## PAVEMENT DESIGN FEATURES

<table>
<thead>
<tr>
<th>No.</th>
<th>Shts.</th>
<th>Drawing Title</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP-2.1</td>
<td>2</td>
<td>Longitudinal Pavement Joints</td>
<td>7-17-2015</td>
</tr>
<tr>
<td>BP-2.2</td>
<td>2</td>
<td>Transverse Pavement Joints</td>
<td>7-18-2008</td>
</tr>
<tr>
<td>BP-2.3</td>
<td>3</td>
<td>Pressure Relief Joint Type A</td>
<td>7-19-2013</td>
</tr>
<tr>
<td>BP-2.4</td>
<td>1</td>
<td>Pressure Relief Joint Types B, C, &amp; D</td>
<td>7-19-2013</td>
</tr>
<tr>
<td>BP-2.5</td>
<td>1</td>
<td>Rigid Replacement</td>
<td>7-19-2013</td>
</tr>
<tr>
<td>BP-2.6</td>
<td>2</td>
<td>Load Transfer Retrofit</td>
<td>7-15-2016</td>
</tr>
<tr>
<td>BP-3.1</td>
<td>2</td>
<td>Asphalt Pavement</td>
<td>7-18-2014</td>
</tr>
<tr>
<td>BP-3.2</td>
<td>1</td>
<td>Asphalt Safety Edge</td>
<td>1-18-2019</td>
</tr>
<tr>
<td>BP-4.1</td>
<td>1</td>
<td>Driveways</td>
<td>7-19-2013</td>
</tr>
<tr>
<td>BP-5.1</td>
<td>1</td>
<td>Concrete Curb and Combined Curb &amp; Gutter</td>
<td>7-18-2013</td>
</tr>
<tr>
<td>BP-5.2</td>
<td>2</td>
<td>Pavement Joints at Ramp Terminals</td>
<td>7-19-2013</td>
</tr>
<tr>
<td>BT-1.1</td>
<td>3</td>
<td>New Curb Ramps</td>
<td>7-20-2018</td>
</tr>
<tr>
<td>BT-2.1</td>
<td>1</td>
<td>Retrofit Concrete Shoulders</td>
<td>7-18-2008</td>
</tr>
<tr>
<td>BT-2.2</td>
<td>1</td>
<td>Concrete Safety Edge</td>
<td>1-18-2019</td>
</tr>
<tr>
<td>BT-5.1</td>
<td>1</td>
<td>Shoulder Rumble Strips</td>
<td>1-18-2019</td>
</tr>
</tbody>
</table>

## ROADWAY DESIGN FEATURES

### Chain Link Fence
- F-1.1: Chain Link Fence, 7-16-2013
- F-2.1: Woven Wire Fence, 7-20-2010
- F-3.1: Fence Details at Bridges, 7-19-2013
- F-3.2: Walk Gates, 7-18-2014
- F-3.3: Fence Terminals, 7-19-2013
- F-3.4: Fence Details, 7-19-2013

### Guardrail
- MGS-1.1: MGS Guardrail Details, 1-19-2019
- MGS-2.1: Standard Type MGS, 7-19-2013
- MGS-2.2: MGS 25' Long-Span Guardrail, 7-18-2014
- MGS-2.4: Socketed Weak Post Attached to Headwall, 7-19-2009
- MGS-3.1: MGS Bridge Terminal Assembly, Type 1, 7-19-2018
- MGS-3.2: MGS Bridge Terminal Assembly, Type 2, 1-18-2013
- MGS-4.1: MGS Type A Anchor Assembly, 1-20-2017
- MGS-4.2: MGS Type A Anchor Assembly, 1-18-2013
- MGS-4.3: MGS Guardrail Transitions, 7-19-2013
- MGS-4.5: MGS Type B Buried in Backslope, 1-18-2013
- MGS-5.1: 1 MGS Introduction of Guardrail Runs, 7-15-2016
- MGS-5.2: 1 MGS Introduction of Guardrail Runs, 7-15-2016
- MGS-6.1: 1 MGS Guardrail at Bridges, 7-19-2018
- MGS-6.2: 1 MGS Median Guardrail at Piers, 7-19-2019
- GR-6.3: 1 Thle Beam Bolluse at Bridge Piers, 1-20-2012

## Roadway Miscellaneous

### Roadway Monuments
- RM-1.1: 2 Roadway Monuments, 7-18-2014
- RM-2.1: 1 Concrete Steps, 7-19-2013
- RM-3.1: 1 Traffic Dividers, 7-20-2010
- RM-4.1: 4 8' Portable Concrete Barrier, 7-29-2017
- RM-4.2: 2 32' Portable Concrete Barrier, 10-24-2019
- RM-4.3: 2 Single Slope Barrier (Type B, Type C), 7-18-2014
- RM-4.4: 1 Single Slope Barrier Transitions, 7-19-2019
- RM-4.5: 2 Single Slope Barrier, Type D, 7-21-2017
- RM-4.6: 3 Concrete Barrier End Sections (Type B, Type D), 7-19-2013
- RM-5.1: 2 Steel Bollards, 7-18-2014
- RM-5.2: 1 Bikeway Railing, 7-18-2015
- RM-6.1: 1 Concrete Parking Block Detail, 7-18-2014
- RM-7.1: 1 Drilled Water Well Abandoned, 7-18-2014
- RM-7.2: 1 Plugging and venting Gas and/or Oil Wells, 1-15-2005

