

**SECTION 02800  
MISCELLANEOUS PAVEMENT CONSTRUCTION**

**PART 1 GENERAL**

**1.01 – Section Includes**

- A. Joint and Crack Routing and Sealing
- B. Pavement Surface Milling
- C. Portland Cement Concrete (PCC) Pavement Cracking and Seating
- D. Bituminous Seal Coat
- E. Aggregate Surfacing
- F. Miscellaneous Hot Mix Asphalt (HMA) Pavement
- G. Survey Monument Adjustment
- H. Grinding or Sawing of Curbing**

**1.02 – Description of Work**

- A. Crack Routing and Sealing: includes cleaning, routing and sealing joints and random cracks in existing pavement in accordance with Contract Documents.
- B. Pavement Surface Milling: includes removal of a pavement surface (**HMA** or PCC) by milling with cold planning equipment in accordance with the Contract Documents.
- C. PCC Pavement Cracking and Seating: includes cracking and seating existing PCC pavement, prior to resurfacing with **HMA** in accordance with the Contract documents.
- D. Bituminous Seal Coat: includes the application of one or more coats of binder bitumen with one or more successive applications of cover aggregate in accordance with the Contract Documents.
- E. Aggregate Surfacing: includes surfacing for alleys, drives and roadways in accordance with the Contract Documents.
- F. Miscellaneous **Hot Mix Asphalt** Pavement: includes mixing, placing, and compaction of **Hot Mix Asphalt** intermediate, surface, or base course as miscellaneous and/or temporary pavement, and/or driveway pavement including tack coat in accordance with the Contract Documents.
- G. Survey Monument Adjustment: includes furnishing and placing of PCC and grout for adjustment of an existing survey monument.
- H. Grinding or Sawing of Curbing: includes furnishing and operating equipment, plus providing labor or materials required to grind or saw existing curbing for driveway or pedestrian ramps or for pavement widening.**

**1.03 – Submittals**

- A. Submit samples and test results as set forth in the Contract Documents.
- B. Submit certificate of compliance indicating the materials incorporated into the Work comply with the Contract Documents.
- C. Submit weight receipts daily.

**1.04 – Delivery, Storage and Handling**

Dispose of excess asphaltic materials so as not to cause damage to adjacent properties or public facilities.

**1.05 – Scheduling and Conflicts**

Schedule Work to minimize disruption of public streets and facilities.

**1.06 – Special Requirements**

- A. All Work and materials incorporated into this Project shall conform to all applicable local, state, and federal requirements.

- B. Contractor shall have responsibility for coordinating cracking-and-sealing operations with utility companies affected by the work prior to commencement of cracking-and-sealing.
- C. Before binder bitumen for seal coat can be placed, the road surface and air temperature, including wind chill, must be a minimum of 60 degrees F.
- D. Seal coat shall not be applied after September 15<sup>th</sup>.
- E. All equipment used in the completion of the Work included in Section 02800 shall comply with the following, or shall be subject to prior approval by the Engineer:
  - 1. Crack Routing and Sealing – Iowa DOT (IDOT) Standard Specifications 2541 and 2542
  - 2. Pavement Surface Milling – IDOT Standard Specification 2531.02
  - 3. PCC Pavement Cracking and Sealing – IDOT Standard Specification 2216.02
  - 4. Pavement Grinding and Profiling (PCC) – IDOT Standard Specification 2532.02
  - 5. Bituminous Seal Coat – IDOT Standard Specification 2307.03

## **PART 2 PRODUCTS**

### **2.01 – Crack Routing and Sealing**

- A. Pour Joint Sealer
  - 1. Hot poured joint sealer shall be composed of petropolymers and be supplied in solid form. The sealer shall meet requirements of ASTM D3405 with the following modifications:
    - a. Penetration at 77 degrees F ..... 90-150
    - b. Bond at -20 degrees F standard specimen, 3 cycles, 200% extension ..... Passes
  - 2. Cold-applied sealers shall also meet the above physical requirements.
- B. Backer Rod: Backer rod used in conjunction with joint sealers shall be of a composition approved by the Engineer. When used with hot poured sealers, the rod must withstand, without damage, high temperatures inherent to sealers. The backer rod shall have a maximum of 5 percent absorption when immersed in water for 24 hours with the ends sealed. The backer rod shall be of a size that compression is required for installation in the joint, so that it maintains its position during the sealing operation. Backer rod shall be dry.
- C. Preformed Elastomeric Joint Seal: AASHTO M220 shall apply, including requirements for lubricant adhesive. The dimensions and shape shall be subject to prior approval of the Engineer.

