Standard Plans
For Road, Bridge, and Municipal Construction

M 21-01

Washington State Department of Transportation
Americans with Disabilities Act (ADA) Information

Materials can be provided in alternative formats for people with disabilities by calling:

- Office of Equal Opportunity (OEO) at (360) 705-7097.
- Persons who are deaf, hard of hearing, or speech disabled may contact OEO through the Washington Relay Service at 7-1-1.
Foreword

This manual contains standard engineering drawings used for road, bridge, and municipal construction. These drawings have been prepared under the direct supervision of a Washington State licensed professional engineer, who is knowledgeable in the specialized field of civil engineering depicted in each drawing. This manual standardizes fabrication, installation, and construction methods for specific items of work, and complements the contract documents and the Standard Specifications for Road, Bridge, and Municipal Construction.

Updating the manual is a continual process and revisions are issued periodically. Questions, comments, and recommendations for changes are welcome.

Contact the Design Standards Team at:
(360) 705-7540 (phone)
designstandards@wsdot.wa.gov (e-mail)

For contact via conventional mail, the Comment Request Form on the reverse side of this page is provided to facilitate routing and prompt delivery. Making a copy will preserve the original form for future use. Attach a copy of the form as a cover sheet when sending comments or sketches made on other documents, such as marked copies of specific Standard Plans. Your questions, comments, and/or recommendations should be sent to:

Design Standards
Transportation Building
Olympia, WA 98504-7329.

Further information, as well as Bentley MicroStation (.dgn) CAD files, Adobe Acrobat (.pdf) files, and some AutoCAD (.dwg) CAD files, can be found on the Design Standards website at:
http://www.wsdot.wa.gov/eesc/design/designstandards

Contact the Engineering Publications Office at (360) 705-7430 if you require additional copies of this manual.

Pasco Bakotich III
State Design Engineer
Comments

<table>
<thead>
<tr>
<th>From: ____________________________</th>
<th>Date: ______________</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Phone: ______________</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>To: Design Standards</th>
<th>Subject: Standard Plans Manual Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washington State Department of Transportation</td>
<td></td>
</tr>
<tr>
<td>Transportation Building</td>
<td></td>
</tr>
<tr>
<td>PO Box 47329</td>
<td></td>
</tr>
<tr>
<td>Olympia, WA 98504-7329</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comment: ☐ See attached

Preserve this original for future use • Submit copies only
# Contents

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
<th>Sheets</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-10.10-00</td>
<td>Survey Stakes</td>
<td>8/7/07</td>
<td>2</td>
</tr>
<tr>
<td>A-10.20-00</td>
<td>Survey Monument Types 1 and 2</td>
<td>10/5/07</td>
<td></td>
</tr>
<tr>
<td>A-10.30-00</td>
<td>Monument and Cover</td>
<td>10/5/07</td>
<td></td>
</tr>
<tr>
<td>A-20.10-00</td>
<td>Slope Treatment</td>
<td>8/31/07</td>
<td></td>
</tr>
<tr>
<td>A-30.10-00</td>
<td>Concrete Slope Protection</td>
<td>11/8/07</td>
<td></td>
</tr>
<tr>
<td>A-30.15-00</td>
<td>Semi-open Concrete Masonry Slope Protection</td>
<td>11/8/07</td>
<td></td>
</tr>
<tr>
<td>A-30.30-00</td>
<td>Wire Mesh Slope Protection</td>
<td>11/8/07</td>
<td></td>
</tr>
<tr>
<td>A-30.35-00</td>
<td>Slope Protection Anchors</td>
<td>10/12/07</td>
<td></td>
</tr>
<tr>
<td>A-40.10-00</td>
<td>Cement Concrete Pavement Joints</td>
<td>10/5/07</td>
<td></td>
</tr>
<tr>
<td>A-40.20-00</td>
<td>Bridge Transverse Joint Seals for HMA</td>
<td>9/20/07</td>
<td></td>
</tr>
<tr>
<td>A-40.50-00</td>
<td>Bridge Approach Slab</td>
<td>11/8/07</td>
<td></td>
</tr>
<tr>
<td>A-60.10-00</td>
<td>Cement Concrete Pavement Repair</td>
<td>10/5/07</td>
<td></td>
</tr>
<tr>
<td>A-60.20-00</td>
<td>Dowel Bar Retrofit for Cement Concrete Pavement</td>
<td>10/5/07</td>
<td></td>
</tr>
<tr>
<td>A-60.30-00</td>
<td>Bridge Deck Transition for HMA Overlay</td>
<td>11/8/07</td>
<td>3</td>
</tr>
<tr>
<td>A-60.40-00</td>
<td>HMA Overlay: Further Deck Preparation</td>
<td>8/31/07</td>
<td></td>
</tr>
<tr>
<td>B-5.20-00</td>
<td>Catch Basin Type 1</td>
<td>6/1/06</td>
<td></td>
</tr>
<tr>
<td>B-5.40-00</td>
<td>Catch Basin Type 1L</td>
<td>6/1/06</td>
<td></td>
</tr>
<tr>
<td>B-5.60-00</td>
<td>Catch Basin Type 1P (for Parking Lot)</td>
<td>6/1/06</td>
<td></td>
</tr>
<tr>
<td>B-10.20-00</td>
<td>Catch Basin Type 2</td>
<td>6/1/06</td>
<td></td>
</tr>
<tr>
<td>B-10.40-00</td>
<td>Catch Basin Type 2 with Flow Restrictor</td>
<td>6/1/06</td>
<td></td>
</tr>
<tr>
<td>B-10.60-00</td>
<td>Catch Basin Type 2 with Baffle Type Flow Restrictor</td>
<td>6/8/06</td>
<td></td>
</tr>
<tr>
<td>B-15.20-00</td>
<td>Manhole Type 1</td>
<td>6/1/06</td>
<td></td>
</tr>
<tr>
<td>B-15.40-00</td>
<td>Manhole Type 2</td>
<td>6/1/06</td>
<td></td>
</tr>
<tr>
<td>B-15.60-00</td>
<td>Manhole Type 3</td>
<td>6/1/06</td>
<td></td>
</tr>
<tr>
<td>B-20.20-01</td>
<td>Drywell Type 1 (for Swale)</td>
<td>11/21/06</td>
<td></td>
</tr>
<tr>
<td>B-20.40-02</td>
<td>Drywell Type 2 (with Pipe Inlet)</td>
<td>6/10/08</td>
<td></td>
</tr>
<tr>
<td>B-20.60-02</td>
<td>Drywell Type 3 (with At-Grade Inlet)</td>
<td>6/10/08</td>
<td></td>
</tr>
<tr>
<td>B-25.20-00</td>
<td>Combination Inlet</td>
<td>6/8/06</td>
<td></td>
</tr>
<tr>
<td>B-25.60-00</td>
<td>Concrete Inlet</td>
<td>6/1/06</td>
<td></td>
</tr>
<tr>
<td>B-30.10-00</td>
<td>Rectangular Frame (Reversible)</td>
<td>6/8/06</td>
<td></td>
</tr>
<tr>
<td>B-30.20-01</td>
<td>Rectangular Solid Metal Cover</td>
<td>11/21/06</td>
<td></td>
</tr>
<tr>
<td>B-30.30-00</td>
<td>Rectangular Vaned Grate</td>
<td>6/1/06</td>
<td></td>
</tr>
<tr>
<td>B-30.40-00</td>
<td>Rectangular Bi-Directional Vaned Grate</td>
<td>6/1/06</td>
<td></td>
</tr>
<tr>
<td>B-30.50-00</td>
<td>Rectangular Herringbone Grate</td>
<td>6/1/06</td>
<td></td>
</tr>
<tr>
<td>B-30.70-01</td>
<td>Circular Frame (Ring) and Cover</td>
<td>8/31/07</td>
<td></td>
</tr>
<tr>
<td>B-30.80-00</td>
<td>Circular Grate</td>
<td>6/8/06</td>
<td></td>
</tr>
<tr>
<td>B-30.90-01</td>
<td>Miscellaneous Details for Drainage Structures</td>
<td>9/20/07</td>
<td></td>
</tr>
<tr>
<td>B-35.20-00</td>
<td>Grate Inlet Type 1 (Cast-In-Place)</td>
<td>6/8/06</td>
<td></td>
</tr>
<tr>
<td>B-35.40-00</td>
<td>Grate Inlet Type 2</td>
<td>6/8/06</td>
<td>2</td>
</tr>
</tbody>
</table>

---

*Standard Plans for Road, Bridge, and Municipal Construction*

*Effective August 4, 2008*
## Contents

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-40.20-00</td>
<td>Welded Grates for Grate Inlet</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-40.40-00</td>
<td>Frame and Dual Vaned Grates for Grate Inlet</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-45.20-00</td>
<td>Drop Inlet Type 1</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-45.40-00</td>
<td>Drop Inlet Type 2</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-50.20-00</td>
<td>Grates for Drop Inlet</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-55.20-00</td>
<td>Pipe Zone Bedding and Backfill</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-60.20-00</td>
<td>Connection Details for Dissimilar Culvert Pipe</td>
<td>6/8/06</td>
</tr>
<tr>
<td>B-60.40-00</td>
<td>Coupling Bands for Corrugated Metal Pipe</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-65.20-00</td>
<td>Animal/Pedestrian Underpass</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-65.40-00</td>
<td>Equipment Underpass</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-70.20-00</td>
<td>Beveled End Sections (for Culverts 30” Diameter or Less)</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-70.60-00</td>
<td>Flared End Sections</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-75.20-01</td>
<td>Headwalls for Culvert Pipe and Underpass</td>
<td>6/10/08</td>
</tr>
<tr>
<td>B-75.50-01</td>
<td>Type 1 Safety Bars for Stepped Culvert Pipe or Pipe Arch</td>
<td>6/10/08</td>
</tr>
<tr>
<td>B-75.60-00</td>
<td>Type 2 Safety Bars for Culvert Pipe or Pipe Arch (On Cross Road)</td>
<td>6/8/06</td>
</tr>
<tr>
<td>B-80.20-00</td>
<td>Tapered End Section with Type 3 Safety Bars</td>
<td>6/8/06</td>
</tr>
<tr>
<td>B-80.40-00</td>
<td>Tapered End Section with Type 4 Safety Bars (On Cross Road)</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-82.20-00</td>
<td>Residential Storm Drain, Under Sidewalk</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-85.10-01</td>
<td>Vertical Connection (for Sanitary Sewer Use)</td>
<td>6/10/08</td>
</tr>
<tr>
<td>B-85.20-00</td>
<td>Side Sewer Connection (for Sanitary Sewer Use)</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-85.30-00</td>
<td>Standing Side Sewer Connection (for Sanitary Sewer Use)</td>
<td>6/1/06</td>
</tr>
<tr>
<td>B-85.40-00</td>
<td>8 Inch Sewer Clean-Out (for Sanitary Sewer Use)</td>
<td>6/8/06</td>
</tr>
<tr>
<td>B-85.50-01</td>
<td>Drop Connections (for Sanitary Sewer Use)</td>
<td>6/10/08</td>
</tr>
<tr>
<td>B-90.10-00</td>
<td>Hydrant Setting Types A and B</td>
<td>6/8/06</td>
</tr>
<tr>
<td>B-90.20-00</td>
<td>2 Inch Blowoff Assembly</td>
<td>6/8/06</td>
</tr>
<tr>
<td>B-90.30-00</td>
<td>Combination Air Release / Air Vacuum Valve Assembly</td>
<td>6/8/06</td>
</tr>
<tr>
<td>B-90.40-00</td>
<td>Concrete Thrust Block</td>
<td>6/8/06</td>
</tr>
<tr>
<td>B-90.50-00</td>
<td>Concrete Thrust Block for Convex Vertical Bends</td>
<td>6/8/06</td>
</tr>
<tr>
<td>B-95.20-00</td>
<td>Median Barrier Drainage Installation</td>
<td>6/8/06</td>
</tr>
<tr>
<td>B-95.40-00</td>
<td>Inlet Placement at Bridge End</td>
<td>6/8/06</td>
</tr>
</tbody>
</table>

### Section C Traffic Barrier

<table>
<thead>
<tr>
<th>C-1</th>
<th>Beam Guardrail: Types 1 ~ 4 (W-Beam)</th>
<th>2/6/07</th>
<th>2 Sheets</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-1a</td>
<td>Beam Guardrail (Thrie Beam)</td>
<td>7/31/98</td>
<td></td>
</tr>
<tr>
<td>C-1b</td>
<td>Beam Guardrail Posts and Blocks</td>
<td>10/31/03</td>
<td>2 Sheets</td>
</tr>
<tr>
<td>C-1c</td>
<td>Beam Guardrail</td>
<td>5/30/97</td>
<td></td>
</tr>
<tr>
<td>C-1d</td>
<td>Thrie Beam Guardrail Reducer Section</td>
<td>10/31/03</td>
<td></td>
</tr>
<tr>
<td>C-2</td>
<td>Guardrail Placement (Cases 1, 2 &amp; 3)</td>
<td>1/6/00</td>
<td></td>
</tr>
<tr>
<td>C-2a</td>
<td>Guardrail Placement (Cases 4, 5 &amp; 6)</td>
<td>6/21/06</td>
<td></td>
</tr>
<tr>
<td>C-2b</td>
<td>Guardrail Placement (Cases 7 &amp; 8)</td>
<td>6/21/06</td>
<td></td>
</tr>
<tr>
<td>C-2c</td>
<td>Guardrail Placement, Median Bull Nose (Cases 9A, 9B &amp; 9C)</td>
<td>6/21/06</td>
<td></td>
</tr>
</tbody>
</table>
Contents

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-2d</td>
<td>Guardrail Placement (Cases 10A, 10B &amp; 10C)</td>
<td>6/21/06</td>
</tr>
<tr>
<td>C-2e</td>
<td>Guardrail Placement (Cases 11A, 11B &amp; 11C)</td>
<td>6/21/06</td>
</tr>
<tr>
<td>C-2f</td>
<td>Guardrail Placement, Weak Post Intersection Design (8' - 6&quot; Max. Radius)</td>
<td>3/14/97</td>
</tr>
<tr>
<td></td>
<td>(Cases 12AC, 12AD, 12BC &amp; 12BD)</td>
<td></td>
</tr>
<tr>
<td>C-2g</td>
<td>Guardrail Placement, Weak Post Intersection Design (35' Max. Radius)</td>
<td>7/27/01</td>
</tr>
<tr>
<td></td>
<td>(Cases 13AC, 13AD, 13BC &amp; 13BD)</td>
<td></td>
</tr>
<tr>
<td>C-2h</td>
<td>Guardrail Placement (Case 14)</td>
<td>3/28/97</td>
</tr>
<tr>
<td>C-2i</td>
<td>Guardrail Placement (Case 15)</td>
<td>3/28/97</td>
</tr>
<tr>
<td>C-2j</td>
<td>Guardrail Placement (Cases 16, 17 &amp; 18)</td>
<td>6/12/98</td>
</tr>
<tr>
<td>C-2k</td>
<td>Guardrail Placement 12' - 6&quot; Span (Cases 19A &amp; 19B)</td>
<td>7/27/01</td>
</tr>
<tr>
<td>C-2n</td>
<td>Guardrail Placement 18' - 9&quot; Span (Case 20)</td>
<td>7/27/01</td>
</tr>
<tr>
<td>C-2o</td>
<td>Guardrail Placement 25' Span (Case 21)</td>
<td>7/13/01</td>
</tr>
<tr>
<td>C-2p</td>
<td>Guardrail Placement, Strong Post Intersection Design (Cases 22AC, 22AD, 22BC &amp; 22BD)</td>
<td>10/31/03</td>
</tr>
<tr>
<td>C-2r</td>
<td>Barrier Placement, Cable to Thrie Beam Bull Nose Connection (Case 25)</td>
<td>3/3/05</td>
</tr>
<tr>
<td>C-2s</td>
<td>Barrier Placement, Cable to W-Beam Shielding for Redirectional Landform (Case 26)</td>
<td>3/3/05</td>
</tr>
<tr>
<td>C-2t</td>
<td>Barrier Placement, Cable Barrier Shielding for Redirectional Landform (Case 27)</td>
<td>3/3/05</td>
</tr>
<tr>
<td>C-3</td>
<td>Beam Guardrail Transition Sections (Types 1, 1A, &amp; 1B)</td>
<td>10/4/05</td>
</tr>
<tr>
<td>C-3a</td>
<td>Beam Guardrail Transition Sections (Types 2, 4, 5, &amp; 6)</td>
<td>10/4/05</td>
</tr>
<tr>
<td>C-3b</td>
<td>Beam Guardrail Transition Sections (Types 10 ~ 15)</td>
<td>10/4/05</td>
</tr>
<tr>
<td></td>
<td>2 Sheets</td>
<td></td>
</tr>
<tr>
<td>C-3c</td>
<td>Beam Guardrail Transition Sections (Types 16, 17, &amp; 18)</td>
<td>6/21/06</td>
</tr>
<tr>
<td>C-4</td>
<td>Beam Guardrail Buried Terminal Type 1</td>
<td>2/21/07</td>
</tr>
<tr>
<td>C-4a</td>
<td>Beam Guardrail Buried Terminal Type 2</td>
<td>2/21/07</td>
</tr>
<tr>
<td>C-4b</td>
<td>Beam Guardrail Flared Terminal</td>
<td>6/8/06</td>
</tr>
<tr>
<td>C-4c</td>
<td>Beam Guardrail Non-Flared Terminal</td>
<td>2/20/03</td>
</tr>
<tr>
<td>C-4d</td>
<td>Beam Guardrail Bull Nose Terminal</td>
<td>6/30/04</td>
</tr>
<tr>
<td></td>
<td>4 Sheets</td>
<td></td>
</tr>
<tr>
<td>C-5</td>
<td>Guardrail Connection to Bridge Rail or Concrete Barrier</td>
<td>10/31/03</td>
</tr>
<tr>
<td>C-6</td>
<td>Beam Guardrail Anchor Type 1</td>
<td>5/30/97</td>
</tr>
<tr>
<td></td>
<td>2 Sheets</td>
<td></td>
</tr>
<tr>
<td>C-6a</td>
<td>Beam Guardrail Anchor Type 2</td>
<td>3/14/97</td>
</tr>
<tr>
<td>C-6c</td>
<td>Beam Guardrail Anchor Type 4</td>
<td>1/6/00</td>
</tr>
<tr>
<td>C-6d</td>
<td>Beam Guardrail Anchor Type 5</td>
<td>5/30/97</td>
</tr>
<tr>
<td>C-6f</td>
<td>Beam Guardrail Anchor Type 7</td>
<td>7/25/97</td>
</tr>
<tr>
<td>C-7</td>
<td>Beam Guardrail End Sections</td>
<td>10/31/03</td>
</tr>
<tr>
<td>C-7a</td>
<td>Thrie Beam End Sections</td>
<td>10/31/03</td>
</tr>
<tr>
<td>C-8</td>
<td>Concrete Barrier Type 2</td>
<td>4/27/04</td>
</tr>
<tr>
<td></td>
<td>2 Sheets</td>
<td></td>
</tr>
<tr>
<td>C-8a</td>
<td>Concrete Barrier Type 4 and Transition Section</td>
<td>7/25/97</td>
</tr>
<tr>
<td>C-8b</td>
<td>Concrete Barrier Light Standard Section</td>
<td>1/11/06</td>
</tr>
<tr>
<td></td>
<td>2 Sheets</td>
<td></td>
</tr>
<tr>
<td>C-8e</td>
<td>Precast Concrete Barrier Anchor ~ Type 3 (Permanent)</td>
<td>2/21/07</td>
</tr>
</tbody>
</table>

Standard Plans for Road, Bridge, and Municipal Construction

Effective August 4, 2008
### Contents

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-8f</td>
<td>Concrete Barrier Transition, Type 2 to Bridge F-Shape</td>
<td>6/30/04</td>
</tr>
<tr>
<td>C-10</td>
<td>Box Culvert Guardrail Steel Post</td>
<td>7/31/98 2 Sheets</td>
</tr>
<tr>
<td>C-13</td>
<td>Single Slope Concrete Barrier (Precast)</td>
<td>7/3/08 3 Sheets</td>
</tr>
<tr>
<td>C-13a</td>
<td>Single Slope Concrete Barrier (Precast) Transition Section</td>
<td>7/3/08</td>
</tr>
<tr>
<td>C-13b</td>
<td>Single Slope Concrete Barrier (Precast) Vertical Back</td>
<td>7/3/08</td>
</tr>
<tr>
<td>C-13c</td>
<td>Single Slope Concrete Barrier (Precast) Terminal</td>
<td>7/3/08</td>
</tr>
<tr>
<td>C-14a</td>
<td>Single Slope Concrete Barrier (Cast-in-Place) Dual-Faced</td>
<td>7/3/08 3 Sheets</td>
</tr>
<tr>
<td>C-14b</td>
<td>Concrete Barrier Transition, Type 2 to Single Slope</td>
<td>7/26/02</td>
</tr>
<tr>
<td>C-14c</td>
<td>Single Slope Concrete Barrier (Cast-in-Place) Terminal</td>
<td>7/3/08</td>
</tr>
<tr>
<td>C-14d</td>
<td>Single Slope Concrete Barrier (Cast-in-Place) Transition Section</td>
<td>7/3/08</td>
</tr>
<tr>
<td>C-14e</td>
<td>Single Slope Concrete Barrier (Cast-in-Place) Vertical Back</td>
<td>7/3/08</td>
</tr>
<tr>
<td>C-14h</td>
<td>Single Slope Concrete Barrier Light Standard Foundation</td>
<td>1/11/06</td>
</tr>
<tr>
<td>C-14i</td>
<td>Single Slope Concrete Barrier Sign Bridge Foundation</td>
<td>12/2/03 2 Sheets</td>
</tr>
<tr>
<td>C-14j</td>
<td>Single Slope Concrete Barrier Transition for Monotube Sign Support</td>
<td>12/2/03</td>
</tr>
<tr>
<td>C-14k</td>
<td>Single Slope Concrete Barrier Cantilever Sign Structure Fdn.</td>
<td>1/11/06 2 Sheets</td>
</tr>
<tr>
<td>C-15a</td>
<td>Single Slope Concrete Barrier Placement (Split)</td>
<td>7/3/08</td>
</tr>
<tr>
<td>C-15b</td>
<td>Single Slope Concrete Barrier Placement (Wrap)</td>
<td>7/3/08</td>
</tr>
<tr>
<td>C-16a</td>
<td>Traffic Barrier Shoulder Widening</td>
<td>11/8/05</td>
</tr>
<tr>
<td></td>
<td>~ for Shoulders 8.0' and Wider</td>
<td></td>
</tr>
<tr>
<td>C-16b</td>
<td>Traffic Barrier Shoulder Widening</td>
<td>11/8/05</td>
</tr>
<tr>
<td></td>
<td>~ for Shoulders Less Than 8.0' Wide</td>
<td></td>
</tr>
<tr>
<td>C-20.14-00</td>
<td>Beam Guardrail Type 31: Placement (Cases 1A, 2A, &amp; 5A)</td>
<td>2/6/07</td>
</tr>
<tr>
<td>C-20.40-00</td>
<td>Beam Guardrail Type 31: Placement</td>
<td>2/6/07</td>
</tr>
<tr>
<td></td>
<td>~ 12'-6&quot;, 18'-9&quot;, or 25'-0&quot; Span</td>
<td></td>
</tr>
<tr>
<td>C-22.40-01</td>
<td>Beam Guardrail Type 31: Non-Flared Terminal</td>
<td>10/5/07</td>
</tr>
<tr>
<td>C-23.60-00</td>
<td>Beam Guardrail (Type 31) Anchor Type 10</td>
<td>2/6/07</td>
</tr>
<tr>
<td>C-25.18-01</td>
<td>Beam Guardrail (Type 31) Transition Section Type 20</td>
<td>9/20/07</td>
</tr>
<tr>
<td>C-25.20-02</td>
<td>Beam Guardrail (Type 31) Transition Section Type 21</td>
<td>7/3/08</td>
</tr>
<tr>
<td>C-25.22-01</td>
<td>Beam Guardrail (Type 31) Transition Section Type 22</td>
<td>10/5/07</td>
</tr>
<tr>
<td>C-25.80-01</td>
<td>Beam Guardrail Type 31 to Beam Guardrail Type 1 Adapter</td>
<td>7/3/08</td>
</tr>
<tr>
<td>C-28.40-00</td>
<td>Beam Guardrail Type 31</td>
<td>2/6/07</td>
</tr>
<tr>
<td>C-90.10-00</td>
<td>Impact Attenuator Inertial Barrier Configurations</td>
<td>7/3/08</td>
</tr>
</tbody>
</table>
### Contents

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Section D Retaining, Noise Barrier, and Geosynthetic Walls</td>
<td></td>
</tr>
<tr>
<td>D-2.02-00</td>
<td>Noise Barrier Wall Type 1 (CIP Conc. on Trench Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.04-00</td>
<td>Noise Barrier Wall Type 2 (CIP Conc. on Spread Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.06-00</td>
<td>Noise Barrier Wall Type 3 (… on Offset Spread Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.08-00</td>
<td>Noise Barrier Wall Type 4 (CIP Conc. on Shaft Foundation)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.10-00</td>
<td>Noise Barrier Wall Type 5 (CIP Conc. with Traffic Barrier on Trench Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.12-00</td>
<td>Noise Barrier Wall Type 5SS (CIP Conc. w/ Single Slope Traffic Barrier on Trench Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.14-00</td>
<td>Noise Barrier Wall Type 6 (CIP Conc. with Traffic Barrier on Spread Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.16-00</td>
<td>Noise Barrier Wall Type 6SS (CIP Conc. w/ Single Slope Traffic Barrier on Spread Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.18-00</td>
<td>Noise Barrier Wall Type 7 (CIP Conc. with Traffic Barrier on Shaft Foundation)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.20-00</td>
<td>Noise Barrier Wall Type 7SS (CIP Conc. w/ Single Slope Traffic Barrier on Shaft Fdn.)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.30-00</td>
<td>Noise Barrier Wall Type 8 (Precast Conc. on Trench Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.32-00</td>
<td>Noise Barrier Wall Type 9 (Precast Conc. on Spread Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.34-00</td>
<td>Noise Barrier Wall Type 10 (… on Offset Spread Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.36-01</td>
<td>Noise Barrier Wall Type 11 (… on Shaft Foundation)</td>
<td>11/8/07</td>
</tr>
<tr>
<td>D-2.38-00</td>
<td>Noise Barrier Wall Type 12 (Precast Conc. with Traffic Barrier on Trench Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.40-00</td>
<td>Noise Barrier Wall Type 12SS (Precast w/ Single Slope Traffic Barrier on Trench Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.42-00</td>
<td>Noise Barrier Wall Type 13 (Precast Conc. with Traffic Barrier on Spread Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.44-00</td>
<td>Noise Barrier Wall Type 13SS (Precast w/ Single Slope Traffic Barrier on Spread Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.46-00</td>
<td>Noise Barrier Wall Type 14 (Precast Conc. w/ Traffic Barrier on Shaft Foundation)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.48-00</td>
<td>Noise Barrier Wall Type 14SS (Precast Conc. w/ Single Slope Traffic Barrier on Shaft Fdn.)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.60-00</td>
<td>Noise Barrier Wall Type 16 (Masonry on Trench Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.62-00</td>
<td>Noise Barrier Wall Type 17 (Masonry on Spread Footing)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.64-00</td>
<td>Noise Barrier Wall Type 18 (Masonry on Offset Spread Ftg.)</td>
<td>11/10/05</td>
</tr>
<tr>
<td>D-2.66-00</td>
<td>Noise Barrier Wall Type 19 (Masonry on Shaft with Grade Beam Foundation)</td>
<td>11/10/05</td>
</tr>
</tbody>
</table>

> Standard Plans for Road, Bridge, and Municipal Construction

> Effective August 4, 2008
## Contents

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
<th>Sheets</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-2.68-00</td>
<td>Noise Barrier Wall Type 20 (Masonry on Shaft Foundation)</td>
<td>11/10/05</td>
<td>2</td>
</tr>
<tr>
<td>D-2.78-00</td>
<td>Noise Barrier Wall Type 15 (Timber Panel on Trench Footing)</td>
<td>11/10/05</td>
<td></td>
</tr>
<tr>
<td>D-2.80-00</td>
<td>Noise Barrier Wall Access Door Type 1 (Cast-In-Place)</td>
<td>11/10/05</td>
<td></td>
</tr>
<tr>
<td>D-2.82-00</td>
<td>Noise Barrier Wall Access Door Type 2 (Cast-In-Place)</td>
<td>11/10/05</td>
<td>2</td>
</tr>
<tr>
<td>D-2.84-00</td>
<td>Noise Barrier Wall Access Door Type 3 (Precast)</td>
<td>11/10/05</td>
<td></td>
</tr>
<tr>
<td>D-2.86-00</td>
<td>Noise Barrier Wall Access Door Type 4 (Precast)</td>
<td>11/10/05</td>
<td>2</td>
</tr>
<tr>
<td>D-2.88-00</td>
<td>Noise Barrier Wall Access Door Type 5 (Masonry)</td>
<td>11/10/05</td>
<td></td>
</tr>
<tr>
<td>D-2.92-00</td>
<td>Noise Barrier Wall Access Door &amp; Frame</td>
<td>11/10/05</td>
<td>2</td>
</tr>
<tr>
<td>D-3</td>
<td>Permanent Geosynthetic Wall: Types 1 ~ 6</td>
<td>7/13/05</td>
<td>3</td>
</tr>
<tr>
<td>D-3a</td>
<td>Permanent Geosynthetic Wall: Fascia and Facing</td>
<td>6/30/04</td>
<td></td>
</tr>
<tr>
<td>D-3b</td>
<td>Permanent Geosynthetic Wall: Single Slope Barrier</td>
<td>6/30/04</td>
<td></td>
</tr>
<tr>
<td>D-3c</td>
<td>Permanent Geosynthetic Wall: F-Shape Barrier</td>
<td>6/30/04</td>
<td></td>
</tr>
<tr>
<td>D-4</td>
<td>Backfill and Drainage for Retaining Walls</td>
<td>12/11/98</td>
<td></td>
</tr>
<tr>
<td>D-6</td>
<td>Gabions</td>
<td>6/19/98</td>
<td></td>
</tr>
<tr>
<td>D-10.10-00</td>
<td>Reinforced Concrete Retaining Wall Type 1 and 1 SW</td>
<td>7/8/08</td>
<td>2</td>
</tr>
<tr>
<td>D-10.15-00</td>
<td>Reinforced Concrete Retaining Wall Type 2 and 2 SW</td>
<td>7/8/08</td>
<td>2</td>
</tr>
<tr>
<td>D-10.20-00</td>
<td>Reinforced Concrete Retaining Wall Type 3 and 3 SW</td>
<td>7/8/08</td>
<td>2</td>
</tr>
<tr>
<td>D-10.25-00</td>
<td>Reinforced Concrete Retaining Wall Type 4 and 4 SW</td>
<td>7/8/08</td>
<td>2</td>
</tr>
<tr>
<td>D-10.30-00</td>
<td>Reinforced Concrete Retaining Wall Type 5</td>
<td>7/8/08</td>
<td>2</td>
</tr>
<tr>
<td>D-10.35-00</td>
<td>Reinforced Concrete Retaining Wall Type 6</td>
<td>7/8/08</td>
<td>2</td>
</tr>
<tr>
<td>D-10.40-00</td>
<td>Reinforced Concrete Retaining Wall Type 7</td>
<td>7/8/08</td>
<td>2</td>
</tr>
<tr>
<td>D-10.45-00</td>
<td>Reinforced Concrete Retaining Wall Type 8</td>
<td>7/8/08</td>
<td>2</td>
</tr>
<tr>
<td>D-15.10-00</td>
<td>Traffic Barrier Details for Reinforced Concrete Retaining Walls</td>
<td>7/8/08</td>
<td>2</td>
</tr>
<tr>
<td>D-15.20-00</td>
<td>Traffic Barrier Details for Reinforced Concrete Retaining Walls</td>
<td>7/8/08</td>
<td>2</td>
</tr>
<tr>
<td>D-15.30-00</td>
<td>Traffic Barrier Details for Reinforced Concrete Retaining Walls</td>
<td>7/8/08</td>
<td>2</td>
</tr>
<tr>
<td>D-30.10-00</td>
<td>Cement Concrete Sidewalk</td>
<td>1/23/07</td>
<td></td>
</tr>
<tr>
<td>F-10.12-00</td>
<td>Cement Concrete Curbs</td>
<td>12/20/06</td>
<td></td>
</tr>
<tr>
<td>F-10.16-00</td>
<td>Cement Concrete Curb and Gutter Pan</td>
<td>12/20/06</td>
<td></td>
</tr>
<tr>
<td>F-10.40-01</td>
<td>Extruded Curb Placement</td>
<td>7/3/08</td>
<td></td>
</tr>
<tr>
<td>F-10.42-00</td>
<td>Extruded Curb</td>
<td>1/23/07</td>
<td></td>
</tr>
<tr>
<td>F-10.62-01</td>
<td>Precast Concrete Sloped Mountable Curb</td>
<td>9/5/07</td>
<td>2</td>
</tr>
<tr>
<td>F-10.64-02</td>
<td>Precast Concrete Dual Faced Sloped Mountable Curb</td>
<td>7/3/08</td>
<td></td>
</tr>
<tr>
<td>F-30.10-00</td>
<td>Cement Concrete Sidewalk</td>
<td>1/23/07</td>
<td></td>
</tr>
<tr>
<td>F-40.10-01</td>
<td>Sidewalk Ramp Type 1, with Layout</td>
<td>10/5/07</td>
<td></td>
</tr>
<tr>
<td>F-40.12-00</td>
<td>Sidewalk Ramp Type 2, with Layout</td>
<td>2/7/07</td>
<td></td>
</tr>
</tbody>
</table>

### Section E  Bridges and Trestles

- **E-1** Date Numeral Placement on Bridge Traffic Barrier 2/21/07
- **E-2** Pile or Frame Detour Bridge with Asphalt Overlay 5/29/98 2 Sheets
- **E-4** Precast Prestressed Concrete Piles 8/27/03
- **E-4a** Precast Prestressed Concrete Piles: Handling & Capping 8/27/03

### Section F  Curbs, Sidewalks, and Driveways

- **F-10.12-00** Cement Concrete Curbs 12/20/06
- **F-10.16-00** Cement Concrete Curb and Gutter Pan 12/20/06
- **F-10.40-01** Extruded Curb Placement 7/3/08
- **F-10.42-00** Extruded Curb 1/23/07
- **F-10.62-01** Precast Concrete Sloped Mountable Curb 9/5/07 2 Sheets
- **F-10.64-02** Precast Concrete Dual Faced Sloped Mountable Curb 7/3/08
- **F-30.10-00** Cement Concrete Sidewalk 1/23/07
- **F-40.10-01** Sidewalk Ramp Type 1, with Layout 10/5/07
- **F-40.12-00** Sidewalk Ramp Type 2, with Layout 2/7/07

---

*Standard Plans for Road, Bridge, and Municipal Construction*
*Effective August 4, 2008*
Contents

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-40.14-00</td>
<td>Sidewalk Ramp Type 3A, with Layout</td>
<td>2/7/07</td>
</tr>
<tr>
<td>F-40.15-00</td>
<td>Sidewalk Ramp Type 3B, with Layout</td>
<td>2/7/07</td>
</tr>
<tr>
<td>F-40.16-00</td>
<td>Sidewalk Ramp Type 4A, with Layout</td>
<td>2/7/07</td>
</tr>
<tr>
<td>F-40.18-00</td>
<td>Sidewalk Ramp Type 4B, with Layout</td>
<td>2/7/07</td>
</tr>
<tr>
<td>F-40.20-00</td>
<td>Sidewalk Ramp Type 4C, with Layouts</td>
<td>10/5/07</td>
</tr>
<tr>
<td>F-42.10-00</td>
<td>Sidewalk Ramp Type 5, with Layouts</td>
<td>10/5/07</td>
</tr>
<tr>
<td>F-80.10-00</td>
<td>Cement Concrete Driveway Entrance: Types 1, 2, 3, &amp; 4</td>
<td>1/23/07, 2 Sheets</td>
</tr>
</tbody>
</table>

Section G  Signs and Sign Supports

- **G-9a**  Overhead Sign Mounting Details 6/25/02, 4 Sheets
- **G-10.10-00**  Milepost 9/20/07
- **G-20.10-00**  Ground Mounted Sign Placement 9/20/07
- **G-22.10-01**  Timber Sign Support 7/3/08, 3 Sheets
- **G-24.10-00**  Steel Sign Support Type AP, Installation Details 11/8/07
- **G-24.20-00**  Steel Sign Support Type AS, Installation Details 11/8/07
- **G-24.30-00**  Steel Sign Support, Types PL, PL-T, & PL-U, Inst. Det. 11/8/07, 2 Sheets
- **G-24.40-00**  Steel Sign Support, Types SB-1 & SB-2, Installation Details 11/8/07, 2 Sheets
- **G-24.50-00**  Steel Sign Support, Types ST-1 ~ ST-4, Installation Details 11/8/07
- **G-24.60-00**  Steel Sign Support, Types TP-A & TP-B, Installation Details 11/8/07, 2 Sheets
- **G-24.70-00**  Steel Sign Support Foundation Details 11/8/07
- **G-30.10-00**  Sign Installation on Signal and Light Standards 11/8/07, 2 Sheets
- **G-50.10-00**  Sign Bracing 11/8/07, 2 Sheets
- **G-60.10-00**  Cantilever Sign Structure (Truss-Type) 8/31/07, 4 Sheets
- **G-60.20-00**  Cantilever Sign Structure (Truss-Type) Foundation Type 1 8/31/07, 2 Sheets
- **G-60.30-00**  Cantilever Sign Structure (Truss-Type) Fdn., Types 2 & 3 8/31/07, 2 Sheets
- **G-70.10-00**  Sign Bridge (Truss-Type) 10/5/07, 4 Sheets
- **G-70.20-00**  Sign Bridge (Truss-Type) Foundation Type 1 10/5/07
- **G-70.30-00**  Sign Bridge (Truss-Type) Foundation Types 2 & 3 10/5/07
- **G-95.10-00**  Maintenance Walkway for Sign Bridges 11/8/07, 3 Sheets
- **G-95.20-01**  Maintenance Walkway Mounting for Monotube Sign Bridge 7/10/08, 3 Sheets
- **G-95.30-01**  Maintenance Walkway Mounting for Truss-Type Sign Bridge 7/10/08, 2 Sheets

Section H  Roadside and Site Development

- **H-10.10-00**  Tree and Shrub Planting Details 7/3/08
- **H-10.15-00**  Live Stake Installations 7/3/08
- **H-30.10-00**  Crest Gage 10/12/07
- **H-32.10-00**  Automated Ground Water Monitoring Well 9/20/07
- **H-60.10-01**  Bollard Type 1 7/3/08

*Standard Plans for Road, Bridge, and Municipal Construction*

*Effective August 4, 2008*
## Contents

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-60.20-01</td>
<td>Bollard Type 2</td>
<td>7/3/08</td>
</tr>
<tr>
<td>H-70.10-00</td>
<td>Mailbox Support Type 1</td>
<td>9/5/07</td>
</tr>
<tr>
<td>H-70.20-00</td>
<td>Mailbox Support Type 2</td>
<td>9/5/07</td>
</tr>
<tr>
<td>H-70.30-00</td>
<td>Mailbox Support Type 3</td>
<td>9/5/07</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Sheets</td>
</tr>
</tbody>
</table>

### Section I  Site Preservation and Erosion Control

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Description</th>
<th>Publication Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-10.10-00</td>
<td>High Visibility Fence</td>
<td>8/31/07</td>
</tr>
<tr>
<td>I-30.10-00</td>
<td>Silt Fence</td>
<td>9/20/07</td>
</tr>
<tr>
<td>I-30.20-00</td>
<td>Erosion Control At Culvert Ends</td>
<td>9/20/07</td>
</tr>
<tr>
<td>I-30.30-00</td>
<td>Wattle Installation On Slope</td>
<td>9/20/07</td>
</tr>
<tr>
<td>I-30.40-00</td>
<td>Compost Sock</td>
<td>10/12/07</td>
</tr>
<tr>
<td>I-30.50-00</td>
<td>Straw Bale Barrier</td>
<td>11/14/07</td>
</tr>
<tr>
<td>I-40.10-00</td>
<td>Temporary Silt Fence for Inlet Protection In Unpaved Areas</td>
<td>9/20/07</td>
</tr>
<tr>
<td>I-40.20-00</td>
<td>Storm Drain Inlet Protection</td>
<td>9/20/07</td>
</tr>
<tr>
<td>I-50.10-00</td>
<td>Geotextile Encased Check Dam Installation</td>
<td>9/20/07</td>
</tr>
<tr>
<td>I-50.20-00</td>
<td>Check Dams</td>
<td>8/31/07</td>
</tr>
<tr>
<td>I-60.10-00</td>
<td>Erosion Control Blanket Placement On Slope</td>
<td>8/31/07</td>
</tr>
<tr>
<td>I-60.20-00</td>
<td>Erosion Control Blanket Placement In Channel</td>
<td>8/31/07</td>
</tr>
<tr>
<td>I-80.10-00</td>
<td>Miscellaneous Erosion Control Details</td>
<td>8/31/07</td>
</tr>
</tbody>
</table>

### Section J  Illumination, Signals, and ITS

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Description</th>
<th>Publication Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>J-1f</td>
<td>Timber Light Standards</td>
<td>6/23/00</td>
</tr>
<tr>
<td>J-3</td>
<td>Type A, B, and C Service Lighting Details</td>
<td>8/1/97</td>
</tr>
<tr>
<td>J-3b</td>
<td>Service Cabinet Type B Modified (0 - 200 Amp Type, 120/240 Single Phase)</td>
<td>3/4/05</td>
</tr>
<tr>
<td>J-3c</td>
<td>Service Cabinet Type D (0 - 200 Amp Type, 120/240 Single Phase)</td>
<td>6/24/02</td>
</tr>
<tr>
<td>J-3d</td>
<td>Service Cabinet Type E (0 - 200 Amp Type, 240/480 Single Phase)</td>
<td>11/5/03</td>
</tr>
<tr>
<td>J-5</td>
<td>Pedestrian Pushbutton Details</td>
<td>8/1/97</td>
</tr>
<tr>
<td>J-6c</td>
<td>Cabinet Foundation Details</td>
<td>4/24/98</td>
</tr>
<tr>
<td>J-6f</td>
<td>Signal Head Mounting Details, Pole &amp; Post Top Mountings</td>
<td>4/24/98</td>
</tr>
<tr>
<td>J-6g</td>
<td>Signal Head Mounting Details, Mast Arm and Span Wire Mountings</td>
<td>12/12/02</td>
</tr>
<tr>
<td>J-6h</td>
<td>Miscellaneous Signal Details</td>
<td>4/24/98</td>
</tr>
<tr>
<td>J-7a</td>
<td>Signal Standard Type Designations and Types PPB, PS, I, RM, and FB Details</td>
<td>9/12/01</td>
</tr>
<tr>
<td>J-7c</td>
<td>Strain Pole Standards Type IV and V</td>
<td>6/19/98</td>
</tr>
<tr>
<td>J-7d</td>
<td>Span Wire Installation</td>
<td>4/24/98</td>
</tr>
</tbody>
</table>
**Contents**