## ROADSIDE DEVELOPMENT

### Landscaping
- LA-1.1: 1 Tree Wells and Pruning, 10-15-2010
- LA-1.2: 1 Planting and Bracing, 1-16-2009
NOTES (NEW JERSEY SHAPE)

GENERAL: this barrier may be manufactured with reinforcing steel or with welded wire fabric as shown in the ELEVATION and SECTION A-A details. See CMS 622 for additional information. The minimum design strength of the concrete is 4,000 psi and meets the requirements of CMS 499.

PORTABLE CONCRETE BARRIER (PCB) must be manufactured with reinforcing steel or with welded wire fabric as shown in the ELEVATION and SECTION A-A details. See CMS 622 for additional information. The minimum design strength of the concrete is 4,000 psi and meets the requirements of CMS 499.

HINGE AND REINFORCING BARS (Use ASTM A 36 for the 1/2" hinge bar. Use rebars meeting the requirements of CMS 509 ASTM A 615 Grade 60. Wire mesh shall meet CMS 709.10. Black Steel is permitted.)

ALTERNATE BARRIER: Approved Alternate Portable Barrier can be found on the Office of Roadway Engineering's website.

PAYMENT: This barrier is paid for in feet as ITEM 622 - Portable Barrier, 32". Approved alternatives to the barrier shown on this drawing and SCD PCB-91 can be found on the Office of Roadway Engineering's website.

Connecting Hardware: Bolts, washers and hex nuts are to be galvanized after fabrication per CMS 711.02 and meet the requirements of CMS 509 except that the rotational capacity test specified in ASTM A 125 shall be waived.

 håndling Devices: Such devices may be used in lieu of the lifting slot for moving the barrier. They may be of any design sufficient to safely handle the weight of the section being lifted. No attaching devices shall protrude from the surface of the barrier when in place.

MARKINGS: All barrier segments are to be marked on the top, as shown, where XX indicates the year cast. The year indicates the year in which the barrier was cast. On the top of each barrier segment, including tapered end sections, permanently mark a unique identification as to its manufacturer, and somewhere on the barrier, permanently mark the date of manufacture. And somewhere on the barrier, permanently mark the day and month the barrier was manufactured.

Reflectors: Install barrier reflectors in accordance with Roadway Engineering Standard Drawing M=220.10, as specified in the plans.

Payment: This barrier is paid for in feet as ITEM 622 - Portable Barrier, 32". Approved alternatives to the barrier shown on this drawing and SCD PCB-91 can be found on the Office of Roadway Engineering's website.

Barrier sections meeting this standard and cast before January 1, 2020, may be used until December 31, 2029, provided the barrier section remains in conformance with the quality standards for temporary traffic control devices and acceptable delineation methods for vehicles.

LEGEND

$1 radius or 1/2" chamfer,
all top and end corners.

Pinnable 15° radius.

Pinnable 45° radius.

$1 radius or 1/2" chamfer,
all top and end corners.
**Pin & Loop Connection Details**

**Open Joint**
- Barrier joints shall be fully open before the nut is tightened onto bolt.
- Hinge Bar insertion through Hinge that Bolts can be easily placed close together so that the Tapered End section is not a crashworthy terminal and should not be used on the approach end of temporary barrier unless it is fully located beyond the clear zone.

**Closed Joint**
- Barriers shall initially be placed close together so that Bolts can be easily inserted through Hinge Bar loop.

**Reinforcing Bar List**

<table>
<thead>
<tr>
<th>Mark</th>
<th>Bar</th>
<th>Bar Length</th>
<th>Shape</th>
<th>Quantity per typ. length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10&quot;</td>
</tr>
<tr>
<td>X501</td>
<td>#5</td>
<td>9-5/8&quot; Str.</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11-5/8&quot; Str.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>19&quot;-5/8&quot; Str.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T301</td>
<td>#3</td>
<td>5-5/8&quot; Bent</td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>X502</td>
<td>#6</td>
<td>9-5/8&quot; Str.</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9&quot;-5/8&quot; Str.</td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

**Connecting Pin Assembly**
- 1 ¼" dia. High Strength Bolt with Plate Washers (2) and high strength heavy hex nut, fully threaded.

**Bending Diagram**

- 6-5/8" lifting slot permitted
- 4'-0" Lifting Slot permitted
- 10'-0"

**Plan**
- 2'-2" Typ.
- 4", 6", 6", 6"
- 18"
- 7" 15" 8"

**Elevation**
- 3' radius
- 2'-2" Typ.
- 4", 6", 6", 6"
NOTES (F-SHAPE)

GENERAL: this barrier may be manufactured with reinforcing steel or with welded wire fabric as shown in the ELEVATION and SECTION A-A details. See CMS Item 622 for additional information. Provide class S09 concrete with a minimum compressive strength of 5,000 psi and permeability of 2,000 coulombs. Provide uncoated reinforcing steel or welded wire fabric in accordance with CMS Item 609.