### **2.02 – Bituminous Seal Coat**

- A. Aggregates
  - 1. Unless otherwise designated, sand shall be used for shoulders and winter seals, and 1/2-inch size crushed aggregate shall be used for other Work.
  - 2. For each Contract, each load of each size of aggregate shall be similar in type and gradation. Change sources only with approval of the Engineer.
  - 3. Cover Aggregate
    - a. Aggregate for bituminous seal coat shall be composed of hard, durable rock, sand, or combination thereof, washed and free from objectionable clay coatings, and shall meet the requirements for the size designated in the Contract Documents. Aggregate for bituminous seal coat shall be Type 4D, or better, friction classification aggregate as shown in IDOT Materials I.M. T203.
    - b. Unless otherwise specified, the 1/2-inch size shall be used. The 1/2-inch and 3/8-inch sizes may be crushed stone, gravel, or a mixture of these materials with sand.
    - c. For 1/2-inch or 3/8-inch sizes, crushed cover aggregate may be specified. When crushed or uncrushed gravel is furnished to meet this requirement, it shall be produced as a separate operation, whereby the gravel is prescreened prior to crushing, and the cover aggregate is produced by crushing particles retained on a screen at least 1/4 inch larger than the maximum particle size specified.
  - 4. Abrasion Loss: The percentage of wear as determined by AASHTO T96, Method C, shall

not exceed 40 percent.

5. Freeze and Thaw Loss: When the particles retained on the No. 4 sieve in all sizes, except sand, are subjected to the freezing and thawing test, IDOT Materials Laboratory Test Method 211, Method C, the loss shall not exceed 10 percent.
6. Shale: For 1/2-inch and 3/8-inch sizes, shale particles in the portion retained on the No. 4 sieve shall not exceed 5.0 percent of the particles retained on the sieve. Sand cover aggregate shall not contain more than 2.0 percent shale particles retained on the No. 16 sieve.
7. Gradation: Cover aggregate shall meet requirements of the Aggregate Gradation Table referenced in the current IDOT General Supplemental Specifications for Construction Projects for the gradation number appropriate for the size designated or required and the aggregate furnished.

Mixture Size	Gradation
1/2-inch Crushed Gravel or Stone	19
Screened Gravel	20
3/8-inch Crushed Gravel or Stone	21
Sand	1

B. Bituminous Material

1. Cutback Asphalt

- a. Cutback asphalts and liquid shall be of the grade specified meeting the following:
  - 1). Rapid Curing (RC) .....AASHTO M81
  - 2). Medium Curing (MC).....AASHTO M82
  - 3). Slow Curing (SC) .....AASHTO M140
- b. The spot test indicated in AASHTO M81, M82 and M140 will not be required.
- c. Antistrip additive for use with cutback asphalt, when specified, shall be approved in accordance with IDOT Materials I.M. 491.16 and shall be added at the approved dosage rate. The treated cutback asphalt shall produce a positive result when tested in accordance with IDOT Materials Laboratory Test Method No. 629.
- d. In Table I of AASHTO M81, the distillation test requirements shall be as follows: Distillate, by volume to 374 degrees F, shall be a minimum of 4 percent of the total distillate to 680 degrees F.

2. Emulsified Asphalt

- a. Emulsified asphalt shall meet the requirements of AASHTO M140 or M208 for the grade required with the following modifications, unless otherwise specified: Sieve Test, Max percent 0.3
- b. The binder bitumen shall be CRS-2P, modified as follows:
  - 1). Storage stability (see subparagraph i) ..... Passes
  - 2). Cure Test (see subparagraph ii) ..... Passes
  - 3). Distillation:
    - a). Oil distillate, by volume of emulsion..... 1.0 percent maximum
    - b). Tests on residue from distillation test:
      - i). Penetration at 77 degrees F ..... Minimum 100, Maximum 150
      - ii). Ductility at 39 degrees F ..... 5 cm/min, Minimum 30 cm
      - iii). Softening point (R&B) ..... Minimum 100 degrees F
    - c). Elastic recovery (Iowa Method Test No. 631) ..... Minimum 55
- c. Examine the CRS-2P storage stability test sample after it has been allowed to stand undisturbed for 24 hours. The surface of the test sample shall show no white, milky colored substance but shall be homogeneous brown clear throughout.

