NOTES:
1. For joint seal dimensions see Sheet 2.
2. For slabs poured simultaneously, tie bars may be inserted in the plastic concrete by means approved by the Engineer.
3. For Longitudinal Joints:
   A. Tie bars are deformed #4 or #5 reinforcing steel bars meeting the requirements of Specifications, Section 931.
   B. Provide a standard load transfer tied joint with #4 bars 22” in length at 24” spacing or #5 bars 30” in length at 30” spacing.
4. Transverse joints are to be spaced at a maximum of 15 ft. Dowels are required at all transverse joints unless otherwise noted in the plans.
5. Expansion joints to be placed on approaches to bridges, at street intersections and other locations indicated in the plans.
6. Punch clean holes in preformed joint filler greater than bar diameter.
7. Coat and lubricate plain steel dowel bars in accordance with Specifications, Section 350.
8. Sheet metal bottom strips in accordance with Specifications, Section 931.
9. For joint seal dimensions see Sheet 2.
10. Expansion joints to be placed on approaches to bridges, at street intersections and other locations indicated in the plans.
11. Punch clean holes in preformed joint filler greater than bar diameter.
12. Coat and lubricate plain steel dowel bars in accordance with Specifications, Section 350.
13. Sheet metal bottom strips in accordance with Specifications, Section 931.
14. Expansion joints to be placed on approaches to bridges, at street intersections and other locations indicated in the plans.
15. Punch clean holes in preformed joint filler greater than bar diameter.
16. Coat and lubricate plain steel dowel bars in accordance with Specifications, Section 350.
17. Sheet metal bottom strips in accordance with Specifications, Section 931.
18. Expansion joints to be placed on approaches to bridges, at street intersections and other locations indicated in the plans.
19. Punch clean holes in preformed joint filler greater than bar diameter.
20. Coat and lubricate plain steel dowel bars in accordance with Specifications, Section 350.
21. Sheet metal bottom strips in accordance with Specifications, Section 931.

**LONGITUDINAL JOINTS**

1. For joint seal dimensions see Sheet 2.
2. For slabs poured simultaneously, tie bars may be inserted in the plastic concrete by means approved by the Engineer.
3. For Longitudinal Joints:
   A. Tie bars are deformed #4 or #5 reinforcing steel bars meeting the requirements of Specifications, Section 931.
   B. Provide a standard load transfer tied joint with #4 bars 22” in length at 24” spacing or #5 bars 30” in length at 30” spacing.
4. Transverse joints are to be spaced at a maximum of 15 ft. Dowels are required at all transverse joints unless otherwise noted in the plans.
5. Expansion joints to be placed on approaches to bridges, at street intersections and other locations indicated in the plans.
6. Punch clean holes in preformed joint filler greater than bar diameter.
7. Coat and lubricate plain steel dowel bars in accordance with Specifications, Section 350.
8. Sheet metal bottom strips in accordance with Specifications, Section 931.
9. Expansion joints to be placed on approaches to bridges, at street intersections and other locations indicated in the plans.
10. Punch clean holes in preformed joint filler greater than bar diameter.
11. Coat and lubricate plain steel dowel bars in accordance with Specifications, Section 350.
12. Sheet metal bottom strips in accordance with Specifications, Section 931.

**TRANSVERSE JOINTS**

1. For joint seal dimensions see Sheet 2.
2. For slabs poured simultaneously, tie bars may be inserted in the plastic concrete by means approved by the Engineer.
3. For Longitudinal Joints:
   A. Tie bars are deformed #4 or #5 reinforcing steel bars meeting the requirements of Specifications, Section 931.
   B. Provide a standard load transfer tied joint with #4 bars 22” in length at 24” spacing or #5 bars 30” in length at 30” spacing.
4. Transverse joints are to be spaced at a maximum of 15 ft. Dowels are required at all transverse joints unless otherwise noted in the plans.
5. Expansion joints to be placed on approaches to bridges, at street intersections and other locations indicated in the plans.
6. Punch clean holes in preformed joint filler greater than bar diameter.
7. Coat and lubricate plain steel dowel bars in accordance with Specifications, Section 350.
8. Sheet metal bottom strips in accordance with Specifications, Section 931.