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>J-8a</td>
<td>Type 1 Induction Loop</td>
<td>5/20/04</td>
<td></td>
</tr>
<tr>
<td>J-8b</td>
<td>Type 2 Induction Loop</td>
<td>5/20/04</td>
<td></td>
</tr>
<tr>
<td>J-8c</td>
<td>Type 3 Induction Loop</td>
<td>5/20/04</td>
<td></td>
</tr>
<tr>
<td>J-8d</td>
<td>Induction Loop Details</td>
<td>5/20/04</td>
<td></td>
</tr>
<tr>
<td>J-9a</td>
<td>Typical Grounding Details</td>
<td>4/24/98</td>
<td></td>
</tr>
<tr>
<td>J-10</td>
<td>Electrical Conduit Placement</td>
<td>7/18/97</td>
<td></td>
</tr>
<tr>
<td>J-11a</td>
<td>Standard Junction Box, Types 1 &amp; 2</td>
<td>10/12/07</td>
<td></td>
</tr>
<tr>
<td>J-11b</td>
<td>Heavy Duty Junction Box, Types 4, 5, &amp; 6</td>
<td>9/2/05</td>
<td>2</td>
</tr>
<tr>
<td>J-11c</td>
<td>Standard Duty Junction Box, Types 7 &amp; 8</td>
<td>6/21/06</td>
<td>2</td>
</tr>
<tr>
<td>J-12</td>
<td>Sign Post-Mounted Junction Box</td>
<td>11/8/05</td>
<td>2</td>
</tr>
<tr>
<td>J-15a</td>
<td>Pull Box</td>
<td>10/4/05</td>
<td>2</td>
</tr>
<tr>
<td>J-15b</td>
<td>Cable Vault</td>
<td>10/4/05</td>
<td>2</td>
</tr>
<tr>
<td>J-16a</td>
<td>Junction Box, Traffic Barrier Mounted</td>
<td>3/4/05</td>
<td></td>
</tr>
<tr>
<td>J-16b</td>
<td>Conduit Installation in Traffic Barrier on Retaining Wall</td>
<td>9/20/07</td>
<td></td>
</tr>
<tr>
<td>J-16c</td>
<td>Conduit Installation in Single Slope Conc. Barrier (Dual Face)</td>
<td>9/20/07</td>
<td></td>
</tr>
<tr>
<td>J-18</td>
<td>Permanent Traffic Recorder Site Installations</td>
<td>9/2/05</td>
<td>2</td>
</tr>
<tr>
<td>J-19</td>
<td>Weigh-In-Motion Site Installation</td>
<td>9/2/05</td>
<td></td>
</tr>
<tr>
<td>J-20</td>
<td>Permanent Traffic Recorder and Weigh-In-Motion Details</td>
<td>9/2/05</td>
<td>3</td>
</tr>
<tr>
<td>J-28.10-00</td>
<td>Steel Light Standard</td>
<td>8/7/07</td>
<td>2</td>
</tr>
<tr>
<td>J-28.22-00</td>
<td>Steel Light Standard: Placement (Slip Base)</td>
<td>8/7/07</td>
<td>2</td>
</tr>
<tr>
<td>J-28.24-00</td>
<td>Steel Light Standard: Placement (Fixed Base)</td>
<td>8/7/07</td>
<td></td>
</tr>
<tr>
<td>J-28.26-00</td>
<td>Steel Light Standard: Placement ~ Miscellaneous</td>
<td>8/7/07</td>
<td></td>
</tr>
<tr>
<td>J-28.30-00</td>
<td>Steel Light Standard: Foundation Types A &amp; B</td>
<td>8/7/07</td>
<td>2</td>
</tr>
<tr>
<td>J-28.40-00</td>
<td>Steel Light Standard: Base Mounting</td>
<td>8/7/07</td>
<td></td>
</tr>
<tr>
<td>J-28.42-00</td>
<td>Steel Light Standard: Anchor/Slip Plate for Slip Base</td>
<td>8/7/07</td>
<td></td>
</tr>
<tr>
<td>J-28.45-00</td>
<td>Steel Light Std.: Elbow Mounting on Bridge &amp; Retaining Wall</td>
<td>8/7/07</td>
<td></td>
</tr>
<tr>
<td>J-28.50-00</td>
<td>Steel Light Standard: Pole Base and Hand Hole Details</td>
<td>8/7/07</td>
<td></td>
</tr>
<tr>
<td>J-28.60-00</td>
<td>Steel Light Standard: Barrier Mounted Base</td>
<td>8/7/07</td>
<td></td>
</tr>
<tr>
<td>J-28.70-00</td>
<td>Steel Light Standard: Wiring Details</td>
<td>11/8/07</td>
<td></td>
</tr>
</tbody>
</table>

**Section K Work Zone Traffic Control**

- **K-10.20-01** Road Closure, with Diversion 10/12/07
- **K-10.40-00** Road Closure, with Off-Site Detour 2/15/07
- **K-20.20-01** Lane Closure, without Flaggers ~ Low Volume Road 10/12/07
- **K-20.40-00** Lane Closure, with Flagger Control 2/15/07
- **K-20.60-00** Lane Closure, with Pilot Car 2/15/07
- **K-22.20-01** Lane Shift, onto Passing Lane 10/12/07
- **K-24.20-00** Single Lane Closure, with Encroachment 2/15/07
- **K-24.40-01** Double Lane Closure, on Multilane Roadway 10/12/07
- **K-24.60-00** Single Lane Closure, on Multilane Roadway 2/15/07
- **K-24.80-01** Single Lane Closure, with Temporary Concrete Barrier 10/12/07

*Standard Plans for Road, Bridge, and Municipal Construction*

*Effective August 4, 2008*
### Contents

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-26.20-00</td>
<td>Lane Shift, onto Two-way Left Turn Lane</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-26.40-01</td>
<td>Left and Center Lane Closure ~ Two-Way Left Turn Lane</td>
<td>10/12/07</td>
</tr>
<tr>
<td>K-30.20-00</td>
<td>Intersection ~ Lane Shift on 3 Lane Two-Way Left Turn Lane</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-30.40-01</td>
<td>Intersection ~ Lane Shift on 5 Lane Two-Way Left Turn Lane</td>
<td>10/12/07</td>
</tr>
<tr>
<td>K-32.20-00</td>
<td>Intersection ~ Right Lane Closure, Far Side</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-32.40-00</td>
<td>Intersection ~ Left Lane Closure, Far Side</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-32.60-00</td>
<td>Intersection ~ Multiple Lane Closure</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-32.80-00</td>
<td>Intersection ~ Half Road Closure with Lane Shift</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-34.20-00</td>
<td>Intersection ~ Pedestrian Detour</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-36.20-00</td>
<td>Intersection ~ Shoulder Work</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-40.20-00</td>
<td>Shoulder Closure ~ High Speed Roadway (45 MPH or Higher)</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-40.40-00</td>
<td>Shoulder Closure ~ Low Speed Roadway (40 MPH or Lower)</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-40.60-00</td>
<td>Shoulder Closure ~ Short Duration</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-40.80-00</td>
<td>Work Beyond the Shoulder</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-40.80-00</td>
<td>Emergency ~ Passable Hazard</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-50.20-00</td>
<td>Speed Zone, Supplemental Signing ~ Chip Seal Project</td>
<td>7/3/08</td>
</tr>
<tr>
<td>K-60.20-00</td>
<td>Motorcycle, Supplemental Signing</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-70.20-00</td>
<td>Temporary Channelization</td>
<td>2/15/07</td>
</tr>
<tr>
<td>K-80.10-00</td>
<td>Class A Construction Signing Installation</td>
<td>2/21/07</td>
</tr>
<tr>
<td>K-80.20-00</td>
<td>Type 3 Barricade</td>
<td>12/20/06</td>
</tr>
<tr>
<td>K-80.30-00</td>
<td>Alternative Temporary Conc. Barrier (F-Shape)</td>
<td>2/21/07</td>
</tr>
<tr>
<td>K-80.35-00</td>
<td>Temporary Conc. Barrier Anchoring</td>
<td>2/21/07</td>
</tr>
<tr>
<td>K-80.37-00</td>
<td>Temporary Conc. Barrier Anchoring ~ Narrow</td>
<td>2/21/07</td>
</tr>
</tbody>
</table>

### Section L  Fence and Glare Screen

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Description</th>
<th>Publication Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-10.10-00</td>
<td>Wire Fence Types 1 &amp; 2, and Wire Gates</td>
<td>2/21/07</td>
</tr>
<tr>
<td>L-20.10-00</td>
<td>Chain Link Fence, Types 3 and 4</td>
<td>2/7/07</td>
</tr>
<tr>
<td>L-30.10-00</td>
<td>Chain Link Gate</td>
<td>2/7/07</td>
</tr>
<tr>
<td>L-40.10-00</td>
<td>Glare Screen Type 1, Design A</td>
<td>2/21/07</td>
</tr>
<tr>
<td>L-40.15-00</td>
<td>Glare Screen Type 1, Design B</td>
<td>2/21/07</td>
</tr>
<tr>
<td>L-40.20-00</td>
<td>Glare Screen Type 2 (Chain Link with Slats)</td>
<td>2/21/07</td>
</tr>
<tr>
<td>L-70.10-01</td>
<td>Access Control Gate</td>
<td>5/21/08</td>
</tr>
<tr>
<td>L-70.20-01</td>
<td>Access Control Double Gate</td>
<td>5/21/08</td>
</tr>
</tbody>
</table>
## Contents

<table>
<thead>
<tr>
<th>Plan No.</th>
<th>Plan Title</th>
<th>Publication Approval Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section M</td>
<td>Roadway Delineation</td>
<td></td>
</tr>
<tr>
<td>M-1.20-01</td>
<td>Ramp Channelization: Single Lane</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-1.40-01</td>
<td>Ramp Channelization: Two Lane</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-1.60-01</td>
<td>Ramp Channelization: Collector Distributor Road</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-1.80-02</td>
<td>Ramp Channelization: Parallel On &amp; Weaving Section</td>
<td>8/31/07</td>
</tr>
<tr>
<td>M-2.20-01</td>
<td>Gore Area Marking Layouts</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-2.40-01</td>
<td>Gore Area Supplement w/ Type 2 Raised Pavement Markers</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-2.60-01</td>
<td>Gore Area Substitution with Types 1 &amp; 2 RPM's</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-3.10-01</td>
<td>Left Turn Channelization</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-3.20-01</td>
<td>Left Turn Channelization: Reduced Tapers</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-3.30-01</td>
<td>Left Turn Channelization: Tee Intersection and Back-to-back Turn Lanes</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-3.40-01</td>
<td>Two-way Left-Turn and Median Channelization</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-3.50-01</td>
<td>Double Left Turn Channelization</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-5.10-01</td>
<td>Right Turn Channelization</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-7.50-01</td>
<td>High Occupancy Vehicle (HOV) Lane Symbol Layout</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-9.50-01</td>
<td>Bicycle Lane Symbol Layout</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-11.10-01</td>
<td>Railroad Crossing Layout</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-15.10-01</td>
<td>Crosswalk Layout</td>
<td>2/6/07</td>
</tr>
<tr>
<td>M-17.10-02</td>
<td>Parking Space Layouts</td>
<td>7/3/08</td>
</tr>
<tr>
<td>M-20.10-01</td>
<td>Longitudinal Marking Patterns</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-20.20-01</td>
<td>Profiled and Embossed Plastic Lines</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-20.30-01</td>
<td>Longitudinal Marking Supplement with Raised Pavement Markers (RPM's)</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-20.40-01</td>
<td>Longitudinal Marking Supplement with RPM's ~ Turn Lanes</td>
<td>1/30/07, 2 Sheets</td>
</tr>
<tr>
<td>M-20.50-01</td>
<td>Longitudinal Marking Substitution with RPM's</td>
<td>1/30/07</td>
</tr>
<tr>
<td>M-24.20-01</td>
<td>Symbol Markings: Traffic Arrows for High Speed Roadways</td>
<td>5/31/06, 3 Sheets</td>
</tr>
<tr>
<td>M-24.40-01</td>
<td>Symbol Markings: Traffic Arrows for Low Speed Roadways</td>
<td>5/31/06, 2 Sheets</td>
</tr>
<tr>
<td>M-24.60-02</td>
<td>Symbol Markings: Miscellaneous</td>
<td>2/6/07, 2 Sheets</td>
</tr>
<tr>
<td>M-40.10-00</td>
<td>Guide Posts and Barrier Delineators</td>
<td>9/20/07</td>
</tr>
<tr>
<td>M-40.20-00</td>
<td>Guide Post Placement: Interchanges</td>
<td>10/12/07</td>
</tr>
<tr>
<td>M-40.30-00</td>
<td>Guide Post Placement: Grade Intersections</td>
<td>9/20/07</td>
</tr>
<tr>
<td>M-40.40-00</td>
<td>Guide Post Placement: Horizontal Curves</td>
<td>9/20/07</td>
</tr>
<tr>
<td>M-40.50-00</td>
<td>Guide Post Placement: Bridges</td>
<td>9/20/07</td>
</tr>
<tr>
<td>M-40.60-00</td>
<td>Guide Post Placement: Miscellaneous</td>
<td>9/20/07</td>
</tr>
<tr>
<td>M-60.10-00</td>
<td>Shoulder Rumble Strip Type 1, for Divided Highways</td>
<td>9/5/07, 4 Sheets</td>
</tr>
<tr>
<td>M-60.20-00</td>
<td>Shoulder Rumble Strip, Types 2, 3, and 4, for Undivided Highways</td>
<td>9/5/07, 2 Sheets</td>
</tr>
<tr>
<td>M-65.10-01</td>
<td>Center Line Rumble Strip</td>
<td>5/21/08, 2 Sheets</td>
</tr>
<tr>
<td>M-80.10-00</td>
<td>Traffic Letter and Numeral Applications</td>
<td>6/10/08, 2 Sheets</td>
</tr>
<tr>
<td>M-80.20-00</td>
<td>Traffic Letters and Numerals (High Speed Roadways)</td>
<td>6/10/08</td>
</tr>
<tr>
<td>M-80.30-00</td>
<td>Traffic Letters and Numerals (Low Speed Roadways)</td>
<td>6/10/08</td>
</tr>
</tbody>
</table>
The Brass Disc will be furnished by the State.

The text in the shaded area (see TOP VIEW) shall be 3/16" high and will be stamped by WSDOT personnel prior to setting the cap. Only the assigned identification letters and numbers are to be placed on the Brass Disc.

The hole shall be 32" minimum in depth or 6" below the deepest recorded frost line. All loose material shall be removed from the bottom of the hole so that the concrete is placed on firm undisturbed earth.

The top of the concrete shall be troweled smooth and the Brass Disc set in the center with top flush and level. The top of the monument may be recessed or protruding, depending on conditions.

The Brass Disc shall be rotated so it can be read while the observer is facing north.

When the concrete is set, cover the entire monument with moist earth and leave for three days.

To replace a Public Land Survey System (PLSS) corner, consult a licensed Professional Land Surveyor (PLS).
**NOTES**

1. Dimensions may vary according to manufacturer.
2. Base to be placed on a well compacted foundation.
3. Monument case to be installed by contractor.
4. See Standard Plan A-10.20 for Monument (brass disc) type to place in 2” O.D. galvanized pipe.

**APPROXIMATE WEIGHTS**

<table>
<thead>
<tr>
<th>CASE</th>
<th>60 LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>COVER</td>
<td>19 LBS</td>
</tr>
<tr>
<td>TOTAL</td>
<td>79 LBS</td>
</tr>
</tbody>
</table>

**MONUMENT CASE AND COVER**

**STANDARD PLAN A-10.30-00**

**SECTION A**

**PLAN VIEW**

**SECTION A**

**SECTION CASE**

**SECTION RISER RING**

**SECTION COVER**

**CASE**

**CONCRETE BASE**

**SECTION OF LETTER**

**ISOMETRIC**

**CASE**

**SECTION COVER**

**SECTION INSTALLATION**

- **CONCRETE BASE**
- **SOIL**
- **GROUT**
- **2” O.D. GALVANIZED STEEL PIPE - NOTE 4**
- **ISOMETRIC**

**APPROVED FOR PUBLICATION**

**DATE**

**Washington State Department of Transportation**

**STATE DESIGN ENGINEER**

**Pasco Bakotich III 10-05-07**

**NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.**
1. Slope treatment shall be constructed simultaneously with the roadway excavation. Hand trimming will not be required if satisfactory results are obtained with mechanical equipment.

2. Slope treatment is used to provide a transition between the existing ground and the cut slope. The intended purpose is to eliminate the abrupt edge and give the area a more natural appearance. The dimensions shown are approximate and can vary to achieve this purpose.

### Table: Slope Treatment

<table>
<thead>
<tr>
<th>Cut Slope (H:V)</th>
<th>Ground Line (H:V)</th>
<th>Class A</th>
<th>Class B</th>
</tr>
</thead>
<tbody>
<tr>
<td>L = 10.0'</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>L = 6.0'</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 1:1
- 2:1
- 3:1
- 4:1
- 5:1
- 6:1

Slope treatment shall be constructed simultaneously with the roadway excavation. Hand trimming will not be required if satisfactory results are obtained with mechanical equipment.
EMBANKMENT SLOPE

PNEUMATICALLY PLACED OR CAST-IN-PLACE CEMENT CONCRETE.

FOOTING

EQUAL SPACING 6' CENTERS MIN., 8' CENTERS MAX.

OUTER EXTREMITY OF BRIDGE

EXTEND SLOPE PROTECTION 6" BEYOND OUTER EXTREMITY OF BRIDGE

PNEUMATICALLY PLACED OR CAST-IN-PLACE CEMENT CONCRETE

10 GAUGE 6" × 6" WIRE MESH REINFORCEMENT CENTERED IN CONCRETE.

SEE STD. SPEC. 9-07.7

A

FOOTING

DUMMY JOINT (TYP.)

B

TYPICAL SECTION

(BELOW ON LOWER ROADWAY)

SANDRA L. SALISBURY

CERTIFICATE NO. 000860

STATE OF WASHINGTON
REGISTERED LANDSCAPE ARCHITECT

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. The design and shape of the semi-open concrete masonry unit shown is only one example of the products that may be used.

2. The Curb Section shall be used only when the lower roadway cross section requires a curb.

The design and shape of the semi-open concrete masonry unit shown is only one example of the products that may be used. The Curb Section shall be used only when the lower roadway cross section requires a curb.
Maximum anchor spacing (A) for debris and impact loads required as per table for a minimum allowable anchor capacity of 20,000 lbs. Systems subjected to snow loads may require narrower maximum spacing.

Hexagonal mesh must meet minimum requirements of ASTM A 975 for gabions.

U-Section of wire rope clips must be applied to the dead end of the rope as shown.

Maximum length of top horizontal support rope = B

Maximum anchor spacing = A

9-gage (USA) galvanized lacing wire woven through each cell (2" spacing)

3" fabric overlap

Overlapped beam with fasteners

Overlapped beam with lacing

Beam alternatives

Seam alternatives

Notes:

1. Maximum anchor spacing (A) for debris and impact loads required as per table for a minimum allowable anchor capacity of 20,000 lbs. Systems subjected to snow loads may require narrower maximum spacing.

2. Hexagonal mesh must meet minimum requirements of ASTM A 975 for gabions.

3. U-Section of wire rope clips must be applied to the dead end of the rope as shown.

Maximum anchor spacing (A)

<table>
<thead>
<tr>
<th>H</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>52</td>
</tr>
<tr>
<td>80</td>
<td>52</td>
</tr>
<tr>
<td>100</td>
<td>52</td>
</tr>
<tr>
<td>120</td>
<td>52</td>
</tr>
<tr>
<td>140</td>
<td>52</td>
</tr>
</tbody>
</table>

Maximum length of top horizontal support rope (B)

<table>
<thead>
<tr>
<th>H</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>48</td>
</tr>
<tr>
<td>80</td>
<td>48</td>
</tr>
<tr>
<td>100</td>
<td>48</td>
</tr>
<tr>
<td>120</td>
<td>48</td>
</tr>
<tr>
<td>140</td>
<td>48</td>
</tr>
</tbody>
</table>
FINISH OUTER EDGE OF PCCP SHOULDER WITH 1/2" R. EDGER.

15" TYP.

FINISH OUTER EDGE OF PCCP SHOULDER WITH 1/2" R. EDGER.

LANE WIDTH

LANE WIDTH

PLAN VIEW

CEMENT CONCRETE PAVEMENT JOINTS

TRANSVERSE CONTRACTION OR CONSTRUCTION JOINT (TYP.) (SEE SECTION VIEWS)

POCC TO POCC

LONGITUDINAL CONSTRUCTION JOINT

POCC TO HMA

LONGITUDINAL JOINT

PCCP SHOULDER IF REQUIRED

LONGITUDINAL JOINT

SEE SECTION VIEW

POCC TO HMA

LONGITUDINAL JOINT

HMA SHOULDER IF REQUIRED

FINISH OUTER EDGE OF PCCP LANE WITH 1/2" R. EDGER.

IF SHOULDER SHALL BE UNPAVED

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. Use the 1/2" joint details for bridges with a length less than 100' and for bridges with L type abutments. Use the 1" joint details for other applications. Use DETAIL 8 on steel trusses and timber bridges with concrete deck panels.

2. Sawcut shall be filled with hot-poured compound in accordance with Standard Specification 9-04.2(1) and sealed in accordance with Standard Specification 5-05.3(8B).

3. The contractor shall avoid sawing existing concrete. The construction tolerance to locate the saw cut is 35/64" (0 min. to 1/2" max.) from the existing concrete (DETAILS 1 and 5).
1. All edges of the approach slab shall have 1/2" radii except the longitudinal edge of the proceeding pour of a LONSDAAL CONSTRUCTION JOINT.

2. Longitudinal joints shall be placed on lane lines and shall be constructed and sealed in accordance with Standard Specification Section 5-05.3(8). Joints may be either a sawcut crack control joint or a construction joint. Basalt joints shall terminate 1' - 0" before reaching edge of slab and must be saw cut as soon as possible after placement of concrete.

(A) Approach slabs less than 40' wide -- no joint is required.

(B) Approach slabs wider than 40' -- one or more joints are required to divide the slab into approximately 24' wide sections.

All edges of the approach slab shall have 1/2" radii except the longitudinal edge of the proceeding pour of a LONSDAAL CONSTRUCTION JOINT.

Longitudinal joints shall be placed on lane lines and shall be constructed and sealed in accordance with Standard Specification Section 5-05.3(8). Joints may be either a sawcut crack control joint or a construction joint. Basalt joints shall terminate 1' - 0" before reaching edge of slab and must be saw cut as soon as possible after placement of concrete.

(A) Approach slabs less than 40' wide -- no joint is required.

(B) Approach slabs wider than 40' -- one or more joints are required to divide the slab into approximately 24' wide sections.

All edges of the approach slab shall have 1/2" radii except the longitudinal edge of the proceeding pour of a LONSDAAL CONSTRUCTION JOINT.

Longitudinal joints shall be placed on lane lines and shall be constructed and sealed in accordance with Standard Specification Section 5-05.3(8). Joints may be either a sawcut crack control joint or a construction joint. Basalt joints shall terminate 1' - 0" before reaching edge of slab and must be saw cut as soon as possible after placement of concrete.

(A) Approach slabs less than 40' wide -- no joint is required.

(B) Approach slabs wider than 40' -- one or more joints are required to divide the slab into approximately 24' wide sections.

All edges of the approach slab shall have 1/2" radii except the longitudinal edge of the proceeding pour of a LONSDAAL CONSTRUCTION JOINT.

Longitudinal joints shall be placed on lane lines and shall be constructed and sealed in accordance with Standard Specification Section 5-05.3(8). Joints may be either a sawcut crack control joint or a construction joint. Basalt joints shall terminate 1' - 0" before reaching edge of slab and must be saw cut as soon as possible after placement of concrete.

(A) Approach slabs less than 40' wide -- no joint is required.

(B) Approach slabs wider than 40' -- one or more joints are required to divide the slab into approximately 24' wide sections.
NOTE: This plan is not a legal engineering document but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.
2. **Concrete Pavement Depth**

1/2" CONCRETE PAVEMENT DEPTH 9"

**NEW CEMENT CONCRETE PAVEMENT**

**EXISTING CONCRETE PAVEMENT**

**DRILL** 1 3/4" MIN. TO 2" MAX. DIAM. × 9" LONG HOLE IN EXISTING CEMENT CONCRETE FOR NEW DOWEL BAR (TYP.)

**SECTION A**

**NOTES**

1. Install tie bars along longitudinal joint between full panel replacement and existing cement concrete pavement. Tie bars are not installed between cement concrete pavement and hot mix asphalt shoulders.

2. Place polyethylene film (per AASHTO M 171) or building paper along the longitudinal joint between partial panel replacement and existing panel.

**EXISTING TRANSVERSE JOINT**

1.5'

**EXISTING LONGITUDINAL JOINT**

0.5'

**NEW CEMENT CONCRETE PAVEMENT**

**EXISTING CEMENT CONCRETE PAVEMENT**

**NEW DOWEL BAR**

1 1/2" DIAM. × 18"

**NEW TIE BAR**

3' MAX. ON CENTER

**SAWED GROOVE**

SEE STD. PLAN A-40.10 FOR TRANSVERSE JOINT DETAILS

SEE STD. PLAN A-40.10 FOR LONGITUDINAL JOINT DETAILS

**NOTES**

1. Install tie bars along longitudinal joint between full panel replacement and existing cement concrete pavement. Tie bars are not installed between cement concrete pavement and hot mix asphalt shoulders.

2. Place polyethylene film (per AASHTO M 171) or building paper along the longitudinal joint between partial panel replacement and existing panel.
Dowel Bar Retrofit for Each Lane
Undivided Highway (Two Way Traffic)

Plan View

Existing Cement Concrete Pavement

Roadway

Lane

Section D

Plan View

Skewed Joint Detail

Dowel Bar (Typ) - See Placement Detail, Sheet 3

Existing Cement Concrete Pavement

Skewed Transverse Contraction Joint (See Std. Plan A-40.10)

Section C

Dowel Bar Retrofit for Each Lane

Inside Lane

1.0' 1.0' 1.0'

Outside Lane

1.0' 1.0' 1.0'

2.0' 1.0' 1.0'

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
TOP OF PAVEMENT AFTER GRINDING (NOT INCLUDED IN BID ITEM)
CENTER OF SAW
TOP OF EXISTING CEMENT CONCRETE PAVEMENT
DOWEL BAR EXPANSION GAP ~ BOTH ENDS
LENGTH NEEDED FOR DOWEL BAR PLACEMENT

SECTION E

TOP OF PAVEMENT AFTER GRINDING (NOT INCLUDED IN BID ITEM)
CENTER OF SAW
TOP OF EXISTING CEMENT CONCRETE PAVEMENT
DOWEL BAR EXPANSION GAP ~ BOTH ENDS
LENGTH NEEDED FOR DOWEL BAR PLACEMENT

SECTION F

DOWEL BAR PLACEMENT DETAIL

TOP OF PAVEMENT AFTER GRINDING (NOT INCLUDED IN BID ITEM)
CENTER OF SAW
TOP OF EXISTING CEMENT CONCRETE PAVEMENT
DOWEL BAR EXPANSION GAP ~ BOTH ENDS
LENGTH NEEDED FOR DOWEL BAR PLACEMENT

Dowel Bar Retrofit for Cement Concrete Pavement
Standard Plan A-60.20-00
Sheet 3 of 3 Sheets

EXPIRES MAY 5, 2008

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
A typical bridge overlay will remove 0.07 feet of Asphaltic Concrete Pavement (ACP) and place 0.15 feet of new Hot Mixed Asphalt (HMA). Depth of removal and placement will vary for each bridge. Total depth of HMA on the bridge shall not exceed 0.25 feet, unless shown otherwise in the plans.

If the existing depth of asphalt on the bridge deck is 0.25 feet, then the overlay will remove 0.15 feet of ACP and place 0.15 feet of new HMA. The existing bridge grade will remain unchanged.

**FINAL GRADE TRANSITION:** The maximum longitudinal taper slope to transition an increase in roadway grade to the new or existing bridge grade will be at least 1 inch rise to 40 feet run (1V:480H or flatter) (0.2% maximum). If several overlays are present, accelerated taper lengths shall be required to maintain the transition slope (1V:480H or flatter) (0.2% maximum).

If the ACP and membrane is to be removed from the bridge deck, see GSP 023106 for deck preparation before placing new membrane.

In accordance with Standard Specification 5-05.3(12), when pavement abuts bridges, the finished pavement parallel to centerline shall be uniform to a degree that no variations greater than 1/8-inch are present when tested with a 10-foot straightedge.

---

**ELEVATION VIEW**

**HMA OVERLAY WITHOUT BRIDGE APPROACH SLAB**

---

**ELEVATION VIEW**

**HMA OVERLAY WITH BRIDGE APPROACH SLAB**
NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

1. If a zone has rebar section loss or full depth repairs, then the concrete deck repair in each zone shall achieve 3,000 PSI before progressing to the adjacent zone.

2. Remove all concrete 3/4" minimum clearance around all exposed reinforcement bars in accordance with Standard Specifications 6-09.3(6).

3. For tension zones of continuous structures, when a longitudinal reinforcement bar has greater than 20% section loss (or damage), remove concrete a minimum of 3' - 0" on each side of section loss and place 2 supplemental reinforcement bars, adjacent and parallel to the deficient bar, extending 2' - 0" beyond each side having 20% section loss. Mechanical splices may be used to facilitate placement of additional reinforcement bars.

4. For typical rebar repairs, when the reinforcement has greater than 20% section loss (or damage), remove concrete a minimum of 2' - 0" on each side of section loss, and replace with new supplemental reinforcement, same diameter as original, adjacent and parallel to the deficient bar, extending 2' - 0" beyond each end of section having 20% section loss.

LEGEND

- CONCRETE REMOVAL AREA

NOTE: Standard Plan A-60.40.00
**NOTES**

1. As acceptable alternatives to the rebar shown in the PRECAST BASE SECTION, fibers (placed according to the Standard Specifications), or wire mesh having a minimum area of 0.12 square inches per foot shall be used with the minimum required rebar shown in the ALTERNATIVE PRECAST BASE SECTION. Wire mesh shall not be placed in the knockouts.

2. The knockout diameter shall not be greater than 20". Knockouts shall have a wall thickness of 2" minimum to 2.5" maximum. Provide a 1.5" minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with Standard Specification 9-04.3.

3. The maximum depth from the finished grade to the lowest pipe invert shall be 5'.

4. The frame and grate may be installed with the flange up or down. The frame may be cast into the adjustment section.

5. The Precast Base Section may have a rounded floor, and the walls may be sloped at a rate of 1:24 or steeper.

6. The opening shall be measured at the top of the precast base section.

7. All pickup holes shall be grouted full after the basin has been placed.

---

**PIECE ALLOWANCES**

<table>
<thead>
<tr>
<th>PIPE MATERIAL</th>
<th>MAXIMUM INSIDE DIAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td>REINFORCED OR PLAIN CONCRETE</td>
<td>12&quot;</td>
</tr>
<tr>
<td>ALL METAL PIPE</td>
<td>10&quot;</td>
</tr>
<tr>
<td>CPSSP # (STD SPEC. 9-08.30)</td>
<td>12&quot;</td>
</tr>
<tr>
<td>SOLID WALL PVC (STD SPEC. 9-08.12(1)</td>
<td>10&quot;</td>
</tr>
<tr>
<td>PROFILE WALL PVC (STD SPEC. 9-08.12(2)</td>
<td>10&quot;</td>
</tr>
</tbody>
</table>

* CORRUGATED POLYETHYLENE STORM SEWER PIPE

---

**CATCH BASIN TYPE 1**

---

**STANDARD PLAN B-5.20-00**

---

**DRAWN BY:** MARK SUJKA
**NOTES**

1. As acceptable alternatives to the rebar shown in the PRECAST BASE SECTION, fibers (placed according to the Standard Specifications), or wire mesh having a minimum area of 0.12 square inches per foot shall be used with the minimum required rebar shown in the ALTERNATIVE PRECAST BASE SECTION. Wire mesh shall not be placed in the knockouts.

2. The knockout diameter shall not be greater than 26". Knockouts shall have a wall thickness of 2" minimum to 2.5" maximum. Provide a 1.5" minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with Standard Specification 9-04.3.

3. The maximum depth from the finished grade to the lowest pipe invert shall be 6'.

4. The frame and grate may be installed with the flange up or down. The frame may be cast into the adjustment section.

5. The Precast Base Section may have a rounded floor, and the walls may be sloped at a rate of 1:24 or steeper.

6. The opening shall be measured at the top of the precast base section.

7. All pickup holes shall be grouted full after the basin has been placed.

---

**FRAME AND VANED GRATE**

One #3 bar hoop for 6' height
Two #3 bar hoops for 12' height

**RECTANGULAR ADJUSTMENT SECTION**

Two #3 bar hoops

**PRECAST BASE SECTION**

See Note 1

**ALTERNATIVE PRECAST BASE SECTION**

See Note 1

**PIPE ALLOWANCES**

<table>
<thead>
<tr>
<th>Pipe Material</th>
<th>Maximum Inside Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reinforced or Plain Concrete</td>
<td>18&quot;</td>
</tr>
<tr>
<td>All Metal Pipe</td>
<td>21&quot;</td>
</tr>
<tr>
<td>CPSSP # (STD. 6/PCC. 9-08.30)</td>
<td>18&quot;</td>
</tr>
<tr>
<td>Solid Wall PVC (STD. 6/PCC. 9-08.12(2))</td>
<td>21&quot;</td>
</tr>
<tr>
<td>Profile Wall PVC (STD. 6/PCC. 9-08.12(1))</td>
<td>21&quot;</td>
</tr>
</tbody>
</table>

* Corrugated Polyethylene Storm Sewer Pipe

---

**FRAME AND GRATE**

FRAME AND VANED GRATE

6" OR 12"

**REINFORCED OR PLAIN CONCRETE**

**ALL METAL PIPE**

**CPSSP # (STD. 6/PCC. 9-08.30)**

**SOLID WALL PVC (STD. 6/PCC. 9-08.12(2))**

**PROFILE WALL PVC (STD. 6/PCC. 9-08.12(1))**

---

**PIPE MATERIAL**

- CORRUGATED POLYETHYLENE STORM SEWER PIPE

---

**RECTANGULAR ADJUSTMENT SECTION**

One #3 bar hoop for 6' height
Two #3 bar hoops for 12' height

---

**PICTURE OF PRECAST BASE SECTION**

---

**PICTURE OF ALTERNATIVE PRECAST BASE SECTION**

---

**FRAME AND VANED GRATE**

---

**FRAME AND GRATE**

---

**REINFORCED OR PLAIN CONCRETE**

---

**ALL METAL PIPE**

---

**CPSSP # (STD. 6/PCC. 9-08.30)**

---

**SOLID WALL PVC (STD. 6/PCC. 9-08.12(2))**

---

**PROFILE WALL PVC (STD. 6/PCC. 9-08.12(1))**

---

**NOTE:** THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

---

**STANDARD PLAN B-5.40-00**

---

**DESIGNED BY:** MARK SUJKA

---

**DRAWN BY:** MARK SUJKA

---

**STAY EXPERIOR JULY 1, 2007**

---

**STANDARD PLAN B-5.40-00**

---

**PRECAST BASE SECTION**

See Note 1

---

**ALTERNATIVE PRECAST BASE SECTION**

See Note 1

---

**FRAME AND GRATE**

---

**REINFORCED OR PLAIN CONCRETE**

---

**ALL METAL PIPE**

---

**CPSSP # (STD. 6/PCC. 9-08.30)**

---

**SOLID WALL PVC (STD. 6/PCC. 9-08.12(2))**

---

**PROFILE WALL PVC (STD. 6/PCC. 9-08.12(1))**

---

**NOTE:** THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

---

**STANDARD PLAN B-5.40-00**

---

**PRECAST BASE SECTION**

See Note 1

---

**ALTERNATIVE PRECAST BASE SECTION**

See Note 1

---

**FRAME AND GRATE**

---

**REINFORCED OR PLAIN CONCRETE**

---

**ALL METAL PIPE**

---

**CPSSP # (STD. 6/PCC. 9-08.30)**

---

**SOLID WALL PVC (STD. 6/PCC. 9-08.12(2))**

---

**PROFILE WALL PVC (STD. 6/PCC. 9-08.12(1))**

---

**NOTE:** THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES

1. As acceptable alternatives to the rebar shown in the PRECAST BASE SECTION, fibers (placed according to the Standard Specifications), or wire mesh having a minimum area of 0.12 square inches per foot shall be used with the minimum required rebar shown in the ALTERNATIVE PRECAST BASE SECTION. Wire mesh shall not be placed in the knockouts.

2. The knockout diameter shall not be greater than 18". Knockouts shall have a wall thickness of 2" minimum to 2.5" maximum. Provide a 1.5" minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with Standard Specification 9-04.3.

3. The maximum depth from the finished grade to the lowest pipe invert shall be 5'.

4. The frame and grate may be installed with the flange up or down. The frame may be cast into the adjustment section.

5. The Precast Base Section may have a rounded floor, and the walls may be sloped at a rate of 1:24 or steeper.

6. The opening shall be measured at the top of the precast base section.

7. All pickup holes shall be grouted full after the basin has been placed.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
CATCH BASIN DIMENSIONS

<table>
<thead>
<tr>
<th>CATCH BASIN DIAMETER</th>
<th>WALL THICKNESS</th>
<th>BASE THICKNESS</th>
<th>MAXIMUM KNOCKOUT SIZE</th>
<th>MINIMUM DISTANCE BETWEEN KNOCKOUTS</th>
<th>SEPARATE BASE</th>
<th>INTERNAL BASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>45&quot;</td>
<td>2&quot;</td>
<td>6&quot;</td>
<td>56&quot;</td>
<td>5&quot;</td>
<td>0.05</td>
<td>0.12</td>
</tr>
<tr>
<td>54&quot;</td>
<td>2.5&quot;</td>
<td>8&quot;</td>
<td>42&quot;</td>
<td>8&quot;</td>
<td>0.19</td>
<td>0.19</td>
</tr>
<tr>
<td>60&quot;</td>
<td>2.5&quot;</td>
<td>8&quot;</td>
<td>42&quot;</td>
<td>8&quot;</td>
<td>0.35</td>
<td>0.28</td>
</tr>
<tr>
<td>72&quot;</td>
<td>3&quot;</td>
<td>12&quot;</td>
<td>72&quot;</td>
<td>12&quot;</td>
<td>0.36</td>
<td>0.24</td>
</tr>
<tr>
<td>84&quot;</td>
<td>3.5&quot;</td>
<td>12&quot;</td>
<td>84&quot;</td>
<td>12&quot;</td>
<td>0.36</td>
<td>0.29</td>
</tr>
</tbody>
</table>

PIECE ALLOWANCES

<table>
<thead>
<tr>
<th>CATCH BASIN DIAMETER</th>
<th>PIPE MATERIAL WITH MAXIMUM INSIDE DIAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CONCRETE</td>
</tr>
<tr>
<td>45&quot;</td>
<td>24&quot;</td>
</tr>
<tr>
<td>54&quot;</td>
<td>30&quot;</td>
</tr>
<tr>
<td>60&quot;</td>
<td>36&quot;</td>
</tr>
<tr>
<td>72&quot;</td>
<td>42&quot;</td>
</tr>
<tr>
<td>84&quot;</td>
<td>48&quot;</td>
</tr>
<tr>
<td>96&quot;</td>
<td>54&quot;</td>
</tr>
</tbody>
</table>

NOTES
1. No steps are required when height is 4' or less.
2. The bottom of the present catch basin may be sloped to facilitate cleaning.
3. The rectangular frame and grate may be installed with the flange up or down. The frame may be cast into the adjustment section.
4. Knockouts shall have a wall thickness of 2" minimum to 2.5" maximum. Provide a 1.5" minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with Standard Specification 9-04.3.

Harold J. Peterfeso 06-01-06
NOTES

1. The pipe supports and the flow restrictor shall be constructed of the same material and be anchored at a minimum spacing of 36". Attach the pipe supports to the manhole with 5/8" stainless steel expansion bolts or embed the supports into the manhole wall 2".

2. The vertical rear stem of the flow restrictor shall be the same diameter as the horizontal outlet pipe with a minimum diameter of 8".

3. The flow restrictor shall be fabricated from one of the following materials:
   - 0.060" Corrugated Aluminum Alloy Drain Pipe
   - 0.064" Corrugated Galvanized Steel Drain Pipe with Treatment 1
   - 0.060" Aluminum alloy flange, in accordance with ASTM B 26, B862 H32 or EP5
   - High Density Polyethylene Storm Sewer Pipe

4. The frame and ladder or steps are to be offset so that: the sheer gate is visible from the top; the climb-down space is clear of the riser and gate; the frame is clear of the curb.

5. The multi-orifice elbows may be located as shown, or all placed on one side of the riser to assure ladder clearance. The size of the elbows and their placement shall be specified in the Contract.

6. Restrictor plate with orifice as specified in the Contract. The opening is to be cut round and smooth.

7. The sheer gate shall be made of material in accordance with ASTM B 26 and ASTM B 275, designation 2024A; or cast iron in accordance with ASTM A 48, Class 30B. The frame and ladder are to be offset as shown.

8. Restrictor plate with orifice as specified in the Contract. The opening is to be cut round and smooth.

9. Restrictor plate with orifice as specified in the Contract. The opening is to be cut round and smooth.

10. Alternative sheer gate designs are acceptable if material specifications are met and flange bolt pattern matches.
1. See Contract for size and location of all pipes and orifices.
2. Precast baffle wall shall be keyed and grouted in place.
3. Bottom orifice plate shall be galvanized steel with a minimum thickness of 1/4". Attach orifice with 1/2" stainless steel bolts.
4. Upper flow orifice plates and elbows shall be aluminum, aluminized steel or galvanized steel. Galvanized steel shall have Treatment 1.

