Materials Laboratory, the Contractor shall notify the Engineer within 2 working days if the results are not representative of the pavement density. The notification shall include details as to which specific test results are not representative, and the reasons for such notification.

402-3.09 Joints. The finished pavement at all joints shall comply with the surface tolerance requirements and exhibit the same uniformity of texture and compaction as other sections of the course. Rollers shall not pass over the unprotected edges of a freshly laid mixture unless approved by the Engineer.

All joints, excluding the tapered wedge joint, shall be constructed such that the exposed edge of the newly placed course is fully thick, and the course is straight unless the exposed joint will not be part of the

joint. If the edge of the newly placed course is not straight or smoothly curved, the Contractor shall sawcut the edge by using a power saw or other approved tools to cut a neat straight line.

Prior to placing the adjacent course, a joint adhesive shall be applied in accordance with §402-3.06 *Joint Adhesive*, to all pavement edges in order to provide bonding with the newly laid pavement.

Successive HMA courses shall be placed over an underlying course such that all longitudinal joints are offset no more than 6 inches from the longitudinal joint of the lower pavement course, unless otherwise approved by the Engineer. HMA courses on existing PCC pavement shall be placed such that all longitudinal joints are stacked on top of the joint of the underlying PCC pavement.

A. Transverse Joints. The pavement courses shall be placed as continuously as possible to limit the number of transverse joints. The transverse joints in adjacent lanes shall be staggered at a minimum of 10 feet. The transverse joint shall be formed by cutting back the previous placement to expose the full depth of the course. The paver shall be set such that material laid overlaps the previously placed edge by 2 to 3 inches at a thickness of approximately 25% of the compacted thickness of the course. Broadcasting the overlapped material onto the fresh mat is not allowed. If the overlap is excessive, the extra material shall be trimmed uniformly along the joint. The coarse particles in the overlap material shall be removed and discarded, if necessary.

The transverse joint shall be compacted in static mode with the roller parallel to the joint and perpendicular to traffic. Boards of proper thickness shall be placed at the edge of the pavement for the off-pavement movement of the roller. The first pass shall be made with the roller operating on the previously laid material with 6 to 8 inches of its drum(s) overlapping onto the uncompacted HMA mixture. If a vibratory roller with pneumatic drive wheels is used, the first pass with one of the pneumatic wheels shall be aligned directly on the joint and the drum operating in static mode. The successive passes shall be made with the roller drum(s) moving approximately one foot onto the hot material per pass until half the width of the roller is on the hot mat.

B. Longitudinal Joints. The longitudinal joints in the Top Course shall correspond with the edges of the proposed traffic lanes. Other joint arrangements will require approval of the Engineer.

For 70 and 80 Series, the dual-drum vibratory roller shall be operated in a vibratory mode, unless static rolling is required, to construct the longitudinal joint. Rollers shall be as close to the paver as practical. The first pass shall be made traveling toward the paver and operating on the hot mat with 6 to 8 inches of the roller drum overlapping onto the cold mat. The second pass shall be made to the joint with the roller traveling back away from the paver along the same path.

If a single-drum vibratory roller with pneumatic drive wheels is used, the roller shall be operated in vibratory mode and following the same procedure. The exception to this is that the roller will be aligned on the joint so that the pneumatic drive wheels travel on the joint. All turning movements of the roller shall be made on previously compacted material. After applying two roller passes on the longitudinal joint, the roller shall proceed to the low side of the lane and compact as described in §402-3.07 *Compaction*.

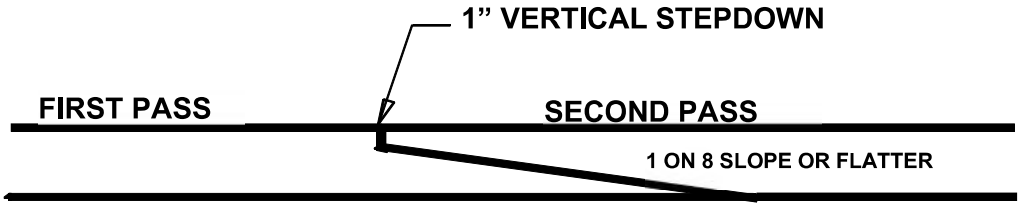
The longitudinal joint shall be constructed such that the compacted thickness of the newly placed mat shall not exceed ¼ inch of the adjacent mat. When the joint is constructed with an overlap, the overlap shall not exceed 2 inches.