- d. The cure test is performed as follows: Pour approximate 1 gram of CRS-2P emulsion onto a metal surface (lid of a 3 ounce ointment tin). Allow the test sample to cure at temperatures of at least 80 degrees F under a heat light (or outdoor sunlight) for 4 hours. After the 4-curing period, the CRS-2P emulsion shall show no tackiness or tendency to stick to the fingers when pressed.
  - e. Emulsified asphalt shall be compatible with Project aggregate when tested in accordance with IDOT Materials Laboratory Test Method No. 630.
  - f. The absolute viscosity of the emulsified asphalt shall be between 600 poises and 1,200 poises when tested in accordance with IDOT Materials Laboratory Test No. 622 in lieu of a penetration test.
3. Asphalt Emulsion for Dust Control: Asphalt emulsion for dust control shall be grade CSS-1, CSS-1H or SS-1H as modified in paragraph 2.02.B.2.b. The emulsion shall be diluted with water prior to application. The initial dilution rate shall be seven parts water to one part emulsion.
- C. Paper for joints shall be a commercial grade, 30 pounds minimum weight, building paper.

### 2.03 – Aggregate

The materials shall comply with IDOT Standard Specification 4120 for the class of material specified.

### 2.04 – Miscellaneous Hot Mix Asphalt Pavement

The material shall be a commercially available Hot Mix Asphalt mix, **or Hot Mix Asphalt mix described in Contract Documents or mix approved by Engineer.**

### 2.05 – Equipment

- A. All equipment used in the completion of the Work specified herein shall comply with the IDOT Standard Specifications Section 2001, 2216, 2307.03, 2532, 2541.03, and 2542.03
- B. PCC Pavement Crack and Seating
  - 1. The roller shall be a pneumatic tired roller consisting of four rubber tired wheels equally spaced across the full width and mounted in line on rigid steel frame in such manner that all wheels carry equal loads, regardless of surface irregularities. Roller tires shall be capable of satisfactory operation in a minimum inflation pressure of 100 psi, and tires shall be inflated to the pressure necessary to obtain proper surface contact pressure to satisfactorily seal pavement slabs. Tires may contain liquid.
  - 2. The roller shall have a weight body suitable for ballasting to a gross load of 50 tons and ballast shall be such that gross roller weight can be readily determined and controlled to maintain a gross roller weight of 50 tons. The roller shall be towed with a rubber tired prime mover.

## PART 3 EXECUTION

### 3.01 – General

- A. The Engineer shall have the authority to shut down paving operations if weather conditions do not allow for proper placement of pavement under this section.
- B. No paving of any type shall commence until traffic control is in place in accordance with Section 01200.
- C. The Contractor shall obtain all necessary permits and shall be responsible for all applicable fees for Work within existing public rights-of-way.
- D. Debris and saw slurry or dust from dry sawing or routing operations shall be removed from the pavement surface before the pavement is opened to traffic.

### 3.02 – Crack Routing and Sealing

- A. General
  - 1. The contractor shall rout all cracks to minimum dimensions of ¼ inch wide and ½ inch

deep.

2. The cracks shall be cleaned with air and dried prior to filling.
3. The cracks shall be filled in accordance with the standard details.
4. The Work shall be conducted on only one lane of the pavement width at a time. When Work encroaches on an adjacent lane, a flagger will be required at that location.
5. Lanes may be opened to traffic only after the sealer has set sufficiently so it will not pick up under traffic. Blotting material may be applied to the sealer, but only after the sealer surface has set so as to avoid penetration of the blotting material into the sealer.
6. Dry sawed or routed joints or cracks shall be cleaned with a stream of air sufficient to remove all dirt, dust, and deleterious material that can adhere to the joint face before the pavement is opened to traffic. This Work shall be done within three hours after the joint or crack has been dry sawed or routed.
7. Wet sawed joints shall be cleaned with high-pressure water immediately after sawing to remove residue produced by the sawing operation.
8. Cracks shall be sealed within 24 hours after preparation.
9. When other Work is included in the Contract, the operations shall be sequenced so that undersealing, longitudinal subdrains, patching, grinding or milling, installation of retrofit load transfer, and crack and joint sealing here done in the area in that order.
10. Overfilling with sealant will not be allowed. Sealant placed on the pavement surface shall be removed immediately.
11. Crack cleaning and sealing shall be done only when the ambient air and pavement surface temperatures are above 40 degrees F. when near this minimum, additional air blasting or drying time or both may be necessary to assure a satisfactory bond to the crack surfaces. Crack sealing after September 30 will not be allowed. When joint sealer cannot be placed in an otherwise completed joint or crack prior to this date due to temperature or other conditions, the Contractor shall temporarily seal these joints or cracks with a joint sealer over the winter shutdown period. This shall be removed, and the joint or crack shall be re-cleaned and resealed according to the Specification at the Contractor's expense during the next construction season.