NOTES:
- Bottom flow orifice plate with orifice removable, watertight coupling.
- ELBOW - SEE DETAIL (72" MIN.)
- CATCH BASIN TYPE 2 WITH BAFFLE TYPE FLOW RESTRICTOR
- GROUTED STEPS OR LADDER
- ISOMETRIC CUTAWAY
- MANHOLE RING ~ COVER REMOVED FOR CLARITY
- DRAWN BY: ADAM COCHRAN
- See Contract for size and location of all pipes and orifices.
- Precast baffle wall shall be keyed and grouted in place.
- Bottom orifice plate shall be galvanized steel with a minimum thickness of 1/4". Attach orifice with 1/2" stainless steel bolts.
- Upper flow orifice plates and elbows shall be aluminum, aluminized steel or galvanized steel. Galvanized steel shall have Treatment 1.
**MANHOLE DIMENSION TABLE**

<table>
<thead>
<tr>
<th>DIAM.</th>
<th>SMALL THICKNESS</th>
<th>BASE THICKNESS</th>
<th>MAXIMUM KNOCKOUT SIZE</th>
<th>MINIMUM DISTANCE BETWEEN KNOCKOUTS</th>
<th>BASE REINFORCING STEEL (in each direction)</th>
</tr>
</thead>
<tbody>
<tr>
<td>48&quot;</td>
<td>4&quot;</td>
<td>6&quot;</td>
<td>36&quot;</td>
<td>5&quot;</td>
<td>0.23</td>
</tr>
<tr>
<td>54&quot;</td>
<td>4.5&quot;</td>
<td>5&quot;</td>
<td>42&quot;</td>
<td>5&quot;</td>
<td>0.18</td>
</tr>
<tr>
<td>60&quot;</td>
<td>5&quot;</td>
<td>6&quot;</td>
<td>48&quot;</td>
<td>5&quot;</td>
<td>0.25</td>
</tr>
</tbody>
</table>

**NOTE**

Knockouts shall have a wall thickness of 3" minimum to 3.5" maximum.

**Harold J. Peterman** 06-01-06

---

**MANHOLE TYPE 1**

**STANDARD PLAN B-15.30-09**

**Sheet 1 of 1 sheet**

**APPROVED FOR PUBLICATION**

Washington State Department of Transportation

**EXPIRES JULY 1, 2007**

**NOTE**

Knockouts shall have a wall thickness of 3" minimum to 3.5" maximum.
### Manhole Ring and Cover
- **CIRCULAR ADJUSTMENT SECTION**
- **FLAT CASING TOP**
- **CHANNEL AND SHELF**

### Steps or Ladder
- **12" (TYP.)**
- **12" MAX.**

### Knockouts
- Knockouts shall have a wall thickness of 2" minimum to 2.5" maximum.

### Manhole Dimension Table

<table>
<thead>
<tr>
<th>DIAM</th>
<th>WALL THICKNESS</th>
<th>BASE THICKNESS</th>
<th>MAXIMUM KNOCKOUT SIZE</th>
<th>MINIMUM DISTANCE BETWEEN KNOCKOUTS</th>
<th>BASE REINFORCING STEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>48&quot;</td>
<td>4&quot;</td>
<td>6&quot;</td>
<td>36&quot;</td>
<td>6&quot;</td>
<td>0.23</td>
</tr>
<tr>
<td>54&quot;</td>
<td>4.5&quot;</td>
<td>6&quot;</td>
<td>42&quot;</td>
<td>8&quot;</td>
<td>0.19</td>
</tr>
<tr>
<td>60&quot;</td>
<td>5&quot;</td>
<td>6&quot;</td>
<td>48&quot;</td>
<td>8&quot;</td>
<td>0.25</td>
</tr>
<tr>
<td>72&quot;</td>
<td>6&quot;</td>
<td>6&quot;</td>
<td>60&quot;</td>
<td>12&quot;</td>
<td>0.25</td>
</tr>
<tr>
<td>84&quot;</td>
<td>6&quot;</td>
<td>12&quot;</td>
<td>72&quot;</td>
<td>12&quot;</td>
<td>0.29</td>
</tr>
<tr>
<td>96&quot;</td>
<td>6&quot;</td>
<td>12&quot;</td>
<td>84&quot;</td>
<td>12&quot;</td>
<td>0.29</td>
</tr>
</tbody>
</table>

**NOTE:**
- Standard Plan B-15.60-00

---

**MANHOLE TYPE 3**

**STANDARD PLAN B-15.60-00**

**DRAWN BY:** Adam Cochran

**NOTE:** This plan is not a legal engineering document but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.

**Expires July 1, 2007**

---

Harold J. Peterfeso
06-01-06
NOTES

1. Precast cone sections may be eccentric or concentric.
2. Seepage port orientation varies among manufacturers.

PRECAST FOOTING DETAIL

CIRCULAR FRAME (RING) ~ SEE STD. PLAN B-30.70
CIRCULAR GRATE ~ SEE STD. PLAN B-30.80

PLAN VIEW

DISTANCE VARIES~ SEE CONTRACT

ADJUSTMENT SECTION (TYP.)
LIMIT OF EXCAVATION 1H:2V SLOPE (MAX.)

PRECAST FOOTING WITH DRAIN HOLES
6" DRAIN HOLE (TYP.)

CUTAWAY ELEVATION VIEW

- 10" DRAIN HOLE (TYP.)
- 6" DRAIN HOLE (TYP.)
- 2" DIAM. DRAIN HOLE (TYP.)
- 8" DIAM. DRAIN HOLE (TYP.)
- 6" DIAM. DRAIN HOLE (TYP.)
- 4" DIAM. DRAIN HOLE (TYP.)
- 2" DIAM. DRAIN HOLE (TYP.)
- 1" DIAM. DRAIN HOLE (TYP.)
- 1/2" DIAM. DRAIN HOLE (TYP.)
- 1/4" DIAM. DRAIN HOLE (TYP.)

DRAWN BY: ADAM COCHRAN

SEEPAGE PORT (TYP.) ~ SEE NOTE 2

SHEET 1 OF 1 SHEET

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009
EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009
EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009
The asymmetry of the Combination Inlet shall be considered when calculating the offset distance for the catch basin. See SECTION A.

1. The dimensions of the Frame and Hood may vary slightly among different manufacturers. The Frame may have cast features intended to support a grate guard. Hood units shall mount outside of the Frame. The methods for fastening the Safety Bar / Debris Guard Rod to the Hood may vary. The top of the Hood may include casting lugs. The top of the Hood may be cast with a pattern.

2. Attach the Hood to the frame with two 3/4" × 2" hex head bolts, nuts, and oversized washers. The washers shall have diameters adequate to assure full bearing across the slots.

3. When bolt-down grates are specified in the contract, provide two holes in the frame that are vertically aligned with the grate slots. Tap each hole to accept a 5/8" × -11 NC × 2" allen head cap screw. Location of bolt-down holes varies among different manufacturers. See BOLT-DOWN DETAIL, Standard Plan B-30.10.


5. This plan is intended to show the installation details of a manufactured product. It is not the intent of this plan to show the specific details necessary to fabricate the castings shown on this drawing.
**NOTES**

1. As acceptable alternatives to the rebar shown in the PRECAST BASE SECTION, fibers (placed according to the Standard Specifications), or wire mesh having a minimum area of 0.12 square inches per foot shall be used with the minimum required rebar shown in the ALTERNATIVE PRECAST BASE SECTION. Wire mesh shall not be placed in the knockouts.

2. The knockout diameter shall not be greater than 18". Knockouts shall have a wall thickness of 2" minimum to 2.5" maximum. Provide a 1.5" minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with Standard Specification 9-04-3.

3. The maximum depth from the finished grade to the lowest pipe invert shall be 5'.

4. The frame and grate may be installed with the flange up or down. The frame may be cast into the adjustment section.

5. The Precast Base Section may have a rounded floor, and the walls may be sloped at a rate of 1:24 or steeper.

6. The opening shall be measured at the top of the precast base section.

7. All pickup holes shall be grouted full after the inlet has been placed.

**PIPE ALLOWANCES**

<table>
<thead>
<tr>
<th>PIPE MATERIAL</th>
<th>MAXIMUM INSIDE DIAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td>REINFORCED OR PLAIN CONCRETE</td>
<td>12&quot;</td>
</tr>
<tr>
<td>ALL METAL PIPE</td>
<td>12&quot;</td>
</tr>
<tr>
<td>CPSSP # (STD. SPEC. 9-06.20)</td>
<td>12&quot;</td>
</tr>
<tr>
<td>SOLID WALL PVC (STD. SPEC. 9-08.12A)</td>
<td>10&quot;</td>
</tr>
<tr>
<td>PROFILE WALL PVC (STD. SPEC. 9-08.12B)</td>
<td>10&quot;</td>
</tr>
</tbody>
</table>

* Corrugated Polyethylene Storm Sewer Pipe

**FRAME AND VANED GRATE**

**RECTANGULAR ADJUSTMENT SECTION**

**CONCRETE INLET**

**STANDARD PLAN B-25.60-99**

---

**DRAWN BY:** MARK SUJKA

---

**HAROLD J. PETERFESO**

06-01-06

---

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

EXPIRES JULY 1, 2007

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES

1. This frame is designed to accommodate 20" × 24" grates or covers as shown on Standard Plans B-30.20, B-30.30, B-30.40, and B-30.50.

2. When bolt-down grates or covers are specified in the Contract, provide two holes in the frame that are vertically aligned with the grate or cover slots. Tap each hole to accept a 5/8" - 11 NC × 2" Allen head cap screw. Location of bolt-down holes varies among different manufacturers.

3. Refer to Standard Specification 9-05.15(2) for additional requirements.

---

RECTANGULAR FRAME
(REVERSIBLE)

STANDARD PLAN B-30.10-00

BOLT-DOWN DETAIL
SEE NOTE 2

SECTION

RECESSED ALLEN HEAD CAP SCREW
5/8" - 11 NC × 2"

FRAME CAST INTO PRECAST ADJUSTMENT SECTION ~ SEE STANDARD PLAN B-30.90 FOR ADJUSTMENT SECTION DETAILS

FLANGE UPWARD

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES

1. When bolt-down covers are specified in the Contract, provide two slots in the cover that are vertically aligned with the holes in the frame. Location of bolt-down slots varies among different manufacturers.

2. Alternative reinforcing designs are acceptable in lieu of the rib design.

3. Refer to Standard Specification 9-05.15(2) for additional requirements.

4. For frame details, see Standard Plan B-30.10.

When bolt-down covers are specified in the Contract, provide two slots in the cover that are vertically aligned with the holes in the frame. Location of bolt-down slots varies among different manufacturers. Alternative reinforcing designs are acceptable in lieu of the rib design. Refer to Standard Specification 9-05.15(2) for additional requirements. For frame details, see Standard Plan B-30.10.
When bolt-down grates are specified in the Contract, provide two slots in the grate that are vertically aligned with the holes in the frame. Location of bolt-down slots varies among different manufacturers.

Refer to Standard Specification 9-05.15(2) for additional requirements.

For Frame details, see Standard Plan B-30.10.
When bolt-down grates are specified in the Contract, provide two slots in the grate that are vertically aligned with the holes in the frame. Location of bolt-down slots varies among different manufacturers. Refer to Standard Specification 9-05.15(2) for additional requirements. For Frame details, see Standard Plan B-30.10.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. When bolt-down grates are specified in the Contract, provide two slots in the grate that are vertically aligned with the holes in the frame. Location of bolt-down slot varies among different manufacturers.

2. Refer to Standard Specification 9-05.15(2) for additional requirements.

3. For Frame details, see Standard Plan B-30.40.

4. The thickness of the grate shall not exceed 1 5/8".

When bolt-down grates are specified in the Contract, provide two slots in the grate that are vertically aligned with the holes in the frame. Location of bolt-down slot varies among different manufacturers.

Refer to Standard Specification 9-05.15(2) for additional requirements.

For Frame details, see Standard Plan B-30.40.

The thickness of the grate shall not exceed 1 5/8".

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. The gasket and groove may be in the seat (frame) or in the underside of the cover. The gasket may be "T" shaped in section. The groove may be cast or machined.

2. For bolt-down manhole ring and covers that are not designated "Watertight", the neoprene gasket, groove and washer are not required.

3. Washer shall be neoprene (Detail "B").

4. For clarity, the vertical scale of the Cover Section has been exaggerated, it is 1.5 times the horizontal scale (1H:1.5V).

5. Proprietary manhole covers without bottom ribs are acceptable.

6. In lieu of blind pick notch for storm sewer manhole covers, drill three 1" diameter holes at 120° spacing.

The gasket and groove may be in the seat (frame) or in the underside of the cover. The gasket may be "T" shaped in section. The groove may be cast or machined.
NOTES

1. For use with Circular Frames (rings) detailed in Standard Plan B-30.70.

2. Gasketed Manhole Covers are intended for use with Drywells only. See Standard Plans B-30.30 and B-20.00.

CIRCULAR GRATE

For use with Circular Frames (rings) detailed in Standard Plan B-30.70.

Gasketed Manhole Covers are intended for use with Drywells only. See Standard Plans B-30.30 and B-20.00.

STANDARD PLAN B-30.80-00

EXPIRES JULY 1, 2007

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
For Access and Steps

TYPICAL ORIENTATION

 Guillotine Joint

ECCENTRIC CONE SECTION

24" or 36" FLAT SLAB TOP

24" DIAM., 48" DIAM. OR 54" DIAM. HOLE

1" MIN. 2 1/2" MAX.

2" (TYP.)

84" or 96" FLAT SLAB TOP

48", 54", or 60" FLAT SLAB TOP

20" x 24", 24" DIAM., 48" DIAM. OR 54" DIAM. HOLE

2" (TYP.)

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES
1. The Steel Angles shall be set so that each bearing bar of prefabricated grate shall have full
   bearing on both ends. The finished top of concrete shall be even with the grate surface.
2. All exposed concrete shall be finished with a 1/2" radius.
3. The grade line of the top inside of any pipe shall enter no lower than the grade line of the
top inside of the outlet pipe.
4. Pipes may enter through the knockouts on any side at any reasonable angle, provided the
outside of the pipe can be contained between two opposite walls.
5. See contract for type of grate specified. See Standard Plan B-35.20 and B-40.40 for grate
details.

The Steel Angles shall be set so that each bearing bar of prefabricated grate shall have full
bearing on both ends. The finished top of concrete shall be even with the grate surface.
All exposed concrete shall be finished with a 1/2" radius.
The grade line of the top inside of any pipe shall enter no lower than the grade line of the
top inside of the outlet pipe.
Pipes may enter through the knockouts on any side at any reasonable angle, provided the
outside of the pipe can be contained between two opposite walls.
See contract for type of grate specified. See Standard Plan B-35.20 and B-40.40 for grate
details.
The Steel Angles shall be set so that each bearing bar of prefabricated grate shall have full bearing on both ends. The finished top of concrete shall be even with the grate surface.

Top of inlet grate shall be placed at ground level to present an unobstructed ditch or median section.

All exposed concrete edges shall be finished with a 1/2" radius.

Pipes may enter through the knockouts on any side at any reasonable angle, provided the outside of the pipe can be contained between two opposite walls.

The flow line of the outlet pipe shall be 18" minimum above the inside bottom of the inlet structure.

The grade line of the top inside of any inlet pipe shall enter no lower than the grade line of the top inside of the outlet pipe.

Unit "H" and optional extension units "J" and "K" shall be grouted in place to the satisfaction of the Engineer.

All pickup holes shall be grouted full after the basin has been placed.

**Grate "A"**

- Approximate weight: 215 lbs
- Cross bars: 3/8" round, or rectangular or hexagonal bar of equivalent area
- Steel plate: 3 1/2" × 3/8" (typ.)

**Grate "B"**

- Approximate weight: 215 lbs
- Cross bars: 3/8" round, or rectangular or hexagonal bar of equivalent area
- Steel plates: 3 1/2" × 3/4" (both sides)

**NOTE:** This plan is not a legal engineering document but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.

**Harold J. Peterfeso**

06-01-06
NOTES

1. The Contract may specify a rotated inlet installation. Orient the Grates in the Frame so they intercept flow.

2. When bolt-down grates are specified in the Contract, provide two slots in the grate that are centered with the holes in the frame. Location of bolt-down slots varies among different manufacturers.

3. Refer to Standard Specification 9-05.15(2) for additional requirements.

The Contract may specify a rotated inlet installation. Orient the Grates in the Frame so they intercept flow.

When bolt-down grates are specified in the Contract, provide two slots in the grate that are centered with the holes in the frame. Location of bolt-down slots varies among different manufacturers.

Refer to Standard Specification 9-05.15(2) for additional requirements.
The top of the inlet shall be placed at ground level to present an unobstructed ditch or median section.

Bevel or round exposed concrete edges 1/2".

Pipes may enter through the knockouts at any reasonable angle provided the outside of the pipe can be contained within the knockout provided.

The grade line of the lowest inlet pipe shall enter the structure at an elevation equal to or higher than the grade line of the outlet pipe.

All pickup holes shall be grouted full after the inlet has been placed.

The steel angles shall be set so that each bearing bar of the grate shall have full seating on both ends. The finished top of concrete shall be even with the grate surface. For grates, see Standard Plan B-50-20.

The amount, type, and grade of reinforcing steel is the responsibility of the manufacturer.

The inside wall taper for form removal shall not result in any wall section thinner than 6" except in pipe knockout areas.

Precast inlets shall be marked with the manufacturer’s identification on the inside of the structure in some readily accessible location.
1. The top of the inlet shall be placed at ground level to present an unobstructed ditch or median section.
2. Bevel or round exposed concrete edges 1/2".
3. Pipes may enter through the knockouts at any reasonable angle provided the outside of the pipe can be contained within the knockout provided.
4. The grade line of the lowest inlet pipe shaft shall enter the structure at an elevation equal to or higher than the grade line of the outlet pipe.
5. All pickup holes shall be grouted full after the inlet has been placed.
6. The concrete shall be placed so that each bearing bar of the grate shall have full seating on both ends.
7. The amount, type, and grade of reinforcing steel is the responsibility of the manufacturer.
8. The inside wall taper for form removal shall not result in any wall section thinner than 6" except in pipe knockout areas.
9. Precast inlets shall be marked with the manufacturer's identification on the inside of the structure in some readily accessible location.
Grates for Drop Inlet

Standard Plan B-80.20-05

Sheet 1 of 1 Sheet

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

Harold J. Peterfeso 06-01-06
**NOTES**

1. See Standard Specifications Section 7-08.3(3) for Pipe Zone Backfill.
2. See Standard Specifications Section 9-03.12(3) for Gravel Backfill for Pipe Zone Bedding.
4. For sanitary sewer installation, concrete pipe shall be bedded to spring line.

---

**CLEARANCE BETWEEN PIPES FOR MULTIPLE INSTALLATIONS**

<table>
<thead>
<tr>
<th>Pipe Type</th>
<th>Size</th>
<th>Minimum Distance Between Barrels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circular Pipe</td>
<td>12&quot; to 24&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td></td>
<td>30&quot; to 60&quot;</td>
<td>12&quot; to 60&quot;</td>
</tr>
<tr>
<td></td>
<td>60&quot; to 180&quot;</td>
<td>40&quot;</td>
</tr>
<tr>
<td>Pipe Arch</td>
<td>18&quot; to 36&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td></td>
<td>48&quot; to 142&quot;</td>
<td>48&quot;</td>
</tr>
<tr>
<td></td>
<td>144&quot; to 302&quot;</td>
<td>48&quot;</td>
</tr>
</tbody>
</table>
1. The Concrete Collar width shall be one half of the outside pipe diameter of the largest pipe. The minimum Concrete Collar width shall be 12”. Concrete Collars may be used with all pipe materials and diameters. The Concrete Collar option shall only be used to extend existing pipes. 

2. Steel Welded Wire Fabric shall be in accordance with Standard Specification 9-07.7. Install two wraps for size 6 × 6 W1.4 × W1.4 (10 Gauge) Steel Welded Wire Fabric or one wrap for any of the following sizes:
   - 6 × 6 W2.1 × W2.1 (8 Gauge)
   - 6 × 6 W2.9 × W2.9 (6 Gauge)
   - 4 × 4 W2.9 × W2.9 (6 Gauge)
   - 4 × 4 W4.0 × W4.0 (4 Gauge)

3. When a Coupling Band connection requires attachment to the bell end of a concrete pipe, the bell end of the pipe shall be removed before the connection is installed.

4. Increase the outside diameter of the metal pipe to match the outside diameter of the concrete pipe by installing 12” wide rubber gaskets, thickness as required (Coupling Band only). The rubber gaskets shall be in accordance with Standard Specification 9-04.4(3).

5. Use a Flat Type K Coupling Band. Type K Coupling Bands with dimples are not allowed for the installation detail shown. The Coupling Band option shall only be used for extending existing pipes that have an inside diameter of 36” or less.
Span and rise dimensions are nominal and are measured to the inside crests of corrugations.

Allowable heights of cover shall be within the limits indicated in the table included herein. Minimums and maximums are shown.

Unless indicated otherwise a 10" depth (over the inside crests of corrugations) of earth shall be placed in the invert of the Structural Plate Underpass, Design 1, for its full width and length. The earth shall consist of naturally occurring materials available in the vicinity of the structural plate underpass installation. See Standard Specification 7-03.3(4).

Designed for H-20 live load and maximum allowable soil pressure of 8 kips per square foot.
### Dimensions

<table>
<thead>
<tr>
<th>SPAN</th>
<th>MIN.</th>
<th>MAX.</th>
<th>MIN.</th>
<th>MAX.</th>
<th>MIN.</th>
<th>MAX.</th>
<th>MIN.</th>
<th>MAX.</th>
</tr>
</thead>
<tbody>
<tr>
<td>12'</td>
<td>62</td>
<td>63</td>
<td>21</td>
<td>31</td>
<td>134</td>
<td>136</td>
<td>38</td>
<td>46</td>
</tr>
<tr>
<td>12'-11&quot;</td>
<td>60</td>
<td>61</td>
<td>20</td>
<td>30</td>
<td>134</td>
<td>136</td>
<td>38</td>
<td>46</td>
</tr>
<tr>
<td>13'-10&quot;</td>
<td>58</td>
<td>59</td>
<td>19</td>
<td>29</td>
<td>134</td>
<td>136</td>
<td>38</td>
<td>46</td>
</tr>
<tr>
<td>14'-1&quot;</td>
<td>56</td>
<td>57</td>
<td>18</td>
<td>28</td>
<td>134</td>
<td>136</td>
<td>38</td>
<td>46</td>
</tr>
<tr>
<td>15'-10&quot;</td>
<td>54</td>
<td>55</td>
<td>17</td>
<td>27</td>
<td>134</td>
<td>136</td>
<td>38</td>
<td>46</td>
</tr>
<tr>
<td>16'-1&quot;</td>
<td>52</td>
<td>53</td>
<td>16</td>
<td>26</td>
<td>134</td>
<td>136</td>
<td>38</td>
<td>46</td>
</tr>
<tr>
<td>17'-1&quot;</td>
<td>50</td>
<td>51</td>
<td>15</td>
<td>25</td>
<td>134</td>
<td>136</td>
<td>38</td>
<td>46</td>
</tr>
<tr>
<td>18'-1&quot;</td>
<td>48</td>
<td>49</td>
<td>14</td>
<td>24</td>
<td>134</td>
<td>136</td>
<td>38</td>
<td>46</td>
</tr>
<tr>
<td>19'-1&quot;</td>
<td>46</td>
<td>47</td>
<td>13</td>
<td>23</td>
<td>134</td>
<td>136</td>
<td>38</td>
<td>46</td>
</tr>
<tr>
<td>20'-1&quot;</td>
<td>44</td>
<td>45</td>
<td>12</td>
<td>22</td>
<td>134</td>
<td>136</td>
<td>38</td>
<td>46</td>
</tr>
</tbody>
</table>

### Allowable Heights of Cover

<table>
<thead>
<tr>
<th>CORRUGATED METAL THICKNESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 GAUGE</td>
</tr>
<tr>
<td>MIN.</td>
</tr>
<tr>
<td>3'</td>
</tr>
<tr>
<td>4'</td>
</tr>
</tbody>
</table>

**Notes:**
- Open and rise dimensions are measured to the inside crest of corrugations and may vary slightly depending on manufacturer.
- The plan is not a legal engineering document. A copy may be obtained upon request.
END SECTION LENGTH SHALL BE AT LEAST SIX TIMES THE DIAMETER OF THE PIPE (SEE STD. SPEC. 7-02.3(1))

NOTES

1. The culvert ends shall be beveled to match the embankment or ditch slope and shall not be beveled flatter than 4H:1V. When slopes are between 4H:1V and 6H:1V, shape the slope in the vicinity of the culvert end to ensure that no part of the culvert protrudes more than 4" above the ground line.

2. Field cutting of culvert ends is permitted when approved by the Engineer. All field-cut culvert pipe shall be treated with treatment as shown in the Standard Specifications or General Special Provisions.

The culvert ends shall be beveled to match the embankment or ditch slope and shall not be beveled flatter than 4H:1V. When slopes are between 4H:1V and 6H:1V, shape the slope in the vicinity of the culvert end to ensure that no part of the culvert protrudes more than 4" above the ground line.

Field cutting of culvert ends is permitted when approved by the Engineer. All field-cut culvert pipe shall be treated with treatment as shown in the Standard Specifications or General Special Provisions.
NOTES

1. D = Inside Diameter of Culvert Pipe, or Pipe Arch Span Width, 36" maximum.

2. The distance between the safety bars, and between the top bar and the culvert crown, shall be equal spaces of no more than 24". The distance may vary 3/64" between bars to facilitate placement.

3. Slope shall match Side Slope; 6H:1V preferred, not steeper than 4H:1V.

D = Inside Diameter of Culvert Pipe, or Pipe Arch Span Width, 36" maximum.

The distance between the safety bars, and between the top bar and the culvert crown, shall be equal spaces of no more than 24". The distance may vary 3/64" between bars to facilitate placement.

Slope shall match Side Slope; 6H:1V preferred, not steeper than 4H:1V.
**REINFORCED EDGE ~ FULL LENGTH OF END SECTION**

**SIDE VIEW**

**TOP VIEW**

**ISOMETRIC VIEW**

**CROSS DRAINAGE STRUCTURE**

**SAFETY BAR END TREATMENT DETAIL**

**SAFETY BAR END TREATMENT DETAIL**

**METAL END SECTIONS FOR CIRCULAR PIPES**

<table>
<thead>
<tr>
<th>PIPE DIAM (INCHES)</th>
<th>MIN Thickness (GAUGE)</th>
<th>MIN Overall OTHER (INCHES)</th>
<th>SLOPE 4:1</th>
<th>SLOPE 6:1</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>0.105</td>
<td>12</td>
<td>6</td>
<td>42</td>
</tr>
<tr>
<td>40</td>
<td>0.105</td>
<td>12</td>
<td>6</td>
<td>42</td>
</tr>
<tr>
<td>48</td>
<td>0.105</td>
<td>12</td>
<td>6</td>
<td>42</td>
</tr>
<tr>
<td>54</td>
<td>0.105</td>
<td>12</td>
<td>6</td>
<td>42</td>
</tr>
<tr>
<td>60</td>
<td>0.105</td>
<td>12</td>
<td>6</td>
<td>42</td>
</tr>
</tbody>
</table>

**METAL END SECTIONS FOR ARCHED PIPES**

<table>
<thead>
<tr>
<th>PIPE DIAM (INCHES)</th>
<th>MIN Thickness (GAUGE)</th>
<th>MIN Overall OTHER (INCHES)</th>
<th>SLOPE 4:1</th>
<th>SLOPE 6:1</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>0.105</td>
<td>12</td>
<td>6</td>
<td>42</td>
</tr>
<tr>
<td>34</td>
<td>0.075</td>
<td>14</td>
<td>12</td>
<td>42</td>
</tr>
<tr>
<td>36</td>
<td>0.075</td>
<td>14</td>
<td>12</td>
<td>42</td>
</tr>
<tr>
<td>40</td>
<td>0.075</td>
<td>14</td>
<td>12</td>
<td>42</td>
</tr>
<tr>
<td>48</td>
<td>0.075</td>
<td>14</td>
<td>12</td>
<td>42</td>
</tr>
<tr>
<td>54</td>
<td>0.075</td>
<td>14</td>
<td>12</td>
<td>42</td>
</tr>
<tr>
<td>60</td>
<td>0.075</td>
<td>14</td>
<td>12</td>
<td>42</td>
</tr>
</tbody>
</table>

**GALVANIZED REINFORCING BAR**

7/16" DIAM. MIN. GALVANIZED W 48" MAX. (TYP.)

**SIDE LUG**

**TOP VIEW CONNECTOR DETAIL**

**NOTE**

1. All pipes or pipe strakes shall be attached as shown in CONNECTOR DETAIL.
2. When a Toe Plate Extension is required, it shall be the same gage as the End Section. The dimensions shall be 6" high, and 6" less than the overall width. Instal centered, and tapered 2", laminated with 2/8" x 2/4" galvanized bolts on 12" maximum centers.
3. Cross Drainage Bar and Safety Bars shall be 3" Schedule 40 galvanized steel pipe. Cross Drainage Bars shall be placed a maximum 30" apart.
4. Holes for safety bar attachment shall be provided on end sections.
5. Number of Safety Bars required will vary depending upon the length of the end section.
6. Number of Safety Bars required will vary depending upon the length of the end section.

**NOTE 5**

SAFETY BARS ARE INSTALLED ON END SECTION WHEN SPAN IS GREATER THAN 36"
1. Install sewer saddle with gasket and stainless steel clamps for connection to existing sewers. Install wye or tee sewer fitting with gaskets for new sewer installations.

2. Mark location of sewer stub in accordance with Contracting Agency requirements.
STANDING SIDE SEWER CONNECTION
STANDARD PLAN B-85.30-00
SHEET 1 OF 1 SHEET
FOR SANITARY SEWER USE

45° BEND
4" OR 6" SEWER PIPE (SEE CONTRACT)
24" x 24" x 24" CONCRETE BLOCK OR CONTROLLED DENSITY FILL
SEWER MAIN
TEE
STANDING SIDE SEWER CONNECTION

DRAWN BY:  ADAM COCHRAN

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. Steel tie rods to be heavily coated with asphalt after installation.
2. Restricted joints may be substituted for tie rods.
3. Surface of ground within 36" of hydrant shall be smooth.
2 INCH BLOWOFF ASSEMBLY

ELEVATION

- Valve box and lid ~ cast iron
- Gate valve with 2" square operating nut
- Concrete block 4" x 8" x 16"
- Solid concrete bearing block ~ 4" x 15" x 25"

PLAN

- Meter box (locate in field)
- Blowoff outlet
- Valve marker post
- Concrete thrust blocking shall be clear of blowoff piping
- Thrust blocking small clear piping
- Concrete thrust blocking
- Water main
- Street elbow
- Tapped cap or plug
- Two concrete blocks 4" x 8" x 16" (top block not shown)

NOTES

1. Coat the pipe threads with asphalt after assembly.
2. All piping shall be galvanized steel.
3. Valve and piping to valve shall be 2" unless otherwise noted in the Contract.
4. Locate blowoff outlet near property corner if possible.

- Water main
- Street elbow
- Two concrete blocks 4" x 8" x 16" (top block not shown)
- Tapped cap or plug

Notes: This plan is not a legal engineering document but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.
NOTES

1. The size of the combination air release / air vacuum valve shall be specified in the Contract. The piping and valves shall be the same size as the combination air release / air vacuum valve.

2. Locate at the high point of the main, tap top of main.
1. Contractor to provide blocking adequate to withstand full test pressure.
2. Divide thrust by safe bearing load to determine required area (in square feet) of concrete to distribute load.
3. Areas to be adjusted for other pressure conditions.
4. Provide two 1" minimum diameter rods on valves up through 10" diameter. Valves larger than 10" require special tie rod design.

<table>
<thead>
<tr>
<th>Size</th>
<th>Test Pressure (PSI)</th>
<th>Thrust at Fittings in Pounds</th>
<th>Thrust at Ties and Dead Ends</th>
<th>Thrust at Bends</th>
<th>Thrust at Cross Bends</th>
<th>Thrust at Slap Bends</th>
<th>Thrust at 11 1/2(^\circ) Bends</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>250</td>
<td>3,140</td>
<td>4,440</td>
<td>2,364</td>
<td>1,529</td>
<td>865</td>
<td>515</td>
</tr>
<tr>
<td>6&quot;</td>
<td>250</td>
<td>7,070</td>
<td>9,995</td>
<td>2,780</td>
<td>1,384</td>
<td>615</td>
<td>2,405</td>
</tr>
<tr>
<td>8&quot;</td>
<td>250</td>
<td>12,565</td>
<td>17,770</td>
<td>6,060</td>
<td>3,045</td>
<td>2,405</td>
<td>3,140</td>
</tr>
<tr>
<td>10&quot;</td>
<td>250</td>
<td>19,635</td>
<td>25,000</td>
<td>10,720</td>
<td>6,130</td>
<td>3,140</td>
<td>3,140</td>
</tr>
<tr>
<td>12&quot;</td>
<td>250</td>
<td>28,275</td>
<td>35,840</td>
<td>16,500</td>
<td>9,540</td>
<td>3,140</td>
<td>3,140</td>
</tr>
<tr>
<td>14&quot;</td>
<td>250</td>
<td>38,485</td>
<td>49,000</td>
<td>25,610</td>
<td>15,015</td>
<td>3,140</td>
<td>3,140</td>
</tr>
<tr>
<td>16&quot;</td>
<td>250</td>
<td>50,265</td>
<td>64,000</td>
<td>35,840</td>
<td>21,640</td>
<td>3,140</td>
<td>3,140</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Soil Type</th>
<th>Safe Bearing Load (PSF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUCK, PEAT, ETC.</td>
<td>0</td>
</tr>
<tr>
<td>SOFT CLAY</td>
<td>1,000</td>
</tr>
<tr>
<td>SAND</td>
<td>2,000</td>
</tr>
<tr>
<td>SAND AND GRAVEL</td>
<td>3,000</td>
</tr>
<tr>
<td>SAND AND GRAVEL CEMENTED WITH CLAY</td>
<td>4,000</td>
</tr>
<tr>
<td>HARD SHALE</td>
<td>10,000</td>
</tr>
</tbody>
</table>

Concrete Thrust Block

Standard Plan B-100.40-00

Sheet 1 of 1 Sheet

Approved for Publication

Harold J. Peterfeso 06-08-06

Washington State Department of Transportation

Expiring July 1, 2007
BLOCKING FOR 11.25° OR 22.5° VERTICAL BENDS

Four tie rods with turnbuckles

Thread 6" 

BLOCKING FOR 45° VERTICAL BENDS

Four tie rods with turnbuckles

Thread 6"

### Dimension Table

<table>
<thead>
<tr>
<th>Pipe Dia.</th>
<th>Test Pressure (PS)</th>
<th>Bend Angle</th>
<th>Concrete Volume (Ft³)</th>
<th>Cure Size (°)</th>
<th>Tie Rod Dia.</th>
<th>Tie Rod Embedment</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>250</td>
<td>11.25°</td>
<td>0</td>
<td>1.0</td>
<td>5/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22.5°</td>
<td>12</td>
<td>2.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>45°</td>
<td>23</td>
<td>2.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6&quot;</td>
<td>250</td>
<td>11.25°</td>
<td>14</td>
<td>2.4</td>
<td>5/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22.5°</td>
<td>27</td>
<td>3.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>45°</td>
<td>50</td>
<td>3.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8&quot;</td>
<td>250</td>
<td>11.25°</td>
<td>25</td>
<td>2.9</td>
<td>5/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22.5°</td>
<td>45</td>
<td>3.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>45°</td>
<td>89</td>
<td>4.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10&quot;</td>
<td>250</td>
<td>11.25°</td>
<td>35</td>
<td>3.4</td>
<td>5/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22.5°</td>
<td>76</td>
<td>4.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>45°</td>
<td>159</td>
<td>5.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12&quot;</td>
<td>250</td>
<td>11.25°</td>
<td>55</td>
<td>3.8</td>
<td>5/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22.5°</td>
<td>128</td>
<td>4.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>45°</td>
<td>200</td>
<td>5.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14&quot;</td>
<td>250</td>
<td>11.25°</td>
<td>75</td>
<td>4.2</td>
<td>5/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22.5°</td>
<td>147</td>
<td>5.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>45°</td>
<td>272</td>
<td>6.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16&quot;</td>
<td>250</td>
<td>11.25°</td>
<td>99</td>
<td>4.0</td>
<td>5/8&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22.5°</td>
<td>182</td>
<td>5.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>45°</td>
<td>355</td>
<td>7.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes
- Steel tie rods to be heavily coated with asphalt after installation.
- The concrete thrust block for convex vertical bends is as follows:

| Concrete Thrust Block for Convex Vertical Bends
| Standard Plan B-90.50-00

Expiring July 1, 2007

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

Harold J. Peterfeso 06-08-06
INLET PLACEMENT
AT BRIDGE END

STANDARD PLAN B-95.40-00

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT
BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY
THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON
FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANS-
PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

1. The beam guardrail type, post type, beam guardrail transition section type, con-
nection type, and bridge traffic barrier shape may vary from that shown on this plan.

2. The Catch Basin or Grate Inlet shall be centered between the Beam Guardrail Posts.

3. With Beam Guardrail Transition Section Types 2, 4, and 5, use Extruded Curb
   Types 1, 2, 4a, 5, or 5a.

4. With Beam Guardrail Transition Section Types 1, 1A, 1B, 10, 11, and 12, use
   Extruded Curb Type 3 (Extruded Asphalt Concrete Curb).

5. See Contract Plans for length of Curb.

Harold J. Peterfeso
06-08-06
When required by the Contract, a Snow Load Post Washer shall be used on the backside of the post (in lieu of the 1 3/4" Post Bolt Washer) and a Snow Load Rail Washer shall be placed on the face side of Beam Guardrail Types 1 and 2. Snow Load Rail Washers shall not be installed on terminals.

Rail Washers, also called "Snow Load Rail Washers" are not required on new installation except as called for in Note 1. Unnecessary Rail washers need not be removed from existing installations, except those on posts 2 through 8 of a BCT installation shall be removed.

Beam Guardrail post spacing for Types 1 through 4 shall be 6' - 3" on centers.

Timber blocks shall be toe-nailed to the post with a 16d galvanized nail to prevent block rotation. For post and block details, see Standard Plan C-1b.

When "Beam Guardrail Type 1 - ___ Ft. Long Post" is specified in the Contract, the post length shall be stamped with numbers, 1 1/2" min. high and 1/4" deep, at the location where the letter "H" is shown in the ASSEMBLY DETAIL. After installing a Long Post, it shall be the Contractor's responsibility to ensure that the stamped numbers are still legible and 1/4" deep.

Existing posts shall not be raised. Replace posts as necessary to achieve required guardrail height.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

Ken L. Smith 02-06-07
NOTES
1. Type 10 posts shall be 6x8 timber or W6x9.
   Type 11 posts shall be 10x10 timber or W6x15.
   For details, see Standard Plan “Beam Guardrail
   Posts and Blocks.”
2. Type 10 guardrail post spacing shall be 6'-3" on center.
   Type 11 shall be a maximum of 3'-1 1/2" on center.

**THRIE BEAM RAIL ELEMENT**

**THRIE BEAM EXPANSION SECTION**

**TYPE 10**

- Wood post assembly
  - 5/8" x 10" button head bolts with 7/32" oval grip
  - Hex nuts and cut washers

**TYPE 11**

- Nested thrie beam
- Wood block for steel post
  - 5/8" x 10" button head bolts with 7/32" oval grip
  - Hex nuts and cut washers

**STEEL POST ASSEMBLY**

- 1 3/4" post bolt washer
- 2 3/4" post bolt, 7/32" oval grip and recessed hex nut

**NOTES**

- Type 10 posts shall be 6x8 timber or W6x9.
  Type 11 posts shall be 10x10 timber or W6x15.
  For details, see Standard Plan “Beam Guardrail Posts and Blocks.”

- Type 10 guardrail post spacing shall be 6'-3" on center.
  Type 11 shall be a maximum of 3'-1 1/2" on center.

- Added missing dimension on Type 11 wood post assembly.

**WASHINGTON STATE DEPARTMENT OF TRANSPORTATION**

OLYMPIA, WASHINGTON

APPROVED FOR PUBLICATION

DEPUTY STATE DESIGN ENGINEER

DATE

NOTES: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT
BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY
THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON
FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANS-
PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
**WOOD POST**

- 8" or 10" (Nominal)
- 3/8" dia. holes (TYP)
- Alternate holes
- 6x8 or 10x10 (see Note 1)

**STEEL POST**

- 12"
- 7 5/8"

**THREE BEAM WOOD BLOCK FOR WOOD POST**

**W BEAM WOOD BLOCK FOR WOOD POSTS**

**THREE BEAM WOOD BLOCK FOR STEEL POST**

**W BEAM WOOD BLOCK FOR STEEL POST**

---

**POST LENGTH TABLE**

<table>
<thead>
<tr>
<th>GUARDRAIL TYPE</th>
<th>LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 through 4</td>
<td>6'-6&quot;</td>
</tr>
<tr>
<td>10 or 11</td>
<td>6'-6&quot;</td>
</tr>
</tbody>
</table>

---

**NOTE:**
- **W6X9**
- **W6X15**
- **1 1/8" for W6x9**
- **1 3/4" for W6x15**
- **3/4" holes**

---

**BEAM GUARDRAIL POSTS AND BLOCKS**

**STANDARD PLAN C-1b**

---

**ATTENTION:**
- This plan is not a legal engineering document but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.

---

**REVISED:**
- July 24, 2004

**EXPIRES:**
- July 24, 2004

---

**APPROVED FOR PUBLICATION**

**WASHINGTON STATE DEPARTMENT OF TRANSPORTATION**

---

**DATE:**
- 10-31-03

**SHEET:**
- 1 OF 2 SHEETS

---

**EFFECTIVE:**
- AUGUST 4, 2008 TO APRIL 5, 2009
5/8" " 
1/4" 
20 3/4" 
13" 
6 1/2" 
G-2 POST 
1/4" 
TYP 
1/4" 
3" 
5/8" 
8X24"x1/4" Plate 
3 1/2" 
9 1/2" 
1/4" 
6 1/4" 
1/4" 
5/8" x 7 1/2" bolts, nuts and washers (two required per post) 
Welded option for Steel Tube and 3/4" Steel Plate connection (See Note 6) 
Wood Breakaway Post 
1/2" hole 
3/4" hole 
3/4" steel plate 
Soil plate may be welded to foundation tube. If so, holes in soil plate and foundation tube may be omitted. 
5'-3" 
3/8" holes 
5/8" holes 
S3x5.7 
8"x24"x 1/4" Plate 
2-11 
4" 
6" 
9" 
9" 
3/4" hole 
3/4" holes 
5'-0" 
3/4" holes 
TS 8" x 6" x 0.1875" 
Bottom corners may be clipped 2"x2" to aid driving 
2" MAX 
5/8" x 7 1/2" bolts, nuts and washers (two required per post) 
6" 
8" 
9" 
9" 
3'-0" 
2 3/8" hole 
2 3/8 " holes 
3/4" holes 
3'-11 1/2 " 
15 3/16 " 
7 3/16 " 
7 5/8 " 
W6x9 steel posts and timber blocks are alternates for 6x8 timber posts and blocks. W6x15 steel posts and timber blocks are alternates for 10x10 timber posts and blocks. 
1. Wood posts for all guardrail placement plans shall be 6x8 except where noted otherwise. 
2. Lower hole is for rub rail of Type 2 and Type 3 Beam Guardrail. 
3. W6x9 steel posts and timber blocks are alternates for 6x8 timber posts and blocks. W6x15 steel posts and timber blocks are alternates for 10x10 timber posts and blocks. 
4. Holes shall be located on approaching traffic side of web. 
5. When contract requires "Beam Guardrail Type __, __ Foot Long Post," the steel post length shall be marked with numbers to ensure permanent identification at the location where the letter "H" is shown on the detail. The marking shall be 1 1/2" MIN height. 
6. Soil plate may be welded to foundation tube. If so, holes in soil plate and foundation tube may be omitted. 