For all HMA courses other than Top Course, the longitudinal pavement joint shall not be exposed more than 100 feet at the end of the working day when traffic is maintained on the roadway during paving operations. For Top Course of 2 inches or less, refer to §402-3.09D *Exposed Longitudinal Joint*.

The longitudinal joint shall be constructed using one of the two options below:

1. Option A - Butt Joint. This method shall be used for the placement of all pavement courses.

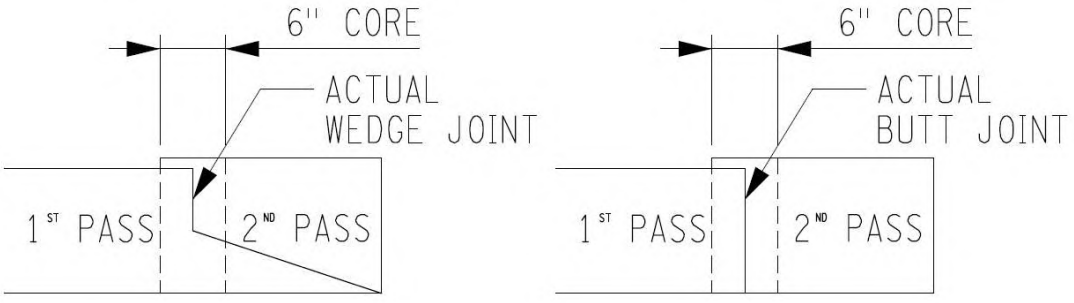
2. Option B - Tapered Wedge Joint. This method shall be used for pavement thickness of 2 inches or less. The HMA mixture for the first pass shall be placed with an attachment to the paver to provide a sloping wedge with a vertical step-down of 1 inch at the longitudinal pavement joint. A wedge of material that is from the bottom of the step-down to the existing surface at a slope of 1 on 8 should be flatter. The vertical step-down shall be ½ inch minimum after compaction of the mat.



TAPERED WEDGE JOINT

C. Joint Density for 50 and 60 Series -

Longitudinal joints in HMA top course between travel lanes for 50 and 60 Series compaction methods are subject to a performance measure based on the core density testing.The Contractor shall select the joint construction method to provide optimum density at the joint.



The cores will be taken from the total length of the joint matched daily. The number of cores extracted shall be in accordance with Table 402-4 *Longitudinal Joint Cores for 50 & 60 Series*. The Engineer will randomly mark core locations centered over the constructed joint in accordance with MP 402-02 using the X coordinates only. A matched joint of 1500 feet or less is not subject to coring. The Contractor shall extract cores on the same day the joint is matched or before the completion of next day's placement. The cores shall be extracted in accordance with §402-3.08A *Pavement Density*

Samples and delivered to the Regional Laboratory. The Regional Materials Engineer will determine the core density using the mixture's maximum theoretical density specified in §402-3.08C.

TABLE 402-4 LONGITUDINAL JOINT CORES FOR 50 & 60 SERIES	
Daily Joint Length (feet)	No. of Cores
1,500 < Length ≤ 10,000	4
10,000 < Length ≤ 20,000	6
Length > 20,000	8

D. Exposed Longitudinal Joint. The exposure of longitudinal joints is not allowed over the weekends, holidays, or when there are other concerns, such as pending wet weather. The joint for the Top Courses with a thickness of 2 inches or less may be exposed to traffic for no more than 24 hours with the following conditions:

- Tapered wedge joint shall be used for 12.5 HMA and 9.5 HMA and a butt joint shall be used for 6.3 HMA.
- The warning signs shall be posted in advance of the condition, at each ramp, and roadway intersection, and repeated every ½ mile in accordance with §**619-3.02** ***Basic Work Zone Traffic Control.***
- If the exposed longitudinal pavement joint becomes damaged due to rounding of the notched wedge, the joint shall be saw-cut prior to placing the adjacent lane.
- Joint adhesive shall be applied to the exposed joint prior to placement of the adjacent lane in accordance with §402-3.06 *Joint Adhesive*.