B. Crack Cleaning and Sealing (**Asphaltic** Surfaces)

1. Class I Cracks: Cracks, which have an average opening of ½ inch or less, shall be routed or sawed to provide a minimum sealant reservoir of ½-inch width by a nominal 1-inch depth. Backer rod may be used. If used, the depth of cleaning and routing or sawing shall be increased, if necessary, and the backer rod shall be placed in the crack to a depth providing at least 5/8-inch clearance above the backer rod for the sealer. The backer rod shall be dry when placed.
2. Class II Cracks
  - a. Cracks which have an average opening greater than ½ inch shall be thoroughly cleaned of all foreign material to a depth necessary to accommodate the sealer material and the backer rod to be used. Routing or sawing will be required to develop a minimum ½-inch reservoir on portions of cracks that have less than ½-inch opening.
  - b. Backer rod shall be placed in the crack to a depth providing at least 5/8-inch clearance above the backer rod for the sealer. The backer rod shall be dry when placed.
3. Prior to Opening to Traffic: Asphaltic material and foreign material resulting from crack preparation shall be removed from the roadway by brooming, compressed air, or other methods satisfactory to the Engineer.
4. Cracks Shall Be Clean and Dry Prior to Sealing: The entire crack reservoir shall be slightly overfilled with sealant and tightly squeegeed with a narrow V-shaped squeegee immediately after placement of the sealant while still hot. The squeegee shall be operated

within approximately 1 foot of the want tip used to place the sealant. Sealant on the roadway surface in excess of ½ inch on each side of the crack edge is not acceptable.

5. Sealer Material: Sealer material shall be heated, handled, and applied according to the manufacturer's recommendations.
- C. Crack Cleaning and Sealing (PCC Surfaces):
1. A partial depth finish patch may be required when joints or cracks have edge spalls or other distress greater than 3 inches in width. If not otherwise included as part of the Contract Work, these areas will be designated by the Engineer as extra Work. Partial depth finish patches shall be constructed in accordance with Section 02750. Joints or cracks less than or equal to 3 inches in width shall be sealed without patching.
  2. Cracks and joints shall be cleaned of existing joint sealer, vegetation, dirt, and all other foreign material to the depth of the bottom of the backer rod. The edges shall be sand blasted throughout the proposed depth of the joint sealer, leaving a clean, dry, newly exposed, and structurally sound concrete surface on the vertical edges. The angle of approach of the sand blast nozzle to each vertical face of the reservoir shall be approximately 30 degrees and the sand blast nozzle must have a guide which inserts in the joint and assures positive location and directional control of the nozzle. A minimum of two passes of the sandblasting operation are required for each joint and crack; one pass for each joint or crack edge. Sand blasting shall be done just prior to the application of the joint sealer. When cleaned joints or cracks are contaminated before sealed, they shall be re-cleaned by sandblast before sealing. Rain will be considered contamination.
  3. The bond breaker at the bottom of the joint or crack shall be a backer rod. It shall be dry when installed. If the width of opening exceeds the maximum size available, methods shown in the Contract Documents for alternate bond breakers at the bottom of the joint or crack may be used.
  4. Joint sealer placement shall be governed by a shape factor (width:depth), ranging from 1:1 to 2:1, which shall be used to determine the depth of the joint sealer. The minimum depth of joint sealer shall be ½ inch for joints and cracks ½ inch to 1 inch in width. The width of opening of Class I cracks and Class III joints will have to be increased to meet the 1:1 ratio. The depth of Class II cracks, Class IV joints, and Class V joints and cracks will have to be increased to meet the 2:1 ratio.
  5. Cracks and joints in partial depth ACC finish patches shall be widened to ½ inch, if widening is necessary, and the cleaning and sealing operation shall be extended across the joint or crack.
  6. Joints and cracks shall be dry and blown clean with compressed air before placing backer rod and joint sealer. Fill joints and cracks to the level shown in the Contract Documents.
  7. Heat, handle, and apply sealer material according to the manufacturer's recommendations.
  8. Cracks/Joints
    - a. Class I Cracks: These are random cracks having an average opening of less than ½ inch. They shall be routed or sawed to provide a sealer reservoir as shown in the Contract Documents. Use of a router will be allowed only when a crack saw cannot follow the crack. Sides of the sealer reservoir shall be near vertical.
    - b. Class II Cracks: These are random cracks having an average opening of ½ inch to 1½ inches. Routing or sawing may be required to provide a sealer reservoir to remove fractured concrete adjacent to the crack.
    - c. Class III Joints: These are existing joints having an average opening of less than ½ inch. They shall be sawn (wet or dry) to provide a sealer reservoir as shown in the Contract Documents.
    - d. Class IV Joints: These are existing joints having an average opening of ½ inch to 1½ inches. Sawing may be required to provide a sealer reservoir and to remove fractured concrete adjacent to the joint.