Wood posts for all guardrail placement plans shall be 6x8 except where noted otherwise. 
Lower hole is for rub rail of Type 2 and Type 3 Beam Guardrail. 
W6x9 steel posts and timber blocks are alternates for 6x8 timber posts and blocks. W6x15 steel posts and timber blocks are alternates for 10x10 timber posts and blocks. 
Holes shall be located on approaching traffic side of web. 
When contract requires "Beam Guardrail Type __, __ Foot Long Post," the steel post length shall be marked with numbers to ensure permanent identification at the location where the letter "H" is shown on the detail. The marking shall be 1 1/2" MIN height. 
Soil plate may be welded to foundation tube. If so, holes in soil plate and foundation tube may be omitted.
NOTES

1. For post details see Standard Plan, "Beam Guardrail Posts and Blocks".

DETAIL A

1/2" DIA x 1 1/2" Hex head bolt with hex nut and 1 3/4" square x .135" washer

DETAIL B

1/2" DIA x 1 1/2" Hex head bolt with hex nut. Guardrail rests on top of bolt.

G-2 Post

See Note 1

TYPE 20

TYPE 21

2'-3" 2'-8" 1"
See Note 1

INTERMEDIATE GUARDRAIL POST CONNECTION DETAILS
(Type A shown):

THREE BEAM GUARDRAIL REDUCER SECTION
TYPE A

(Left section shown, right section reversed)

NOTES
1. For wood posts, saw top of post and block to 1” above three beam guardrail reducer section. For steel posts, drive post down to 1” maximum above the three beam guardrail reducer section.

THREE BEAM GUARDRAIL REDUCER SECTION
TYPE B

(Left section shown, right section reversed)

NOTES
1. For wood posts, saw top of post and block to 1” above three beam guardrail reducer section. For steel posts, drive post down to 1” maximum above the three beam guardrail reducer section.
1. Type 4 anchor required. For details, see Standard Plan C-6a.

2. Post spacing is 6'-3" unless otherwise shown.

3. For Terminal type and details, see Contract Plans and applicable Standard Plan(s).

4. The slope from the edge of the shoulder into the face of the guardrail should not exceed 10:1 when the face of the guardrail is less than 12'-0" from the edge of the shoulder.

5. For one-way traffic, use Type 4 anchor. For two-way traffic, use Type 1 anchor. See applicable Standard Plan(s) for details.

6. When Beam Guardrail Flared Terminals are used on both ends a minimum of 25'-0" of Beam Guardrail shall be installed.
NOTES

1. For terminal type and details, see Contract and applicable Standard Plan(s).

2. The slope from the edge of the shoulder into the face of the guardrail should not be steeper than 10H:1V when the guardrail is within 12'-0" from the edge of the shoulder.

3. See Contract for Beam Guardrail Transition Section type and Connection to Bridge Traffic Barrier or Concrete Barrier.

**Flare Rate Table**

<table>
<thead>
<tr>
<th>POSTED SPEED (MPH)</th>
<th>RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>15:1</td>
</tr>
<tr>
<td>80</td>
<td>14:1</td>
</tr>
<tr>
<td>90</td>
<td>12:1</td>
</tr>
<tr>
<td>100</td>
<td>11:1</td>
</tr>
<tr>
<td>40 OR LESS</td>
<td>9:1</td>
</tr>
<tr>
<td></td>
<td>8:1</td>
</tr>
</tbody>
</table>

**Guardrail Placement**

Standard Plan C-2a

Sheet 1 of 1 Sheet

© 2006 Washington State Department of Transportation

APPROVED FOR PUBLICATION

Harold J. Peterfeso 06-21-06

Washington State Department of Transportation
1. Varying flare rates and structure widths may require a length of Beam Guardrail Type 1 or 2 between the Beam Guardrail Type 3 or 4 and the Transition on one side, and the Beam Guardrail Type 10 on the other. For Beam Guardrail Type 2 or 3, terminate the rub rail (channel rail) at the last 6'-3" post of the Beam Guardrail Transition Section Type 16, and by tapering it behind the second 6'-3" post on the Beam Guardrail Type 10 side, or as approved by the Engineer.

2. Use the minimum number of needed 12'-6" thrie beam sections needed to span the structure. This run may extend past the end of the structure, and an excess of 6'-3" minimum is acceptable. If the last 12'-6" section extends more than 5'-6" but less than 12'-6", use an 12'-6" thrie beam section in its place.

3. The Beam Guardrail Transition Section Type 16 on this end shall terminate at a 10×10 post. Place the last 12'-6" beam section of the Beam Guardrail Type 10 side, or as approved by the Engineer.

4. If full post depth cannot be achieved due to the structure foundation, post length shall be adjusted to the top of foundation. The Beam Guardrail Type 10 post height shall be 2'-9".

**Flare Rate Table**

<table>
<thead>
<tr>
<th>POSTED SPEED (MPH)</th>
<th>RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 or less</td>
<td>9:1</td>
</tr>
<tr>
<td>10 to 20</td>
<td>10:1</td>
</tr>
<tr>
<td>20 to 40</td>
<td>11:1</td>
</tr>
<tr>
<td>40 or less</td>
<td>12:1</td>
</tr>
<tr>
<td>40 to 60</td>
<td>13:1</td>
</tr>
<tr>
<td>60 to 80</td>
<td>14:1</td>
</tr>
<tr>
<td>80 or less</td>
<td>15:1</td>
</tr>
</tbody>
</table>

**Reducer Section Type B**

- The Beam Guardrail Type 1 or 2 between the Beam Guardrail Type 3 or 4 and the Transition shall terminate at the first 6×8 post of the Beam Guardrail Type 10, and by lapping the Beam Guardrail Type 1 or 2 behind the second 6×8 post of the Beam Guardrail Type 10.

**RUB RAIL (CHANNEL RAIL) - SEE NOTE 1**

- If full post depth cannot be achieved due to the structure foundation, post length shall be adjusted to the top of foundation. The Beam Guardrail Type 10 post height shall be 2'-9".

**NOTE:** THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTE

1. CASE 9C: Thrie Beam Guardrail is used when the distance from the end of the Bullnose Terminal to the beginning of the transition of the Bridge Rail is less than 100 feet.
NOTES:
1. SRT Terminal shown. For terminal type and details, see Contract or applicable Standard Plan(s).
2. Post spacing is 9' - 0" except where noted.
3. Type 4 anchor required. See applicable Standard Plan(s).
4. The slope from the edge of the shoulder into the face of the guardrail should not exceed 10H:1V when the guardrail is within 12' - 0" from the edge of the shoulder.

SRT Terminal shown, for terminal type and details, see Contract or applicable Standard Plan(s).
Post spacing is 9' - 0" except where noted.
Type 4 anchor required. See applicable Standard Plan(s).
The slope from the edge of the shoulder into the face of the guardrail should not exceed 10H:1V when the guardrail is within 12' - 0" from the edge of the shoulder.

NOTES:
1. SRT Terminal shown, for terminal type and details, see Contract or applicable Standard Plan(s).
2. Post spacing is 9' - 0" except where noted.
3. Type 4 anchor required. See applicable Standard Plan(s).
4. The slope from the edge of the shoulder into the face of the guardrail should not exceed 10H:1V when the guardrail is within 12' - 0" from the edge of the shoulder.

SRT Terminal shown, for terminal type and details, see Contract or applicable Standard Plan(s).
Post spacing is 9' - 0" except where noted.
Type 4 anchor required. See applicable Standard Plan(s).
The slope from the edge of the shoulder into the face of the guardrail should not exceed 10H:1V when the guardrail is within 12' - 0" from the edge of the shoulder.
NOTES

1. SRT Terminal shown. For terminal type and details see Contract and applicable Standard Plan(s).

2. Beam Guardrail Anchor Type 4 (W-Beam) or Type 4 (Thrie Beam) required.

3. The slope from the edge of the shoulder into the face of the guardrail should not exceed 10H:1V when the guardrail is within 12'-0" from the edge of the shoulder.

4. If the distance from end of Beam Guardrail Type 11 to the structure exceeds 6'-3" using 12'-6" thrie beam sections, add a 6'-3" nested section of thrie beam with 10×10 posts, spaced at 3'-1 1/2" maximum, and begin transition.

5. Guardrail post spacing for Beam Guardrail Type 11 past the end of the structure shall be spaced at 6'-3" maximum with 6×8 post and standard block.

6. Attach the standard wood block to the rail using two 5/8" × 4" lag bolts.

Harold J. Peterfeso
06-21-06

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
GUARDRAIL PLACEMENT
WEAK POST INTERSECTION DESIGN (8'-6" MAX RADIUS)

**NOTES**

1. See Contract for guardrail connection to bridge rail and concrete barrier.
2. The slope from the edge of the shoulder into the face of the guardrail should not be steeper than 10:1.
3. Attach to rail with 5/16" x 9" long bolt, nut and 3/4" washer on back of post.
4. For terminal type and details, see Contract and applicable Standard Plans.
5. Radius dimensions shall be etched into plate replacing the letters "HH", shown on the Identification Plate detail. Digits shall be 1 1/2" MIN height and 3/4" MAX width. The plate shall be galvanized after etching.
6. The guardrail radius Identification Plate shall be mounted on the back side of the Rail Element using the lowest splice bolt at the P.C. of the guardrail radius.
7. First letter of case designation placement indicates end treatment on side road. Second letter indicates end treatment on main road. For instance, a Type 5 Anchor on the side road and a bridge connection on the main road would be Case 12 AC.
8. For the 8'-6" radius, five CRT posts are required including the CRT post at point B.
9. For CRT post details, see Standard Plan "Beam Guardrail Posts and Blocks".

**CASE 12 _D**
(see Note 7)

**CASE 12 _C**
(see Note 7)

**CASE 12 _A_**
(see Note 8)

**SECTION A-A**

**IDEN TIFICATION PLATE MOUNTING DETAIL**
(see Note 6)

**CASE 12 _B_**
(see Note 7)

**IDENTIFICATION PLATE**
(see Note 51)
1. See Contract Plans for guardrail connection to bridge rail and concrete barrier.

2. The slope from the edge of the shoulder into the face of the guardrail should not be steeper than 10:1.

3. Fewer CRT posts are required for smaller radii; include CRT Post at Point B. Attach guardrail to post with a 5/16" x 9" long bolt, a 3/8" I.D. x 7 1/2" snug fitting insert, and a 1 1/2" washer with nut on back of post.

4. For terminal type and details, see Contract and applicable Standard Plan(s).

5. Radius dimensions shall be etched into plate replacing the letters "HH", shown on the GUARDRAIL RADIUS IDENTIFICATION PLATE DETAIL. Digits shall be 1 1/2" minimum height and 3/4" maximum width. Plate shall be galvanized after etching.

6. The guardrail radius identification Plate shall be mounted on the back side of the rail element using the lowest splice bolt nearest the PC of the guardrail radius (See View A).

7. The first letter of the Case Designation indicates the end treatment on the side road. The second letter indicates the end treatment on the main road. For example, a Type 5 Anchor on the side road with a bridge connection on the main road would be Case 13 AC, the combination shown.

8. For CRT post details, see Standard Plan C-1b.
NOTES
1. For Service Level 1, Weak Post Bridge Rail System, see Contract.
2. SRT Terminal shown. For Terminal type and details, see Contract and applicable Standard Plan(s).
3. The slope from the edge of the shoulder into the face of the guardrail should not be steeper than 10:1.
4. See Standard Plan "Beam Guardrail Posts and Blocks".

NOTES
1. For Service Level 1, Weak Post Bridge Rail System, see Contract.
2. SRT Terminal shown. For Terminal type and details, see Contract and applicable Standard Plan(s).
3. The slope from the edge of the shoulder into the face of the guardrail should not be steeper than 10:1.
4. See Standard Plan "Beam Guardrail Posts and Blocks".

Direction of Traffic

CASE 14

GUARDRAIL PLACEMENT

STANDARD PLAN C-2h
NOTES

1. SRT Terminal shown. For Terminal type and details, see Contract and applicable Standard Plan(s).

2. The slope from the edge of the shoulder into the face of the guardrail should not be steeper than 10:1.


Donald K. Nelson
3/28/97

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES
1. Type 4 anchor required. For details, see applicable Standard Plan(s).
2. For terminal type and details, see contract and applicable Standard Plan(s).
3. Post spacing is 6'-3" except where noted.
4. For guardrail to bridge rail connection see applicable Standard Plan(s) or Contract.
5. The slope from the edge of the shoulder into the face of the guardrail should not be steeper than 10:1; when the guardrail is within 12'-0" from the edge of the shoulder. Beyond 12'-0", the slope shall not be steeper than 6:1.

FLARE RATE TABLE

<table>
<thead>
<tr>
<th>Rate</th>
<th>Posted Speed (MPH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:1</td>
<td>70</td>
</tr>
<tr>
<td>14:1</td>
<td>60</td>
</tr>
<tr>
<td>12:1</td>
<td>55</td>
</tr>
<tr>
<td>11:1</td>
<td>50</td>
</tr>
<tr>
<td>10:1</td>
<td>45</td>
</tr>
<tr>
<td>9:1</td>
<td>40 or less</td>
</tr>
</tbody>
</table>

NOTES
1. Type 4 anchor required. For details, see applicable Standard Plan(s).
2. For terminal type and details, see contract and applicable Standard Plan(s).
3. Post spacing is 6'-3" except where noted.
4. For guardrail to bridge rail connection see applicable Standard Plan(s) or Contract.
5. The slope from the edge of the shoulder into the face of the guardrail should not be steeper than 10:1; when the guardrail is within 12'-0" from the edge of the shoulder. Beyond 12'-0", the slope shall not be steeper than 6:1.
NOTES:
1. See Standard Plan C-1b for additional details.
2. One-way traffic layouts are identical to the two-way layout with the exception that only the posts trailing the span need to be CRT's with double blocks.

CASE 21

ONE-WAY TRAFFIC

ONE-WAY TRAFFIC LAYOUT

ELEVATION

PLAN

GUARDRAIL PLACEMENT
25' SPAN

STANDARD PLAN C-2a

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

APPROVED FOR PUBLICATION

Clifford E. Mansfield

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

EXPIRES MAY 3, 2002
NOTES
1. See Contract for transition and connection type.
2. The slope from the edge of the shoulder into the face of the guardrail should not be steeper than 10:1.
3. Guardrail installation shall be Beam Guardrail Type 1 with standard post and block.
4. First letter of case designation indicates end treatment on side road. Second letter indicates end treatment on main road. For instance a terminal on the side road and a bridge connection on the main road would be Case 22 BC.
5. For terminal type and details, see Contract and applicable Standard Plan(s).
6. Radius dimensions shall be etched into plate replacing the letters "HH" shown on the Identification Plate Detail. Digits shall be 1 1/2" MIN height and 3/4" MAX width. Plate shall be galvanized after etching.
7. The guardrail Identification Plate shall be mounted at the lower splice bolt on the back side of the rail element at the PC of the guardrail radius.

CASE 22 A
(See Note 4)

CASE 22 B
(See Note 4)

CASE 22 C
(See Note 4)

CASE 22 D
(See Note 4)

IDENTIFICATION PLATE DETAIL

IDENTIFICATION PLATE MOUNTING DETAIL

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES
1. The Design Layout Line shall intercept the Cable Barrier at a point that is at least 12 feet (perpendicular) from the opposite Edge of Traveled Way.

2. A 20:1 or flatter taper shall be used when adjusting the alignment of the Cable Barrier, and is required when the W-Beam Guardrail face is less than 12 feet from the Edge of Traveled Way.

LEGEND
--- Design Layout Line

--- Cable Barrier
--- Thrie Beam Bull Nose
--- Edge of Pavement
--- Edge of Traveled Way
--- Direction of Traffic

CASE 25

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES

1. The Design Layout Line shall intersect the Cable Barrier at a point that is at least 12 feet (perpendicular) from the opposite Edge of Travelled Way.

2. A 20:1 or flatter taper shall be used when adjusting the alignment of the Cable Barrier, and is required when the W-Beam Guardrail face is less than 12 feet from the Edge of Travelled Way.

3. For Cable Barrier Type 3 Transition to W-Beam Guardrail details, see Standard Plan C-3d.

LEGEND

**Design Layout Line**

CABLE BARRIER TYPE 3

PLAN VIEW

CASE 26

CABLE BARRIER MINIMUM TAPER LENGTH

(ASS SHOWN)

EDGE OF SHOULDER

EDGE OF TRAVELED WAY

BEAM GUARDRAIL TYPE 1 (W-BEAM) PAY LIMIT

BEAM GUARDRAIL ANCHOR TYPE 4 PAY LIMIT

CABLE BARRIER TYPE 3 TRANSITION TO W-BEAM GUARDRAIL PAY LIMIT

CABLE BARRIER TYPE 3 FLARED TERMINAL PAY LIMIT

CABLE BARRIER TYPE 3 MINIMUM TAPER LENGTH

BEAM GUARDRAIL EXISTING REDIRECTIONAL LANDFORM

CABLE BARRIER TYPE 3 TO W-BEAM GUARDRAIL PAY LIMIT

EDGE OF TRAVELED WAY

EDGE OF SHOULDER

W-BEAM GUARDRAIL

SEE NOTE 1

SEE NOTE 2

SEE NOTE 3

DIRECTION OF TRAFFIC

25°

3' MIN.

3' MIN.

20 MIN. (20:1 OR FLATTER)

20 MIN. (20:1 OR FLATTER)
1. Extend the Cable Barrier Type 2 until the Design Layout Line clears the opposing Cable Barrier Type 2 and intercepts the Cable Barrier Type 3 at a point that is at least 12 feet (perpendicular) from the opposite Edge of Traveled Way.

2. A 20:1 or flatter taper shall be used when adjusting the alignment of the Cable Barrier. A minimum taper is required, when the Cable Barrier Type 2 is less than 12 feet from the Edge of Traveled Way, before transitioning to Cable Barrier Type 3.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTE

1. Install a Type 2 Extruded Asphalt Concrete Curb (see Standard Plan F-2b) at face of Guardrail.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
BEAM GUARDRAIL TRANSITION SECTION TYPE 2 ~ PAY LIMIT

SEE CONTRACT PLANS FOR SPECIFIED CONNECTION

6' - 6" POST WITH STANDARD BLOCK (TYP.)

TOTAL LENGTH = 25' - 0"

BEAM GUARDRAIL

BEAM GUARDRAIL TRANSITION SECTION TYPE 3 ~ PAY LIMIT

SEE CONTRACT PLANS FOR SPECIFIED CONNECTION

8' - 0" POST, 6×8 POST WITH 8×8 BLOCKS

TOTAL LENGTH = 6' - 3"

BEAM GUARDRAIL

BEAM GUARDRAIL TRANSITION SECTION TYPE 4 ~ PAY LIMIT

SEE CONTRACT PLANS FOR SPECIFIED CONNECTION

6' - 0" LONG, 6×8 POST WITH STANDARD BLOCK (TYP.)

TOTAL LENGTH = 6' - 0"

BEAM GUARDRAIL

BEAM GUARDRAIL TRANSITION SECTION TYPE 5 ~ PAY LIMIT

SEE CONTRACT PLANS FOR SPECIFIED CONNECTION

6' - 0" LONG, 6×8 POST WITH STANDARD BLOCK (TYP.)

TOTAL LENGTH = 6' - 3"

BEAM GUARDRAIL

BEAM GUARDRAIL TRANSITION SECTION TYPE 6 ~ PAY LIMIT

SEE CONTRACT PLANS FOR SPECIFIED CONNECTION

6' - 0" LONG, ONE POST WITH STANDARD BLOCK (TYP.)

TOTAL LENGTH = 25' - 0"

BEAM GUARDRAIL
NOTES:

1. If the distance from the end of the bridge to the end of the thrie beam bridge rail section exceeds 6' - 3" using 12' - 6" thrie beam sections, add 6' - 3" section of thrie beam bridge rail to reduce the length to less than 6' - 3".

2. When thrie beam is installed at the face of the bridge curb, install a Type 2 Extruded Asphalt Concrete Curb (see Standard Plan F-2b) at face of Guardrail. Match the height of existing bridge curb with a 20:1 transition.

3. When thrie beam is installed at the face of rigid bridge rail, an HMA ramp is required from the roadway surface to the top of the bridge curb or sidewalk. The slope of the ramp shall be 20:1 or flatter.
NOTES
1. See Contract for the number of thrie beam sections for Beam Guardrail Type 11.
2. If the distance from the end of the Beam Guardrail Type 11 to the column/structure exceeds 6' - 3" using 12' - 6" thrie beam sections, add a 6' - 3" nested section of thrie beam to reduce the distance to less than 6' - 3".
3. Install a Type 2 Extruded Asphalt Concrete Curb (see Standard Plan F-2b) at face of Guardrail.
4. Attach the standard block to the rail using two 5/8" x 4" lag bolts.

4. See Notes 1 & 2

5. See Note 5
1. Posts installed on shoulder slopes steeper than 10H:1V shall be 8' long.
2. The flare rate of the guardrail may be steepened after crossing the ditch bottom to shorten the length of the terminal.
3. Determine the height of the W-Beam at the Anchor (G) by first calculating the perpendicular offset distance (D) from the edge of shoulder (S) to the Anchor (on station). Multiply that distance by 0.1, then subtract the product from the elevation of the same point (S) on the edge of shoulder used to obtain the offset distance (at the same station). Add Beam Guardrail design height (H) to that remainder for a sum that equals the elevation of the top of the W-Beam at the Anchor.

Refer to SECTION C:

$$Elevation\;G = \left( Elevation\;S - D(0.1) \right) + H$$

- For Beam Guardrail Type 1: $H = 27" \left( 2.25' \right)$
- For Beam Guardrail Type 31: $H = 31" \left( 2.58' \right)$

### Notes

- **Section A**
- **Section B**
- **Location of Posts & Blocks for Beam Guardrail Type 31 (Typ.)**
- **Location of Posts & Blocks for Beam Guardrail Type 1 (Typ.)**
1. Unless otherwise indicated in the contract, the SRT - 350 (12.5, 8 Post) as manufactured by Trinity Industries, Inc., or a FLEAT 350 as manufactured by Road Systems Inc., shall be installed per manufacturer's recommendations. If specified in the Contract, the FLEAT TL2 as manufactured by Road Systems Inc. shall be installed per manufacturer's recommendations.

2. When terminal is placed on a curve, post offsets would result in the rail encroaching onto the shoulder (e.g., the inside of a curve), the posts shall be installed so that the face of the rail is at the edge of the shoulder.

3. When snow load post washers and snow load rail washers are called for in the contract, the snow load rail washers must be omitted within the terminal limits.

4. Offset distances:
   - FLEAT 350 ............................................... 4' - 0"
   - FLEAT TL2 ............................................... 1' - 8" minimum
**NOTES**

1. An ET-PLUS (TL3) as manufactured by Trinity Industries, Inc. or an SKT-350 as manufactured by Road Systems Inc. shall be installed according to manufacturer's recommendations. When a TL2 terminal is specified in the contract an ET-PLUS (TL2) as manufactured by Trinity Industries, Inc. or an SKT-TL2 as manufactured by Road Systems, Inc. shall be installed according to manufacturer's recommendations.

2. A reflectorized object marker shall be installed according to manufacturer's recommendations.

3. When snow load post washers and snow load rail washers are required by the contract, the snow load rail washers must not be installed within the terminal limits.

4. Terminal shall be installed at a taper, ensuring that end piece is entirely off shoulder.

5. Length for ET-PLUS (TL3) and SKT-350 is 50'. Length for ET-PLUS (TL2) and SKT-TL2 is 25'.
SLOTTED THREE BEAM RAIL ELEMENT #1
SEE STD PLAN C-1a FOR RAIL ELEMENT DETAILS
(RAIL DIMENSIONS SHOWN ARE BEFORE BENDING TO RADIUS SHOWN IN PLAN)
SPLICE BOLT SLOT
POST BOLT SLOT

SLOTTED THREE BEAM RAIL ELEMENT #2
SEE STD PLAN C-1a FOR RAIL ELEMENT DETAILS
(RAIL DIMENSIONS SHOWN ARE BEFORE BENDING TO RADIUS SHOWN IN PLAN)
SPLICE BOLT SLOT
POST BOLT SLOT

SLOTTED THREE BEAM RAIL ELEMENT #3
SEE STD PLAN C-1a FOR RAIL ELEMENT DETAILS
SPLICE BOLT SLOT
POST BOLT SLOT

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES

1. Attach guardrail to bridge rail or concrete barrier with 7/8" diameter high strength bolts (Standard Specification 9-06.5(4)) with thin slab ferrule inserts or resin bonded anchors. See the Contract Plans.

2. If the last guardrail post is 3" or less from the end of the bridge barrier, this attachment and blockout is not necessary.

3. This case is also applicable for vertical faces with no curbs.

4. When B Connection is used with Type 1A Transition, the maximum spacing between bolts is 6'-3".

1. Attach guardrail to bridge rail or concrete barrier with 7/8" diameter high strength bolts (Standard Specification 9-06.5(4)) with thin slab ferrule inserts or resin bonded anchors. See the Contract Plans.

2. If the last guardrail post is 3" or less from the end of the bridge barrier, this attachment and blockout is not necessary.

3. This case is also applicable for vertical faces with no curbs.

4. When B Connection is used with Type 1A Transition, the maximum spacing between bolts is 6'-3".

1. Attach guardrail to bridge rail or concrete barrier with 7/8" diameter high strength bolts (Standard Specification 9-06.5(4)) with thin slab ferrule inserts or resin bonded anchors. See the Contract Plans.

2. If the last guardrail post is 3" or less from the end of the bridge barrier, this attachment and blockout is not necessary.

3. This case is also applicable for vertical faces with no curbs.

4. When B Connection is used with Type 1A Transition, the maximum spacing between bolts is 6'-3".

1. Attach guardrail to bridge rail or concrete barrier with 7/8" diameter high strength bolts (Standard Specification 9-06.5(4)) with thin slab ferrule inserts or resin bonded anchors. See the Contract Plans.

2. If the last guardrail post is 3" or less from the end of the bridge barrier, this attachment and blockout is not necessary.

3. This case is also applicable for vertical faces with no curbs.

4. When B Connection is used with Type 1A Transition, the maximum spacing between bolts is 6'-3".
NOTE:

1. Anchor plate may be constructed from 1/4" plates welded to equal strength and dimensions as shown.
2. For end section details see Standard Plan "Beam Guardrail End Sections".
3. For post details, see Standard Plan "Beam Guardrail Posts and Blocks".
4. Eight 5/8" x 1 1/2" machine bolts with hex nut and washer. Place washer on face side of rail.
5. Outside nut shall be torqued against inside nut a minimum of 100 ft-lbs.
6. Toenail bearing plate with 10d nail at corners to prevent turning.
7. Anchor pay limit does not apply when anchor is included in a Beam Guardrail Terminal.

Donald K. Nelson
05/30/97

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
BEARING PLATE

BEAM GUARDRAIL ANCHOR
TYPE 1

ANCHOR RAIL WASHER

ANCHOR CABLE

ELEVATION

SECTION B-B

ANCHOR PLATE
(See Note 1)

3 1/4 x 1 3/8 x 1/2" End plate

1/2" x 2 1/2 x 1/2" End plate

1 1/4 " x 1" x 8" plate
double welded to 3/8" plate

1 3/8 " Plate

1 1/4 " Plate

BEARING PLATE

3/16 " x 1/2 " Hole

3 1/8 " Hole

1" x 7" Stud
threaded full length (TYP)

3/16 " x 1" x 8" Plate
tack welded to 5/8" Plate

STANDARD PLAN C-6

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT
BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY
THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON
FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANS-
PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. Rail section and W8 x 17 post shall be fabricated to receive 5/8" hex head bolts as shown.

2. All bolts shall be high strength 5/8" hex head bolts with anchor rail washers.

**See Note 1**

**See Note 2**

5'-0" (or 2'-0" MIN in solid rock)

One 13/4" x 55/8" x 0.164" washer with two 11/64" holes

6' Post
(or 3' MIN in solid rock)

10" DIA
NOTES:
1. For details, see Standard Plan C-6.
2. For end section details see Standard Plan C-7 or C-7a.
3. For details, see Standard Plan C-1b.
4. Outside nut shall be torqued against inside nut a minimum of 300 ft-lbs.
5. Post and block shall match beam guardrail posts.
1. Attach W-beam to steel pipe with 5/8" x 1 1/4" button head bolt with no washer. No connection to the post is required.

2. For end section details see Standard Plan, "Beam Guardrail End Sections".

3. For details see Standard Plan, "Beam Guardrail Anchor Type 1".

4. For details see Standard Plan, "Beam Guardrail Posts".

5. Outside nut shall be torqued against inside nut a minimum of 100 ft/lbs.

NOTES

1. Attach W-beam to steel pipe with 5/8" x 1 1/4" button head bolt with no washer. No connection to the post is required.

2. For end section details see Standard Plan, "Beam Guardrail End Sections".

3. For details see Standard Plan, "Beam Guardrail Anchor Type 1".

4. For details see Standard Plan, "Beam Guardrail Posts".

5. Outside nut shall be torqued against inside nut a minimum of 100 ft/lbs.

NOTES

1. Attach W-beam to steel pipe with 5/8" x 1 1/4" button head bolt with no washer. No connection to the post is required.

2. For end section details see Standard Plan, "Beam Guardrail End Sections".

3. For details see Standard Plan, "Beam Guardrail Anchor Type 1".

4. For details see Standard Plan, "Beam Guardrail Posts".

5. Outside nut shall be torqued against inside nut a minimum of 100 ft/lbs.
**NOTES**

1. For details, see Standard Plan, "Beam Guardrail Anchor Type 1".

2. The rail element is to be included in the "Beam Guardrail" pay item. The "Anchor" pay item includes the anchor post, anchor plate, anchor cable, bearing plate, nuts and washers.

3. For details, see Standard Plan, "Beam Guardrail Posts and Blocks".

4. Post shall match beam guardrail posts.

---

**Standard Plan C-6f**

**Beam Guardrail Anchor Type 7**

**Approve for Publication**

Donald K. Nelson

**State Design Engineer**

**Washington State Department of Transportation**

**Olympia, Washington**

**Washington State**

**Expires May 3, 1998**

---

**Diagram Description**

- **Anchor Post Assembly** (See Note 3)
  - Standard 2" ID pipe sleeve (2 3/8" OD)
  - Two 1" nuts and washers (see Note 1)

- **Bearing plate**
  - (see Note 1)

- **Anchor plate**
  - (see Note 1)

- **Two 1" nuts and washers** (see Note 1)

- **Anchor pay limit** (see Note 2)

- **Beam Guardrail pay limit** (see Note 2)

---

**Legend**

- **Anchor**
- **Bearing plate**
- **Anchor plate**
- **Two 1" nuts and washers**
- **Anchor pay limit**
- **Beam Guardrail pay limit**

---

**Note:** This plan is not a legal engineering document but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.
1. End Section Design G shall be used except where noted on the plans or contract.

2. Attach guardrail to bridge rail or concrete barrier with 7/8" diameter high strength bolts (Standard Specification 6-05 6-06) with thin slab ferrule inserts or resin bonded anchors. See the Contract Plans.

3. A single piece having similar dimensional shape to Design G and mating with the W-beam guardrail is an alternate.

4. In cases where Design "F" end section is lapped on the outside of the guardrail, a galvanized 1" ID, 2" OD, 0.134" thick, narrow Type A Plain Washer or a anchor rail washer shall be placed under the splice bolt heads.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
**NOTES**

1. Attach guardrail to bridge rail or concrete barrier with 7/8" diameter high strength bolts (Standard Specification C-634) with thin slab ferrule inserts or thin bonded anchors. See the Contract Plans.

2. In cases where Design F End Section is lapped on the outside of the guardrail, a galvanized 1" ID, 2" OD, 0.134" thick, narrow Type A Plain Washer or an anchor rail washer will be placed under the splice bolt heads.

---

**DESIGN D (THREE BEAM) END SECTION**

- **R = 6"**
- **3/4" x 2 1/2" SLOTS (TYP)**
- **30°** BEND FOR USE WITH DESIGN G (THREE BEAM)

**DESIGN F (THREE BEAM)**

- **29/32" x 1 1/8" SLOTS (TYP)**
- **3/4" HOLES (TYP)**
- **2" BEND FOR USE WITH DESIGN G (THREE BEAM) END SECTION ONLY**

**DESIGN G (THREE BEAM)**

- **2" BEND FOR USE WITH DESIGN G (THREE BEAM)**
- **1" HOLES (TYP)**
- **29/32" x 1 1/8" SLOTS (TYP)**
- **3/4" x 2 1/2" SLOTS (TYP)**

---

**STANDARD PLAN C-7a**

**THREE BEAM END SECTIONS**

**NOTE:** THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
Wire rope loops shall be 3' - 8" long, except for the top loop of the Barrier Terminal, which shall be 2' - 0" long.

1. For the locations of the wire rope loops, the dimensions shown in END VIEW "A" are typical for both ends of a Barrier Section or opposing ends of Barrier Terminals.

2. Connecting and Drift Pin head designs vary among different manufacturers. Pin designs that are shaped differently than those shown in the detail are acceptable, if the bearing surface is within the minimum and maximum widths specified.

3. The vertical spacing of the Wire Rope Loops in a Barrier Terminal is determined by the end of the Barrier Segment to which it is being connected. See BARRIER CONNECTION DETAIL (Sheet 2).
CONCRETE BARRIER TYPE 4
AND TRANSITION SECTION

INTERMEDIATE PLAN

INTERMEDIATE ELEVATION

TRANSITION PLAN

TRANSITION ELEVATION

CONCRETE BARRIER TYPE 4
AND TRANSITION SECTION

SECTION A-A
TYPE 4

TRANSITION END VIEW

SECTION B-B
TRANSITION SECTION

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES:

1. This plan shall be used for 40' and 50' Light Standards with 16' max. length double mast arms.


3. See the Contract Plans for conduit placement.

4. Concrete shall be Class 4000.

This plan shall be used for 40' and 50' Light Standards with 16' max. length double mast arms. See Standard Plan C-8 for details on barrier ends, Wire Rope Loops, and Connecting Pins. See the Contract Plans for conduit placement. Concrete shall be Class 4000.
NOTES

1. The intended use of this plan is for the permanent anchoring of Precast Concrete Barrier Type 2 (see Standard Plan C-8) on hot mix asphalt pavement.

2. Remove the Type 3 Anchors by first driving the steel pins down through the barrier further into the pavement to allow lifting the barrier without interference, then remove the pins from the pavement.

3. After removing the Type 3 Anchors, clean the pin holes and fill them with sealant according to Standard Specification 9-04.2.

The intended use of this plan is for the permanent anchoring of Precast Concrete Barrier Type 2 (see Standard Plan C-8) on hot mix asphalt pavement. Remove the Type 3 Anchors by first driving the steel pins down through the barrier further into the pavement to allow lifting the barrier without interference, then remove the pins from the pavement. After removing the Type 3 Anchors, clean the pin holes and fill them with sealant according to Standard Specification 9-04.2.
BOX CULVERT GUARDRAIL STEEL POST TYPE 1
(16” to 36” ground cover)

BASE ATTACHMENT DETAIL

POST ATTACHMENT DETAIL

BOX CULVERT GUARDRAIL STEEL POST TYPE 2
(3” to 6” ground cover)

POST BASE ATTACHMENT DETAIL

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. Length of W8x35 and W6x9 shall be determined by measurement from top of ground to top of grout pad. This distance shall be verified by the contractor.

2. Attach guardrail post to box culvert with 3/4" high strength bolts with resin bonded anchors.

3. Drill 1 1/4" diameter hole in concrete slab for 7/8" high strength bolts. Length of bolt is determined by top slab of box culvert thickness which shall be verified by the contractor.

4. For details of post attachment to double box culvert see Standard Plan "Guardrail Placement," Case 15.

---

**NOTES**

1. Length of W8x35 and W6x9 shall be determined by measurement from top of ground to top of grout pad. This distance shall be verified by the contractor.

2. Attach guardrail post to box culvert with 3/4" high strength bolts with resin bonded anchors.

3. Drill 1 1/4" diameter hole in concrete slab for 7/8" high strength bolts. Length of bolt is determined by top slab of box culvert thickness which shall be verified by the contractor.

4. For details of post attachment to double box culvert see Standard Plan "Guardrail Placement," Case 15.
SINGLE SLOPE CONCRETE BARRIER (PREFAB)  
STANDARD PLAN C-13  
Sheet 2 of 2 Sheets  

STANDARD MOUNTING HEIGHT
**NOTES**

1. **PERMANENT INSTALLATION** requirements:
   - Semi-buried barrier 3'-0" minimum, install 1/4" premolded joint filler between segments, fill the connection blockout with grout, centering the Rebar Grid in the blockout before adding grout.

2. **TEMPORARY INSTALLATION** requirements:
   - Place a Rebar Grid in the connection blockout between barrier segments.

3. See standard Plan C-12 for **REBAR GRID DETAIL** and **BARRIER CONNECTION DETAIL**.

4. This plan is for transitions to precast concrete barriers only.

5. When High Performance Concrete Barriers are specified in the Contract, use the dimensions given in the HP row in the **DIMENSION TABLE**, with a minimum height above roadway of 3'-0" and a minimum embedment of 3'-0".

---

**DIMENSION TABLE**

<table>
<thead>
<tr>
<th></th>
<th>2A</th>
<th>B</th>
<th>C</th>
<th>2D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>STD.</td>
<td>3'-0&quot;</td>
<td>5'-0&quot;</td>
<td>3'-0&quot;</td>
<td>2'-0&quot;</td>
<td>2'-0&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>HP</td>
<td>4'-0&quot;</td>
<td>6'-0&quot;</td>
<td>3'-0&quot;</td>
<td>2'-0&quot;</td>
<td>2'-0&quot;</td>
<td>18&quot;</td>
</tr>
</tbody>
</table>

**REINFORCING STEEL BENDING DIAGRAM**

- **12" Hook**
- **24" Hook**
- **36" Hook**

---

**SINGLE SLOPE CONCRETE BARRIER (PRECAST)**

**TRANSITION SECTION**

**STANDARD PLAN C-13a**

---

**REMARKS**

- This plan is for transitions to precast concrete barriers only.
- When High Performance Concrete Barriers are specified in the Contract, use the HP dimensions in the **DIMENSION TABLE**.

---

**APPROVED FOR PUBLICATION**

**Puente Ranchos Rd**

**SEALING OFFICIALS**

**Washington State Department of Transportation**

**EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009**
This plan is for transitions to Pre-cast Concrete Barrier Type 2 only. See contract for transitions to other barrier shapes and bridge rails.

1. Field bend as required in transition.
2. All bends are 2" radius.

See Note 1

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES:

1. The Terminal is used only on the tailing end of a barrier, unless otherwise shown in the Contract.

2. See Standard Plan C-14c, Sheet 1, for EXPANSION JOINT and DUMMY JOINT details.

3. When High Performance Concrete Barrier is specified in the Contract, use the dimensions given in the HP row in the DIMENSION TABLE, with a minimum height above roadway of 3'-6", and a minimum embankment of 3'.
When connecting between cast-in-place and precast Single Slope Barrier, provide a slot and rebar grid as shown on Standard Plan C-13.

2. See the Contract Plans for conduit placement.

3. Concrete shall be Class 4000.
NOTES


2. CONCRETE SHALL BE CLASS 4000 UNLESS OTHERWISE NOTED.

NOTES


CONCRETE SHALL BE CLASS 4000 UNLESS OTHERWISE NOTED.

SEE THE CONTRACT PLANS FOR CONDUIT PLACEMENT

1. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

2. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

3. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

4. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

5. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

6. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

7. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

8. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

9. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

10. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

11. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

12. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

13. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

14. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

15. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

16. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

17. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

18. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

19. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

20. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

21. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

22. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

23. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

24. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

25. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

26. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

27. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

28. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.

29. SHAFT DEPTH "Z" IS BASED ON ALLOWABLE LATERAL LOADS BASED ON EXCESS OF 1000 PSF.
1. See Standard Specification 8-21.3(b) for construction requirements.
2. Use a template to locate and secure the bolts during foundation installation.
3. When connecting between cast-in-place and precast single slope barrier, provide a slot and rebar grid as shown in Standard Plan C-15.

**Material Specifications**

| Shaft Concrete | Class 4000P |
| All Other Concrete | Class 4000 |
| Steel Reinforcement | ASTM A 615 Grade 60 |
| Anchor Rods | ASTM A 416 Grade 100 |
| Anchor Nuts | ASTM A 564 Grade 100 |

**Shaft Depth**

<table>
<thead>
<tr>
<th>Size</th>
<th>Total Area (in²)</th>
<th>Allowable Lateral Reactions (kip)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11'-0&quot;</td>
<td>300 or less</td>
<td>1000 and up</td>
</tr>
<tr>
<td>16'-0&quot;</td>
<td>300 or less</td>
<td>1000 and up</td>
</tr>
<tr>
<td>18'-0&quot;</td>
<td>300 or less</td>
<td>1000 and up</td>
</tr>
<tr>
<td>22'-0&quot;</td>
<td>300 or less</td>
<td>1000 and up</td>
</tr>
</tbody>
</table>

**Elevation**

See Section "A" Sheet 2 for shaft riser/anchor.
1. Use the barrier type, precast or cast-in-place, as specified in the Contract.