402-3.10 Surface Tolerance. The Contractor shall construct each pavement course to a ¼ inch surface tolerance. The Engineer may test the surface with a 16-foot straight edge or string line placed parallel to the centerline of the pavement and with a 10-foot straight edge or string line placed transversely to the centerline of the pavement. Variations exceeding ¼ inch shall be appropriately corrected or the pavement be removed and replaced at no additional cost to the State.

402-3.11 Thickness Tolerance. The Contractor shall construct the pavement such that the final compacted thickness is as near to the nominal thickness as is practical, and within the tolerances specified below. The thickness indicated for each of the various courses of HMA pavement is the nominal thickness.

The Engineer may request pavement cores to determine the thickness of the completed pavement course for final acceptance and payment. The Contractor shall provide work zone traffic control and take pavement cores in accordance with §402-3.08 *Pavement Density Sample,* at no additional cost to the State. The Engineer may use another acceptance method such as yield calculations to determine the final thickness for acceptance and payment.

HMA mixture placed as a Truing and Leveling course as described in §402-3.05 *Conditioning of Existing Surface* shall not be considered in pavement thickness determinations. The allowable tolerance for HMA mixture specified under a single pay item is as follows:

- 1/4 inch or less for a required course whose nominal thickness is 4 inches or less.
- 1/2 inch or less for a course or courses whose nominal thickness is over 4 inches.

The tolerance for the total thickness of all HMA mixture courses shall be 1/4 inch. When the HMA mixture is placed on newly constructed subbase material, an additional tolerance of 1/4 inch will be allowed both in the nominal thickness of the course placed directly on the subbase and the total pavement thickness. No payment shall be made for any material placed in excess of the permissible tolerance.

402-3.12 Paver and Equipment Cleaning. Tools and equipment used for HMA placement shall not be cleaned on the pavement surface, or near streams, ponds, drainage structures or other areas that are tributaries to waterways. The designated area approved by the Engineer shall be used for cleaning all paving equipment and tools. If a petroleum product is used for cleaning, tarpaulins, sand pads, pails, or other collection methods of all liquid products during cleaning operations shall be used to prevent spillage or accidental release. Hand sprayers or other similar devices may be used to minimize the amount of petroleum product applied. The sand and the collected petroleum products shall be properly disposed of as petroleum contaminated soil at no additional cost to the State.

402-3.13 Shoulder Edge Wedge. When specified, the Contractor shall construct a shoulder edge wedge as detailed in the contract documents. The HMA mixture shall be placed on the pavement shoulders where the outside edge of Top and Binder Course consist of an angle of 35° or flatter measured from finished grade to the preceding course surface. The shoulder edge wedge shall be constructed using a device attached to the screed to minimize hand work. The top of the tapered section shall be at the end of the shoulder width such that the tapered section will be an additional width of material outside of the paved shoulder width. The shoulder edge wedge is optional at locations where guiderails are installed.

402-3.14 Pavement Evaluation. The Engineer will evaluate mixtures either placed or produced outside the specification limits which results in low quality adjustment factors.

A. Plant Production. When plant production QAF is 0.85, the Engineer will evaluate the pavement section in accordance with §401-3.10 *Evaluation of Sublots Represented by 0.85 QAF* to decide whether to keep it in place or not.