**DOWELS (LENGTH 18")**

<table>
<thead>
<tr>
<th>Pavement Thickness</th>
<th>Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-10”</td>
<td>1”</td>
</tr>
<tr>
<td>6-12”</td>
<td>1½”</td>
</tr>
<tr>
<td>6” - 12”</td>
<td>1½”</td>
</tr>
</tbody>
</table>

Plain Steel Dowel Bars

<table>
<thead>
<tr>
<th>Plain Steel Dowel Bars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Puncture And Push Down 1/2” On Both Sides</td>
</tr>
</tbody>
</table>

**METAL**

**PLASTIC**

**DOWEL BARS CAPS**

**DOWEL BAR LAYOUT**

**CONCRETE PAVEMENT JOINTS**

INDEX

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**Concrete-Concrete Joints**

**FOR NEW PROJECTS**

**PREFORMED ELASTOMERIC COMPRESSION SEAL**

**FOR REHABILITATION PROJECTS**

**TAPE BOND BREAKER**

**Concrete-Concrete Joints**

**Joint Sealant Dimensions**

- **Joint Width**
- **Joint Thickness**
- **Bead Sealant**
- **Rod Dia.**
- **Backer Rod Placement Depth**

For new projects, the joint width will be shown on the plans. For new construction, joint width will be 4" for construction joints, 4" for all other joints.

For rehabilitation projects, the joint width will be shown on the plans or established by the Engineer based on field conditions.

Two-Tone Pavement Joint

Concrete Pavement

Asphalt Shoulder Pavement

Joint Sealant Material To Be As Specified In The Plans

Concrete Pavement

Asphalt Shoulder Pavement

Joint Sealant Material To Be As Specified In The Plans

Concrete Pavement

Asphalt Shoulder Pavement

Joint Sealant Material To Be As Specified In The Plans

**Concrete-Asphalt Shoulder Joints**

**Joint Seal Dimensions**

- **Joint Width**
- **Joint Thickness**
- **Bead Sealant**
- **Rod Dia.**
- **Backer Rod Placement Depth**

For new and rehabilitation projects, either tape or backer rod bond breaker required; shoulder must be repaired if proper joint shape cannot be attained.

**Concrete Pavement Joints**

**Index**

350-001

2 of 4
GENERAL

1. Longitudinal joints will not be required for single lane pavement 14' or less in width. For entrance and exit ramp joint details, see Sheet 4.

2. Arrangement of longitudinal joints are to be as directed by the Engineer.

3. All manholes, meter boxes and other projections into the pavement shall be boxed-in with 1/2" preformed expansion joint material.

ALTERNATE KEYWAY AND HOOK BOLT

STEEL HOOK BOLT ASSEMBLY

Anchor bolts shall be Grade C in accordance with ASTM A 307. Threaded sleeves shall develop the full strength of the bolt and meet the material and thread requirements of ASTM A 563.

NOTES

Note: After the concrete has set to the extent that the Keyway will retain its shape, the hex bolt and plastic insert shall be removed.

Note: Proprietary contraction and expansion assemblies may be used. Products shall be introduced to the State Construction Office in accordance with section (C) of the Product Evaluation Procedure.

CONTRACTION ASSEMBLY

EXPANSION ASSEMBLY

Note: Proprietary contraction and expansion assemblies may be used. Products shall be introduced to the State Construction Office in accordance with section (C) of the Product Evaluation Procedure.
CONCRETE PAVEMENT JOINTS

13’ with tied Concrete Shoulders or 14’ with Asphalt Shoulders.