Barrier Types: New Jersey Shape and F-Shape, the same run shall not be mixed.

Welded Wire Fabric with the same bar sizes as shown may be used instead of Rebar.

HINGE AND REINFORCING BARS: Size ASTM A 36 for the 1/4" hinge bars. Use rebars meeting the requirements of CMS S09 ASTM A 615 Grade 60. Wire mesh shall meet CMS 709.10. Black Steel is permitted.

Connecting Hardware: Bolts and washers are to be galvanized after fabrication per CMS 710.02 and meet the requirements of CMS 710.09 except that the Rotational Capacity test specified in ASTM A 325 shall be waived.

Alternate Barrier: Approved Alternate Portable Barrier can be found on the Office of Highway Engineering’s website.

Handling Devices: Such devices may be used in lieu of the lifting slot for moving the barrier. They may be of any design sufficient to safely handle the weight of the section being lifted. No handling devices shall protrude from the surface of the barrier when in place.

MARKINGS: All barrier segments are to be marked on the top, PCB-XX-MASH-TL3, where XX indicates the year the barrier was manufactured. On the top of each barrier segment, including tapered end sections, permanently mark a unique identification as to its manufacturer. And somewhere on the barrier, permanently mark the day and month the barrier was manufactured. Permanently impress these markings in the barrier using a minimum of 2" high lettering.

See Item 509.158 for transitions.

INSTALLATION: Install barrier reflectors in accordance with Highway Engineering Standard Drawing RMS-011, when specified in the plans.

PAYMENT: This barrier is paid for in feet as Item 622 - Portable Barrier, 32". Approved alternatives to the barrier shown on this drawing can be found on the Office of Highway Engineering’s website.

GENERAL: This barrier may be manufactured with reinforcing steel or with welded wire fabric as shown in the ELEVATION and SECTION A-A details. See CMS Item 622 for additional information.

Provide class S09 concrete with a minimum compressive strength of 5,000 psi and permeability of 2,000 coulombs. Provide uncoated reinforcing steel or welded wire fabric in accordance with CMS Item 609.

Barrier Types: New Jersey Shape and F-Shape, the same run shall not be mixed.

Welded Wire Fabric with the same bar sizes as shown may be used instead of Rebar.

HINGE AND REINFORCING BARS: Size ASTM A 36 for the 1/4" hinge bars. Use rebars meeting the requirements of CMS S09 ASTM A 615 Grade 60. Wire mesh shall meet CMS 709.10. Black Steel is permitted.

Connecting Hardware: Bolts and washers are to be galvanized after fabrication per CMS 710.02 and meet the requirements of CMS 710.09 except that the Rotational Capacity test specified in ASTM A 325 shall be waived.

Alternate Barrier: Approved Alternate Portable Barrier can be found on the Office of Highway Engineering’s website.

Handling Devices: Such devices may be used in lieu of the lifting slot for moving the barrier. They may be of any design sufficient to safely handle the weight of the section being lifted. No handling devices shall protrude from the surface of the barrier when in place.

MARKINGS: All barrier segments are to be marked on the top, PCB-XX-MASH-TL3, where XX indicates the year the barrier was manufactured. On the top of each barrier segment, including tapered end sections, permanently mark a unique identification as to its manufacturer. And somewhere on the barrier, permanently mark the day and month the barrier was manufactured. Permanently impress these markings in the barrier using a minimum of 2" high lettering.

See Item 509.158 for transitions.

INSTALLATION: Install barrier reflectors in accordance with Highway Engineering Standard Drawing RMS-011, when specified in the plans.

PAYMENT: This barrier is paid for in feet as Item 622 - Portable Barrier, 32". Approved alternatives to the barrier shown on this drawing can be found on the Office of Highway Engineering’s website.
NOTES (F-SHAPE)

1. Use this standard for the anchoring of precast concrete barrier on asphalt or portland cement concrete pavement including bridge decks.

2. After removing anchoring pins, clean the pin holes and fill them with non-shrink mortar conforming to CMS 705.22.

3. Refer to the Plans for locations of anchored barrier.

- The minimum depth from the surface of the PCB to the end of the hole shall be 27 1/4".
- Use rebar cutting bit if steel is encountered.

4. After removing anchoring pins, clean the pin holes and fill them with non-shrink mortar conforming to CMS 705.22.

1. Use this standard for the anchoring of precast concrete barrier on asphalt or portland cement concrete pavement including bridge decks.

2. After removing anchoring pins, clean the pin holes and fill them with non-shrink mortar conforming to CMS 705.22.

3. Refer to the Plans for locations of anchored barrier.

- The minimum depth from the surface of the PCB to the end of the hole shall be 27 1/4".
- Use rebar cutting bit if steel is encountered.

4. After removing anchoring pins, clean the pin holes and fill them with non-shrink mortar conforming to CMS 705.22.