- e. Class V Joints and Cracks: These are existing joints and cracks having an average opening from 1½ inches to 3 inches. Routing or sawing may be required to provide a sealer reservoir and to remove fractured concrete adjacent to the joint or crack.

### 3.03 – Pavement Surface Milling

- A. The milling operation shall progress longitudinally in a direction opposing traffic, unless approved otherwise by the Engineer.
- B. Binder shall be applied within two days after milling.
- C. Construction traffic shall enter and leave the Project in the direction of the open traffic lane.
- D. The milling operation shall be completed in such a manner as to preserve the typical cross section of the roadway. The milling machine shall not extend to both sides of the crown in a single pass.
- E. No more than two passes shall be allowed to obtain the full milling depth and width. Additional passes shall be permitted to obtain a smooth profile or transverse slope.
- F. Passes shall overlap longitudinal joints by a minimum of 2 inches to reduce spalling. Joint passes in a travel lane shall be within one foot of the center of the lane.
- G. The transverse slope and joint match shall be as set forth in Section 01100. The forward speed of the milling machine shall be controlled to prevent the formation of visible corrugations on the pavement surface.
- H. The Contractor shall mill to the depth and in the locations as set forth in the contract Documents. Surfaces milled beyond these limits shall be replaced or repaired in a manner approved by the Engineer, and at the Contractor's expense.
- I. The milled material shall be salvaged as set forth in Section 01400.
- J. The milling machine shall be able to load material directly onto hauling trucks, or shall provide means to load immediately after milling.

### 3.04 – Pavement Grinding and Profiling (PCC)

- A. IDOT Standard Specification 2532 (Pavement Surface Repair (Diamond Grinding) and 2316 (Pavement Smoothness) shall apply to this Work except as modified herein and in the Contract Documents.
- B. Pavement surface repair (diamond grinding) shall consist of grinding and texturing the entire surface of the pavement in a longitudinal direction. Substantially the entire surface area of the pavement shall be ground and textured until the pavement surface on both sides of the transverse joints and all cracks are in the same plane and meet the smoothness required. In each lane, at least 95 percent of the area in each 100 foot section shall have a newly ground surface. Except at joints and cracks, grinding shall not exceed ½ inch in depth. At joints and cracks, grinding shall not exceed ¾ inch in depth. The ground surface shall be of uniform texture.
- C. Grinding shall be performed in a longitudinal direction. Grinding shall progress in the direction against normal traffic in the lane being ground unless otherwise specified by the Engineer. All construction traffic entering or leaving the Work area shall move in the direction of traffic of the open lane. Grinding shall begin and end at the lines normal to the pavement centerline within any one-ground area and at the Project limits. This will not be required at the end of each shift. Normally, the grinding should proceed from the centerline (or lane line) across the lane to the pavement edge with each pass cut at least as deep as the previous pass, so there is good transverse drainage.
- D. For multiple passes, the equipment shall be carefully controlled to minimize the overlap. Overlaps shall not exceed approximately 1 inch.
- E. When more than one grinding machine is used in the same travel lane, the blade segment thicknesses, blade spacings, and blade diameter shall be similar so that the texture of the

ground surface is reasonably uniform across the lane.