2-THRU Lanes with Single Lane Entrance Ramp

2-THRU Lanes with Single Lane Exit Ramp

3-THRU Lanes with Auxiliary Lane and 2-Lane Exit Ramp

Joint Layout at Entrance and Exit Ramp Terminals
1. For Repair and Replacement Criteria see Sheet 2.

2. Full depth repairs consist of removing and replacing at least a portion of the existing slab to the bottom of the concrete.

3. Repair boundaries shall be sawed full-depth with diamond saw blades. On hot days, it may not be possible to make this cut without first making a wide pressure relief cut within the repair boundaries. A carbide-tipped wheel saw may be used for this purpose, but the wheel saw must not intrude on the adjacent lane, unless the lane is slated for repair. The wheel saw cuts produce a ragged edge that promotes excessive spalling along joints. Hence, it wheel saw cuts are made, diamond saw cuts must be made 18 in. outside the wheel saw cuts. To prevent damage to the base, the wheel saw must not be allowed to penetrate more than 0.5 in. into the base.

4. No additional base or subgrade material shall be added and all loose base or subgrade material shall be removed prior to placement of the new concrete slab. The concrete slab shall be placed to the full depth of the material removed. No additional compensation will be allowed for additional concrete required to bring proposed concrete slab up to finished grade.

5. Removal of the damaged concrete pavement shall be by lifting. Any good concrete pavement which is damaged during removal of damaged areas shall be removed and replaced by the contractor at his expense.

6. If the roadway contract includes grinding, then the slab replacement shall be performed first.

7. During slab replacement operations, fill any saw cut overrun into adjacent slabs with epoxy.

8. Install tie bars at longitudinal joints when two full adjacent or multiple replaced slabs.

**GENERAL NOTES**
## Slab Repair and Replacement Criteria

### Cracking

<table>
<thead>
<tr>
<th>Distress Pattern</th>
<th>Severity/Description</th>
<th>Repair Method</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Longitudinal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>&lt;1/2&quot;, no faulting, spalling &lt;1/2&quot; wide</td>
<td>None</td>
<td>Figure 10.2</td>
</tr>
<tr>
<td>Moderate</td>
<td>1/2&quot; width &lt;1/2&quot;, spalling &lt;3&quot; wide</td>
<td>Clean and Seal</td>
<td>Figure 10.2</td>
</tr>
<tr>
<td>Severe</td>
<td>width &gt;1/2&quot;, spalling &gt;3 faulting &gt;1/2&quot;</td>
<td>Replace</td>
<td>Figure 10.3</td>
</tr>
<tr>
<td>Transverse</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>&lt;1/2&quot;, no faulting, spalling &lt;1/2&quot; wide</td>
<td>None</td>
<td>Figure 10.2</td>
</tr>
<tr>
<td>Moderate</td>
<td>1/2&quot; width &lt;1/2&quot;, spalling &lt;3&quot; wide</td>
<td>Clean and Seal</td>
<td>Figure 10.2</td>
</tr>
<tr>
<td>Severe</td>
<td>width &gt;1/2&quot;, spalling &gt;3 faulting &gt;1/2&quot;</td>
<td>Replace</td>
<td>Figure 10.3</td>
</tr>
</tbody>
</table>

### Joint Deficiencies

- **Spall Nonwheel Path**
  - Light: spall width <1/16", <1/2 slab depth, <12" in length
  - Moderate: 1/16" <spall width <3", <1/2 slab depth, <12" in length
  - Severe: spall width >3" or length >12", >1/2 slab depth, <12" in length

- **Spall Wheel Path**
  - Light: spall width <1/16", <1/2 slab depth, <12" in length
  - Moderate: 1/16" <spall width <3", <1/2 slab depth, <12" in length
  - Severe: spall width >3" or length >12", >1/2 slab depth, <12" in length

### Surface Deterioration

- **Pop Outs Nonwheel Path**
  - Light: Not deemed to be a traffic hazard
  - Moderate: spalling <3" wide, >12" in depth
  - Severe: spalling >3" wide, >12" in depth