B. Pavement Density. When a QAF of a paving lot for 50 Series, 60 Series or 70 Series compaction method is calculated to be 0.60, the Engineer will evaluate the lot to determine if it can be left in place. The type of material produced (i.e. Binder, Top), the course in which it is used, and the location of use (i.e., mainline or a non-critical area) will be primary considerations in the determination of whether the HMA mixture can be left in place. If it is determined that the HMA mixture can be left in place, the Engineer will apply a QAF of 0.60. If the HMA mixture cannot be left in place, the Engineer will instruct the Contractor to remove and replace the mixture at no additional cost to the State.

402-3.15 Pavement Defects. Upon completion of the HMA mixture placement, the Engineer will ensure there are no visible defects in the pavement, such as ruts, ridges, roller marks, cracking, tearing, segregation, bleeding, or any other irregularities. The Contractor shall correct any defects that become apparent or replace the defective pavement at no additional cost to the State.

402-4 METHOD OF MEASUREMENT

402-4.01 Hot Mix Asphalt. The quantity of HMA mixture to be measured for payment will be measured in tons and rounded to the nearest 0.01 tons.

402-4.02 Plant Production Quality Adjustment. Plant Production Quality Adjustments will be measured in Quality Units determined for each day's production using the daily Quality Adjustment Factor (QAF)

for plant production. Also, this will be determined in accordance with §401-3.07 *Documentation*. Quality Units for plant production quality adjustments will be calculated using the formula below.

Quality Units = (Quality Adjustment Factor - 1.00) x HMA Placed (Tons)

No plant adjustment will be made for temporary pavement, shim, permeable base items and other miscellaneous items.

402-4.03 Pavement Density Quality Adjustment. Pavement Density Quality Adjustments will be measured in Quality Units determined for each day's production using the daily Quality Adjustment Factor (QAF) for pavement density. The quantity of HMA mixture subject to adjustment will be determined from quantity placed on the mainline. The pavement density QAF will not apply to HMA mixture placed on ramps with a uniform full width section less than 1500 feet, shoulders, widening, crossovers, and bridges. Payment in these areas will be a QAF of 1.00 based on satisfactory placement and compaction. When shoulders and mainline are placed together, the mainline quantity may be determined using typical sections shown in the contract documents.

Quality Units for pavement density quality adjustments under 50 and 60 Series compaction methods will be calculated using the formula below. No pavement density quality adjustments will be made under 70 and 80 Series compaction methods.

Quality Units = (Quality Adjustment Factor - 1.00) x HMA Placed (Tons)

A. 50 Series Compaction QAF. The Engineer will determine the Percent Within Limits (PWL) for a paving lot in accordance with MP 402-02 and determine the QAF in accordance with Table 402-6 *Quality Adjustment Factors for 50 Series* and use the QAF to calculate the Quality Units for the accepted HMA mixture quantity. A payment adjustment will be made using the Quality Unit Index Price to all the material placed on the traveled way for the day the pavement cores represent.

TABLE 402-6 QUALITY ADJUSTMENT FACTORS FOR 50 SERIES

Percent Within Limits (PWL)	Quality Adjustment Factor (QAF)
$PWL_{\geq 93} > 93$	1.05
$PWL_{\geq 93} \leq 93$	$\sum (PWL_{Segment} \times Pay\ Factor_{Segment})$[1]

1. $PWL_{Segment}$ will be calculated for each of the density ranges in Table 402-7 *Density Segment Pay Factors*, using the standard deviation and average density for the lot.

TABLE 402-7 DENSITY SEGMENT PAY FACTORS

Density Segment	Segment Pay Factor
88 – 90	0.60
90 – 91	0.70
91 – 92	0.80
92 – 93	0.90
93 – 94	1.00
94 – 100	1.05

B. 60 Series Compaction QAF. The Engineer will determine QAF in accordance with Table 402-8 *Quality Adjustment Factors for 60 Series* and use the QAF to calculate the Quality Units for the

accepted HMA mixture quantity. A payment adjustment will be made using the Quality Unit Index Price to all the material placed on the traveled way for the day the pavement cores represent.