2. For Single Slope Concrete Barrier details, see Standard Plan series C-13 (precast) or C-14 (cast-in-place).
PRECAST CONC. BARRIER TYPE 2

SHOULDER

HINGE-POINT

MATCH SLOPE

3H:1V OR FLATTER SLOPE

CABLE BARRIER TYPE 1 OR 2

TYPE 3 ANCHORS (SEE STD. PLAN C-8e)

ANCHORED PRECAST CONC. BARRIER TYPE 2

FACE OF BARRIER

1.5M H:1V

CABLE BARRIER ON STEEP SLOPES

BEAM GUARDRAIL ON STEEP SLOPES

FACE OF BARRIER

2H:1V OR FLATTER SLOPE

BEAM GUARDRAIL

SINGLE SLOPE CONC. BARRIER

CAST-IN-PLACE

FACE OF BARRIER

2H:1V OR FLATTER SLOPE

SINGLE SLOPE CONC. BARRIER

PRECAST
NOTES

1. An additional width for any distance is required when the existing roadway is to be widened.

2. The additional width for any distance may be less than 2.0' when it, combined with the existing shoulder width, totals 2.0' or more.

SHOULDERS

PRECAST CONC. BARRIER TYPE 2

ANCHORED PRECAST CONC. BARRIER TYPE 2

CABLE BARRIER TYPE 1 or 2

SINGLE SLOPE CONC. BARRIER CAST-IN-PLACE

SINGLE SLOPE CONC. BARRIER PRECAST

TRAFFIC BARRIER SHOULDER WIDENING - FOR SHOULDERS LESS THAN 6.0' WIDE

STANDARD PLAN C-16b

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

DRAWN BY: BILL BERENS

EXPIRES JULY 24, 2006
NOTES

1. For component details, see Standard Plan C-23.60.

2. For terminal type and details, see Contract Plans and applicable drawings.

3. The slope from the edge of the shoulder into the face of the guardrail cannot exceed 10:1 when the face of the guardrail is less than 12'-0" from the edge of the shoulder.

4. For one-way traffic and where a crashworthy terminal is not required, use the Beam Guardrail Anchor Type 10, see Standard Plan C-23.60.

5. Where a crashworthy terminal is required use a Beam Guardrail Type 31 Non-Flared Terminal, see Standard Plan C-22.40.

For component details, see Standard Plan C-23.60.

For terminal type and details, see Contract Plans and applicable drawings.

The slope from the edge of the shoulder into the face of the guardrail cannot exceed 10:1 when the face of the guardrail is less than 12'-0" from the edge of the shoulder.

For one-way traffic and where a crashworthy terminal is not required, use the Beam Guardrail Anchor Type 10, see Standard Plan C-23.60.

Where a crashworthy terminal is required use a Beam Guardrail Type 31 Non-Flared Terminal, see Standard Plan C-22.40.
NOTES

1. An ET-PLUS 31 as manufactured by Trinity Industries, Inc. or an SKT-MGS as manufactured by Road Systems Inc. shall be installed according to manufacturers' recommendations.

2. A reflectorized object marker shall be installed according to manufacturer's recommendations.

3. When snow load post washers and snow load rail washers are required by the contract, the snow load rail washers shall not be installed within the terminal limits.

4. Terminal shall be installed at a widening, ensuring that the end piece is entirely off the shoulder.

5. While these terminals do not require an offset at the end, a flare is recommended so that the end piece does not protrude into the shoulder. A maximum flare of 25:1 over the system length of the terminal is allowed for either the ET-PLUS 31 or the SKT-MGS.

6. 

SEE NOTE 5

SEE NOTE 2

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES
1. For use on the end of guardrail runs when a crashworthy terminal is not required.
2. For additional details not shown, see Standard Plan C-6c.
3. For End Section details, see Standard Plan C-7.
4. For Anchor Post Assembly details, see Standard Plan C-1b. Use detail on this plan for Wood Breakaway Post. (No block on this post).
5. Fasten the Anchor Cable using two 1" nuts and washer, at both ends of cable. Distinctive nut shall be torqued against inside nut a minimum of 100 ft-lbs.
6. Posts shall match those of connecting run: Timber or Steel.

BEAM GUARDRAIL TYPE 31 - PAY LIMIT
BEAM GUARDRAIL, ANCHOR TYPE 10 - PAY LIMIT

ANCHOR PLATE
(SEE NOTE 2)

GROUND LINE

ANCHOR POST ASSEMBLY
(SEE NOTE 4)

SEE NOTE 6

5 1/2"
7 1/2"
7"
22"
2"
3' - 10 1/2"
6×8
S4S

WOOD BREAKAWAY POST DETAIL

ELEVATION VIEW

ISOMETRIC VIEW

BEAM GUARDRAIL (TYPE 31)
ANCHOR TYPE 10
STANDARD PLAN C-33.60-00

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. This guardrail transition is for connection to a vertical concrete shape or single slope barrier and cannot be connected directly to a concrete safety shape.

2. Do not bolt nested W-Beam or rubrail W-Beam to posts and blocks on posts 1, 2, 3, and 6. Bolt tapered blocks directly to posts.

3. The nested W-Beam can be shop bent to facilitate installation.

4. Posts 1, 2, 3, and 6 require an additional hole to attach tapered blocks and/or rubrail.

5. Posts 1 and 2 are 10×10 timber or W8×13 steel posts ~ 7' - 6" long. Posts 3 through 9 are 6×8 timber or W6×9 steel posts ~ 6' - 0" long.

Tapered Blocks for Rubrail Detail

11 1/4" long (typ.)

3/4" diameter hole (typ.)

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTE


2. If the distance from the end of the bridge to the end of the Bridge Rail Thrie Beam Retrofit section (10 gage) exceeds 6' - 3" using 12' - 6" thrie beam sections, add a 6' - 3" section of 10 gage thrie beam to reduce the length to less than 6' - 3".

3. When a transition is required on the trailing end of the bridge, use a mirror image of this plan.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES:

1. Refer to Standard Plan C-01 and C-19 for component details for Beam Guardrail Type 1 not shown on this plan.

2. Refer to Standard Plan C-264-6 for component details for Beam Guardrail Type 31 not shown on this plan.

3. Where post offset is constrained, and when the existing shoulder width is less than 4 feet, the existing shoulder may be reduced up to 6 feet to accommodate the 6-inch blockout of the Beam Guardrail Type 31. See PLAN VIEW — ALIGNMENT TAPER.

4. All posts for any standard barrier run shall be of the same type, Timber or Steel.
**NOTES**

1. Refer to Standard Plan C-1 and C-14a, for additional details not shown on this plan.

2. All posts for any standard barrier run shall be of the same type: Timber or Steel.


4. Use a single or combination of blocks to achieve the actual 12" offset. See Standard Specification 9-16.3 (2). Wood blocks shall be toe-nailed to post (and blocks, if block combinations are utilized) with a 16d galvanized nail to prevent block rotation.

5. On steel posts, attach blockouts using bolt holes on approaching traffic side of post webs.

**SLOPE EMBANKMENT TABLE**

<table>
<thead>
<tr>
<th>SLOPE</th>
<th>B实现了</th>
<th>B实现了</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5'</td>
<td>4.0'</td>
<td>B实现了</td>
</tr>
<tr>
<td>4.5'</td>
<td>6.0'</td>
<td>B实现了</td>
</tr>
</tbody>
</table>

**TYPICAL RAIL ELEMENT**

- 6×12 BLOCKOUT (TYP.)
- 3/4" DIAM. HOLE
- 1/4" DIAM. HOLE FOR ANTI-ROTATION NAIL (16d)
- 3/4" DIAM. HOLE THROUGH BLOCK FOR STEEL POST
- 5/8" × 14" BUTTON HEAD BOLT WITH 7/32" OVAL GRIP AND RECESSED HEX NUT WITH CUT WASHER (TYP.)

**BEAM GUARDRAIL TYPE 31**

- 6×12 BLOCKOUT (TYP.)
- 3/4" DIAM. HOLE THROUGH BLOCK FOR TIMBER POST
- 5/8" × 22" BUTTON HEAD BOLT WITH 7/32" OVAL GRIP (TYP.)
- SEE NOTE 4

**PRECAST CURB REPLACEMENT AREA**

- PRECAST CURB PLACEMENT AREA — SEE NOTE 9
- 6×8×6' LONG TIMBER POST (SEE NOTE 2)
- 6×8×6' LONG STEEL POST (SEE NOTE 2)
- 6×12 BLOCKOUT (TYP.)
- 3/4" DIAM. HOLE FOR ANTI-ROTATION NAIL (16d)
- 3/4" DIAM. HOLE FOR HEAD BOLT (TYP.)
- SEE NOTE 4
NOTES

1. Walls to be designated Noise Barrier Wall Type 2A, 2B, 2C or 2D. The Contract specifies actual wall designations.

2. For intermediate wall heights not listed, use the next higher H.

3. Panels shall have at least 3 feet of level ground on each side.

4. Construction joints in the footing shall be spaced at 120 feet maximum.

CAST-IN-PLACE CONCRETE WALL ON SPREAD FOOTING

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT. THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON ARCHIVES. A COPY MAY BE OBTAINED UPON REQUEST.
FOOTING WIDTH TRANSITION DETAIL
FOR LOCATIONS WITHOUT FOOTING STEP

W/2

C FOOTING

FOOTING

BAR 'X' (TP)

(TRANSVERSE BARS NOT SHOWN)

JOINT AND CORNER DETAIL

CAST-IN-PLACE CONCRETE WALL ON SPREAD FOOTING

NOISE BARRIER WALL TYPE 2
STANDARD PLAN D-2.04-00

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

Harold J. Peterfeso
11-10-05
DRAWN BY: ADAM COCHRAN

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

EXPIRES AUGUST 23, 2006

STANDARD PLAN D-2.04-00
SHEET 2 OF 2 SHEETS
APPROVED FOR PUBLICATION
Harold J. Peterfeso 11-10-05
Washington State Department of Transportation
FOOTING WIDTH TRANSITION DETAIL
FOR LOCATIONS WITHOUT FOOTING STEP

CAST-IN-PLACE CONCRETE WALL ON OFFSET SPREAD FOOTING

JOINT AND CORNER DETAIL
1. Walls to be designated Noise Barrier Wall Type 4A, 4B, 4C or 4D. The Contract specifies actual wall designations.

2. For intermediate wall heights, see next table.

3. Panels shall have at least 3 feet of level ground on each side.

4. Construction joints in the shaft cap shall be spaced at 120 feet maximum.

5. The Contract specifies actual foundation requirements D1 or D2.

CAST-IN-PLACE CONCRETE WALL ON SHAFT FOUNDATION

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES:
1. Wall to be designated Noise Barrier Wall Type 5A, 5B, 5C or 5D. The Contract specifies actual wall designation.
2. For intermediate wall heights, use the next highest H.
3. Panels shall have at least 3 feet min. of level ground on each side.
4. Construction joints in the footing shall be spaced at 120 feet max.
5. The Contract specifies actual foundation requirements D1 or D2.

The Contract specifies actual foundation requirements D1 or D2.

Construction joints in the footing shall be spaced at 120 feet max.

Panels shall have at least 3 feet min. of level ground on each side.

For intermediate wall heights, use the next higher H.

Wall to be designated Noise Barrier Wall Type 5A, 5B, 5C or 5D.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES
1. Wall to be designated Noise Barrier Wall Type 6A, 6B, 6C or 6D. The Contract specifies actual wall designations.

2. For Intermediate wall heights, use the next higher H.

3. Panel shall have at least 3 feet of level ground on each side.

4. Construction joints in the foundation shall be spaced at 120 feet maximum.
1. Wall to be designated Notes Barrier Wall Type 6SSA, 6SSB, 6SSC or 6SSD. The Contract specifies actual wall designations.

2. For intermediate wall heights, use the next higher H.

3. Panel shall have at least 3 feet of level ground on each side.

4. Construction joints in the foundation shall be spaced at 120 feet maximum.

Construction joints in the foundation shall be spaced at 120 feet maximum.
NOTES:
1. Wall to be designated Noise Barrier Wall Type 7A, 7B, 7C or 7D. The Contract specifies actual wall designations.
2. For intermediate wall heights, use the next higher H.
3. Panel wall have at least 6 feet of level ground on each side.
4. The Contract specifies actual foundation requirements D1 or D2.

1/2" PREMOLDED JOINT FILLER IN EXPANSION JOINTS AT FACE OF BARRIER (TYP).

WALL W/ TRAFFIC BARRIER ON STANDARD PLAN D-2.18-00

CAST-IN-PLACE CONCRETE WALL W/ TRAFFIC BARRIER ON SHAFT FOUNDATION

NOISE BARRIER WALL TYPE 7
STANDARD PLAN D-2.18-00

APPROVED FOR PUBLICATION

Harold J. Peterfeso
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
**NOTES**

1. Wall to be designated Noise Barrier Wall Type 7SSA, 7SSB, 7SSC or 7SSD. The Contract specifies actual wall designations.
2. For intermediate wall heights, use the next higher H.
3. Panels shall have at least 3 feet of level ground on each side.
4. The Contract specifies actual foundation requirements D1 or D2.
5. Panels shall have at least 3 feet of level ground on each side.

**BENDING DIAGRAM**

**CAST-IN-PLACE CONC. WALL W/ SINGLE SLOPE TRAFFIC BARRIER ON SHAFT FOUNDATION**

**JOINT AND CORNER DETAIL**

**ELEVATION**

**REINFORCING STEEL**

**REINFORCED PER LISTED WALL HEIGHT REINFORCEMENT TABLE**

**SURFACE TREATMENT AS REQUIRED**

**CONSTRUCTION JOINT WITH AGGREGATE-FILLED SURFACE**

**SHEET 1 OF 1 SHEET**
### Panels Height (H) + Depth (D)

#### Type 8A
- **Wall Height (H):** 5' - 0" to 6' - 0"
- **Depth (D):** 1 1/2" @ 8" to 9 1/2" @ 8" (min. 3"
- **Bar "D":** Center in wall

#### Type 8B
- **Wall Height (H):** 5' - 0" to 6' - 0"
- **Depth (D):** 1 1/2" @ 6 1/2" to 8" @ 6 1/2" (min. 3"
- **Bar "D":** Center in wall

#### Type 8C
- **Wall Height (H):** 5' - 0" to 6' - 0"
- **Depth (D):** 5" @ 6" to 7" @ 6" (min. 3"
- **Bar "D":** Center in wall

#### Type 8D
- **Wall Height (H):** 5' - 0" to 6' - 0"
- **Depth (D):** 6" @ 6" to 8" @ 6" (min. 3"
- **Bar "D":** Center in wall

### Notes
1. Wall to be designated Noise Barrier Wall Type 8A, 8B, 8C, or 8D. The Contract specifies actual wall designations.
2. For intermediate wall heights, use the next higher H.
3. Panels shall have at least 3" - 5" of level ground on each side.
4. All joints shall be in full contact and sealed.
5. The Contract specifies actual foundation requirements.
6. 3/4" chamfer (typ).
7. 2" - 1/2" compaction base shall be present on each side of each panel.
8. Allusion point shall be set vertically.
9. 1/2" noise seal at top of wall height.
10. Reinforcement reinforcement table.

### Specification Details
- **Wind Exposure & Velocity:**
  - **Type 8A, 8B:** 80 MPH
  - **Type 8C, 8D:** 90 MPH

### Additional Information
- **Foundation Requirements:**
  - **Step in Panel Top:**
  - **Joint and Corner Detail:**
- **Noise Barrier Wall Type 8**
- **Standard Plan D-3.30-00**

---

**H: Harold J. Peterfeso**

**Washington State Department of Transportation**

**Date:** 11/10/05

**State Design Engineer**

**Expires August 23, 2006**
All joints shall be in full contact and sealed.

1. Joints shall be in full contact and sealed. Construction joints in the footing shall be spaced at the next higher H.
2. For intermediate wall heights, use the next higher H.
3. Panels shall be at least 3' - 0" of level ground on each side.
4. Construction joints in the footing shall be spaced at 120 feet minimum.
5. All joints shall be in full contact and sealed.

NOTES:

- Walls to be designated Noise Barrier Wall Type 9A, 9B, 9C or 9D. The Contract specifies actual wall designation.
- Type 9A, 9B, 9C or 9D. The Contract specifies actual wall designation.
- For intermediate wall heights, use the next higher H.
- Panels shall be at least 3' - 0" of level ground on each side.
- Construction joints in the footing shall be spaced at 120 feet minimum.
- All joints shall be in full contact and sealed.
FOOTING WIDTH TRANSITION DETAIL

PRECAST CONCRETE WALL ON SPREAD FOOTING

FOOTING

WALL

CORNER PANEL

J JOINT AND CORNER DETAIL

BAR "D"

BAR "G" SPIRAL

BAR "H"

GROUT PAD

GROUT

DUCT

3/4" CHAMFER (TYP.)

1/2" NOISE SEALER (TYP.)

1' - 0" MIN. (TYP.)

CORNER PANEL

BAR "D"

BAR "G" SPIRAL

BAR "H"

GROUT PAD

GROUT

DUCT

3/4" CHAMFER (TYP.)

1/2" NOISE SEALER (TYP.)

1' - 0" MIN. (TYP.)

PRECAST CONCRETE WALL

ON SPREAD FOOTING

FOOTING

WALL

CORNER PANEL

J JOINT AND CORNER DETAIL

BAR "D"

BAR "G" SPIRAL

BAR "H"

GROUT PAD

GROUT

DUCT

3/4" CHAMFER (TYP.)

1/2" NOISE SEALER (TYP.)

1' - 0" MIN. (TYP.)

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
### Noise Barrier Wall Type 10

**Standard Plan D-3.34-00**

**Wall Heights**

- **Type 10A**: 9' - 0"  W/4.0 @ 1 1/4"
- **Type 10B**: 10' - 0"  W/4.0 @ 2"
- **Type 10C**: 10' - 0"  W/4.0 @ 2"
- **Type 10D**: 12' - 0"  W/4.0 @ 2"

**Wind Exposure & Velocity**

- **Barrier Type**
  - 10A: 100
  - 10B & 10C: 90
  - 10D: 80

**Notes**

1. Walls to be designated Noise Barrier Wall Type 10A, 10B, 10C, or 10D. The Contract specifies actual wall designation.
2. For intermediate wall heights, use the next higher H.
3. Panels shall have at least 3' - 0" of level ground on each side.
4. Construction joints in the footing shall be spaced at 120 feet maximum.
5. All joints shall be in full contact and sealed.

**Construction Details**

- **Joint Hole for Dowel Bar**: 24' - 0"
- **Joint Hole for Placing Grout**: 22' - 0"
- **Joint Hole for Placing Grout**: 20' - 0"  W/2.0 @ 1 1/2"
- **Joint Hole for Placing Grout**: 18' - 0"  W/3.0 @ 2"
- **Joint Hole for Placing Grout**: 16' - 0"  W/3.0 @ 2"
- **Joint Hole for Placing Grout**: 14' - 0"  W/3.0 @ 2"
- **Joint Hole for Placing Grout**: 12' - 0"  W/3.0 @ 2"
- **Joint Hole for Placing Grout**: 10' - 0"  W/3.0 @ 2"
- **Joint Hole for Placing Grout**: 8' - 0"  W/3.0 @ 2"
- **Joint Hole for Placing Grout**: 6' - 0"  W/3.0 @ 2"

**Reinforcing Steel**

- **Typical Section**
  - WALL HT: 1' - 0" 5 ~ #4
  - WALL HT: 2' - 0" 5 ~ #4
  - WALL HT: 3' - 0" 5 ~ #4
  - WALL HT: 4' - 0" 5 ~ #4
  - WALL HT: 5' - 0" 5 ~ #4
  - WALL HT: 6' - 0" 5 ~ #4
  - WALL HT: 7' - 0" 5 ~ #4
  - WALL HT: 8' - 0" 5 ~ #4
  - WALL HT: 9' - 0" 5 ~ #4
  - WALL HT: 10' - 0" 5 ~ #4
  - WALL HT: 11' - 0" 5 ~ #4
  - WALL HT: 12' - 0" 5 ~ #4
  - WALL HT: 13' - 0" 5 ~ #4
  - WALL HT: 14' - 0" 5 ~ #4
  - WALL HT: 15' - 0" 5 ~ #4
  - WALL HT: 16' - 0" 5 ~ #4
  - WALL HT: 17' - 0" 5 ~ #4
  - WALL HT: 18' - 0" 5 ~ #4
  - WALL HT: 19' - 0" 5 ~ #4
  - WALL HT: 20' - 0" 5 ~ #4
  - WALL HT: 21' - 0" 5 ~ #4
  - WALL HT: 22' - 0" 5 ~ #4
  - WALL HT: 23' - 0" 5 ~ #4
  - WALL HT: 24' - 0" 5 ~ #4

**Typical Cross-Section**

- **Bar "B"**
  - 2' - 0" MAX.
- **Bar "C"**
  - 2' - 0" MAX.
- **Bar "D"**
  - CENTERED
- **Bar "E"**
  - REINFORCING STEEL

**Notices**

1. All joints shall be in full contact and sealed.
2. Panel Width 15' - 0" MAX.
JOINT AND CORNER DETAIL

PRECAST CONCRETE WALL
ON OFFSET SPREAD FOOTING

FOOTING WIDTH TRANSITION DETAIL

FILL THE JOINT HOLE WITH GROUT USING DUCTS.
DUCTS SHALL BE LOCATED ON PANEL FACE
OPPOSITE TRAFFIC

DETAIL A

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT
BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY
THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON
FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANS-
PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

Harold J. Peterfeso
11-10-05

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

EXPIRES AUGUST 23, 2006

SHEET 2 OF 2 SHEETS
APPROVED FOR PUBLICATION
NOTES

1. Wall to be designated Noise Barrier Wall Type 12A, 12B, 12C and 12D. The Contract specifies actual wall designation.

2. For intermediate wall heights, use the next higher H.

3. Compaction of trench height differential shall not exceed 1 foot.

4. Panels shall have at least 3 feet of level ground on each side.

5. All joints shall be in full contact and sealed.

6. The Contract specifies actual foundation requirements D1 or D2.

The Contract specifies actual foundation requirements D1 or D2.

Compaction of trench height differential shall not exceed 1 foot.

For intermediate wall heights, use the next higher H.

Panels shall have at least 3 feet of level ground on each side.

All joints shall be in full contact and sealed.

The Contract specifies actual foundation requirements D1 or D2.

<table>
<thead>
<tr>
<th>WALL HT</th>
<th>TYPE 12A</th>
<th>TYPE 12B</th>
<th>TYPE 12C</th>
<th>TYPE 12D</th>
</tr>
</thead>
<tbody>
<tr>
<td>8' - 0&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
</tr>
<tr>
<td>8' - 0&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
</tr>
<tr>
<td>8' - 0&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
</tr>
<tr>
<td>8' - 0&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
</tr>
<tr>
<td>8' - 0&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
</tr>
<tr>
<td>8' - 0&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
</tr>
<tr>
<td>8' - 0&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
</tr>
<tr>
<td>8' - 0&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
<td>#6 @ 12&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WALL HT</th>
<th>12A</th>
<th>12B</th>
<th>12C</th>
<th>12D</th>
</tr>
</thead>
<tbody>
<tr>
<td>10' - 0&quot;</td>
<td>8&quot;</td>
<td>10&quot;</td>
<td>15&quot;</td>
<td>15&quot;</td>
</tr>
<tr>
<td>12' - 0&quot;</td>
<td>8&quot;</td>
<td>10&quot;</td>
<td>15&quot;</td>
<td>15&quot;</td>
</tr>
<tr>
<td>14' - 0&quot;</td>
<td>8&quot;</td>
<td>10&quot;</td>
<td>15&quot;</td>
<td>15&quot;</td>
</tr>
<tr>
<td>16' - 0&quot;</td>
<td>8&quot;</td>
<td>10&quot;</td>
<td>15&quot;</td>
<td>15&quot;</td>
</tr>
<tr>
<td>18' - 0&quot;</td>
<td>8&quot;</td>
<td>10&quot;</td>
<td>15&quot;</td>
<td>15&quot;</td>
</tr>
</tbody>
</table>

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

PRECAST CONCRETE WALL

WITH TRAFFIC BARRIER

ON TRENCH FOOTING

NOISE BARRIER WALL

TYPE 12

STANDARD PLAN D-3.35-00

APPROVED FOR PUBLICATION

Harold J. Peterfeso

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

PRECAST CONCRETE WALL W/ SINGLE SLOPE TRAFFIC BARRIER ON TRENCH FOOTING

NOISE BARRIER WALL TYPE 12SS
STANDARD PLAN D-2.40-00

Sheet 1 of 1 Sheet

APPROVED FOR PUBLICATION
HAROLD J. POTTERSON 11-10-25
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

NOTES
1. Wall to be designated Noise Barrier Wall Type 12SSA, 12SSB, 12SSC and 12SSD. The Contract specifies actual wall designation.
2. For intermediate wall heights, use the next higher H.
3. Composition of bench height differential shall not exceed 1 foot.
4. Panels shall have at least 3 feet of level ground on each side.
5. All joints shall be in full contact and sealed.
6. The Contract specifies actual foundation requirements D1 or D2.

ELEVATION

TYPICAL SECTION

HEIGHT MAY VARY IF REQUIRED TO PROVIDE A SMOOTH PROFILE CONSISTENT WITH THE ROADWAY PROFILE

WALL HT

DATE

EXPRESS AUGUST 23, 2006

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES

1. Wall to be designated Noise Barrier Wall Type 14A, 14B, 14C, or 14D. The Contract specifies actual wall designations.

2. For intermediate wall heights, use the next higher H.

3. Preliminary shall have at least 3 feet level ground on each side.

4. All joints shall be in full contact and eased.

5. Anchor Bolts, Nuts, Washers, Base Plates, and Bar "B" shall have a Protective Coating of one of the following: Hot Dipped Galvanizing AASHTO M 222 for Hardware; AASHTO M 222 CL 68, or Zinc Rich Paint. Paint threads and nuts after installation.

6. The bottom 9" of Bar "B" shall be painted with one coat of Formula A-6-86 Zinc Dust Oxide Primer OR, one coat of Formula A-11-99 Primer.

7. The Contract specifies actual foundation requirements D1 or D2.

The Contract specifies actual foundation requirements D1 or D2.

8. 1 1/4" Anchor Bolt. Set bolts with template. Use nuts top and bottom of template to secure location. For Alternative Anchor Base Plate Detail.

PREREQUISITE CONCRETE WALL W/ TRAFFIC BARRIER ON SHAFF FOUNDATION

NOISE BARRIER WALL TYPE 14

STANDARD PLAN D-2.46-00

Sheet 1 of 2sheets

APPROVED FOR PUBLICATION

Harold J. Peterfeso
11-10-05
Washington State Department of Transportation

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT. THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
**ANGLE POINT PLAN**

Adjust reinforcement as necessary to accommodate angle point.

**TYPICAL INTERMEDIATE AND END PANEL**

- **LIMITS OF TRANSVERSE BARRIER REINFORCEMENT (TYP)**
- **TRAFFIC SIDE**
- **NOISE WALL**
- **BASE PLATE**
- **NOISE SEALER**

- **BASE PLATE DETAIL**
  - **BASE PLATE**
  - **ANCHOR BOLT**
  - **WASHER**

**SHEAR-KEY DETAIL**

Optional

**NOISE BARRIER WALL**

**TYPE 14**

**STANDARD PLAN D-2.46-00**

**NOTE:** This plan is not a legal engineering document but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.

**Harold J. Peterfeso**

**11-10-05**
NOTES:
1. Wall to be designated Noise Barrier Wall Type 16A, 16B, 16C or 16D. The Contract specifies actual wall designations.
2. For intermediate wall heights, use the next higher H.
3. All masonry shall be hollow unit and installed as running bond.
4. All masonry is to be specially inspected.
5. All Concrete Masonry Unit (CMU) cells that have vertical steel reinforcing bars or bond beam units shall be filled with grout.
6. Panels shall have at least 3 feet of level ground on each side.
7. Construction joints in the trench footing shall be spaced at 120 linear feet maximum.
8. See "Masonry Wall Finishes and Details" sheet for masonry block finishes, special shapes, sizes and layouts.
9. The Contract specifies actual foundation requirements D1 or D2.
TYPICAL EXPANSION JOINT

EXPANSION JOINT FILLER PLACED IN SASH BLOCK RECESSES.

Traffic Side

#5 (TYP.)

PLAN VIEW

PLAN VIEW

TYPICAL EXPANSION JOINT

NOTICE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

DATE: 11-10-05

Harold J. Peterfeso

MASONRY WALL ON TRENCH FOOTING

NOISE BARRIER WALL

TYPE 18

STANDARD PLAN D-2.60-00

SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION

Washington State Department of Transportation

EXPIRES AUGUST 23, 2006
FOOTING WIDTH TRANSITION DETAIL

NOTE: TRANSVERSE BARS NOT SHOWN

STANDARD PLAN D-2.62-00

NOISE BARRIER WALL

MASONRY WALL ON SPREAD FOOTING

TYPICAL EXPANSION JOINT

PLAN VIEW

EXPANSION JOINT AT WIDTH STEP

PLAN VIEW

TYPICAL BOND BEAM DETAIL

MASONRY WALL ON SPREAD FOOTING

8" CMU

10" CMU

8" OR 10" CMU

CELLS WITH VERTICAL REINFORCING AND BOND BEAMS SHALL BE FILLED WITH GROUT

EXPANSION JOINT FILLER PLACED IN SASH BLOCK RECESSES.

9" (TYP.)

10" GUR

1/2" JOINT

#5 (TYP.)

#5 @ 4' - 0" MAX. (TYP.)

3" CLR. (TYP.)

BOND BEAM DETAIL

BONDING LIMIT

SEE DETAIL A

TYPICAL BOTH SIDES OF WALL

SEE DETAIL A

EXPANSION JOINT AT WIDTH STEP
### Wall Height and Spacing

<table>
<thead>
<tr>
<th>Wall Height</th>
<th>Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>10' - 0&quot;</td>
<td>2' - 0&quot;</td>
</tr>
<tr>
<td>12' - 0&quot;</td>
<td>2' - 0&quot;</td>
</tr>
<tr>
<td>14' - 0&quot;</td>
<td>2' - 0&quot;</td>
</tr>
<tr>
<td>16' - 0&quot;</td>
<td>2' - 0&quot;</td>
</tr>
<tr>
<td>18' - 0&quot;</td>
<td>2' - 0&quot;</td>
</tr>
<tr>
<td>22' - 0&quot;</td>
<td>2' - 0&quot;</td>
</tr>
<tr>
<td>24' - 0&quot;</td>
<td>2' - 0&quot;</td>
</tr>
</tbody>
</table>

### Reinforcement

<table>
<thead>
<tr>
<th>CMU Width</th>
<th>Bar Size</th>
<th>Bar Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>#5 @ 4&quot;</td>
<td></td>
</tr>
<tr>
<td>8&quot;</td>
<td>#6 @ 8&quot;</td>
<td></td>
</tr>
<tr>
<td>10&quot;</td>
<td>#7 @ 12&quot;</td>
<td></td>
</tr>
<tr>
<td>12&quot;</td>
<td>#8 @ 16&quot;</td>
<td></td>
</tr>
</tbody>
</table>

### Construction Notes

1. Wall to be designated Noise Barrier Wall Type 18A, 18B, 18C. The contract specifies actual wall designations.
2. For intermediate wall heights, use the next higher h.
3. All masonry shall be hollow unit and installed as running bond.
4. All masonry is to be specially inspected.
5. All Concrete Masonry Unit (CMU) units that have vertical steel reinforcing bars or bond beam units shall be filled with grout.
6. Panels shall have at least 5 feet of level ground on each side.
7. Construction joints in the footing shall be spaced at 120 feet maximum.
8. See "Masonry Wall Finishes and Details" sheets for masonry block finishes, special shapes, sizes and layout.
Noise Barrier Wall
Type 18

Standard Plan D-2.64-00

Footing Width Transition Detail
(for locations without footing step)

Note: Transverse bars not shown

3" CLR. (TYP.)

Bar "A" (TYP.)

1' - 0" Min. (TYP.)

Typical Expansion Joint

Typical Both Sides of Wall

Bond Beam Detail

Bond Beam Grouting Limit

Backer Rod

Polyurethane Sealant

Expansion Joint at Width Step

Expansion Joint Filler Placed in Sash Block Recesses.

8" CMU

10" CMU

8" or 10" CMU Cells with vertical reinforcing and Bond Beams shall be filled with grout.

Cells with Vertical Reinforcing and Bond Beams shall be filled with grout.

TRAFFIC SIDE

EXPANSION JOINT

FILLER PLACED IN SASH BLOCK RECESSES.

EXPANSION JOINT AT WIDTH STEP

TRAFFIC SIDE

TRAFFIC SIDE

39 (TYP.)

63 (TYP.)

5" or 10" CMU

5/8" to 3" MAX. (TYP.)

5/8" to 3" MAX. (TYP.)

9/16" to 3/4" MAX. (TYP.)

Backer Rod

Polyurethane Sealant

Harold J. Peterfeso

11-10-05

Drawn by: Adam Cochran

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
BOND BEAM DETAIL

SHAFT LENGTH FOR PAYMENT
#4 @ 1' - 0"
EVEN MULTIPLES OF 8"

STEP DETAIL
3' - 0"

NOISE BARRIER WALL
TYPE 19

MASONRY WALL ON SHAFT W/ GRADE BEAM FOUNDATION

EXPANSION JOINT FILLER PLACED IN SASH BLOCK RECESSES.
4' - 0" MAX. (TYP.)

EXPANSION JOINT - FILLER PLACED IN SASH BLOCK RECESSES.

CELLS WITH VERTICAL REINFORCING AND BOND BEAM SHALL BE FILLED WITH GROUT.

EXPANSION JOINT AT WIDTH STEP

135° HOOK (TYP.)
BAR 1' AT EQUAL SPACING FROM TOTAL REINFORCEMENT AS REQUIRED.

10" CMU

CELLS WITH VERTICAL REINFORCING AND BOND BEAM SHALL BE FILLED WITH GROUT.

HAZARD BAR "P" AT EQUAL SPACING (FOR TOTAL NUMBER SEE REINFORCEMENT SCHEDULE)

NOTE: SPIRAL REINFORCEMENT SHALL BE LAPPED AS SHOWN TO TERMINATE THE ENDS OF THE SPIRAL REINFORCEMENT (TOP AND BOTTOM).

1' - 5" MIN. LAP

PIECEWISE SPACING OF 5"

1/2" JOINT

NOTE 9

SECTION A

DETAIL B

TYPICAL EXPANSION JOINT

TRAFFIC SIDE

EXPANSION JOINT AT WIDTH STEP

PLAN VIEW

TRAFFIC SIDE

EXPANSION JOINT FILLER PLACED IN SASH BLOCK RECESSES.

DETAIL A

TYPICAL BOTH SIDES OF WALL

PENNYEDGE SEALANT

BACKER ROD

HOOKS PARALLEL TO WALL LAYOUT LINE

24 STIRRUP SPACING @ 12"

6" - 24 STIRRUP SPACED @ 6"

CONCRETE SHAFT

3 ~ #4 STIRRUP SPACING @ 12"

10" CMU

CELLS WITH VERTICAL REINFORCING AND BOND BEAMS SHALL BE FILLED WITH GROUT

3-5 SPiral @ 6" PITCH

#4 STIRRUP SPACING @ 6"

18" HOOK (TYP.)

#5 @ 4' - 0" MAX. (TYP.)

BOND BEAM

UNITS 4' - 0" MAX.

BOND BEAM GROUTING LIMIT

2" CLR.

BAR "P" AT EQUAL SPACING (FOR TOTAL NUMBER SEE REINFORCEMENT SCHEDULE)
The Contract specifies actual foundation requirements. See "Masonry Wall Finishes and Details" sheet for masonry block finishes, special shapes, stanes and layout. For intermediate wall heights, use the next higher H.

Wall to be designated Noise Barrier Wall Type 20A, 20B, 20C, or 20D. The Contract specifies actual wall designations.

All masonry is to be specially inspected.

All Concrete Masonry Unit (CMU) cells that have vertical reinforcing bars or bond beam units shall be filled with grout.

Panels shall have at least 3 feet of level ground on each side.

See "Masonry Wall Finishes and Details" sheet for masonry block finishes, special shapes, stanes and layout.

The Contract specifies actual foundation requirements D1 or D2.
NOTES:
1. Wall to be designated Noise Barrier Wall Type 15A, 15B, 15C or 15D. The Contract specifies actual wall designations.
2. For intermediate wall heights not listed use the next higher H.
3. Panels shall have at least 3 feet of level ground on each side.
4. Plywood and Glulam panels and all lumber shall be pressure preservative treated.
5. The Contract shall specify actual foundation requirements D1 or D2.

SOIL TYPE

<table>
<thead>
<tr>
<th>SOIL TYPE</th>
<th>TYPE</th>
<th>32</th>
<th>38</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>15A</td>
<td>80</td>
<td>90</td>
</tr>
<tr>
<td>D2</td>
<td>15B</td>
<td>80</td>
<td>90</td>
</tr>
<tr>
<td>B1</td>
<td>15C</td>
<td>80</td>
<td>90</td>
</tr>
<tr>
<td>B2</td>
<td>15D</td>
<td>80</td>
<td>90</td>
</tr>
</tbody>
</table>

WIND EXPOSURE & VELOCITY

<table>
<thead>
<tr>
<th>WIND EXPOSURE</th>
<th>WIND VELOCITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOISE BARRIER</td>
<td>TYPE</td>
</tr>
<tr>
<td>WIND</td>
<td>VELOCITY (MPH)</td>
</tr>
<tr>
<td>TYPE</td>
<td></td>
</tr>
</tbody>
</table>

SOIL TYPE

<table>
<thead>
<tr>
<th>SOIL TYPE</th>
<th>ANGLE OF INTERNAL FRICTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>32</td>
</tr>
<tr>
<td>D2</td>
<td>38</td>
</tr>
</tbody>
</table>

TIMBER PANEL WALL

ON TRENCH FOOTING

PANEL WIDTH

BATTEN EMBEDMENT

PORTION

TOP OF PANEL SHALL BE BRACED LATERALLY TO MAINTAIN ALIGNMENT UNTIL TRENCH BACKFILL IS COMPLETED.

The Contract specifies actual foundation requirements D1 or D2.
NOTES
1. All rebar shall have a minimum 1 1/2" cover.
2. See Standard Plan D-2.02 for door and frame details.
3. See Standard Plan D-2.06 for wall reinforcement not shown.

ANCHOR PIN WELDED TO DOOR FRAME (TYP.)

EXPANSION JOINT

NOISE BARRIER WALL ACCESS DOOR TYPE 1

STANDARD PLAN D-2.80-00

FOR CAST-IN-PLACE WALL ON OFFSET SPREAD FOOTING

All rebar shall have a minimum 1 1/2" cover.
See Standard Plan D-2.02 for door and frame details.
See Standard Plan D-2.06 for wall reinforcement not shown.

ANCHOR PIN WELDED TO DOOR FRAME (TYP.)

EXPANSION JOINT
NOTES
1. All rebar shall have a minimum 1 1/2" cover.
2. See Standard Plan D-2.02 for door and frame details.

All rebar shall have a minimum 1 1/2" cover.
See Standard Plan D-2.02 for door and frame details.
See Standard Plan D-2.14 for wall reinforcement not shown.

#5 @ 6' - 8" (TYP.)

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. All rebar shall have a minimum 1 1/2" cover.
2. See Standard Plan D-2.02 for door and frame details.
3. See Standard Plan D-2.36 for wall reinforcement not shown.
NOTES
1. All rebar shall have a minimum 1 1/2" cover.

CONCRETE
SLAB
DOOR FRAME
(SEE NOTE 2)
1 MIN.
BAR "A"
BAR "F"

FOR PRECAST WALL W/Traffic Barrier on Shaft Foundation

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

Harold J. Peterfeso

APPROVED FOR PUBLICATION

Washington State Department of Transportation
NOTES
1. All rebar shall have a minimum 1 1/2" cover.
3. See Standard Plan D-2.68 for wall reinforcement not shown.

CONCRETE SLAB DETAIL

FRONT VIEW

SECTION A

GROUND LINE

DOOR OPENING

WALL

CONCRETE SLAB

BAR "A"

ANCHOR (TYP.)

SOLID GROUT CAP

CMU

CONCRETE SLAB DETAIL

5' - 0"

4' - 0"

WALL

GROUND LINE

5"

2' - 0"

4 1/2"

BAR "A"

BENDING DIAGRAM

BAR "A"

CONCRETE SLABS

STANDARD PLAN D-2.88-00

All rebar shall have a minimum 1 1/2" cover.


See Standard Plan D-2.68 for wall reinforcement not shown.

#6 x 11' - 0" (TYP.)
2 PER SIDE OF DOOR

#5 x 7' - 0" (TYP.)

#6 x 11' - 0" (TYP.)

BAR "A"

8" OR 10"

3" OR 5"

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
All exposed metal surfaces shall be painted with paint conforming to the requirements in the Standard Specifications, Section 9.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

FRONT VIEW

SIDE VIEW

ISOMETRIC VIEW

NOTE:

ANCHOR PIN ~ 1/2" x 9" STEEL WELDED TO REINFORCEMENT PLATE

ANCHOR REINFORCEMENT PLATE (TYP.) ~ (CHANNEL WIDTH) x 5" x 1/4", WELDED TO FRAME

HINGE & ANCHOR PIN REINFORCEMENT PLATE (TYP.) ~ (CHANNEL WIDTH) x 12" x 1/4", WELDED TO FRAME

ANCHOR REINFORCEMENT PLATE W/ 1/2" x 9" ANCHOR PIN

WELD FRAME TOGETHER INSIDE OF CHANNEL.

GRIND SMOOTH EXTERIOR SURFACES BEFORE PAINTING IF NEEDED.

NOTE

1/2" x 9" ANCHOR PIN

6" x 16" S.S. PLATE W/ 10" x 1" DIAM. S.S. HANDLE

16 GAGE STEEL DOOR FRAME

6" x 16" S.S. PLATE W/ 10" x 1" DIAM. S.S. HANDLE

4 1/2" STAINLESS STEEL HINGE (TYP.)

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STANDARD PLAN D-2.92-00

SHEET 1 OF 2 SHEETS

HAROLD J. PETERFESO  11-10-05

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

All exposed metal surfaces shall be painted with paint conforming to the requirements in the Standard Specifications, Section 9.

NOTE

1/2" x 9" ANCHOR PIN

6" x 16" S.S. PLATE W/ 10" x 1" DIAM. S.S. HANDLE

4 1/2" STAINLESS STEEL HINGE (TYP.)