- F. The Contractor shall provide a control profilograph trace prior to performing any grinding work. This control trace will be used to identify the required smoothness for the Project. Each segment of the finished ground surface shall have a final profile index of 35 percent of the control profilograph trace or 10 inches per mile, whichever is greater, and shall not include any bumps exceeding 0.5 inches in 25 feet. Depressed pavement areas due to subsidence or other localized causes, and areas where the maximum cut at mid panel or a fault restricts further grinding will be excluded from testing with the profilograph when approved by the Engineer.
- G. The profiling operation shall be completed in such a manner as to preserve the typical cross section of the roadway. The profiling machine shall not extend to both sides of the crown in a single pass.
- H. The transverse slope of the ground pavement shall be uniform to a degree that there are no depressions or misalignment of slope greater than ¼ inch to 12 feet when tested by stringline or straightedge perpendicular to the centerline.
- I. Concrete slurry from the profiling operation shall be removed from the roadway surface and shall be disposed of in a manner approved by the Engineer.
- J. Profilograph testing shall end 15 feet prior to excluded areas and shall resume 15 feet following excluded areas.
- K. The Engineer may test for smoothness and bumps near the centerline and at other spot locations where compliance is questioned. Additional grinding may be required.

### 3.05 – PCC Pavement Cracking and Seating

- A. Field-locate all utilities in roadways that are to be cracked-and-seated before starting Work. Additionally, representatives from utilities shall be on site during cracking-and-seating operations.
- B. Before cracking and seating the existing pavement, remove any existing ACC overlay. The removal operation shall be as set forth in Section 3.03 herein and shall be paid separately. The removal of full depth ACC patches is not required.
- C. Valves and utility fixtures will be adjusted by the respective utilities.
- D. Saw full depth along the perimeter of existing boxouts at water valves, manholes, and/or intakes to separate same from pavement. If no boxouts exists, a boxout shall be sawn full depth. Boxout dimensions shall be determined in the field. Saw boxouts as square as possible and square with the roadway centerline.
- E. Full depth saw cut shall be required to separate integral curb-and-gutter sections from existing pavement. Curb replacement may be performed either before or after sawcut operations, but shall be completed prior to cracking-and-seating operations.
- F. Adjust intake manholes unless noted otherwise. Adjustments shall be to finish grade after placement of the HMA leveling course. If casting is to be replaced, the existing or sawn boxout shall be removed, and the boxout area filled with compacted job-mix HMA.
- G. Crack the existing PCC pavement so as to produce full depth, generally transverse, hairline cracks at a nominal spacing of 1½ to 3 feet. Take care to prevent the formation of a continuous longitudinal crack. The Contractor shall use minimum energy to provide the desired result.
- H. When cracking operations begin, the Engineer will designate test sections of approximately 100 feet. The Contractor shall crack the test sections using varying energy and striking patterns until a satisfactory cracking pattern is established.  
This energy and striking pattern shall then be used for the remainder of the Project, unless the Engineer determines that a satisfactory cracking pattern is no longer being produced.
- I. During cracking-and-seating, take care to prevent undue breaking and/or removal of “D” cracked PCC concrete at existing transverse and longitudinal joints. It is understood that some breakage of cracked concrete at existing joints is unavoidable.
- J. Furnish and apply water to the test area to dampen the pavement following cracking (or immediately prior) to enhance visual determination of the cracking pattern. Furnish and apply

- water to check stations, as required by the Engineer, to verify that the specified crack pattern is being maintained.
- K. Seat the cracked pavement by rolling. Roller shall be weighted in order to provide for seating in one pass. The rolling pattern, including laps, shall be as approved by the Engineer, based on one or more initial test sections.
  - L. Placement of asphaltic leveling and surface courses must be completed with five (5) days after completion of cracking-and-seating operations.
  - M. Do not operate cracking equipment on a bridge. Do not crack areas in a bridge approach section or within 3 feet of a fixed object.
  - N. After cracking-and-seating operations have been performed, the Engineer shall examine the seated PCC pavement prior to resurfacing. Remove loosened material at existing joints where extensive breakage of existing concrete has occurred. Removal methods include hand tools and/or air blasting. Material that requires jackhammering for removal shall remain in place. Where breakage has occurred and has resulted in voids in the seated pavement, base repairs shall be completed according to Section 2700. The locations designated for base repair shall be tacked. Job-mix asphalt concrete shall then be placed and compacted in 1-inch lifts to match the surface of the seated pavement. After final approval by the Engineer, resurfacing operations may commence.
  - O. Unless noted otherwise, place non-woven polypropylene crack control fabric over the sawcut line separating the curb-and-gutter sections from the remainder of the pavement. Place the fabric on the asphaltic leveling course prior to placement of the asphaltic surface course. Fabric placement shall be in accordance with manufacturer's recommendation and with the Drawings.
  - P. Clean the area of all loose material before opening to traffic.