TABLE 402-8 QUALITY ADJUSTMENT FACTORS FOR 60 SERIES	
Average Pavement Core Density	**Quality Adjustment Factor**
Density≥93.0	1.00
88.0 ≤ Density < 93.0	QAF = 0.08 * Avg Core Density – 6.44[1]
Density < 88.0	0.60

1. Quality Adjustment Factor rounded to two decimal places using ASTM standard.

402-4.04 Joint Density Quality Adjustment. The Engineer will determine the density of each joint core and calculate the average percent of the mixture's maximum theoretical density (%MMTD) of the longitudinal joint cores. The Engineer will measure the length of longitudinal joints, in linear feet, and determine the number of segments. A segment is defined as a 528-foot section of a joint. A partial segment of 264 feet or greater (≥ 0.5 of a segment) will be considered a full segment.

The Engineer will determine the segment Quality Units (QU) from Table 402-9 *Quality Adjustment for Longitudinal Joint Density* based on the average density of the joint cores and calculate the total Quality Units using the formula below.

Quality Units = Segment QUs X # of Segments

A payment adjustment will be made using the Quality Unit Index Price to the longitudinal joint length on the traveled way for the day the joint cores represent.

TABLE 402-9 QUALITY ADJUSTMENT FOR LONGITUDINAL JOINT DENSITY	
Average Core Density, % MMTD	**Segment Quality Units (QU)**
Density ≥ 93.0	4
86.0≤ Density <93.0	QU = 1.143*Avg Core Density – 102.3[1]
Density <86	-4

1. Quality Unit rounded to a whole number using ASTM standard.

402-5 BASIS OF PAYMENT. The unit price bid for all HMA mixture shall include the cost of all labor, materials, and equipment necessary to satisfactorily complete the work, including cleaning of pavement, extracting the pavement cores, filling, and compaction of all core holes. Application of tack coat, joint adhesive, and repairs of pavement, and filling of cracks will be paid separately except when the joint adhesive is applied under §402-3.01E.

Payment of Quality Adjustments will be made based on the number of Quality Units multiplied by the fixed index price for Quality Adjustment to HMA Items listed in the contract documents for the quantity placed on the day the Quality Units represent.

Payment will be made under:

Item No.	Item	Pay Unit
402.011904	Type 2 F9, Asphalt-Treated Permeable Base Course	Ton
402.017904	Truing & Leveling F9, HMA, 70 Series Compaction	Ton
402.018904	Truing & Leveling F9, HMA, 80 Series Compaction	Ton