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STANDARD PLAN D-2.92-00

SHEET 1 OF 2 SHEETS

HAROLD J. PETERFESO  11-10-05

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

All exposed metal surfaces shall be painted with paint conforming to the requirements in the Standard Specifications, Section 9.

NOTE

1/2" x 9" ANCHOR PIN

6" x 16" S.S. PLATE W/ 10" x 1" DIAM. S.S. HANDLE

4 1/2" STAINLESS STEEL HINGE (TYP.)

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STANDARD PLAN D-2.92-00

SHEET 1 OF 2 SHEETS

HAROLD J. PETERFESO  11-10-05

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
GEOSYNTHETIC WALLS

GEOSYNTHETIC WALL, TYPE 1
INCL. STATIC DESIGN
GROUND ACCELERATION COEFFICIENT, A=0.16g TO 0.30g.
HORIZONTAL BACKSLOPE WITH 2 FT. TRAFFIC SURCHARGE
LESS THAN 2/3 L.

GEOSYNTHETIC WALL, TYPE 2 & 3
STATIC DESIGN ONLY
GROUND ACCELERATION COEFFICIENT, A=0.15g OR LESS.
HORIZONTAL BACKSLOPE WITH 2 FT. TRAFFIC SURCHARGE
LESS THAN 2/3 L.

GEOSYNTHETIC WALL, TYPE 4
STATIC DESIGN ONLY
GROUND ACCELERATION COEFFICIENT, A=0.15g OR LESS.
HORIZONTAL BACKSLOPE WITH 2 FT. TRAFFIC SURCHARGE
LESS THAN 2/3 L.

PERMANENT GEOSYNTHETIC WALLS

SECTION DETAIL

APPROXIMATE FINAL BATTER FOR FACE OF GEOSYNTHETIC LAYERS

TOP GEOSYNTHETIC LAYER

GEOSYNTHETIC LAYERS (TYP.)

FINISHED GRADE AFTER CONSTRUCTION OF WALL FACINGS

KEY NOTES

1. "N" ROWS OF #4 REINFORCEMENT PLACED BETWEEN GEOSYNTHETIC LAYERS @ 8 FT. O.C. HORIZONTAL SPACING. SEE TABLE, SHEET 2. VERTICAL SPACING BETWEEN ROWS TO BE EQUALLY, AS MULTIPLES OF "Sv" ALLOW. ROWS MAY BE STAGGERED.

2. GEOTEXTILE FOR UNDERGROUND DRAINAGE CLASS A, LOW SURVIVABILITY (ONLY NEEDED IF A GEOGRID IS USED FOR GEOSYNTHETIC REINFORCEMENT)

3. "P" LAYER OF GEOTEXTILE OVERLAP, TOP & BOTTOM

4. 2" LID PVC PIPE FOR WEEP HOLES IN WALL FACINGS - PLACE BETWEEN GEOSYNTHETIC LAYERS APPROX. 6 FT. DEEP AT 8 FT. HORIZONTAL SPACING, LENGTH TO EXTEND TO OUTER SURFACE OF SPECIFIED WALL FACINGS.

NOTES


FOR GEOSYNTHETIC WALL CONSTRUCTION SEQUENCE, SEE SHEET 3.

EPOXY COATED
### Permanent Geosynthetic Wall

#### Types 1 ~ 6

**Standard Plan D-3**

**Sheet 2 of 3 Sheets**

**APPROVED FOR PUBLICATION**

**PERMANENT GEOSYNTHETIC WALL**

**TYPES 1 ~ 6**

**STANDARD PLAN D-3**

**DATE**

---

### Geosynthetic Reinforcement Spacing and Strength

<table>
<thead>
<tr>
<th>TOTAL WALL HEIGHT [H_{W} (ft)]</th>
<th>DEPTH BELOW TOP OF BURIED PIPE [H_{D} (ft)]</th>
<th>GEOSYNTHETIC REINFORCEMENT VERTICAL SPACING [Y_{B} (in)]</th>
<th>LONG-TERM GEOSYNTHETIC REINFORCEMENT STRENGTH REQUIRED [f_{T} (lbf/ft)]</th>
</tr>
</thead>
<tbody>
<tr>
<td>[6 \leq H_{W} \leq 10]</td>
<td>[6 \leq H_{D} \leq 10]</td>
<td>[6 \leq H_{D} \leq 10]</td>
<td>[0.76]</td>
</tr>
<tr>
<td>[0 \leq 10]</td>
<td>[0 \leq 10]</td>
<td>[0 \leq 10]</td>
<td>[0 \leq 10]</td>
</tr>
<tr>
<td>[10 \leq ]</td>
<td>[10 \leq ]</td>
<td>[10 \leq ]</td>
<td>[1.25]</td>
</tr>
<tr>
<td>[20]</td>
<td>[20]</td>
<td>[20]</td>
<td>[1.25]</td>
</tr>
<tr>
<td>[30]</td>
<td>[30]</td>
<td>[30]</td>
<td>[1.25]</td>
</tr>
<tr>
<td>[40]</td>
<td>[40]</td>
<td>[40]</td>
<td>[1.25]</td>
</tr>
</tbody>
</table>

---

**NOTES**

- The long-term geosynthetic design strength \[f_{T}\] shall be determined in accordance with WSDOT Standard Practice T6.0.4.3.1.5.2 but an electronic duplicate.

- The original, signed by the State Design Engineer, shall be kept at the Washington State Department of Transportation. A copy may be obtained upon request.

- "\[f_{T}\]" is the distance from the top of wall to the geosynthetic layer, and is used to determine \[f_{T}\] for that layer.

- Column \[f_{T}\] is a reference for Standard Plan D-3.
PLACE THE GEOSYNTHETIC "TAIL" OVER THE WINDROW AND LOCK INTO PLACE WITH BACKFILL.

PLACE A WINDROW TO SLIGHTLY GREATER THAN FULL LIFT HEIGHT AGAINST THE FORM.

SET FORM ON COMPLETED LIFT.

1. UNROLL GEOSYNTHETIC AND POSITION IT SO THAT A 4'-0" WIDE "TAIL" DRAPES OVER THE FORM. IF A GEOGRID IS USED FOR THE GEOSYNTHETIC REINFORCEMENT, POSITION GEOTEXTILE TO PREVENT BACKFILL FROM SPILLING THROUGH GEOGRID OPENINGS.

2. PLACE THE BACKFILL UNTIL THE BACKFILL IS UP TO HALF OF THE REQUIRED VERTICAL GEOSYNTHETIC LAYER SPACING.

3. COMPLETE BACKFILL UNTIL THE COMPACTED BACKFILL LAYER THICKNESS IS EQUAL TO THE REQUIRED VERTICAL GEOSYNTHETIC LAYER SPACING.

4. PLACE A WINDROW TO SUBSTANTIALLY GREATER THAN FULL LIFT HEIGHT AGAINST THE FORM.

5. PLACE THE GEOSYNTHETIC "TAIL" OVER THE WINDROW AND LOCK INTO PLACE WITH BACKFILL.

6. COMPLETE BACKFILL UNTIL THE COMPACTED BACKFILL LAYER THICKNESS IS EQUAL TO THE REQUIRED VERTICAL GEOSYNTHETIC LAYER SPACING.

7. THE FORM MAY BE LEFT IN PLACE WHILE CONSTRUCTING THE NEXT LAYER (SEE NOTE 2), OTHERWISE, RESET THE FORM AND REPEAT THE SEQUENCE.
PERMANENT GEOSYNTHETIC RETAINING WALL WITH SHOTCRETE FACING

1. DOWEL REINFORCEMENT (SEE STANDARD PLAN D-3)
2. GROUT LINE FOR CONCRETE REINFORCEMENT
3. TYPICAL SECTION

NOTES:
- ALL SIZES SHOWN ON THIS PLAN SHALL BE AUGMENTED AS REQUIRED TO ACCOMMODATE ARCHITECTURAL FEATURES AND FINISH.
- CONSTRUCTION JOINT WITH PRECUT ORNAMENTS
- VERTICAL CONSTRUCTION JOINTS IN FACING (SEE STANDARD PLAN D-3) - USE TYPICAL JOINT IN FACING (SEE TYPICAL JOINT)
- SHOTCRETE DETAIL (SEE STANDARD PLAN D-3)
- KEY NOTES
  - 1. DOWEL REINFORCEMENT (SEE STANDARD PLAN D-3)
  - 2. GROUT LINE FOR CONCRETE REINFORCEMENT
  - 3. TYPICAL SECTION

TYPICAL SECTION
PERMANENT GEOSYNTHETIC RETAINING WALL WITH CAST-IN-PLACE CONCRETE FASCIA
ELEVATION

MOMENT SLAB TABLE

<table>
<thead>
<tr>
<th>SLAB LENGTH</th>
<th>BLN WALL</th>
<th>AT GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>GREATER THAN 20'</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>BETWEEN 15' &amp; 20'</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>BETWEEN 10' &amp; 15'</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>LESS THAN 10'</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

REINFORCING STEEL BENDING DIAGRAM

TYPICAL SECTION SHOWN AT GRADE

TYPICAL SECTION SHOWN ON WALL
ASPHALT CONCRETE PAVEMENT

GRAVEL BACKFILL FOR WALLS

CONDITION A OR CONDITION B WITH GEOTEXTILE

CONDITION A

CONDITION B

ALTERNATE DETAIL TYPICAL FOR CONSTRUCTION WITH SHORING

NOTES
1. SEE CONTRACT FOR BACKFILL LIMITS AND GEOTEXTILE CLASS.
TYPICAL GABION

Unit A - 2 cell gabion = 6'
Unit B - 3 cell gabion = 9'
Unit C - 4 cell gabion = 12'

FASTENING ADJACENT BASKETS

TWISTED FABRIC

WELDED FABRIC

CROSS CONNECTING WIRE
PLACEMENT, END CELLS

CROSS-CONNECTING WIRE
PLACEMENT, INTERIOR CELLS
OF FRONT GABIONS

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
### Footing Reinforcement

<table>
<thead>
<tr>
<th>WALL</th>
<th>DIMENSIONS</th>
<th>FOOTING REINFORCEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

### Steel Reinforcement

<table>
<thead>
<tr>
<th>WALL</th>
<th>STEEL REINFORCEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

### Material Quantity

<table>
<thead>
<tr>
<th>WALL</th>
<th>MATERIAL QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

### Vertical Face Wall Design

**With a 250 PSF surcharge or traffic barrier**

---

**Reinforced Concrete Retaining Wall**

**Type 1 and 1B**

**Standard Plan D-18.10.00**

-Sheet 2 of 2 sheets

---

**ABENDEN**

Department of Transportation

Washington State Department of Transportation

---

**APPENDED FOR PUBLICATION**

Pea Ridge Rd 08-08-00
1. All concrete shall be Class 4000, except as noted.

2. For beddill requirements, see Standard Plan D-4.

3. When Wall Type 25W (satisfying) is specified, the concrete cover over steel in the front face and the total wall thickness shall be increased by 1".

4. When Wall Type 25W (satisfying) is specified, concrete in the table columns "Material Quantity" shall be increased by (0.003 x ft³) CY/LF.

5. Concrete in the 48-foot wall sections shall be placed separately between expansion joints with a minimum 24-hour period before placing concrete in the adjacent section.

6. This wall has been designed in accordance with the requirements of the AASHTO LRFD Bridge Design Specifications 4th Edition 2007 and 2009. The seismic design of these walls has been completed using an effective PGA of 0.5 g.


SLOPING FACE WALL DESIGN
WITH A 250 PSF SUBSURFACE OR TRAFFIC BARRIER

REINFORCED CONCRETE
RETAINING WALL
TYPE 2 AND 25W
STANDARD PLAN D-10.15-00

Sheet 1 of 2 sheets

Approved for Publication
Pete Rikard
07-06-00
Washington State Department of Transportation
### Reinforcement Notes

1. If Triplex Barrier or Damed, add 0.110 CY of concrete class A&B for barrier alternate 1. Add 0.150 CY of concrete class A&B for barrier alternate 2. See standard plan D-10.15.00.

2. Add 10% more reinforcement steel for barrier alternate 1 or 20% more reinforcement steel for barrier alternate 2. See standard plan D-10.15.00.

### Sloping Face Wall Design

With a 250 PSF Surcharge

### Standard Plan D-10.15-00

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Radius**

Radius (see tables)
<table>
<thead>
<tr>
<th>WALL HT</th>
<th>B</th>
<th>C0</th>
<th>D</th>
<th>No.</th>
<th>A</th>
<th>LENGTH</th>
<th>h</th>
<th>SIZE</th>
<th>EPSI LENGTH</th>
<th>SIZE</th>
<th>EPSI LENGTH</th>
<th>LENGTH</th>
<th>h</th>
<th>SIZE</th>
<th>EPSI LENGTH</th>
<th>SIZE</th>
<th>EPSI LENGTH</th>
<th>MATERIAL QUANTITY</th>
<th>STEM REINFORCEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LENGTH</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.88</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.74</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.28</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6.36</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.30</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.72</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.99</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8.45</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.95</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.97</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.99</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.90</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.90</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.80</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.90</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.90</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.90</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7.90</td>
<td></td>
</tr>
</tbody>
</table>

**VERTICAL FACE WALL DESIGN WITH 2:1 BACKSLOPE**

**REINFORCED CONCRETE RETAINING WALL**

**TYPE 3 AND 3SW STANDARD PLAN D-10.20-00**

**SHEET 2 OF 2 SHEETS**

**APPROVED FOR PUBLICATION**

Peave Bailey 01 07-06-00

Washington State Department of Transportation
<table>
<thead>
<tr>
<th>WALL &amp; H</th>
<th>DIMENSIONS</th>
<th>FOOTING REINFORCEMENT</th>
<th>STEM REINFORCEMENT</th>
<th>MATERIAL QUANTITY</th>
<th>MAXIMUM VOLT PRIMERS (POP)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**VERTICAL FACE WALL DESIGN WITH 2:1 BACKSLOPE**

**REINFORCED CONCRETE RETAINING WALL TYPE 4 AND 4BW**

**STANDARD PLAN D-10.25-00**

Sheet 2 of 2 sheets

APPROVED FOR PUBLICATION

Penny Baldufck MD 07-06-00

Washington State Department of Transportation
### Reinforced Concrete Retaining Wall

**Type 6**

**Standard Plan D-10.35-00**

**Sheet 2 of 2 Sheets**

**APPROVED FOR PUBLICATION**

**Peon Balakrishna**

**07-06-00**

**Approved by:**

**Washington State Department of Transportation**

**Effective: August 4, 2008 to April 5, 2009**

### SLOPING FACE WALL DESIGN WITH 2:1 BACKSLOPE

#### BAR RADIUS

<table>
<thead>
<tr>
<th>BAR</th>
<th>RADIUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>1/8&quot;</td>
</tr>
<tr>
<td>8</td>
<td>3/16&quot;</td>
</tr>
<tr>
<td>10</td>
<td>5/32&quot;</td>
</tr>
<tr>
<td>12</td>
<td>1/8&quot;</td>
</tr>
<tr>
<td>14</td>
<td>1/8&quot;</td>
</tr>
<tr>
<td>16</td>
<td>1/8&quot;</td>
</tr>
<tr>
<td>20</td>
<td>3/32&quot;</td>
</tr>
<tr>
<td>25</td>
<td>5/32&quot;</td>
</tr>
<tr>
<td>27</td>
<td>7/32&quot;</td>
</tr>
<tr>
<td>30</td>
<td>9/32&quot;</td>
</tr>
<tr>
<td>32</td>
<td>1/4&quot;</td>
</tr>
<tr>
<td>35</td>
<td>1/4&quot;</td>
</tr>
<tr>
<td>40</td>
<td>5/32&quot;</td>
</tr>
<tr>
<td>45</td>
<td>5/32&quot;</td>
</tr>
<tr>
<td>50</td>
<td>5/32&quot;</td>
</tr>
<tr>
<td>55</td>
<td>5/32&quot;</td>
</tr>
<tr>
<td>60</td>
<td>5/32&quot;</td>
</tr>
<tr>
<td>65</td>
<td>5/32&quot;</td>
</tr>
<tr>
<td>70</td>
<td>5/32&quot;</td>
</tr>
<tr>
<td>75</td>
<td>5/32&quot;</td>
</tr>
<tr>
<td>80</td>
<td>5/32&quot;</td>
</tr>
<tr>
<td>85</td>
<td>5/32&quot;</td>
</tr>
<tr>
<td>90</td>
<td>5/32&quot;</td>
</tr>
<tr>
<td>95</td>
<td>5/32&quot;</td>
</tr>
<tr>
<td>100</td>
<td>5/32&quot;</td>
</tr>
</tbody>
</table>

#### BAR BRAKE PLANS

<table>
<thead>
<tr>
<th>BAR NAIL PLACEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>12</td>
</tr>
<tr>
<td>14</td>
</tr>
<tr>
<td>16</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>25</td>
</tr>
<tr>
<td>27</td>
</tr>
<tr>
<td>30</td>
</tr>
<tr>
<td>32</td>
</tr>
<tr>
<td>35</td>
</tr>
<tr>
<td>40</td>
</tr>
<tr>
<td>45</td>
</tr>
<tr>
<td>50</td>
</tr>
<tr>
<td>55</td>
</tr>
<tr>
<td>60</td>
</tr>
<tr>
<td>65</td>
</tr>
<tr>
<td>70</td>
</tr>
<tr>
<td>75</td>
</tr>
<tr>
<td>80</td>
</tr>
<tr>
<td>85</td>
</tr>
<tr>
<td>90</td>
</tr>
<tr>
<td>95</td>
</tr>
<tr>
<td>100</td>
</tr>
</tbody>
</table>
### Reinforcement Details

**REINFORCEMENT NOTES:**

1. If trapped bar(s) is used, add 0.400 CPF of concrete class 4000 for bar(s) alternate 1.
2. Add 0.150 CPF of concrete class 4000 for bar(s) alternate 2. See standard plan D-10.40.
3. Add 25% of reinforcing steel for bar(s) alternate 1 or 10% of reinforcing steel for bar(s) alternate 2. See standard plan D-10.10.

---

**REINFORCED CONCRETE RETAINING WALL TYPE 7 STANDARD PLAN D-10.40-00**

**VERTICAL FACE WALL DESIGN WITH A 250 PSF SURCHARGE OR TRAFFIC BARRIER**

---

**WASHINGTON STATE**

**Department of Transportation**

**Peck/Pilkington Inc. 07-04-00**

**Approved for Publication**
### Reinforcement Notes

1. For Type A Barrier, add 0.101 CY of concrete (40% for Barrier, Alternate 1, add 0.12 CY of concrete class) for Barrier, Alternate 2. See Standard Plan D-10.10.

2. Add 10% of reinforcing steel for Barrier, Alternate 1 or 12% of reinforcing steel for Barrier, Alternate 2. See Standard Plan D-10.10.

### SLOPING FACE WALL DESIGN WITH A 280 PSF SURCHARGE

**REINFORCED CONCRETE RETAINING WALL TYPE 6 STANDARD PLAN D-10.46-00**

**APPROVED FOR PUBLICATION**

**Pepe Roldan, RN 07-08-00**

**Washington State Department of Transportation**
REINFORCING STEEL BENDING DIAGRAM

NOTE
WEB LENGTH FOR LAP SPlice REQUIREMENTS

CONSTRUCTION JOINT - LEVEL TRANSVERSE WITH RUGGEDIZED SURFACE

PLAN VIEW
FRACtURED PIN FINISH DETAIL

DUMMY JOINT DETAIL

TRAFFIC BARRIER DETAILS
FOR REINFORCED CONCRETE RETAINING WALLS
STANDARD PLAN D-15.10-00

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

WEBCODE: 1107
APPROVED FOR PUBLICATION
Peach Blandish RH 07-08-08

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
DATE NUMERALS
~ SEE DETAILS

NOTE:

1. All numerals are approx. 3 1/4" wide except numeral "1" which is approx. 5/8" wide.
2. Spacing between the numeral "1" and any other numeral is 1". Spacing between all other numerals is 3/4".
3. Traffic Barrier Connections between the bridge and the approaching roadway vary and may consist of concrete barrier extensions. Install the Date Numerals on the traffic barrier of the bridge itself.

DATE NUMERAL DETAILS

TYPICAL DATE NUMERALS

ALIGN THE NUMERALS PARALLEL TO TOP OF TRAFFIC BARRIER

DATE LOCATION - SEE DETAIL

ELEVATION VIEW
DATE LOCATION DETAIL

DATE NUMERAL "1"

PERSPECTIVE VIEW

DATE NUMERAL PLACEMENT ON BRIDGE TRAFFIC BARRIER

STANDARD PLAN E-1

DATE NUMERAL DETAILS

TOP OF ROADWAY

DATE LOCATION ON TWO-WAY BRIDGES

DATE LOCATION ON ONE-WAY BRIDGES

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

APPROVED FOR PUBLICATION

EXPIRES AUGUST 26, 2007

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. Dimensions and notations for superstructure are typical for both single lane and two lane bridges.
2. All timber and lumber shall be #2 or better and untreated Douglas fir-larch.
3. All piling shall be untreated Douglas Fir and shall be driven to develop a minimum load bearing capacity of 15 tons.
4. Blockings for frame bents shall be proportioned to carry a minimum load of 15 tons per post.
5. All hardware shall be black, ungalvanized.
6. Each deck plant shall be nailed to each stringer with two 7" spikes, number 1 or larger.
7. On 17' spans, stringers shall be 6x16 S1E. On 15' spans, stringers shall be 5x16 S1E. Two lane bridges shall use thirteen lines of stringers, one lane bridges shall use seven lines of stringers.
8. Overlay thickness must be sufficient to cover bolts.

**SECTION A-A**

**DISTRIBUTION PLATE DETAIL**

**BASE PLATE DETAIL**

**BACKING PLATE DETAIL**

**NOTES**

1. Dimensions and notations for superstructure are typical for both single lane and two lane bridges.
2. All timber and lumber shall be #2 or better and untreated Douglas fir-larch.
3. All piling shall be untreated Douglas Fir and shall be driven to develop a minimum load bearing capacity of 15 tons.
4. Blockings for frame bents shall be proportioned to carry a minimum load of 15 tons per post.
5. All hardware shall be black, ungalvanized.
6. Each deck plant shall be nailed to each stringer with two 7" spikes, number 1 or larger.
7. On 17' spans, stringers shall be 6x16 S1E. On 15' spans, stringers shall be 5x16 S1E. Two lane bridges shall use thirteen lines of stringers, one lane bridges shall use seven lines of stringers.
8. Overlay thickness must be sufficient to cover bolts.
### PRECAST Prestressed Concrete Piles

**Standard Plan E-4**

**PILE DETAILS**

1. Place lifting loops at the lifting points shown in the PILE HANDLING DIAGRAM, Standard Plan E-4a, for the case stated in the contract.

2. Spirals shall be applied either by lapping one full turn and bending the end of the spiral to a 135° seismic hook, by welding, or by the use of a mechanical connector that develops 100% of the minimum yield strength of the spiral. Welding shall meet the requirements of Standard Specification 6-02.3(24)E.

3. All prestressing strands are 1/2" or 0.6" diameter (Dps), Grade 270, uncoated strands, AASHTO M203, Jacc to 0.75 Fpu maximum.

4. Strength of concrete shall be 5.0 ksi at release and 7.0 ksi at final.

5. All prestressing strands are 1/2" or 0.6" diameter (Dps), Grade 270, uncoated strands, AASHTO M203, Jacc to 0.75 Fpu maximum.

6. 2.12" cover if pile is exposed to salt water.

---

**NOTES**

1. Place lifting loops at the lifting points shown in the PILE HANDLING DIAGRAM, Standard Plan E-4a, for the case stated in the contract.

2. Spirals shall be applied either by lapping one full turn and bending the end of the spiral to a 135° seismic hook, by welding, or by the use of a mechanical connector that develops 100% of the minimum yield strength of the spiral. Welding shall meet the requirements of Standard Specification 6-02.3(24)E.

3. All prestressing strands are 1/2" or 0.6" diameter (Dps), Grade 270, uncoated strands, AASHTO M203, Jacc to 0.75 Fpu maximum.

4. Strength of concrete shall be 5.0 ksi at release and 7.0 ksi at final.

5. 2.12" cover if pile is exposed to salt water.

---

**PILE HANDLING DIAGRAM**

**PILE DETAILS**

1. Place lifting loops at the lifting points shown in the PILE HANDLING DIAGRAM, Standard Plan E-4a, for the case stated in the contract.

2. Spirals shall be applied either by lapping one full turn and bending the end of the spiral to a 135° seismic hook, by welding, or by the use of a mechanical connector that develops 100% of the minimum yield strength of the spiral. Welding shall meet the requirements of Standard Specification 6-02.3(24)E.

3. All prestressing strands are 1/2" or 0.6" diameter (Dps), Grade 270, uncoated strands, AASHTO M203, Jacc to 0.75 Fpu maximum.

4. Strength of concrete shall be 5.0 ksi at release and 7.0 ksi at final.

5. 2.12" cover if pile is exposed to salt water.
For pile lifting Cases 1 and 2, do not allow pile tip to bear on other piling stored in a lower layer.

For pile lifting Cases 3 and 4, tilt the pile in the air, do not allow the pile to touch the ground.

The minimum angle between the pile and the lifting strap is 60° when the pile is in the horizontal position.

When directed to remove a lifting loop, cut it off at the bottom of the recess and patch the recess by filling it with 1:2 mortar, finishing it to the level of the pile face. The patch shall be allowed to cure at least 24 hours prior to driving the pile.

Expose the spiral reinforcement at the pile head and splice with new spiral in accordance with Standard Plan E-4, Note 2.

Piles stored on the ground should be bunked on level dunnage at no more than 20' on center, with a maximum overhang of 10'.

The length of the formed or drilled hole shall allow for potential cut-off and full development length of the steel reinforcement. The holes must be roughened and filled with epoxy resin.

For handling and bunking, the Prestressed piles shall have at least the minimum number of strands shown on Std Plan E4.
General Note
See Standard Plan F-3 for Curb Expansion and Contraction Joint spacing.

General Note

Cement Concrete Curbs

Standard Plan F-10.12-00
Sheet 1 of 1 Sheet

Approved for Publication
Kevin J. Dayton 12-20-06
Washington State Department of Transportation

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
The intent of this design is to facilitate the compaction of Hot Mix Asphalt pavement adjacent to a drainage structure. The centerline of the drainage structure may differ from the centerline of the frame and grate.

2. The centerline of the drainage structure may differ from the centerline of the frame and grate.

Adjustment Section — Not Included in Curb and Gutter Bid Item

Drainage Structure — Not Included in Curb and Gutter Bid Item
NOTES

1. The installation of curbs in areas with existing guardrail would require the removal and reinstallation of the guardrail or its components.

2. Extend shoulder pavement to provide a base for the extruded curbs.

3. Make Contract for exception to distances shown.

4. Type 3 and 5 curbs are not used on roadways with a posted speed greater than 45 mph.

5. Type 3 and 6 are not used under guardrail on roadways with a posted speed greater than 60 mph.

EXTRUDED CURB PLACEMENT
STANDARD PLAN F-10.40-01
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

Pamela Balakrishan 07-23-06
Washington State Department of Transportation

WACLICH, PASCAL
STATE ENGINEER
NOTE: This plan is not a legal engineering document but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.
APPROVED FOR PUBLICATION

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

PRECAST CONCRETE SLOPED MOUNTABLE CURB

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

EXPIRES JUNE 19, 2008

PRECAST CONCRETE SLOPED MOUNTABLE CURB

STANDARD PLAN F-10.62-01

DRAWN BY: BILL BERENS

TYPICAL OF ALL ISOMETRIC VIEW

TOP VIEW
18" RADIUS BLOCK

TOP VIEW
30" RADIUS BLOCK

ISOMETRIC VIEWS

INSIDE CORNER BLOCK

OUTSIDE CORNER BLOCK

18" RADIUS BLOCK

30" RADIUS BLOCK

NOTE: 2-1/2" CLR. REQUIRED ONLY IN TANGENT BLOCK, WHEN LENGTH EXCEEDS 30" (2'-1/2" CLR. BOTH ENDS)

CRABTCH, PACIFIC
REGISTERED ENGINEERS

PASCO BAKOTICH III 09-05-07

20TH AVENUE CORPORATION

Washington State Department of Transportation

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009
CURB RADIUS TABLE

<table>
<thead>
<tr>
<th>CURB RADIUS</th>
<th>DIMENSION A</th>
<th>DIMENSION B</th>
<th>DIMENSION C</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>12”</td>
<td>3”</td>
<td>6”</td>
</tr>
<tr>
<td>8 TO 9”</td>
<td>17”</td>
<td>1 1/2”</td>
<td>8”</td>
</tr>
<tr>
<td>9</td>
<td>17”</td>
<td>4”</td>
<td>9”</td>
</tr>
<tr>
<td>9 1/2”</td>
<td>19”</td>
<td>6 1/2”</td>
<td>10”</td>
</tr>
<tr>
<td>10”</td>
<td>20”</td>
<td>10”</td>
<td>10 1/4”</td>
</tr>
<tr>
<td>11”</td>
<td>21”</td>
<td>12”</td>
<td>12”</td>
</tr>
<tr>
<td>12”</td>
<td>22”</td>
<td>14”</td>
<td>12”</td>
</tr>
<tr>
<td>12 1/2”</td>
<td>23”</td>
<td>16”</td>
<td>14”</td>
</tr>
<tr>
<td>13”</td>
<td>24”</td>
<td>16”</td>
<td>14”</td>
</tr>
<tr>
<td>14” TO 17”</td>
<td>25”</td>
<td>16 1/2”</td>
<td>16”</td>
</tr>
<tr>
<td>16” TO 17”</td>
<td>26”</td>
<td>18”</td>
<td>18”</td>
</tr>
<tr>
<td>18” TO 20”</td>
<td>27”</td>
<td>20”</td>
<td>20”</td>
</tr>
<tr>
<td>20” TO 25”</td>
<td>28”</td>
<td>22”</td>
<td>22”</td>
</tr>
<tr>
<td>25” TO 30”</td>
<td>29”</td>
<td>24”</td>
<td>24”</td>
</tr>
<tr>
<td>30” TO 35”</td>
<td>30”</td>
<td>26”</td>
<td>26”</td>
</tr>
<tr>
<td>40” TO 45”</td>
<td>32”</td>
<td>28”</td>
<td>28”</td>
</tr>
<tr>
<td>OVER 45”</td>
<td>32”</td>
<td>30”</td>
<td>30”</td>
</tr>
</tbody>
</table>

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTE

The dual faced curb may be constructed by using two precast concrete sloped mountable curbs (longitudinal relief) so long as the installation is consistent with the dimensions shown in the plan.

PRECAST CONCRETE
DUAL FACED
SLOPED MOUNTABLE CURB
STANDARD PLAN F-10.64-02

Sheets 1 of 1 Sheet
Approved for publication
Pecco Badach Jr. 07-03-06
Washington State Department of Transportation
NOTES
1. The bottom of the ramp shall have a level area (not in excess of 2% in any direction), 4' × 4'.
2. Layouts 1, 2, & 3 require two (2) of this bid item: "Cement Conc. Sidewalk Ramp Type 1". The bid item does not include the adjacent Curb (or Curb & Gutter), or Sidewalk.
3. Ramp slopes shall not be steeper than 12H:1V.
4. To the maximum extent feasible, ramp cross slopes shall not exceed 2%.
5. Avoid placing drainage structures, junction boxes or other obstructions in front of ramp access areas.
6. Curb & Gutter is shown, see the Contract Plans for the curb design specified. See Standard Plan F-10.12 for curb details.

DETECTABLE WARNING PATTERN DETAIL

THIS PATTERN AREA SHALL BE YELLOW IN COLOR

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTE:

1. The bottom of the ramp shall have a level area (not in excess of 2% in any direction), 4' × 4'.

2. The Type 2 Ramp Layout requires two (2) of this bid item: "Cement Conc. Sidewalk Ramp Type 2". The bid item does not include the adjacent Curb for Curb & Gutter, the Sidewalk between Ramps, or the Cement Conc. Pedestrian Curb.

3. Ramp slopes shall not be steeper than 12H:1V.

4. Avoid placing drainage structures, junction boxes or other obstructions in front of ramp access areas.

5. Curb & Gutter is shown, see the Contract Plans for the curb design specified. See Standard Plan F-10.12 for curb details.


7. Dimensions at Face of Curb

8. 3/8" Expansion Joint (Typ.)

9. DETECTABLE WARNING PATTERN (SEE DETAIL)

10. This pattern area shall be yellow in color.

11. CONTRACT FOR RADIUS

12. PEDESTRIAN CURB

13. 2% MAX.
NOTES

1. The bottom of the ramp shall have a level area (not in excess of 2% in any direction), 4' × 4'.

2. The Type 3A Ramp Layout requires two (2) of this bid item: "Cement Conc. Sidewalk Ramp Type 3A". The bid item does not include the adjacent Curb (or Curb & Gutter), the Sidewalk between Ramps, or the Cement Conc. Pedestrian Curb.

3. Ramp slopes shall not be steeper than 12H:1V.

4. Avoid placing drainage structures, junction boxes or other obstructions in front of ramp access areas.

5. Curb & Gutter is shown, see the Contract Plans for the curb design specified. See Standard Plan F-10.12 for curb details.

NOTES
1. The bottom of the ramp shall have a level area (not in excess of 2% in any direction), 4' × 4'.
2. The Type 3B Ramp Layout requires two (2) of this bid item: "Cement Conc. Sidewalk Ramp Type 3B". The bid item does not include the adjacent Curb (or Curb & Gutter), the Sidewalk between Ramps, or the Cement Conc. Pedestrian Curb.
3. Ramp slopes shall not be steeper than 12H:1V.
4. Avoid placing drainage structures, junction boxes or other obstructions in front of ramp access areas.
5. Curb & Gutter is shown, see the Contract Plans for the curb design specified. See Standard Plan F-10.12 for curb details.

1. The bottom of the ramp shall have a level area (not in excess of 2% in any direction), 4' × 4'.
2. The Type 3B Ramp Layout requires two (2) of this bid item: "Cement Conc. Sidewalk Ramp Type 3B". The bid item does not include the adjacent Curb (or Curb & Gutter), the Sidewalk between Ramps, or the Cement Conc. Pedestrian Curb.
3. Ramp slopes shall not be steeper than 12H:1V.
4. Avoid placing drainage structures, junction boxes or other obstructions in front of ramp access areas.
5. Curb & Gutter is shown, see the Contract Plans for the curb design specified. See Standard Plan F-10.12 for curb details.
This layout is used to provide access to a single crosswalk parallel to the major street. The bid item "Cement Conc. Sidewalk Ramp Type 4A" does not include the adjacent Curb (or Curb & Gutter), the Sidewalk, or the Cement Conc. Pedestrian Curb.

Ramp slopes shall not be steeper than 12H:1V. Avoid placing drainage structures, junction boxes or other obstructions in front of ramp access areas.

Curb & Gutter is shown, see the Contract Plans for the curb design specified. See Standard Plan F-10.12 for curb details.

See Std. Plan F-30.10 for sidewalk joint placement and details.

The bottom of the ramp shall have a level area (not in excess of 2% in any direction), 4' × 4'.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
This layout is used to provide access to a single crosswalk parallel to the major street. The bid item "Concrete Sidewalk Ramp Type 4B" does not include the adjacent Curb (for Curb & Gutter), the Sidewalk, or the Concrete Pedestrian Curb.

2. Ramp slopes shall not be steeper than 1:12:1.

3. Avoid placing driveways, structures, junction boxes or other obstructions in front of ramp access areas.

4. Curb & Gutter is shown; see the Contract Plans for the curb design specified. See Standard Plan F-10.12 for curb details.

5. See Std. Plan F-30.10 for sidewalk joint placement and details.

6. The bottom of the ramp shall have a level area not in excess of 2% in any direction, 4’ x 4’.
The ramp shown on this plan is ideal and assumes optimal roadway geometric design. It assumes a curb height of 6". Adjustments must be made for conditions in the field such as roadway grade, actual curb height, etc.

2. The maximum allowable ramp slope is 12H:1V (8.34% grade). The Federal Highway Administration (FHWA) allows and accepts sidewalk ramps with slopes steeper than 12H:1V. Flatter ramp slopes are permissible. Field verify the forms before pouring concrete.

3. The maximum admissible, the ramp cross slope shall not exceed 2%.

4. The bottom of the ramp shall have a level area (not in excess of 2% in any direction), 4' × 4'.

5. Avoid placing drainage structures, functional boxes or other obstructions in front of ramp access areas.

6. The bid item "Cement Conc. Sidewalk Ramp Type 4C" does not include the adjacent Curb or Curb & Gutter, the Sidewalk, or the Cement Conc. Pedestrian Curb.

7. Curb & Gutter is shown, see the Contract Plans for the curb design specified. See Standard Plan F-10.12 for curb details.

8. See Standard Plan F-30.10 for Cement Concrete Sidewalk details, sections, etc.
1. The ramp shown on this plan is ideal and assumes optimal roadway geometric design. A given initial curb height of 6" is first reduced to 4", via the Auxiliary Ramp, staging the final descent to the roadway. Adjustments must be made for conditions in the field such as roadway grade, existing curb height, etc. The dimensions shown are the minimum unless labeled otherwise.

2. The maximum allowable ramp slope is 12H:1V (8.34% grade). The Federal Highway Administration (FHWA) does not accept sidewalk ramps with slopes steeper than 12H:1V. Flatter ramp slopes are permissible. Field verify the forms before pouring concrete.

3. To the maximum extent feasible, ramp cross slopes shall not exceed 2%.

4. The bottom of the ramp shall have a level area (not in excess of 2% in any direction), 4' x 4'.

5. Avoid placing drainage structures, function boxes or other obstructions in front of ramp access areas.

6. Layouts 1, 2, & 3 require two (2) of this bid item: "Cement Conc. Sidewalk Ramp Type 5". The bid item does not include the adjacent Curb (or Curb & Gutter), or Sidewalk.

7. Curb & Gutter is shown, see the Contract Plans for the curb design specified. See Standard Plan F-10.12 for curb details.

8. See Standard Plan F-30.10 for Cement Concrete Sidewalk details, sections, etc.
NOTES

1. When the driveway width exceeds 15 feet, construct a full depth expansion joint (see Std. Plan F-30.10) with 3/8" joint filler along the driveway centerline. Construct expansion joints parallel with the centerline as required at 15' maximum spacing when driveway widths exceed 30'.

2. See Std. Plan F-30.10 for sidewalk details.

3. Curb and gutter shown, see the Contract Plans for the curb design specified. See Standard Plan F-10.12 for curb details.

4. Avoid placing drainage structures, junction boxes or other obstructions in front of driveway entrances.

5. When the driveway width exceeds 15 feet, construct a full depth expansion joint (see Std. Plan F-30.10) with 3/8" joint filler along the driveway centerline. Construct expansion joints parallel with the centerline as required at 15' maximum spacing when driveway widths exceed 30'.


7. Curb and gutter shown, see the Contract Plans for the curb design specified. See Standard Plan F-10.12 for curb details.

8. Avoid placing drainage structures, junction boxes or other obstructions in front of driveway entrances.

9. When the driveway width exceeds 15 feet, construct a full depth expansion joint (see Std. Plan F-30.10) with 3/8" joint filler along the driveway centerline. Construct expansion joints parallel with the centerline as required at 15' maximum spacing when driveway widths exceed 30'.

10. See Std. Plan F-30.10 for sidewalk details.

11. Curb and gutter shown, see the Contract Plans for the curb design specified. See Standard Plan F-10.12 for curb details.

12. Avoid placing drainage structures, junction boxes or other obstructions in front of driveway entrances.
Cement Concrete Driveway Entrance Types 1, 2, 3 & 4

Type 3 ~ Isometric View

Type 4 ~ Isometric View

Section E

Section F

Section H

Plan View

Cement Concrete Driveway Entrance Type 3

Cement Concrete Driveway Entrance Type 4

This entrance shall not be used on an ADA accessible pedestrian route.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
ITEM AVAILABLE FROM FIXTURE MANUFACTURER, MATERIAL IS GALV. 10 GAGE STEEL PLATE

LUMINAIRE MOUNTING PLATE
8 3/4" X 1 3/8"
3/4" X 1"
1/2" X 7/16" X 1"
7/16" X 1"
1/4" R (TYP.)
4 1/4" X 2 1/4" X 6 1/2"
7/8" X 3 1/2"
7/8" X 1/4"
4"
8 3/4"
1"
1 3/8"
1 1/2"

TRUSS TOP CHORD DEPTH OF TRUSS

TRUSS BOTTOM CHORD

SIGN FACE

WINDBEAM

ELECTRICAL CONDUIT

LUMINAIRE BRACKET - (TYP.)

ELECTRICAL CONDUIT

LUMINAIRE MOUNTING PLATE

W4 X 13 STEEL

SIGN LIGHTING LUMINAIRE MOUNTING DETAILS FOR TRUSS STRUCTURES
NOTE: ALL NUTS, BOLTS, WASHERS, HARDWARE AND OTHER HARDWARE SHALL BE STAINLESS STEEL, EXCEPT AS NOTED.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

STANDARD PLAN G-9a
OVERHEAD SIGN MOUNTING DETAILS

NOTE: ALL NUTS, BOLTS, WASHERS AND OTHER HARDWARE SHALL BE STAINLESS STEEL, EXCEPT AS NOTED.

W4 X 13 (TYP.)

BOTH FLANGES SEE DETAIL "A"

W4 X 13 STEEL

7/16" DIAM.

3/8" DIAM. X 1 1/2" BOLT
3/8" WASHER
3/8" LOCKWASHER

3/8" DIAM. X 3/8" LOCKNUT
2 1/2"

LUMINAIRE BRACKET (TYP.)

DETAIL "A"

3/8" DIAM. X 1 1/2" BOLT

3/8" WASHER MOUNTING PLATE

3/8" LOCK WASHER MOUNTING PLATE

2 1/2"

NOTE: ALL NUTS, BOLTS, WASHERS, HARDWARE AND OTHER HARDWARE SHALL BE STAINLESS STEEL, EXCEPT AS NOTED.

W4 X 13 STEEL

TOP FLANGE OF W4 X 13 STEEL (DRILL 1/2" HOLE THROUGH POST)

NOTE: ALL NUTS, BOLTS, WASHERS AND OTHER HARDWARE SHALL BE STAINLESS STEEL, EXCEPT AS NOTED.
NOTE:
1. Refer to Contract Plans for Monotube Beam Bracket element sizes, dimensions and weld symbols.