### 3.06 – Bituminous Seal Coat

- A. If the seal coat is to be applied to a prepared subbase, the base shall be prepared in accordance with Section 02100. Priming, if required, shall be completed as set forth in Section 02750.
- B. If the seal coat is to be applied to an existing paved surface, the surface shall be cleaned, including curb and gutter sections, free of foreign materials.
- C. Bituminous material shall be spread at the recommended temperature utilizing the appropriate equipment. Adjoining application passes shall be accomplished with minimum overlap. At least two coats shall be applied.
- D. Protect fixtures and objects within and adjacent to the operation from bitumen application.
- E. Unless otherwise specified, apply bitumen binder at a rate of 0.35 gallons per square yard.
- F. When one lane of traffic is to be maintained, the bituminous seal coat shall be placed in one lane. When one lane is completed, the Contractor shall switch traffic to the other lane and proceed with the operation.
- G. For the first course of a two-course bituminous seal coat, the spreading of bitumen for the first lane shall be approximately 12 inches wider than one-half the width of the pavement to be surfaced.
- H. The direction of progress for spreading bitumen shall be the direction from which aggregate is to be hauled to the spreader and spread.
- I. Bitumen shall not be applied further ahead of the aggregate spreading operation than can be covered by aggregate within two minutes, and rolled within 30 minutes. In addition, the separation between the bitumen distributor and aggregate spreader shall not be more than 150 feet. The roller shall not be more than 200 feet behind the aggregate spreader.
- J. Uniform distribution of binder bitumen, at the specified rate of application, shall be secured at transverse joints by the use of paper placed at the start of each distributor run. When the end of the run joins newly placed seal coat, paper shall be placed at that joint also. The joint shall be a cut straight along the off edge of the paper, and seal coat material on the paper adjacent to the off edge shall be removed from the roadbed surface.
- K. The Contractor shall spread the first course of aggregate at a rate of 30 pounds per square yard.

Care shall be taken to spread aggregate evenly without piling material. If piling occurs, it shall be corrected by manual methods by additional workers before rollers cover the area and not by the roller operators themselves.

- L. Aggregate shall be damp, but shall have no free water on the surface.
- M. Each seal coat course shall be rolled prior to the succeeding course being applied. This will typically require five roller passes.
- N. If a second course is required, all loose material shall be removed from the entire roadbed with a vacuum machine or by lightly brooming the full surfaced width with the power sweeper to remove any loose material. After cleaning, the entire surface shall be rolled once with the steel roller. This preparation shall be completed in sections, just prior to application of the bitumen for the second course.
- O. Application rates for the second course shall be 0.30 gallons of bitumen and 25 pounds of aggregate per square yard.
- P. If the bitumen bleeds to the top, additional aggregate shall be applied at the Contractor's expense.
- Q. The contractor shall broom the area following rolling and prior to opening to traffic.

### 3.07 – Aggregate Surfacing

- A. If aggregate is to be applied to a prepared subbase, the base shall be prepared in accordance with Section 02100.
- B. The exact proportions of aggregate and water shall be regulated so as to produce a uniform satisfactory mixture. The order of sequence in which the aggregate and water shall be drawn or weighed may vary under different conditions. The percentage of water in the mixture may vary with moisture conditions and sources of aggregate, but in no case shall the percentage of water be more than 12 percent by weight of the total mixture. The finished mixture shall have a moisture content necessary to obtain the maximum density required to comply with the standard compaction test herein specified. In general, the proper moisture content can be judged by the appearance of free water on the surface of the particles. Excess moisture resulting in runoff shall be avoided.
- C. In no case will the Contractor be permitted to place the mixture or manipulate it on muddy or frozen subgrade. Also, any mixture containing frost or frozen particles shall not be placed on the subgrade or compacted. After the subgrade has been properly prepared, the mixture shall be uniformly spread by blades, or other approved equipment, in successive layers or courses to such depth that, when compacted, the base will have the minimum thickness shown on the typical cross section. The Contractor may construct the base in any number of layers which the Contractor may find convenient to facilitate compacting, except that, in no case, shall any individual layer have a compacted thickness of more than 6 inches, provided the equipment used proves capable of compacting the base in accordance with these specifications.
- D. Each layer shall be compacted as hereinafter specified before any succeeding layer is placed. Except as otherwise permitted by the Engineer, the first course placed upon the subgrade shall be compacted and allowed to become firm before any subsequent layer is constructed.
- E. If, in the opinion of the Engineer, the mixture becomes too dry to permit compaction, water shall be added during the compacting operations in such an amount as to insure proper compaction. If, for any reason, the mixture is too wet for proper compaction, it shall be allowed to dry until the proper moisture is obtained.
- F. The mixture shall be handled in such manner as to avoid undue segregation. If segregation occurs, or if mixture becomes contaminated, such segregated or contaminated materials shall be removed and replaced with materials of suitable quality and gradation, except that areas of surface segregation may be corrected by spreading a quantity of limestone screenings sufficient to close the void and bind the loose material firmly in place. The screenings shall be wet and rolled so as to create a dense and uniform surface. Segregated or contaminated materials that the Engineer orders removed shall be removed and replaced with suitable materials at the sole expense of the Contractor. The Engineer may restrict hauling over the completed or partially