402.058904	Shim Course F9, HMA	Ton
402.068104	6.3 F1 Top Course HMA, 80 Series Compaction	Ton
402.068204	6.3 F2 Top Course HMA, 80 Series Compaction	Ton
402.068304	6.3 F3 Top Course HMA, 80 Series Compaction	Ton
402.095104	9.5 F1 Top Course HMA, 50 Series Compaction	Ton
402.095204	9.5 F2 Top Course HMA, 50 Series Compaction	Ton
402.096104	9.5 F1 Top Course HMA, 60 Series Compaction	Ton
402.096204	9.5 F2 Top Course HMA, 60 Series Compaction	Ton
402.096304	9.5 F3 Top Course HMA, 60 Series Compaction	Ton
402.097104	9.5 F1 Top Course HMA, 70 Series Compaction	Ton
402.097204	9.5 F2 Top Course HMA, 70 Series Compaction	Ton
402.097304	9.5 F3 Top Course HMA, 70 Series Compaction	Ton
402.098104	9.5 F1 Top Course HMA, 80 Series Compaction	Ton
402.098204	9.5 F2 Top Course HMA, 80 Series Compaction	Ton
402.098304	9.5 F3 Top Course HMA, 80 Series Compaction	Ton
402.098904	9.5 F9 T&L or Shoulder Course HMA, 80 Series Compaction	Ton
402.125104	12.5 F1 Top Course HMA, 50 Series Compaction	Ton
402.125204	12.5 F2 Top Course HMA, 50 Series Compaction	Ton
402.126104	12.5 F1 Top Course HMA, 60 Series Compaction	Ton
402.126204	12.5 F2 Top Course HMA, 60 Series Compaction	Ton
402.126304	12.5 F3 Top Course HMA, 60 Series Compaction	Ton
402.127104	12.5 F1 Top Course HMA, 70 Series Compaction	Ton
402.127204	12.5 F2 Top Course HMA, 70 Series Compaction	Ton
402.127304	12.5 F3 Top Course HMA, 70 Series Compaction	Ton
402.128104	12.5 F1 Top Course HMA, 80 Series Compaction	Ton
402.128204	12.5 F2 Top Course HMA, 80 Series Compaction	Ton
402.128304	12.5 F3 Top Course HMA, 80 Series Compaction	Ton
402.128904	12.5 F9 T&L or Shoulder Course HMA, 80 Series Compaction	Ton
402.195904	19 F9 Binder Course HMA, 50 Series Compaction	Ton
402.196904	19 F9 Binder Course HMA, 60 Series Compaction	Ton
402.197904	19 F9 Binder Course HMA, 70 Series Compaction	Ton
402.198904	19 F9 Binder Course HMA, 80 Series Compaction	Ton
402.255904	25 F9 Binder Course HMA, 50 Series Compaction	Ton
402.256904	25 F9 Binder Course HMA, 60 Series Compaction	Ton
402.257904	25 F9 Binder Course HMA, 70 Series Compaction	Ton
402.258904	25 F9 Binder Course HMA, 80 Series Compaction	Ton
402.376904	37.5 F9 Base Course HMA, 60 Series Compaction	Ton
402.377904	37.5 F9 Base Course HMA, 70 Series Compaction	Ton
402.378904	37.5 F9 Base Course HMA, 80 Series Compaction	Ton
402.418904	9.5 F9 Temporary Top Course HMA, 80 Series Compaction	Ton
402.428904	12.5 F9 Temporary Top Course HMA, 80 Series Compaction	Ton
402.438904	19 F9 Temporary Binder Course HMA, 80 Series Compaction	Ton
402.448904	25 F9 Temporary Binder Course HMA, 80 Series Compaction	Ton
402.000014	Plant Production Quality Adjustment to HMA Items	Quality Unit
402.000024	Pavement Density Quality Adjustment to HMA Items	Quality Unit
402.000034	Longitudinal Joint Density Quality Adjustment to HMA Items	Quality Unit

SECTION 403- HOT MIX ASPHALT (HMA) WITH POLYMER FIBERS

Exhibit – Street System Map

STREETS UNDER CHIPS

BASE BID STREETS

NOTE: TOP COURSE REQUIREMENTS AS FOLLOWS

⚠ 2" TOP COURSE NYSDOT 402.097304 -
9.5mm F3 TOP COURSE HMA, (ALL STREETS AND AREAS)
70 SERIES COMPACTION

REVISIONS		
NO	DATE	DESCRIPTION
⚠	4/4/25	ADDENDUM NO. 1

DRAWING TITLE:

STREET SYSTEM MAP

CLIENT:

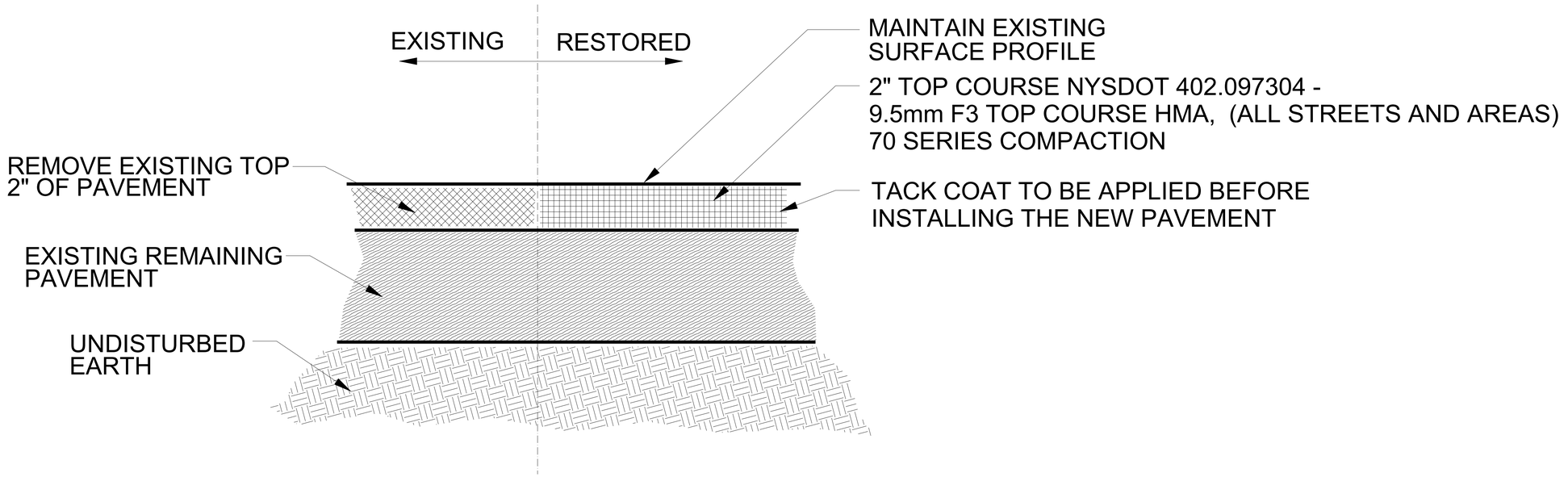
CITY OF NORWICH
STREET REHABILITATION PROGRAM
STREET GRINDING AND PAVING

CONTRACT No. CN1-P-25

DELAWARE ENGINEERING, D.P.C.
CIVIL AND ENVIRONMENTAL ENGINEERING
55 SOUTH MAIN STREET, ONEONTA, NY 13820 - 607.432.8073
28 MADISON AVENUE EXTENSION, ALBANY, NY 12203 - 518.452.1290
6 TOWNSEND STREET, WALTON, NY 13856 - 607.865.9235
31 NORTH MAIN STREET, LIBERTY, NY 12754 - 845.747.9952
16 EAST MAIN STREET, RED HOOK, NY 12571 - 518.452.1290

DESIGNED BY:	DPW
DRAWN BY:	DPW
REVIEWED BY:	DRO
CHECKED BY:	DRO
APPROVED BY:	
GRAPHIC SCALE	0 400
SCALE:	NOT TO SCALE
DATE:	February 2025
FILENAME:	G-1 Street Layout
SHEET NO.	G-1

Exhibit – Pavement Details



STREET GRINDING AND PAVING DETAIL

(NOT TO SCALE)

NOTE:

1. SEE PAVEMENT LIMITS ON SHEET G-1
2. CONTRACTOR SHALL SCHEDULE PAVING SO THAT WHEN A STREET IS BEING PAVED IT IS COMPLETED IN ITS ENTIRETY (FULL LENGTH AND WIDTH) PRIOR TO MOBILIZING TO THE NEXT STREET.

REVISIONS		
NO	DATE	DESCRIPTION
1	4/4/25	ADDENDUM NO. 1

DELAWARE ENGINEERING, D.P.C.
CIVIL AND ENVIRONMENTAL ENGINEERING
55 SOUTH MAIN STREET, ONEONTA, NY 13820 - 607.432.8073
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16 EAST MAIN STREET, RED HOOK, NY 12571 - 518.452.1290

DRAWING TITLE: PAVEMENT DETAILS

CLIENT: CITY OF NORWICH
STREET REHABILITATION PROGRAM
STREET GRINDING AND PAVING
CONTRACT No. CN1-P-25

DESIGNED BY: DPW
DRAWN BY: DPW
REVIEWED BY: DRO
CHECKED BY: DRO
APPROVED BY:
GRAPHIC SCALE 0 20
SCALE: NOT TO SCALE
DATE: MARCH 2025
FILENAME: G-2 PAVEMENT DETAILS
SHEET NO. G-2