- Steel Plate
- Steel Channel
- Bolt
- Hex Nut
- Locking Hex Nut
- Washer
- Lockwasher
- Steel Plate
- Z Bar
- Channel
- Flange
- Beam
- Bolt with locknut
- Slotted hole for mounting beam bolt (typ.)
- Both flanges
- Steel Channel
- Channel Rod
- Locknut
- Hex Nut
- WASHER (TYP.)
- MONOTUBE BEAM
- SIGN FACE
- WINDBEAM
- 2 1/2" LUMINAIRE MOUNTING PLATE
- 14742
- EXP. JUNE 29, 2004

NOTES
1. Refer to Contract Plans for Monotube Beam Bracket element sizes, dimensions and weld symbols.

- Steel Plate
- Steel Channel
- Bolt
- Hex Nut
- Locking Hex Nut
- WASHER (TYP.)
- MONOTUBE BEAM
- SIGN FACE
- WINDBEAM
- 2 1/2" LUMINAIRE MOUNTING PLATE
- 14742
- EXP. JUNE 29, 2004

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

2. Provide Supplemental Plaques and install on Mileposts where indicated in the Contract.

3. See the Contract for the width of the Single-Faced Milepost Signs required (10" or 12").

4. For lateral installations behind traffic barrier, 6" high curbs, and ditches, see Standard Plan G-20.10.

5. Install at the locations shown in the Contract. Installation may be moved 50 feet or less (longitudinally) before or after the contract location if obstructions are encountered, or to utilize the post of another sign. Mileposts that cannot be placed within this degree of accuracy shall be omitted entirely.
1. Refer to the Sign Specification Sheet of the Contact for the 'V' and 'W' distances.

2. The minimum vertical distance from the bottom of the sign to the ground shall not be less than 7' for signs located within the Design Clear Zone.

**NOTES:**

- Refer to the Sign Specification Sheet of the Contract for the 'V' and 'W' distances.
- The minimum vertical distance from the bottom of the sign to the ground shall not be less than 7' for signs located within the Design Clear Zone.
NOTES

1. Nut is only required with multiple post installations.

2. 8×10, 8×12, and 6×12 Timber Sign Posts cannot be madeanzi 2020 and do not have holes or rebates. These posts shall not be installed within the Design Clear Zone. They may be installed behind traffic barrier.

3. Signs with a width less than 12 feet and supported on three 6×8 or 6×6 posts shall not be installed within the Design Clear Zone. They may be installed behind traffic barrier.

4. Signs with a width less than 17 feet and supported on four 6×6 or 6×6 posts shall not be installed within the Design Clear Zone. They may be installed behind traffic barrier.


6. For 6×8 posts and larger, 7 feet minimum spacing is required between posts.

<table>
<thead>
<tr>
<th>POST INSTALLATION TABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>POST AREA (SQIN)</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>4×4</td>
</tr>
<tr>
<td>4×6</td>
</tr>
<tr>
<td>5×5</td>
</tr>
<tr>
<td>6×6</td>
</tr>
<tr>
<td>6×8</td>
</tr>
<tr>
<td>6×12</td>
</tr>
</tbody>
</table>

ELEVATION VIEW

TYPICAL SINGLE POST INSTALLATION

MINIMUM POST HOLE DIAMETER IS THE WIDTH POINT dimension PLUS

TIMBER SIGN SUPPORT

STANDARD PLAN 0-32.10-01

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

APPROVED FOR PUBLICATION

Pete Raskovich M  07-03-20

CERTIFYING OFFICIAL
NOTE:

1. Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented, manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are only shown on this plan to illustrate how the parts are assembled.

2. For Steel Sign Support Foundation, see Standard Plan G-25.10.

3. For "H1" refer to the Sign Specification Sheet in the Contract.

4. Mounting brackets with steel straps shall be the stainless steel one bolt, flared leg bracket and 3/4" wide, 0.030" thick strap "Band-it" products or an approved equal.

STEEL SIGN SUPPORT
TYPE AP
INSTALLATION DETAILS
STANDARD PLAN G-34.10-00

Pasco Bakotich III
11-8-07

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
**NOTES**

1. Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented, manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are only shown on this plan to illustrate how the parts are assembled.

2. For Steel Sign Support Foundations, see Standard Plan G-25.10.

3. For "H1" refer to the Sign Specification Sheet in the Contract.
STEEL SIGN SUPPORT
TYPES PL, PL-T, & PL-U
INSTALLATION DETAILS

STANDARD PLAN G-24.30-00

NOTES
1. Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented, manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are only shown on this plan to illustrate how the parts are assembled.

2. For Steel Sign Support Foundations, see Standard Plan G-25.10.

3. For "X", "Y", "H1", and "H2", refer to the Sign Specification Sheet in the Contract.

4. Sign post shall be 2 1/2" nominal I.D. galvanized schedule 80 steel pipe.

5. Do not tighten any slip plate bolt to the recommended torque before pre-tightening the other bolts. Progressively tighten the three slip plate bolts in 10 ft-lbs increments, alternately, to a final torque of 38 ft-lbs on each bolt.

Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented, manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are only shown on this plan to illustrate how the parts are assembled.

For Steel Sign Support Foundations, see Standard Plan G-25.10.

For "X", "Y", "H1", and "H2", refer to the Sign Specification Sheet in the Contract.

Sign post shall be 2 1/2" nominal I.D. galvanized schedule 80 steel pipe.

Do not tighten any slip plate bolt to the recommended torque before pre-tightening the other bolts. Progressively tighten the three slip plate bolts in 10 ft-lbs increments, alternately, to a final torque of 38 ft-lbs on each bolt.
STEEL SIGN SUPPORT

TYPES PL, PL-T, & PL-U

INSTALLATION DETAILS

STANDARD PLAN G-24.30-00

"X" SIGN WIDTH

<table>
<thead>
<tr>
<th>Width (in)</th>
<th>Variant</th>
</tr>
</thead>
<tbody>
<tr>
<td>6' - 0&quot;</td>
<td>A</td>
</tr>
<tr>
<td>1' - 0&quot;</td>
<td>B</td>
</tr>
<tr>
<td>3' - 0&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

"Y" SIGN HEIGHT

<table>
<thead>
<tr>
<th>Height (in)</th>
<th>Variant</th>
</tr>
</thead>
<tbody>
<tr>
<td>6' - 0&quot;</td>
<td>A</td>
</tr>
<tr>
<td>1' - 0&quot;</td>
<td>B</td>
</tr>
<tr>
<td>3' - 0&quot;</td>
<td></td>
</tr>
<tr>
<td>4' - 0&quot;</td>
<td>F</td>
</tr>
</tbody>
</table>

A, B, C, D, E, F MAY BE INTERPOLATED FOR INTERMEDIATE SIGN SIZES

SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION

STATE DESIGN ENGINEER

Washington State Department of Transportation

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented, manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are only shown on this plan to illustrate how the parts are assembled.

Do not tighten any single Slip Plate Bolt to the recommended torque before pre-tightening the other bolts. Progressively tighten the three Slip Plate Bolts in 10 ft-lbs increments, alternately, to a final torque of 40 ft-lbs on each.
Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented, manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are only shown on this plan to illustrate how the parts are assembled.

For "H1" refer to the Sign Specification Sheet in the Contract.
Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented, manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are only shown on this plan to illustrate how the parts are assembled.

1. For Steel Sign Support Foundations, see Standard Plan G-25.10.
STEEL SIGN SUPPORT
TYPES TP-A AND TP-B
INSTALLATION DETAILS

STANDARD PLAN G-24.60-00

WIDE FLANGE
STEEL SIGN POST
(UPPER SECTION)

WIDE FLANGE
STEEL SIGN POST
(LOWER SECTION)

SIGN PANEL

"H1" POST HEIGHT
7' - 0" MIN.

HINGE
PLATE
(TYP.)

EQUAL SPACING
@ 3' - 0" MAX.

SECONDARY SIGN

WINDBEAM

MAJOR SIGN

VARIES
0" TO 3"

"Y" SIGN HEIGHT

"H2" POST HEIGHT

B

Z-BAR

BREAKAWAY
HINGE PLATE

6"

"S" POST HEIGHT

3"

3/16" RIVET

3/16" ALUMINUM RIVET

B

Z-BAR

BOTTOM OF SECONDARY SIGN

3"

6"

VARIES
0" TO 3"

SECONDARY SIGN

MAJOR SIGN

BREAKAWAY
HINGE PLATE

3/8" DIAM. WITH TWO FLAT WASHERS AND ONE LOCKNUT PER BOLT

ATTACH POST CLIPS ON BOTH SIDES OF WIDE FLANGE STEEL SIGN POST

SEE STD. PLAN G-20.10
SEE NOTE 3
SEE NOTE 3
SEE NOTE 3

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
PASCO BAKOTICH III 11-8-07

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
**ELEVATION VIEW**

**TYPE TP-A & TYPE TP-B FOUNDATION**

<table>
<thead>
<tr>
<th>POST SIZE</th>
<th>MAX. X-Y-Z</th>
<th>VERTICAL REBAR</th>
<th>FOUNDATION DEPTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>W6 x 12</td>
<td>250</td>
<td>3' - 0&quot;</td>
<td>3' - 0&quot;</td>
</tr>
<tr>
<td>W8 x 18</td>
<td>265</td>
<td>4' - 0&quot;</td>
<td>4' - 0&quot;</td>
</tr>
<tr>
<td>W10 x 22</td>
<td>275</td>
<td>4' - 0&quot;</td>
<td>4' - 0&quot;</td>
</tr>
<tr>
<td>W12 x 26</td>
<td>300</td>
<td>4' - 0&quot;</td>
<td>4' - 0&quot;</td>
</tr>
</tbody>
</table>

**TECHNICAL SPECIFICATIONS**

1. For TRANSP: 5" to 8" square posts require TP-B foundations. Foundation diameter and depth shall be verified with the Bridge office.

2. Install conduit for post-mounted Junction Box in the concrete foundation, when required. See Standard Plan J-12, Sheet 2.

**KEY NOTES**

1. Foundation depths based on allowable lateral bearing pressure in excess of 2500 PSF.

2. Two post installation.
1. Mounting brackets with steel straps shall be a stainless steel band and buckle system product or an approved equal. Mounting brackets shall be universal channel clamps; steel straps shall be 3/4" wide and 0.030" thick.

2. All signs installed on mast arms or standards (poles) require windbeams. All signs shall be installed with horizontal edges level. A skewed windbeam is required only when the sign is mounted within 12" of the mast arm base (see Detail "A").

NOTES

1. Mounting brackets with steel straps shall be a stainless steel band and buckle system product or an approved equal. Mounting brackets shall be universal channel clamps; steel straps shall be 3/4" wide and 0.030" thick.

2. All signs installed on mast arms or standards (poles) require windbeams. All signs shall be installed with horizontal edges level. A skewed windbeam is required only when the sign is mounted within 12" of the mast arm base (see Detail "A").
NOTES:

1. Mounting brackets with steel straps shall be a stainless steel band and buckle system product or an approved equal. Mounting brackets shall be one bolt, flared leg; steel straps shall be 3/4" wide and 0.030" thick.

2. Sign braces are only installed when specified in the contract.

3. Sign braces are typically necessary on large sign panels that are exposed to high winds, traffic generated wind buffeting, or when snow thrown from plows might impact the sign.

4. A nylon washer shall be placed between the sign and the steel washer when the sign face has Type 3 or 4 sheeting.

For sign attachment, see Std. Plan G-22.10
For sign attachment, see Std. Plan G-24.50
For sign attachment, see Std. Plan G-30.10

Mounting brackets with steel straps shall be a stainless steel band and buckle system product or an approved equal. Mounting brackets shall be one bolt, flared leg; steel straps shall be 3/4" wide and 0.030" thick. Sign braces are only installed when specified in the contract. Sign braces are typically necessary on large sign panels that are exposed to high winds, traffic generated wind buffeting, or when snow thrown from plows might impact the sign. A nylon washer shall be placed between the sign and the steel washer when the sign face has Type 3 or 4 sheeting.
NOTES
1. Vertical and horizontal clearance requirements shall be as shown on the contract plans.
2. No post splice permitted in lower third of height, nor closer than 3' - 0" to bottom chord, except as otherwise noted. No chord shop splice permitted in first two-thirds of the span, except as otherwise noted. A maximum of two splices are permitted in the post. For post or chord shop splice details, see Standard Plan 6-70.18.
3. The back-up plates or rings for all full penetration welds shall be welded continuously to the joined pieces. This can be done by either a continuous flat weld on the back side of the piece, or by a continuous weld in the root of the full penetration weld.
4. All bolt holes shall be drilled, and the diameter shall be 1/16" larger than the nominal bolt diameter, except as noted.
5. The design and analysis of the structure has been done in accordance with AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaires and Traffic Signals Dated 2001, using 60 MPH wind velocity and fatigue category - I.
6. Adjust post alignment in plane normal to roadway center line by means of leveling nuts located below base plate to maintain upward slope in cantilever arm(s). Tighten anchor nuts above base plate to maintain up-down slope in cantilever arm(s). Tighten anchor nuts above base plate in accordance with Standard Specification 6.03.5(6).
7. Variable Message Signs (VMS) exceeding 700 lbs. and/or 200 sq. ft. shall not be installed on cantilever structure.

MATERIAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Pipe/Plates/Shape/Dimensions and Parts</th>
<th>ASTM A 36 or ASTM A 45 BEEN</th>
<th>Type E or S, or AASHTO M 111</th>
<th>AASHTO M 232</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Sign Area 1 ft. 2&quot; x 15 ft. 6&quot;</td>
<td>200 in 200</td>
<td>3.0&quot;</td>
<td>3.0&quot;</td>
</tr>
<tr>
<td>150 in 180</td>
<td>2.5&quot;</td>
<td>3.0&quot;</td>
<td></td>
</tr>
<tr>
<td>100 in 100</td>
<td>2.5&quot;</td>
<td>3.0&quot;</td>
<td></td>
</tr>
<tr>
<td>50 in 50</td>
<td>2.5&quot;</td>
<td>3.0&quot;</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>2.0&quot;</td>
<td>3.0&quot;</td>
<td></td>
</tr>
</tbody>
</table>

BOLTED, NUTS, WASHERS

GALVANIZING

DIAGONALS, FASTENER

GRADE B, (TYP.)

<table>
<thead>
<tr>
<th>Post Size</th>
<th>2' - 9&quot;</th>
<th>3' - 0&quot;</th>
<th>4' - 0&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>O.D.</td>
<td>0.500&quot;</td>
<td>0.438&quot;</td>
<td>0.438&quot;</td>
</tr>
<tr>
<td>Wall</td>
<td>0.154&quot;</td>
<td>0.144&quot;</td>
<td>0.144&quot;</td>
</tr>
</tbody>
</table>

END

ALL TRUSS DIAGONALS AND STRUTS SHALL BE 1 1/2" PIPE (0.145" WALL)

PERSPECTIVE

SINGLE CANTILEVER SIGN STRUCTURE
VERTICAL STRUTS
AT SPAN END ONLY

TRUSS & Buum e
CAMBER EACH TRUSS
BASE PLATE

VEYICAL CLEARANCE ~ 17' - 6" MIN.
FROM HIGHEST POINT OF ROADWAY
UNDER ASSEMBLY
SIGN CENTERLINE MAY VARY FROM TRUSS CENTERLINE
TO PROVIDE MINIMUM VERTICAL CLEARANCE.

CAMBER EACH TRUSS
BASE PLATE

CAMBER EACH TRUSS
BASE PLATE

CAMBER EACH TRUSS
BASE PLATE

CAMBER EACH TRUSS
BASE PLATE

CAMBER EACH TRUSS
BASE PLATE

CAMBER EACH TRUSS
BASE PLATE

CAMBER EACH TRUSS
BASE PLATE

CAMBER EACH TRUSS
BASE PLATE
BASE WELD DETAIL

2 1/2" DIAM. STEEL BOLT, 1 1/2" LONG, WITH WASHER AND NUT FOR GROUND

HAND HOLE COVER WITH GASKET

REMOVABLE RAIN TIGHT HAND HOLE COVER WITH GASKET - FASTEN WITH TWO STAINLESS STEEL (ASTM F 304) SCREWS

2" DIAM. HOLES FOR ANCHOR BOLTS

INSIDE EDGES SHALL BE ROUND AND SMOOTH ALL AROUND

DRILL AND TAP FOR 1/4" DIAM. CAP SCREW, ASTM F 593, 1/4" BOLTS, W/ S.S. WASHER, SPACING O.C.

1/16" x 7/16" SQ. WRAP AROUND BASE PLATE WITH 3" MIN. LAP

REMOVABLE RAIN TIGHT HAND HOLE COVER WITH GASKET

FASTEN WITH TWO STAINLESS STEEL (ASTM F 593) SCREWS

1/4" BACK-UP BAR

100% UT SEE WELD DETAIL "G"

POST BASE DETAIL

POST BASE DETAIL

SECTION B

VIEW C

DRILL AND TAP FOR 1/4" DIAM. CAP SCREW, ASTM F 593, 1/4" BOLTS, W/ S.S. WASHER, SPACING O.C.

TOP OF BASE

HAND HOLE FRAME

TOP OF BASE

HOLES IN POST BASE (HOLES DIA. = POST ID. - 2"

SCREEN DETAIL

WELDED GALV. CLOTH 1/8" x 7/16" SQ. WRAP AROUND BASE PLATE WITH 3" MIN. LAP

1/4" BACK-UP BAR

1/4" BACK-UP BAR

5/32" BACK-UP RING (TYP.)

24" O.D. PIPE 6 ft. SPlice WITH 24" O.D. UPPER POST (SEE POST SELECTION TABLE)

18" O.D. PIPE 6 ft. SPlice WITH 18" O.D. UPPER POST (SEE POST SELECTION TABLE)

25470

RICHARD P. ZELDENREICH

STANDARD PLAN 0-60.10-50

CANTILEVER SIGN STRUCTURE (TRUSS-TYPE)

EXPIRES NOVEMBER 14, 2008

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
**VALUES OF Z**

<table>
<thead>
<tr>
<th>FOUNDATION TYPE</th>
<th>TOTAL SIGN AREA</th>
<th>ALLOWABLE LATERAL BEARING PRESSURE (PSF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>200 SF or Less</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>200 SF - 400 SF</td>
<td>2</td>
</tr>
</tbody>
</table>

- **1'-6" STEEL CONDUIT OR AS PER CONTRACT** ~ WHEN REQUIRED. CAP EACH END.
- **#4 SPIRAL ~ 1'-0" PITCH**

**NOTES**
1. See Standard Specification Section 8-21.3(9) for construction requirements.
2. Use a template to locate and secure bolts in place during foundation installation.

**ANCHOR PLATE** ~ SEE DETAIL, SHEET 2
### MATERIAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Material</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
<td>Class 4000</td>
</tr>
<tr>
<td>Steel Rebar, Grade 80</td>
<td>ASTM A 615</td>
</tr>
<tr>
<td>Anchor Rods</td>
<td>ASTM F 1554</td>
</tr>
<tr>
<td>Anchor Nuts</td>
<td>ASTM A 325</td>
</tr>
<tr>
<td>Anchor Washers</td>
<td>ASTM A 325</td>
</tr>
<tr>
<td>Foundation Wall Ties</td>
<td>ASTM A 36</td>
</tr>
</tbody>
</table>

### VALUES OF Z

<table>
<thead>
<tr>
<th>Foundation Type</th>
<th>Total Sign Area</th>
<th>Allowable Lateral Bearing Pressure (PSF)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>200 SF OR LESS</td>
<td>200 SF ~ 400 SF</td>
</tr>
<tr>
<td>TYPE 2</td>
<td>Z</td>
<td>Z</td>
</tr>
<tr>
<td>TYPE 3</td>
<td>9' - 0&quot;</td>
<td>11' - 0&quot;</td>
</tr>
</tbody>
</table>

### BENDING DIAGRAM

- **Foundation Wall Ties:** #5 - 6 each
- **Foundation Verticals:** #6 - 14 each
- **Pedestal Verticals:** #6 - 6 each
- **Foundation Wall Horizontals:** #4 - 16 each
- **Foundation Wall Horizontals At Slope:** #5 - 2 each

### BAR LIST - TYPES 2 AND 3

<table>
<thead>
<tr>
<th>Mark</th>
<th>Location</th>
<th>Total Sign Area</th>
<th>200 SF OR LESS</th>
<th>200 SF ~ 400 SF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pedestal Hoop</td>
<td>5</td>
<td>64</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>Foundation Wall Ties</td>
<td>6</td>
<td>62</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>Foundation Verticals</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>4</td>
<td>Pedestal Verticals</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>5</td>
<td>Foundation Wall Horizontals</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>Foundation Wall Horizontals At Slope</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>

### MARK LOCATION

- **Foundation Wall Ties:** #5 - 6 each
- **Foundation Verticals:** #6 - 14 each
- **Pedestal Verticals:** #6 - 6 each
- **Foundation Wall Horizontals:** #4 - 16 each
- **Foundation Wall Horizontals At Slope:** #5 - 2 each

### TOTAL SIGN AREA

- **200 SF OR LESS:** 200 SF OR LESS
- **200 SF ~ 400 SF:** 200 SF ~ 400 SF

### VALUES OF Z

- **Foundation Type:**
  - TYPE 2
  - TYPE 3

### ALLOWABLE LATERAL BEARING PRESSURE (PSF)

- **200 SF OR LESS:**
  - Z
- **200 SF ~ 400 SF:**
  - Z

### BENDING DIAGRAM

- **Foundation Wall Ties:** #5 - 6 each
- **Foundation Verticals:** #6 - 14 each
- **Pedestal Verticals:** #6 - 6 each
- **Foundation Wall Horizontals:** #4 - 16 each
- **Foundation Wall Horizontals At Slope:** #5 - 2 each
**TYPICAL JOINT DETAIL**

**CHORD* SHOWN ~ END POST SIMILAR**

**DEAD LOAD CAMBER**

**FOR SPAN LENGTHS NOT LISTED, INTERPOLATE VALUES OF .75/4.**

**ELEVATION**

**SECTION A**

**SECTION B**

**SECTION C**

**DRAWN BY:** BILL BERENS

**SHEET 3 OF 4 SHEETS**

**DATE:**

**STATE DESIGN ENGINEER**

**WASHINGTON STATE DEPARTMENT OF TRANSPORTATION**

**APPROVED FOR PUBLICATION**

**EXPIRES NOVEMBER 14, 2008**

**NOTE:** THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
MATERIAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIPE</td>
<td>ASTM A 36 OR ASTM A 53 Grade B Type E Or S Or ASTM A 30 Grade B</td>
</tr>
<tr>
<td>PLATE AND SHAPE</td>
<td>ASTM A 36</td>
</tr>
<tr>
<td>STRUCTURAL TUBING</td>
<td>ASTM A 512</td>
</tr>
<tr>
<td>GALLVANIZED FOR PIPE PLATE AND SHAPE</td>
<td>AASHTO M 111</td>
</tr>
<tr>
<td>HIGH STRENGTH BOLTS, WELD &amp; WASHING, MOUNTING BOLTS</td>
<td>STD SPEC BOLT (.234)</td>
</tr>
<tr>
<td>ALL OTHER BOLTS</td>
<td>STD SPEC BOLT (.234)</td>
</tr>
<tr>
<td>PANTHERS, GALVANIZED</td>
<td>AASHTO M 333</td>
</tr>
<tr>
<td>STEEL GRATING</td>
<td>ASTM A 36</td>
</tr>
</tbody>
</table>

NOTES

1. NOT INTENDED FOR USE IN FRONT OF STATIC SIGNS.
2. FOR MOUNTING THE MAINTENANCE WALKWAY TO A MONOTUBE SIGN BRIDGE, SEE STANDARD PLAN G-95.20.
3. FOR MOUNTING THE MAINTENANCE WALKWAY TO A TRUSS-TYPE SIGN BRIDGE, SEE STANDARD PLAN G-95.30.
4. LOCATION OF RAILING SPLICES TO BE DETERMINED BY FABRICATOR, SEE "RAILING SPLICE DETAIL."
MAINTENANCE WALKWAY FOR SIGN BRIDGES

STANDARD PLAN G-85.10-10

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
Steel Grating Detail

Plan

(Revised Note: Shown for clarity)

Panel span (Typ.)

Cross bar, 1/32 in. thickness (Typ.)

Bearing bar, 3/16 in. thickness (Typ.)

3/16 in. toe plate

1/8 in. toe plate

Every fourth bearing bar and near all toe plate corners

3/16 in. clearance between ends of cross bars

Install and arrange the grating fasteners according to the grating manufacturer's recommendations.

Note: This plan is not a legal engineering document but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.
MAINTENANCE WALKWAY INSTALLED ON MONOTUBE SIGN BRIDGE

(Walkways may be used with other layouts than that shown above)

NOTES:
1. NOT INTENDED FOR USE IN FRONT OF STATION SIGNS.
2. FOR MAINTENANCE WALKWAY, RAILING, GRATING, AND TOE PLATE DETAILS, SEE STANDARD PLAN 0-05.52.
3. UNIT TWO LANYARDS THROUGH INTERMEDIATE WIRE ROPE SUPPORT.
4. 3/8" DIA. WIRE ROPE WITH 14 LOOP IN WIRE BREAKING STRENGTH. THE WIRE ROPE SHALL BE INSTALLED WITH 45° LIPS, OR TERMINAL, AND WITH 6" OF EACH OF ADJACENT AVAILABLE IN THE TURNOVER.
LIVE STAKE INSTALLATION IN RIPRAP

TYPICAL LIVE STAKE INSTALLATION

NOTES:
1. See Plant Material List for size and type of live stakes.
2. Do not use nails or notes for driving stakes.
3. In hard ground use an iron bar or stake drill to prepare the holes for the stakes.
4. Avoid stripping bark or slicing stems during installation.
5. Fill void around cutting with soil.

LIVE STAKE INSTALLATIONS
STANDARD PLAN H-10.15-00
SHEET 1 OF 1 SHEET
APPROVED FOR PUBLICATION
Pepeekeo Ranch Rd
07-23-00
STATE OF
WASHINGTON
DEPARTMENT OF TRANSPORTATION
SALLY A. ANDERSON
CERTIFICATE NO. 620472.
NOTES

1. All Angle Irons and Steel Straps shall be galvanized in accordance with AASHTO M 222.

2. Pipe, Caps, and T-Adapters shall be 1" I.D. white PVC, or Primed Steel, except the water intake pipe shall be white PVC. Pipe shall be Sch. 40. All pipe joints shall be threaded.

3. Gage assembly pipe, stainless rod, and angle iron can be extended as needed to fit site requirements. Extra Pipe Clamps shall be added for security.

4. Score the water intake pipe 1/4" deep, 1/32" wide (width of saw blade), every 1/2", alternating cuts on top and bottom for drainage. Place at lowest water level.

5. Water level may vary, depending on season.

6. Pour in approximately 1 tablespoon of cork dust at installation, and after each reading.
A socket and wedge anchoring system that meets the NCHRP 350 crash test criteria may be substituted in lieu of the anti-twist plate designs shown. Anti-twist plates are not required for wood post installations.

The platform design shown on this plan features slots that accommodate various types of mailbox supports, only those slots necessary for assembling the type being installed are required. An adjustable platform may be used in lieu of this design, but it must fit the bracket design shown on this plan. Brackets are required for all single-post installations.

Field drilling may be necessary.

Center the mailbox on the platform to ensure space for the mailbox door to open and to allow space for installing the fasteners (See ALIGNMENT DETAIL, Sheet 2). Spacing of mailbox mounting holes varies among manufacturers. Attachment of the mailbox to the platform may require drilling additional holes through the mailbox to fit the platform.

Attach a newspaper box to a steel post with two 1 7/8" Muffler Clamps spaced 4" apart. Field drill 7/16" holes in the newspaper box to fit. Use 2 1/2" × 1/4" lag bolts to attach newspaper boxes to wood posts. Newspaper boxes must not extend beyond the front of the mailbox when the mailbox door is closed.

A Type 2 Support (Standard Plan H-70.20) is required when 2 or more mailboxes are to be installed on one support.
NOTES

1. The anchoring system shall meet NCHRP 350 crash test criteria. Use a socket and wedge system, or the anchoring system supplied by or recommended by the Type 2 Support manufacturer.

2. A maximum of 5 mailboxes may be installed on a Type 2 Support.

3. The Platform design shown in this plan is detailed in the PLATFORM DETAIL, Standard Plan H-70.10, Sheet 2. The design features slots that accommodate several types of mailbox supports; only those slots necessary for assembling the type being installed are required. An adjustable platform may be used in lieu of this platform design. Adjustable platforms must fit the 1 7/8" M-Clamp.

4. Center the mailbox on the platform to ensure access for the mailbox door to open and to allow space for installing the fasteners (See ALIGNMENT DETAIL). Spacing of mailbox mounting holes varies among manufacturers. Attachment of the mailbox to the platform may require drilling additional holes through the mailbox to fit the platform.

5. Attach a newspaper box to a Type 2 Support with two 1 7/8" Muffler Clamps spaced 4" apart. Field drill 7/16" holes in the newspaper box to fit. Newspaper boxes must not extend beyond the front of the mailbox when the mailbox door is closed.

MAILBOX ~ SIZE 1, 1A, OR 2
(SIZE 1A SHOWN) (SEE TABLE, STD. PLAN H-70.10, SHEET 2, FOR DIMENSIONS)

ADJUSTABLE PLATFORM ~ SEE NOTE 3

SEE NOTE 4

SNOW GUARD ~ WHEN REQUIRED
(SEE DETAIL, SHEET 2)

ASSEMBLY DETAIL

3/16" × 1" PHILLIPS HEAD SCREW,
2 WASHERS, AND LOCKNUT
WITH NYLON INSERT (TYP.)

1 7/8" MUFFLER CLAMP
(1 7/8" M-CLAMP),
2 WASHERS AND
2 LOCKNUTS (TYP.)

MAILBOX ~ PLATFORM
& SUPPORT

MAILBOX MOUNTING HOLE (TYP.)

SPACE PROVIDED ON BOTH
ENDS TO ALLOW ACCESS TO
FASTENERS (SEE NOTE 4)

MAILBOX SUPPORT

TYPE 2

STANDARD PLAN H-70.20-00

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES

1. The insert pipe is 1" nominal diameter, Schedule 40 steel pipe, as indicated; all other pipe shown on this plan is 1 1/4" nominal diameter, Schedule 40 steel pipe. All pipe, couplings, and elbows shall be galvanized in accordance with ASTM A 153.

2. The vertical support may be cast in a concrete foundation, or bolted to a U-channel post (see PLACEMENT DETAIL, Sheet 2). Avoid placing the vertical support in the face line of a ditch.

3. The pipe angles required in this design may be achieved by using pipe fittings, or by bending the pipes. See DETAIL "K", Sheet 2.

4. Coat the 1" diam. pipe with grease (petroleum) before sliding the 1 1/4" diam. pipe (cantilever arm) onto it, to aid rotation and to guard against corrosion.

5. The Platform design shown in this plan is detailed in the PLATFORM DETAIL, Standard Plan H-70.10, Sheet 2. The design features slots that accommodate several types of mailbox supports; only those slots necessary for assembling the type being installed are required.

6. Match the edge of the mailbox platform to the end of the horizontal pipe mount. Center the mailbox on the platform to ensure space for the mailbox door to open and to allow space for installing the fasteners. Attachment of the mailbox to the platform may require drilling additional holes through the platform. See ALIGNMENT DETAIL.

7. Attach a newspaper box to the pipe with two 1 3/4" muffler clamps spaced 4" apart. Newspaper boxes must not extend beyond the front of the mailbox when the mailbox door is closed.
HIGH VISIBILITY FENCE

STANDARD PLAN I-10.10-00

SHEET 1 OF 1 SHEET

STATE OF WASHINGTON
REGISTERED LANDSCAPE ARCHITECT
CERTIFICATE NO. 000598

MARK W. MAURER

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
Maximize detention of stormwater by placing fence as far away from toe of slope as possible without encroaching on sensitive areas or outside of the clearing boundaries.

Install silt fencing along contours whenever possible.

Install the ends of the silt fence to point slightly upslope to prevent sediment from flowing around the ends of the fence.

Perform maintenance in accordance with Standard Specifications 8.01.3(9)A and 8.01.3(15).

When specified in the contract, install backup support for the geotextile — see Std. Spec. 8.01.3(9)A, Table 8.
NOTE
Perform maintenance in accordance with Standard Specification 8-01.3.9(A) and 8-01.3.15.

SILT FENCE DESIGN

Place sand bags as required around culvert to provide support for silt fence.

Compost berm design

Erosion control at culvert ends

Standard Plan I-30.30-00

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT. IT IS AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES
2. Securely knot each end of Wattles. Abut adjacent Wattles tightly, end to end, without overlapping the ends.
3. Pilot holes may be driven through the Wattles and into the soil when soil conditions require.
4. Live stakes may be used for permanent installation and shall be in accordance with Standard Specification 9-14.5(6).
5. Wattles shall be inspected regularly, and immediately after a rainfall produces runoff, to ensure they remain thoroughly entrenched and in contact with the soil.

WATTLE INSTALLATION ON SLOPE
STANDARD PLAN I-30.30-00

<table>
<thead>
<tr>
<th>SLOPE</th>
<th>MAXIMUM SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:1</td>
<td>10' - 0&quot;</td>
</tr>
<tr>
<td>2:1</td>
<td>30' - 0&quot;</td>
</tr>
<tr>
<td>3:1</td>
<td>40' - 0&quot;</td>
</tr>
<tr>
<td>4:1</td>
<td>60' - 0&quot;</td>
</tr>
</tbody>
</table>
NOTES

1. Compost Sock shall be in accordance with Standard Specification 9-14.6(6). Compost Sock shall be a minimum of 9" in diameter or sized to suit conditions as specified by the Engineer or Contract.

2. Compost materials to be dispersed on site as determined by the Engineer.

3. When placing Compost Sock on slopes, use Erosion Control Blanket if specified by the Engineer and in accordance with Standard Specification 9-14.6(2). See Standard Plan I-60.10.

4. Always install Compost Sock perpendicular to slopes and along contour lines.

5. Remove sediment from the up slope side of the Compost Sock when accumulation has reached 1/2 of the effective height of the Compost Sock.

6. Live stakes can be used in addition to wooden stakes and shall be in accordance with Standard Specification 9-14.6(1). See plans for species selection and spacing.

Compost Sock shall be in accordance with Standard Specification 9-14.5(6). Compost Sock shall be a minimum of 8" in diameter or sized to suit conditions as specified by the Engineer or Contract. Compost material to be dispersed on site as determined by the Engineer.

When placing Compost Sock on slopes, use Erosion Control Blanket if specified by the Engineer and in accordance with Standard Specification 9-14.6(2). See Standard Plan I-60.10.

Always install Compost Sock perpendicular to slopes and along contour lines.

Remove sediment from the up slope side of the Compost Sock when accumulation has reached 1/2 of the effective height of the Compost Sock.

Live stakes can be used in addition to wooden stakes and shall be in accordance with Standard Specification 9-14.6(1). See plans for species selection and spacing.
NOTES

1. See Standard Specification 8-01.3(9)C, for additional information.

2. Perform maintenance in accordance with Standard Specification 8-01.3(15).

1'. 6" min. penetration

COMPACT NATIVE MATERIAL TO PREVENT PIPING

STRAW BALES TO PREVENT EROSION OR FLOW UNDER BALES ~ 4" MINIMUM

STEEL, OR 2×2 WOODEN STAKES (TYP.)

SECOND STAKE

DROVE FIRST STAKE AT AN ANGLE TOWARD THE PREVIOUS BALES TO PROMOTE A TIGHT FIT

STRAW BALES TO BE PLACED IN A ROW WITH THE ENDS TIGHTLY ABUTTING

FREEZE PACK ARY SPACERS WITH STRAW

STRAW STALKS STAND VERTICALLY

STEEL, OR 2×2 WOODEN STAKES (TYP.)

SECOND STAKE

STEEL, OR 2×2 WOODEN STAKES (TYP.)

1'. 6" min. penetration

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
Prefabricated units may be used in lieu of the design shown on this plan upon approval of the Engineer.

Structure shall be constructed such that geotextile material shall be fastened to posts creating a seam-less joint.

Ensure that ponding height of water does not cause flooding on adjacent roadways or private property.

Perform maintenance in accordance with Standard Specification 8-01.3(18).
OVERFLOW BYPASS (TYP.)

DRAINAGE GRATE

RECTANGULAR GRATE SHOWN

RETRIEVAL SYSTEM (TYP.)

NOTES

1. Size the Below Inlet Grate Device (BIGD) for the storm water structure it will service.
2. The BIGD shall have a built-in high-flow relief system (overflow bypass).
3. The retrieval system must allow removal of the BIGD without spilling the collected material.
4. Perform maintenance in accordance with Standard Specification 6-01.3(15).

STATE OF WASHINGTON
REGISTERED LANDSCAPE ARCHITECT

CERTIFICATE NO. 000598

MARK W. MAURER

STORM DRAIN INLET PROTECTION
STANDARD PLAN I-40.20-00

PASCO BAKOTICH III
09-23-07

MENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT.
Geotextile encased Check Dams shall meet the requirements of Standard Specifications 8-01.3(6)A and 9-14.5(4).

2. Install the sloped ends of the Check Dam a minimum of 3" higher than the top of the check dam in the channel to ensure that water flows over the dam and not around it.

3. Flat bottom ditch design shown. Check Dam installation details are similar for "V" bottom ditches.

4. Perform maintenance in accordance with Standard Specifications 8-01.3(15).

Flat bottom ditch design shown. Check Dam installation details are similar for "V" bottom ditches.
SPACE CHECK DAMS THE DISTANCE APART WHERE POINTS A AND B ARE THE SAME ELEVATION

NOTE: PLACE SACKS FIRMLY AGAINST GROUND LINE AND ADJACENT SACKS.

BAGS SHALL BE #10 BURLAP OR APPROVED ALTERNATE FILLED WITH 48 TO 55 LBS. OF GRAVEL BACKFILL FOR DRAINS.

WATTLE OR COMPOST SOCK CHECK DAM

SPACE CHECK DAMS THE DISTANCE APART WHERE POINTS A AND B ARE THE SAME ELEVATION

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

NOTE: MARK W. MAURER, CERTIFICATE NO. 000598

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
1. More than the minimum of one fastener per square yard may be required due to conditions such as blanket composition, soil type, surface uniformity, and slope steepness.

2. See Standard Specification 8-01.3(3).
1. More than the minimum of one fastener per square yard may be required due to conditions such as blanket composition, soil type, surface uniformity, and flow velocity.

2. Provide check slots per manufacturer's recommendations.

3. Roll ends may be spliced in a check slot.


More than the minimum of one fastener per square yard may be required due to conditions such as blanket composition, soil type, surface uniformity, and flow velocity. Provide check slots per manufacturer's recommendations. Roll ends may be spliced in a check slot. See Standard Specification 8-01.3(b).

Approved for publication.

State of Washington
Registered Landscape Architect
Certificate No. 000598
Mark W. Maurer
08-31-07

A copy may be obtained upon request.
MISCELLANEOUS
EROSION CONTROL DETAILS
STANDARD PLAN 1-80.10-00

PLACE CONSTRUCTION GEOTEXTILE FOR SOIL STABILIZATION AND A MINIMUM OF 0.4" CRUSHED ROCK UNDER THE SPALLS FROM THE ELEVATION OF THE EXISTING ROADWAY TO THE RADIUS RETURN, OR AS DIRECTED BY THE ENGINEER.

2'-0" SETTLING DEPTH

5'-0" MAX.

QUARRY SPALLS

4" ~ 8" QUARRY SPALLS

AS REQUIRED ~ 100' MIN., EXCEPT MAY BE REDUCED TO 50' MIN. FOR SITES WITH LESS THAN ONE ACRE OF EXPOSED SOIL.

5'-0" MIN.

PROVIDE FULL WIDTH OF INGRESS / EGRESS AREA

ELEVATION

ELEVATION

SECTION A

TEMPORARY SEDIMENT TRAP

GROUND LINE

2'-0" SETTLING DEPTH

1'-0" DEPTH OF 2" - 4" ROCK

1'-0" DEPTH OF 3/4" - 1 1/2" WASHED GRAVEL BACKFILL

OUTFLOW CHANNEL IS CONSTRUCTED BY EXCAVATION OR EMBANKMENT

2'-0" SETTLING DEPTH

COMPACTED NATIVE MATERIAL CONSTRUCTED BY EXCAVATION OR EMBANKMENT

1'-0" DEPTH OF 2" - 4" ROCK

EXISTING ROAD

25'-0" R MIN. (TYP.)

1'-0" MIN.

PROVIDE FULL WIDTH OF INGRESS / EGRESS AREA

7'-0" MIN.

PLACE CONSTRUCTION GEOTEXTILE FOR SOIL STABILIZATION AND A MINIMUM OF 0.15' CRUSHED ROCK UNDER THE SPALLS, FROM THE EDGE OF THE EXISTING ROADWAY TO THE RADIUS RETURN, OR AS DIRECTED BY THE ENGINEER.

TEMPORARY SEDIMENT TRAP

GROUND LINE

2'-0" SETTLING DEPTH

1'-0" DEPTH OF 2" - 4" ROCK

1'-0" DEPTH OF 3/4" - 1 1/2" WASHED GRAVEL BACKFILL

OUTFLOW CHANNEL IS CONSTRUCTED BY EXCAVATION OR EMBANKMENT

2'-0" SETTLING DEPTH

COMPACTED NATIVE MATERIAL CONSTRUCTED BY EXCAVATION OR EMBANKMENT

1'-0" DEPTH OF 2" - 4" ROCK

EXISTING ROAD

25'-0" R MIN. (TYP.)

1'-0" MIN.

PROVIDE FULL WIDTH OF INGRESS / EGRESS AREA

7'-0" MIN.