completed work after inclement weather, or at any time when the subgrade is soft and there is tendency for the subgrade material to work into the surface material. Any screenings used in correcting areas of surface segregation will not be measured or paid for as a part of the aggregate constituting the base course. All extra work or expense involved due to screenings being required shall be the Contractor's obligations without extra cost to the Owner. Compaction shall be performed by the use of any approved equipment within the limits of these specifications, which will produce satisfactory results.

- G. Shaping and compaction shall be carried on until a true, even, uniform base course of the proper grade, cross section and density is obtained. Proper moisture content shall be maintained by wetting the surface as required during shaping and compaction operations. The use of excess water, resulting in runoff or in the formation of a slurry on the surface shall be avoided.
- H. Final rolling on the top course of multiple course construction or the top or single course construction shall be accomplished by a self-propelled, smooth-welded roller weighing not less than 7 tons, nor more than 10 tons.
- I. The density to be obtained in the complete base shall be at least 95 percent of maximum density as determined by the Standard Proctor Compaction Test. The standard compaction test is designed to determine the moisture content at which maximum density is obtained and to determine the density that is obtained at that moisture content. In performing the compaction test, only the portion of the mixed material passing the No. 4 sieve will be compacted. Such material will be compacted in three (3) layers in a mold, 4-inches in diameter and having a volume of 1/30 cubic foot, by applying twenty-five (25) blows on each layer by means of a specially constructed hammer having a 2-inch diameter face, and delivering a blow to the material, approximately equivalent to that of the drop of a 5 ½ pound hammer through a distance of 12 inches. The maximum density is obtained in this test. This density and moisture must not be adjusted proportionately to the percentage of mixed material passing the No. 4 sieve.

### **3.08 – Miscellaneous Hot Mix Asphalt Pavement**

- A. Thickness of material shall be in accordance with the Contract Documents.
- B. Work includes the placement of pavement, maintenance of pavement for entire time pavement use is required and removal and disposal of material.

### **3.09 – Survey Monument Adjustment**

Complete according to the Standard Detail.

### **3.10 – Grinding or Sawing of Curbing**

- A. **Purpose**
  - 1. **Prepare curb cuts for driveways and/or pedestrian ramps.**
  - 2. **Remove existing curbing prior to pavement widening.**
- B. **Approved Methods**
  - 1. **Grinding**
  - 2. **Sawcut using machine or frame-mounted saw with suitable control system.**
  - 3. **Scoring existing curbing with a hand-held saw followed by jack hammering is not allowed.**
- C. **Equipment Requirements and Tolerances**
  - 1. **Grinding or sawing equipment shall be supported in-place, mounted on a walk-behind wheeled frame or vehicle mounted.**
  - 2. **Hand-held equipment shall not be allowed.**
  - 3. **To control depth and angle of grinding or sawing, equipment shall be equipped with stringline or electronic controls or be mounted on an adjustable support system to ensure grinding or sawing to required dimensions.**
  - 4. **Finished ground or sawn surfaces shall be within ¼ inch of specified dimensions.**

5. **Finished ground or sawn surfaces shall be smooth, without pitting or aggregate pop-out.**
  6. **Equipment and methods are subject to Engineer approval prior to construction.**
- D. Construction Requirements**
1. **Verify required length and depth of curb removal as shown in applicable standard detail.**
  2. **Excavate behind existing curbing if required.**
  3. **Set up support system or calibrate equipment for line and depth control.**
  4. **If wet grinding or sawing equipment is used, clean up wet concrete dust after completing operation.**
  5. **If dry grinding or sawing equipment is used, take suitable measures to capture or otherwise mitigate concrete dust.**
  6. **Remove and dispose of broken concrete and other debris after completing operations.**

**END OF SECTION 02800**