- **Pop Outs Wheel Path**
  - Light: Not deemed to be a traffic hazard
  - Moderate: spalling >1", >12" in depth
  - Severe: spalling >1", >12" in depth

### Miscellaneous Distress

- **Faulting**
  - Light: Faulting <1/32"
  - Moderate: <1/16" faulting <1/32"
  - Severe: Faulting >1/16"/1/32"

- **Lane To Shoulder Drop Off**
  - Light: spall width <1"
  - Moderate: 1" <drop-off <3"
  - Severe: drop-off >3"

- **Water Bleeding Or Pumping**
  - Light: Seeping or ejection of water through joints or cracks, accompanied by shattering of the concrete.
  - Severe: Not deemed to be a traffic hazard
  - Moderate: Flying debris deemed a traffic hazard
  - Severe: Deemed to be a traffic hazard

- **Blowups**
  - Light: Elevation differences across joints or cracks.
  - Moderate: Faulting <1/32"
  - Severe: Faulting >1/16"/1/32"

### Reference

- Figure 10.4 and 10.5
- Figure 10.3 and 10.4

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**Notes:**

- Distress patterns that divide the slab into three or more segments.
- Cracking patterns that divide the slab into three or more segments.
- A corner of the slab is separated by a crack that intersects the adjacent longitudinal and transverse joint, describing an approximate 45° angle with the direction of traffic.
1. Expansion Joints Shall Be Constructed Parallel To The Existing Transverse Pavement Joints On Rehabilitation Projects, And Parallel To The Standard Transverse Pavement Joints Shown In The Plans For New Construction.

2. The location of expansion joints shall be shown on the plans.

3. Expansion joint to be paid for under the contract unit price for expansion joint shall be full compensation for joint construction, including reinforced concrete slab, sheet metal strip and compression seal, but, not including roadway pavement reconstruction associated with joint replacement or reconstruction. Expansion joint to be paid for under the contract unit price for Bridge Approach Expansion Joint, LF.

**GENERAL NOTES**

1. See Approach Slab Details.

**REINFORCING STEEL**

<table>
<thead>
<tr>
<th>Mark</th>
<th>Size: Dia.</th>
<th>No. Req.</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5'-0&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>3'-0&quot;</td>
<td>10</td>
<td>5'-0&quot;</td>
</tr>
</tbody>
</table>

Note: Finish surface smooth. Cure with heavy coating of wax base white pigmented curing compound. Apply second application immediately prior to placing pavement.

**OPTIONAL SEALS**

- Tool To 1/4" Radius Or Grind 1/4" Chamfer
- Polychloroprene Compression Seal Installed As Per Manufacturer's Specifications.

Note: All contacting surfaces between the compression seal and concrete shall be thoroughly coated with a lubricant-adhesive.

**JOINT DIMENSIONS**

**COMPRESSION SEAL DETAIL**

**DESIGN NOTES**

1. For rehabilitation projects, the designer must indicate in the plans the number of slabs to be removed, the number of subslabs to be constructed/reconstructed, and the location of expansion joints.

2. Pay quantity of expansion joint to be calculated across pavement at right angles to the centerline of the roadway pavement. Shoulder pavement joint included.

3. The centerline of roadway and the centerline of bridge do not necessarily coincide. Prior to the placement of the expansion joint, the centerline of the roadway pavement shall be determined.

4. For information on other types of concrete pavement joints see Index 350-001.

**PLAN**

**SECTION AA**

**EXPANSION JOINT**

**WITH RIGID SHOULDER PAVEMENT**

**WITH GRASSED SHOULDER OR FLEXIBLE SHOULDER PAVEMENT**

Note: Immediately prior to placing the seal, the joint shall be thoroughly cleaned of all foreign material. Immediately after the seal is placed, sheet metal strip shall be bent up against the pavement edge.

The sheet metal strip shall be a minimum 16 gage steel, 12" wide and shall be galvanized in accordance with ASTM A-526, Coating Designation 090.