PLACE CONSTRUCTION GEOTEXTILE FOR SOIL STABILIZATION AND A MINIMUM OF 0.15' CRUSHED ROCK UNDER THE SPALLS, FROM THE EDGE OF THE EXISTING ROADWAY TO THE RADIUS RETURN, OR AS DIRECTED BY THE ENGINEER.
High Mast Timber Luminaires Support

1. Mounting height - roadway to luminaire elevation difference \( \pm 2\% \), see Contract.
2. Ground level - see Contract.
3. No galvanized thimbles or eyebolts (single or double) with washers and nuts or eyelets.
4. Bending jumper.
5. Pole and bracket cable.
7. From ground line to 10' above ground, enclose equipment grounding conductor in galvanized steel conduit, code sized. Above 10' from ground, staple equipment grounding conductor to pole. Connect to supplemental ground per Standard Plan J-9a.
8. Service wedge clamp.
9. ACSR triplex or quadruplex conductors - see Contract.
10. Copper split bolt connector.
11. Messenger cable.
12. Insulating tape for waterproof connection.
13. Fused quick disconnect - use 30 amp fuses for high mast supports.
14. Weatherhood - size as required.
15. Steel conduit.
16. 8" x 8" x 4" NEMA 3R junction box with raintight hubs and removable cover.
17. 5/8" x 9" step bolt.
18. 3/8" x 4" machine bolts (four required) with washers and nuts.
19. 1/2" lag bolts (six required) - drill 9/16" hole in plate.
20. 2" pipe.
21. 3/4" wire hole 2" from gusset plate, smooth hole edges.
22. 1" nonmetallic conduit with 3/4" stops at code spacing.
23. Distance varies, 35' MIN, 50' MAX, depending on line clearance requirements.
25. From ground line to 10' above ground, enclose equipment grounding conductor in galvanized steel conduit, code sized. Above 10' from ground, staple equipment grounding conductor to pole. Connect to supplemental ground per Standard Plan J-9a.
27. ACSR triplex or quadruplex conductors - see Contract.
28. Copper split bolt connector.
29. Messenger cable.
30. Insulating tape for waterproof connection.
31. Fused quick disconnect - use 30 amp fuses for high mast supports.
32. Weatherhood - size as required.
33. Steel conduit.
34. 8" x 8" x 4" NEMA 3R junction box with raintight hubs and removable cover.
35. 5/8" x 9" step bolt.
36. 3/8" x 4" machine bolts (four required) with washers and nuts.
37. 1/2" lag bolts (six required) - drill 9/16" hole in plate.
38. 2" pipe.
39. 3/4" wire hole 2" from gusset plate, smooth hole edges.
40. 1" nonmetallic conduit with 3/4" stops at code spacing.
41. Distance varies, 35' MIN, 50' MAX, depending on line clearance requirements.

NOTES:
1. Timber luminaires are allowed only for temporary installations where breakdown or slip bases are not required.
2. When down guys are required, see Standard Plan J-7a.

When down guys are required, see Standard Plan J-7a.
TYPE A, B AND C SERVICE LIGHTING DETAILS

1. Metering arrangements may vary with different serving utilities. The contractor shall verify the requirements of the utility prior to installing the service equipment.

2. All service pole conduit shall be secured to the pole with conduit strap at 5' centers.

3. All risers and service equipment shall be installed on side of pole that is away from traffic.

4. Where required by the serving utility, service breakers shall be installed above the meter socket in a separate raintight enclosure.

5. Bend and attach to pole within 1' of enclosure. See Standard Plan "Typical Grounding Details."

6. For Type B service wiring diagram, use Standard Plan "Modified Type B Service."

7. For Type C service wiring diagram, use Standard Plan, "Type E Service."

8. See breaker schedule in contract for breaker and contactor sizes.

NOTES:

1. Metering arrangements may vary with different serving utilities. The contractor shall verify the requirements of the utility prior to installing the service equipment.

2. All service pole conduit shall be secured to the pole with conduit strap at 5' centers.

3. All risers and service equipment shall be installed on side of pole that is away from traffic.

4. Where required by the serving utility, service breakers shall be installed above the meter socket in a separate raintight enclosure.

5. Bend and attach to pole within 1' of enclosure. See Standard Plan "Typical Grounding Details."

6. For Type B service wiring diagram, use Standard Plan "Modified Type B Service."

7. For Type C service wiring diagram, use Standard Plan, "Type E Service."

8. See breaker schedule in contract for breaker and contactor sizes.

120 VOLT

Meter base

Test switch

150 VA 480/120 VAC dry transformer (500 VA if flasher used)

Neutral busbar

1" conduit three #12 (Photoelectric control)

120 VAC coil contactor

2P 480VAC service breaker

Control breaker

Service

120 VAC cell conductor

TYPE B SERVICE CABINET

SECTION A-A

TYPE A WIRING DIAGRAM

120 VOLT

Test switch

Neutral busbar

120 VAC

Control breaker

Service

120 VAC cell conductor

1" conduit three #12 (Photoelectric control)

150 VA 480/120 VAC dry transformer (500 VA if flasher used)

Neutral busbar

1" conduit three #12 (Photoelectric control)

TYPE C SERVICE CABINET

STANDARD PLAN J-3

APPROVED FOR PUBLICATION

AUGUST 4, 2008 TO APRIL 5, 2009

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

OLYMPIA, WASHINGTON

STANDARD PLAN J-3

DATE

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

Sheet 2 of 2 Sheets

TYPE A, B AND C SERVICE LIGHTING DETAILS

1. Metering arrangements may vary with different serving utilities. The contractor shall verify the requirements of the utility prior to installing the service equipment.

2. All service pole conduit shall be secured to the pole with conduit strap at 5' centers.

3. All risers and service equipment shall be installed on side of pole that is away from traffic.

4. Where required by the serving utility, service breakers shall be installed above the meter socket in a separate raintight enclosure.

5. Bend and attach to pole within 1' of enclosure. See Standard Plan "Typical Grounding Details."

6. For Type B service wiring diagram, use Standard Plan "Modified Type B Service."

7. For Type C service wiring diagram, use Standard Plan, "Type E Service."

8. See breaker schedule in contract for breaker and contactor sizes.

NOTES:

1. Metering arrangements may vary with different serving utilities. The contractor shall verify the requirements of the utility prior to installing the service equipment.

2. All service pole conduit shall be secured to the pole with conduit strap at 5' centers.

3. All risers and service equipment shall be installed on side of pole that is away from traffic.

4. Where required by the serving utility, service breakers shall be installed above the meter socket in a separate raintight enclosure.

5. Bend and attach to pole within 1' of enclosure. See Standard Plan "Typical Grounding Details."

6. For Type B service wiring diagram, use Standard Plan "Modified Type B Service."

7. For Type C service wiring diagram, use Standard Plan, "Type E Service."

8. See breaker schedule in contract for breaker and contactor sizes.

120 VOLT

Meter base

Test switch

150 VA 480/120 VAC dry transformer (500 VA if flasher used)

Neutral busbar

1" conduit three #12 (Photoelectric control)

120 VAC coil contactor

2P 480VAC service breaker

Control breaker

Service

120 VAC cell conductor

1" conduit three #12 (Photoelectric control)

150 VA 480/120 VAC dry transformer (500 VA if flasher used)

Neutral busbar

1" conduit three #12 (Photoelectric control)

TYPE C SERVICE CABINET

SECTION A-A

TYPE A WIRING DIAGRAM

120 VOLT

Test switch

Neutral busbar

120 VAC

Control breaker

Service

120 VAC cell conductor

1" conduit three #12 (Photoelectric control)

150 VA 480/120 VAC dry transformer (500 VA if flasher used)

Neutral busbar

1" conduit three #12 (Photoelectric control)

TYPE C SERVICE CABINET

SECTION A-A

TYPE A WIRING DIAGRAM

120 VOLT

Test switch

Neutral busbar

120 VAC

Control breaker

Service

120 VAC cell conductor

1" conduit three #12 (Photoelectric control)

150 VA 480/120 VAC dry transformer (500 VA if flasher used)

Neutral busbar

1" conduit three #12 (Photoelectric control)
1. Verify the service utility stand-off dimension.

2. When using alternate door hinge: remove the side view.

3. Drawn by: Mark Sujka

4. Face of the nuts and no more than 3 full threads extend past the cut-off all-thread bolts so that no less than 2 provided by the utility company. After adjustment, see drawing 309 requirements.

5. Designed to meet metering portion of EUSERC.

6. Note 15 has been deleted.

7. Dimensions shown are minimum and shall be verified to accommodate the vacuum zone of equipment installed.

8. All busbars shall be 1/0 copper and 1/0 aluminum. Neutral busbars shall be all-aluminum.

9. The panel door shall be stainless steel.

10. All internal ways shall be identified with the turns of the connector labeled with letters and numbers shown on the schedule. Approved for use on all future work using the schedule.

11. All nuts, bolts, and washers used for mounting the panel shall be stainless steel.

12. A 1% tolerance is allowed for all dimensions.

13. Unistrut-type channels and mounting hardware components shall be stainless steel. Stainless clamps shall not be used.

14. Install conduit supports on all conduit's place equal span flush with top of concrete foundation.

15. Note 18 has been deleted.

16. The meter panel portion of this component was designed to meet metering portion of EUSERC.

17. When using alternate door hinge, remove hinge pin prior to welding hinge to cabinet and prior to any hot-dip galvanizing cabinet. After galvanizing, replace hinge pin with harden pin shown in place.

18. Verify the reduce utility stand-off dimension. Mounting panel to the measurement provided by the utility company. After adjustment, cut hinge pin so there is no more than 3 and no more than 3 full threads extend past the face of the nut.

19. Label cabinet with nameplate rating.

20. See standard specification P9-29.24, service cabinets.

21. May be used as alternative material. See photoelectric enclosure detail.

22. Neutral use 14 gauge copper.

23. All circuit panel board - minimum size with separate circuit panel board - minimum size with separate neutral bus bar. See details on sheet 2 of 3.
NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

STATE DESIGN ENGINEER

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY PORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
**PEDESTRIAN PUSHBUTTON DETAILS**

**ALUMINUM 'H' EXTRUSION**

**WOOD POLE INSTALLATION**

**METAL POLE INSTALLATION**

**KEY**

1. Pushbutton switch assembly
2. Cast metal housing
3. Protective collar
4. Pushbutton switch
5. Gasket
6. Stainless steel fastener
7. Cast aluminum conduit
8. Aluminum plug with 1/8" drilled weep hole. On timber pole installation, remove plug for wire entrance and drill weep hole in conduit.
9. Aluminum "H" extrusion
10. Chase nipple - 7/8" hex head x 3" pipe thread x 2 1/2" long
11. 3/8" - 16 X 2 1/2" stainless steel bolt with washer
12. 5/8" x 4" lag bolt with washer
13. Drill and top short for 3/8" bolt
14. Drill and top short for 5/8" nipple
15. Conduit and fittings as required for timber pole installation; reverse conduit and conduit for top feed
16. Drill pilot hole for 3/8" lag bolt

**NOTE:**
- When "PPB-MR" or "PPB-WR" are specified in the contract, the arrow shall be installed in the opposite direction than as shown for "PPB-M" or "PPB-W".
NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

1. Where pad or pedestal mounts are located in a sidewalk, construct mount top flush with sidewalk grade, omitting corner where top and sidewalk abut.

2. Pad mount design is typical.

3. Place a silicone seal between the cabinet foundation and the cabinet for the pad mount design.

CABINET FOUNDATION DETAILS

PAD MOUNT

Install one spare 2" conduit and caps; others as required.

Locate conduits centrally in foundation

#4 bar each corner

1'-6"

Cabinet depth 1'-6"

6"

Cabinet width 6"

PEDESTAL MOUNT

#4 bars at approximately 1'-0" centers

#4 hoops

2'-0"

3'-0"

(= 2"

3/8" diameter plastic drain

6" MIN

6"

3/8" diameter plastic drain

3'-7"

4" slip-fitter

4" steel pipe

3" X 5" handhole with cover

5/8" X 2'-0" X 4" steel anchor bolts

4" x 9" pipe flange

PEDESTAL BASE DETAILS

7 1/2" DIA bolt circle for at least 4 bolt holes

3/4" DIA each

3/4" DIA each

4/" X 9" pipe flange

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

OLYMPIA, WASHINGTON

STANDARD PLAN J-6c

APPROVED FOR PUBLICATION

DEPUTY STATE DESIGN ENGINEER

DATE

EXPIRES JUNE 4, 1999

CABINET FOUNDATION DETAILS

SPECIAL PLAN J-6c

APPROVED FOR PUBLICATION

Clifford E. Mansfield 04-24-98

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

OLYMPIA, WASHINGTON

EXPIRES JUNE 4, 1999
NOTES:

1. SEE CONTRACT FOR HEAD TYPE, MOUNTING HEIGHT AND ORIENTATION.
2. ALL NIPPLES, FITTINGS AND CENTER PIPES SHALL BE 1 1/2'' DIA
   NOMINAL TRADE SIZE (NEC).
3. INSTALL NEOPRENE GASKET OUTSIDE HEAD WHEN FLANGED ELBOWS
   ARE SUPPLIED.

- 1/2'' LAG SCREWS ON WOOD POLE
- 1/2'' BOLTS TAPPED TO METAL POLE
- 1/4'' DRAIN HOLE
- 12 POSITION TERMINAL STRIP
- BRONZE COLLAR, 4 1/4'' I.D. WITH SET SCREWS
- GASKET AND WASHER
- COMBINATION LOCK
- FLATHEAD SOCKET BOLT
- 1/2'' INSERT HOLE FOR EXTERNAL WIRE ENTRANCE

REQUIRED ON TIMBER POLE MOUNTINGS ONLY.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT
BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY
THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON
FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION.
A COPY MAY BE OBTAINED UPON REQUEST.
**NOTES:**

1. Type M mounting shall have "O" ring groove and seal top and bottom of signal attachment.
2. Type M mounting for conventional heads shall have a 2" diameter opening at the signal attachment.
3. Type M mounting for optically programmed heads shall have a 2 1/2" DIA opening at the signal attachment.
4. Type N mounting with optically programmed heads shall be installed with 12" normal arms.
5. See Standard Plan J-6h for tether wire, and backplate requirements.

**KEY:**

1. End cap
2. Conduit locknut, 1 1/2" DIA
3. Locknipple, 1 1/2" DIA
4. Steel washer
5. Neoprene gasket
6. Bronze serrated ell fitting with:
   - 3/8" stainless steel through bolt and nuts
   - Three set screws at slipfitter connection
   - Three allen head stainless steel set screws at conduit nipple connection
7. Serrated ring with pins
8. Hex locknut with:
   - Two allen head stainless steel set screws
   - Pin receptacles
9. Conduit nipple, 1 1/2" DIA
10. Hex locknut, 1 1/2" DIA
11. Mounting assembly
12. Bronze elevator plumbizer with 3/8" stainless steel through bolt, washers, and two nuts
13. Aluminum arm with set screw
14. Slotted tube with closure strip
15. Tube clamp, 2 1/2" ID, MIN
16. Internally threaded clamp assembly with:
   - Two set screws
   - 1/2" x 0.045" stainless steel bands
   - Screw buckles, 7/16" with swivels, nuts, and washers
   - Band clips with allen head stainless steel set screws
17. Bronze messenger hanger with:
   - 1/2" DIA J bolts
   - Cable lock bar
   - Cotter key
18. Bronze internally threaded wire entrance with:
   - Bushing insert
   - Allen head stainless steel set screw
19. Bronze balance adjuster
20. Multi-head mounting assembly
21. Spider assembly
22. Serrated ring with no pins

**SPAN WIRE**

- Type P (1 HEAD)
- Type Q (2 HEADS)
- Type R (3 HEADS)
- Type S (4 HEADS)
### Signal Standard Type Designations

#### Type PPB, PS, I, RM & FB Details

<table>
<thead>
<tr>
<th>Type</th>
<th>Ped. Push Button Post</th>
<th>Ped. Head Standard</th>
<th>Type I &amp; RM</th>
<th>Flashing Beacon Standard</th>
<th>Type II</th>
<th>Type III</th>
<th>Type IV</th>
<th>Strain Pole Standard</th>
<th>Type V</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PPB</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>I</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>RM</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FB</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Foundation Details

- **H1 (Square)**: 2" CLEARANCE
- **H2 (Round)**: 2" CLEARANCE
- **Foundation Details**: 2 1/2 " CLEARANCE

### Type PPB, PS, I, RM & FB Standard Dimension Chart

<table>
<thead>
<tr>
<th>Item</th>
<th>Type PPB</th>
<th>Type PS</th>
<th>Type I</th>
<th>Type RM</th>
<th>Type FB</th>
<th>Type II</th>
<th>Type III</th>
<th>Type IV</th>
<th>Type V</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Height</strong></td>
<td>4'-0&quot;</td>
<td>6'-0&quot;</td>
<td>10'-0&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>B. Pole Base Dia</strong></td>
<td>2 1/2&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>C. Plate Thickness</strong></td>
<td>3/8&quot;</td>
<td>3/8&quot;</td>
<td>3/8&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>D. Plate Width</strong></td>
<td>5/8&quot;</td>
<td>5/8&quot;</td>
<td>5/8&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>E. Hole Dia</strong></td>
<td>1&quot;</td>
<td>1&quot;</td>
<td>1&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>F. Bolt Circle</strong></td>
<td>1&quot; 1/2&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>G. Foundation Depth</strong></td>
<td>8'-0&quot;</td>
<td>8'-0&quot;</td>
<td>8'-0&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>H. Foundation Width</strong></td>
<td>1'-6&quot;</td>
<td>1'-6&quot;</td>
<td>1'-6&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>I. Foundation Dia</strong></td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td>4'-0&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>J. Nut &amp; Washer</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>K. Grout Pad Dia</strong></td>
<td>4&quot;</td>
<td>4&quot;</td>
<td>4&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>L. Plastic Drain Tub</strong></td>
<td>1'-6&quot;</td>
<td>1'-6&quot;</td>
<td>1'-6&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>M. Vertical Rebar</strong></td>
<td>None</td>
<td>4&quot;</td>
<td>4&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>N. Reinforcement</strong></td>
<td>None</td>
<td>Three #4</td>
<td>Three #4</td>
<td>Three #4</td>
<td>Three #4</td>
<td>Three #4</td>
<td>Three #4</td>
<td>Three #4</td>
<td></td>
</tr>
<tr>
<td><strong>O. Slipfitter Dia</strong></td>
<td>1 1/2&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P. Thickness</strong></td>
<td>None</td>
<td>None</td>
<td>None</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

* Tapered round or octagonal shaft, 1/2" cage, 4" OD at slipfitter. Taper = 0.14 inches/ft.

---

* Leveling nut height 1" maximum.

Leveling nuts not required for Type PPB standard.
**FLASHER WARNING BEACON**

Type D standard signal head mounting, Standard Plan J-46:
- Drill slipfitter to seat set screws.
- Slipfitter to match standard signal head.

**KEEPER PLATE**

Place between pole base plate and slip plate on top of middle washers.

**SLIP ANCHOR PLATES DETAIL**

See Slip Anchor Plate Detail for dimensions not shown. Match Slip Plate dimensions.

**ANALOR BOLT LAYOUT**

- 3/4" Chamfer
- Keeper plate
- Top of concrete
- 6" Hollow in center of grout pad

**FLASHING BEACON AND RAMP METER BASE ELEVATION**

Study "FOUNDATION DETAIL" for other requirements.

**RAMP METER DETAIL**

- Install 5 amp quick disconnect for R, S, & G conductors.
- Install unfused quick disconnect for W conductor. Tape off B conductor. See Std. Spec. 9-29.7.
- Secure 5c cable with cable ties. See Std. Plan J-34.
- See "FOUNDATION DETAIL" for Foundation Detail requirements.

**FLASHING BEACON DETAIL**

Install 5 amp quick disconnect for R, S, & G conductors.
- Install unfused quick disconnect for W conductor. Tape off B conductor. See Std. Spec. 9-29.7.
- See "FOUNDATION DETAIL" for Foundation Detail requirements.

**PLATE WASHER**

- 3/4" DIA hole (chamfered)

**SIGNAL STANDARD TYPE DESIGNATIONS AND TYPE PPB, PS, I, RM, & FB DETAILS**

See "FOUNDATION DETAIL" for other requirements.

**REVISION**

HRP 09-12-01
EXPIRES OCTOBER 26, 2002

APPROVED FOR PUBLICATION

Harold J. Peterfeso 09-12-01

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTE
1. For Sections A and B, see Standard Plan J-8d.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. All of the loop lead-in wires shall return to the Junction Box.
2. For splice detail, see Standard Plan J-8d.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. All of the loop lead-in wires shall return to the Junction Box.

2. For Splice Detail, see Standard Plan J-8d.

S = START
F = FINISH

NOTES

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. Fill the conduit trench to the top of the existing or new surfacing with CSTC, sand or controlled density fill. See "Standard Specifications" Section 2-09.3(1)E.
2. Minor Regional variation is allowed in the soft pocket closure. Consult with the Engineer or see the Contract for additional requirements.
3. Conductors shall be snug to the bottom of the sawcut. High temperature backer rod shall be snug to the conductors.

**Conduit Sizing Table**

<table>
<thead>
<tr>
<th>Loop Lead Pairs</th>
<th>1</th>
<th>2</th>
<th>4</th>
<th>8</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduit Size (in)</td>
<td>1&quot;</td>
<td>1 1/4&quot;</td>
<td>1 1/2&quot;</td>
<td>2&quot;</td>
<td>2 1/4&quot;</td>
</tr>
</tbody>
</table>

**Notes**

- Induction loop details
- Standard plan J-8d
- SHEET 1 OF 2 SHEETS
- DRAWN BY: MONIQUE GLICK
- FOR CONDUIT SIZE TO CONTROLLER CABINET, SEE CONTRACT
- EXPLORES MAY 5, 2005
- INDUCTION LOOP DETAILS
- STANDARD PLAN J-8d
- SHEET 1 OF 2 SHEETS
- APPROVED FOR PUBLICATION
- HAROLD J. PETERFESO 08-30-04
- WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

**Standard Specifications**

- See Standard Specifications Section 2-09.3(1)E.
- Minor Regional variation is allowed in the soft pocket closure.
- Conductors shall be snug to the bottom of the sawcut.
- High temperature backer rod shall be snug to the conductors.
**INDUCTION LOOP DETAILS**

**STANDARD PLAN J-8d**

**DRAWN BY:** MONIQUE GLICK

---

**LOOP INSTALLATION NOTES**

1. Install the Junction Box and the lead-in conduit.
2. Sawcut the loop slots and the lead-in slots.
3. Lay out the loop wire starting at the Junction Box, allowing 5' minimum slack.
4. Install the wire in the loop slot as shown.
5. Finish laying out the wire at the Junction Box and identify the leads with the loop number, the "S" for start and the "F" for finish, and the loop series number.
6. Twist each pair of the lead-in wire twice per foot from the loop to the Junction Box. Reverse the direction of the twist for each successive pair installed.
7. Construct a supplemental splice containing any series loop connections required in the plans. Supplemental splices are subject to the same requirements shown for the loop lead and the shielded cable splice.
8. Splice the loop leads of supplemental splice leads to the shielded cable as noted in the Contract.
9. Complete installation and test loop circuits or combination loop circuits. See Standard Specifications 8-20.3(14)D.
10. Consult for the loop stubout shall be as required in the Contract.

---

**SAWCUT AND CONDUIT CONNECTION PLAN**

**DETAIL "A"**

**DETAIL "B"**

---

**DATE:**

**STATE DESIGN ENGINEER:** Washington State Department of Transportation

---

**NOTE:** THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. If parallel circuits of different sizes are contained in one conduit, the size of the grounding conductor shall be determined on the basis of the largest conductor. Only one grounding conductor is required for each conduit regardless of the number of circuits contained.

2. Service ground per serving utility requirement. If the utility uses aluminum service conductors, an approved Al-Cu pressure type ground connector shall be used to secure the service neutral to the copper neutral bar in the service enclosure. Except for the above, all grounding conductors shall be copper.

3. Equipment grounding conductors and grounding electrode conductors shall be sized in accordance with the National Electric Code (No. 8 minimum).

4. Required to supplement equipment grounding for luminaire standards with direct burial, aerial feeds, or where required in plans.

5. Required at all services and separately derived systems.

NOTES

1. If parallel circuits of different sizes are contained in one conduit, the size of the grounding conductor shall be determined on the basis of the largest conductor. Only one grounding conductor is required for each conduit regardless of the number of circuits contained.

2. Service ground per serving utility requirement. If the utility uses aluminum service conductors, an approved Al-Cu pressure type ground connector shall be used to secure the service neutral to the copper neutral bar in the service enclosure. Except for the above, all grounding conductors shall be copper.

3. Equipment grounding conductors and grounding electrode conductors shall be sized in accordance with the National Electric Code (No. 8 minimum).

4. Required to supplement equipment grounding for luminaire standards with direct burial, aerial feeds, or where required in plans.

5. Required at all services and separately derived systems.

KEY

1. Service Neutral
2. Service Ground
3. Grounding Electrode Conductor
4. Bonding Jumper
5. Grounding Bushing (typ. all conduit terminations)
6. Service Neutral Bus (Copper)
7. Service Enclosure
8. Equipment Grounding Conductor
9. Junction Box
10. Electrical Load Support (luminaire pole)
11. Copper Split Bolt Clamp
12. Galvanized Steel Conduit (GSC)
13. Non-metallic Conduit (NMC)
14. Option 1 - 10’ GSC with Field Bend
15. Option 2 - 10’ GSC
16. Option 3 - 10’ GSC
17. Option 4 - 10’ GSC with Field Bend
18. Option 5 - 10’ GSC
19. Ground Rod
20. Edge of Foundation, Pole or Service Support
21. Clamp
22. Junction Box or 8” Drain Tile with Approved Cover
23. Code Sized GSC
24. To Service Neutral Bus
25. To Grounding Terminal or Connection to Equipment Grounding System

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. All box dimensions are approximate. Exact configurations vary among manufacturers.

2. The lid thicknesses are minimum. The diamond pattern shall be 28% minimum of overall thickness.

3. Lid support members shall be 3/16" thick steel C, L, or T shape, welded to the frame.

4. A 1 1/4"-20NC × 3/4" S.S. ground stud shall be welded to the bottom of the lid; include S.S. nut and flat washer.

5. Bolts and nuts shall be liberally coated with anti-seize compound.

6. Connect a bonding jumper to steel conduit bushing for GRS conduit; connect to equipment grounding conductor for PVC conduit. Bonding jumper shall be #8 min. × 4' of tinned braided copper.

7. The System identification letters shall be 1/8" thick lines formed by engraving, stamping, or with a S.S. weld bead. Grind off diamond pattern before forming letters. See System Identification Detail.

8. Park Box Type 2 boxes shall be provided with a 10" × 27 1/2", 10 gage divider plate complete with fasteners.

9. The Junction Box Type 2 shall be provided with a 12" deep extension when specified in the Contract.

10. See the Standard Specifications for alternative reinforcement and class of concrete.
1. All box dimensions are approximate. Exact configurations vary among manufacturers.
2. All lid thicknesses are minimum. The diamond pattern shall be 3/32” minimum thick.
3. Lid stiffener plates shall bear on frame. Mill to bearing seat and perimeter bar for full even contact after fabrication of frame and lid. Lid and frame units with uneven bearing will be rejected.
4. The installed lid and frame shall fill with full even contact around the perimeter of a junction box after installation. Care shall be taken to prevent debris accumulation on the contact surfaces.
5. The hinges shall allow the lid to open 180°.
6. A 1/4-20NC × 3/4” S.S. ground stud shall be welded to the bottom of each lid. Include S.S. nut and flat washer.
7. The hinges shall allow the lid to open 180°.
8. Bolts and nuts shall be liberally coated with anti-seize compound.
9. Connect a bonding jumper to steel conduit bushing for GRS conduit, connect to equipment grounding conductor for PVC conduit. As an alternative, the bonding jumper shall be attached to the front face of the hinge pocket with a 5/16-20NC × 3/4” bolt, S.S. nut, and flat washer. Bonding Jumper shall be #8 min. × 4’ of tinned braided copper.
10. The system identification letters shall be 1/8” line thickness formed by engraving, stamping, or with a S.S. weld bead. Grind off diamond pattern before forming letters. See System Identification Detail.
11. A 1% tolerance is allowed for all dimensions.
12. See the Standard Specifications for class of concrete.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES

1. Junction boxes type 7 and type 8 are identical except for the addition of locking bolts on the type 8.

2. All box dimensions are approximate. Exact configurations vary among manufacturers.

3. All lid thicknesses are minimum. The diamond pattern shall be 3/32" minimum thick.

4. Lid support members shall be 3/16" min. thick steel C, L, or T shape, welded to the frame. Exact configurations vary among manufacturers.

5. A 1/4-20NC × 3/4" S.S. ground stud shall be welded to the bottom of each lid, include S.S. nut and flat washer.

6. The hinges shall allow the lids to open 180°.

7. Bolts and nuts shall be liberally coated with anti-seize compound.

8. Connect an equipment bonding jumper to steel conduit bushing for GR6 conduit; connect to equipment grounding conductor for PVC conduit. As an alternative to the ground stud connection, the equipment bonding jumper shall be attached to the front face of the hinge pocket with a 5/16-20NC × 3/4" S.S. bolt, nut, and flat washer. Equipment Bonding Jumper shall be #8 min. × 4' of tinned braided copper.

9. The System Identification letters shall be 1/8" line thickness formed by engraving, stamping, or with a S.S. weld bead. Grind off diamond pattern before forming letters. See System Identification Detail.

10. See the Standard Specifications for alternative reinforcement and class of concrete.

11. Capacity — conduit diameter = 24"
1. Install the Junction Box on the Timber Sign Post, or the Steel Sign Support, that is farthest from the roadway.

- **NOTE:** THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES

1. The Heavy Duty Lid shall be used when a Pull Box is placed in the paved shoulder. Use a 18" thick lid for new pull box installation, otherwise see Contract Plans for overlay depth to match the lid thicknesses.

2. The diamond pattern shall be 3/32" minimum thick.

3. A 1/4-20NC × 3/4" S.S. ground stud with S.S. nut and flat washer shall be attached to the lid and coated with anti-seize compound.

4. Connect a bonding jumper to steel conduit bushings for GRS conduit; connect to equipment grounding conductor and also to the ground rod for PVC conduit. The Bonding Jumper shall be #8 min. × 4' of tinned braided copper.

5. The System Identification letters shall be 1/8" line thickness formed by engraving, casting, stamping, or with a weld bead. See SYSTEM IDENTIFICATION DETAIL, Standard Plan J-11a.

6. Concrete shall be Class 4000.

7. Plastic plugs shall be put into lid inserts after fabrication and after lid installation.

The Heavy Duty Lid shall be used when a Pull Box is placed in the paved shoulder. Use a 9" thick lid for new pull box installation, otherwise see Contract Plans for overlay depth to match the lid thickness.

A 1/4-20NC × 3/4" S.S. ground stud with S.S. nut and flat washer shall be attached to the lid and coated with anti-seize compound.

Concrete shall be Class 4000.

Plastic plugs shall be put into lid inserts after fabrication and after lid installation.

The System Identification letters shall be 1/8" line thickness formed by engraving, casting, stamping, or with a weld bead. See SYSTEM IDENTIFICATION DETAIL, Standard Plan J-11a.
COIL THE CABLE BY USING A "FIGURE 8" FOLDED IN THE MIDDLE TO MAKE A LOOP

HEAVY DUTY LID
~ SEE NOTE 1

HEX HEAD BOLT 1/2-13NC × 15/16"

CHANNEL NUT WITH SPRING

HEX BOLT 3/8-16NC × 12"

SIDE VIEW

ISOMETRIC VIEW

CABLE RACKING SCHEME

LOCATION WIRE - PROVIDE 1" - 6" DIAM.
LOOP AROUND CHANNEL SECTION

5 PIPE HANGER - SEE DETAIL

CABLE BUFFER

PIPE HANGER ~ S.S., 12 GAGE, 1" WIDE

GROUND STUD ~ THREAD INTO PREDRILLED HOLE, SEE NOTE 2

GROUND STUD ~ THREAD INTO PREDRLLED HOLE, SEE NOTE 0

HEAVY DUTY LID
~ SEE NOTE 1

PULL BOX

SPLIT PULL BOX
DIAGRAM WITH HEAVY DUTY LID
SEE PULL BOX, SHEET 1, FOR DIMENSIONS NOT SHOWN

6" PIPE HANGER DETAIL
FABRICATE IF NOT AVAILABLE COMMERCIALY

SPLIT PULL BOX (SHOWN WITH HEAVY DUTY LID)
SEE PULL BOX, SHEET 1, FOR DIMENSIONS NOT SHOWN

NOTE:   THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT
BUT AN ELECTRONIC DUPLICATE.  THE ORIGINAL, SIGNED BY
THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON
FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANS-
PORTATION.   A COPY MAY BE OBTAINED UPON REQUEST.
NOTES:

1. The Heavy Duty Lid shall be used when a Cable Vault is placed in the paved shoulder. Use a 9" thick lid for the new cable vault installation, otherwise see Contract Plans for overlay depth to match the lid thickness.

2. The diamond pattern shall be 3/32" minimum thick.

3. A 1/4-20NC × 3/4" S.S. ground stud with S.S. nut and flat washer shall be attached to the lid and coated with anti-seize compound.

4. Connect a bonding jumper to steel conduit bushings for GRS conduit; connect to equipment grounding conductor and also to the ground rod for PVC conduit. The Bonding Jumper shall be #8 min. × 4' of tinned braided copper.

5. The System Identification letters shall be 1/8" line thickness formed by engraving, casting, stamping, or with a weld bead. See SYSTEM IDENTIFICATION DETAIL, Standard Plan J-11a

6. Concrete shall be Class 4000.

7. Plastic plugs shall be put into lid inserts after fabrication and after lid installation.

Concrete shall be Class 4000.

The System Identification letters shall be 1/8" line thickness formed by engraving, casting, stamping, or with a weld bead. See SYSTEM IDENTIFICATION DETAIL, Standard Plan J-11a

The Heavy Duty Lid shall be used when a Cable Vault is placed in the paved shoulder. Use a 9" thick lid for the new cable vault installation, otherwise see Contract Plans for overlay depth to match the lid thickness.

A 1/4-20NC × 3/4" S.S. ground stud with S.S. nut and flat washer shall be attached to the lid and coated with anti-seize compound.

Connect a bonding jumper to steel conduit bushings for GRS conduit; connect to equipment grounding conductor and also to the ground rod for PVC conduit. The Bonding Jumper shall be #8 min. × 4' of tinned braided copper.

The System Identification letters shall be 1/8" line thickness formed by engraving, casting, stamping, or with a weld bead. See SYSTEM IDENTIFICATION DETAIL, Standard Plan J-11a

Concrete shall be Class 4000.

The Heavy Duty Lid shall be used when a Cable Vault is placed in the paved shoulder. Use a 9" thick lid for the new cable vault installation, otherwise see Contract Plans for overlay depth to match the lid thickness.

A 1/4-20NC × 3/4" S.S. ground stud with S.S. nut and flat washer shall be attached to the lid and coated with anti-seize compound.

Connect a bonding jumper to steel conduit bushings for GRS conduit; connect to equipment grounding conductor and also to the ground rod for PVC conduit. The Bonding Jumper shall be #8 min. × 4' of tinned braided copper.

The System Identification letters shall be 1/8" line thickness formed by engraving, casting, stamping, or with a weld bead. See SYSTEM IDENTIFICATION DETAIL, Standard Plan J-11a

Concrete shall be Class 4000.

The Heavy Duty Lid shall be used when a Cable Vault is placed in the paved shoulder. Use a 9" thick lid for the new cable vault installation, otherwise see Contract Plans for overlay depth to match the lid thickness.

A 1/4-20NC × 3/4" S.S. ground stud with S.S. nut and flat washer shall be attached to the lid and coated with anti-seize compound.

Connect a bonding jumper to steel conduit bushings for GRS conduit; connect to equipment grounding conductor and also to the ground rod for PVC conduit. The Bonding Jumper shall be #8 min. × 4' of tinned braided copper.

The System Identification letters shall be 1/8" line thickness formed by engraving, casting, stamping, or with a weld bead. See SYSTEM IDENTIFICATION DETAIL, Standard Plan J-11a

Concrete shall be Class 4000.

The Heavy Duty Lid shall be used when a Cable Vault is placed in the paved shoulder. Use a 9" thick lid for the new cable vault installation, otherwise see Contract Plans for overlay depth to match the lid thickness.

A 1/4-20NC × 3/4" S.S. ground stud with S.S. nut and flat washer shall be attached to the lid and coated with anti-seize compound.

Connect a bonding jumper to steel conduit bushings for GRS conduit; connect to equipment grounding conductor and also to the ground rod for PVC conduit. The Bonding Jumper shall be #8 min. × 4' of tinned braided copper.

The System Identification letters shall be 1/8" line thickness formed by engraving, casting, stamping, or with a weld bead. See SYSTEM IDENTIFICATION DETAIL, Standard Plan J-11a

Concrete shall be Class 4000.

The Heavy Duty Lid shall be used when a Cable Vault is placed in the paved shoulder. Use a 9" thick lid for the new cable vault installation, otherwise see Contract Plans for overlay depth to match the lid thickness.

A 1/4-20NC × 3/4" S.S. ground stud with S.S. nut and flat washer shall be attached to the lid and coated with anti-seize compound.

Connect a bonding jumper to steel conduit bushings for GRS conduit; connect to equipment grounding conductor and also to the ground rod for PVC conduit. The Bonding Jumper shall be #8 min. × 4' of tinned braided copper.

The System Identification letters shall be 1/8" line thickness formed by engraving, casting, stamping, or with a weld bead. See SYSTEM IDENTIFICATION DETAIL, Standard Plan J-11a

Concrete shall be Class 4000.
CABLE VAULT

SPLIT CABLE VAULT

END VIEW

FIELD VERIFY

LOCATION WIRE — PROVIDE 1-6" DUAL LOOP ABOVE CHANNEL SECTION

SPlice Case MOUNTING AT SPlice LOCATIONS

PIPE HANGER ~ S.S., 1/2-13NC × 15/16"

HEX HEAD BOLT 1/2-13NC × 15/16"

HEX BOLT 1/2" × 12"

CHANNEL NUT WITH SPRING

PIPE HANGER ~ SEE DETAIL

8" PIPE HANGER DETAIL

FABRICATE IF NOT AVAILABLE COMMERCiALLY

8" PIPE HANGER (TYP.)

8" PIPE HANGER (TYP.) — MINIMUM 6 HOLES EACH WALL

HEAVY DUTY Lid — SEE NOTE 1

GROUND STUD — THREAD INTO PREDRILLED HOLE, SEE NOTE 2

5" DIAM. KNOCKOUT (TYP.) — MINIMUM 8 KNOCKOUTS EACH WALL

PIPE HANGER ~ S.S., 12 GAGE, 1" WIDE

SPLICE CASE MOUNTING AT SPLICE LOCATIONS

CABLE BUFFER ~ CORRUGATED PVC PIPE 8" DIAM., 1'-0" LONG, SPLIT

PIPE HANGER ~ S.S. 1 5/8" SLOTTED CHANNEL

CABLE BUFFER

CABLE RACKING SCHEME

COIL THE CABLE BY USING A "FIGURE 8"

CABLE VAULT, SHEET 1, FOR DIMENSIONS NOT SHOWN

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

EXPIRES MAY 5, 2007

APPROVED FOR PUBLICATION

STANDARD PLAN J-15b

FIELD VERIFY

CABLE VAULT

SPLIT CABLE VAULT

HEAVY DUTY Lid

ISOMETRIC CUTOAWAY VIEW

ISOMETRIC VIEW

END VIEW

FIELD VERIFY

MEASUREMENT VIEW

CABLE BUFFER
1. The Junction Box shall be of type 304 stainless steel, welded seam construction; #12 gage backbox with #2B finish, #12 gage cover with #4 finish, and #12 gage mounting tabs.

2. All conduit connections to the Junction Box shall be concrete-tight (wet concrete shall not infiltrate during pour). Field drill or punch the holes in the center of the box end, unless adding additional conduit. (See SECTION "B")

3. Use concrete-tight fittings on the outside of the junction box conduit connection. Use an insulated, grounded bushing on the inside for GRS conduit. Use an end bell bushing on the inside for PVC conduit.

4. The System Identification letters shall be 1/16" line thickness formed by engraving, stamping, or with a S.S. weld bead. See Detail.

5. Liberally coat the threads of the cover fasteners with anti-seize compound during construction & before final closure.

6. Details shown for box installation in stationary forms.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

DRAWN BY: ELENA BRUNSTEIN

CONCRETE-TIGHT FITTING (TYP.) ~ SEE NOTE 3

CLOSED CELL NEOPRENE GASKET 1 1/4" × 1/4"
1. Conduit placed in retaining wall traffic barrier shall be filled with conduit deflection (CD) Fittings spaced at 120° maximum. The CD Fittings shall be placed at the traffic barrier open joints that coincide with the retaining wall beam expansion joints nearest to the transverse construction joints in the wall footing.

2. Install Galvanized Rigid Steel (GRS) conduit between the Junction Box(es) Type 1 and the CD Fitting(s) “A”. GRS conduit shall also be used from the CD Fitting(s) “A” to the PVC adapter in the barrier. PVC conduit may be used only in stationary-form barriers. Connect to GRS using a PVC adapter. GRS conduit may be used in stationary-form barriers, but it shall be used in slipform barriers.

3. Junction Box ~ 8" × 6" × 10" NEMA 4X in stationary-form barrier, adjustable NEMA 3R in slipform barrier. Junction box can be recessed up to 1/6". See Standard Plan J-16a.


5. Where conduit exits from a structure, wrap the conduit pipe for 1' - 0" on each side from the cutting point. Pipe-wrap tape shall be 2" wide, 20 mil thick, & installed w/ 1" minimum overlap.

6. 1' - 0" long section of GRS conduit.
Notes:

1. Install a Conduit Deflection (CD) Fitting "A" at the exit from the barrier.
   Install a Conduit Deflection Fitting "B" to connect conduit ends at each concrete barrier expansion joint. See Standard Plan J-16b for Conduit Deflection Fitting details.

2. Install Galvanized Rigid Steel (GRS) conduit between the Junction Box(es) Type 1 and the CD Fitting(s) "A". GRS conduit shall also be used from the CD Fitting(s) "A" to the PVC adapter in the barrier.
   PVC Conduit may be used only in stationery-form barriers. Connect to GRS using a PVC adapter.
   GRS Conduit may be used in stationery-form barriers, but it shall be used in slipform barriers.

3. See Standard Plan C-14a for additional information on Single Slope Concrete Barrier.

Key Notes:

1. Junction Box = 8" x 8" x 18" NEMA 4X in stationery-form barrier, adjustable NEMA 3R in slipform barrier (junction box can be recessed up to 1/8""). See Standard Plan J-16a.

2. Where conduit in a structure is routed across a cold joint with continuous reinforcing steel, install premolded joint filler and wrap the conduit pipe for 1'-0" on each side of joint. Pipe-wrap tape shall be 2" wide, 20 mil thick, & installed w/ 1" min. overlap.

3. 10' long section of GRS Conduit.

Conduit installation in single slope concrete barrier (dual face):

Standard Plan J-16a

Sheet 1 of 1 Sheet

Approved for publication
Pasco Bakotich III 09-20-07
Washington State Department of Transportation

Expiry: August 9, 2009

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES:
1. The Traffic Data Collection Loop spacing shall be 16'-0" from leading edge to leading edge. The loops shall be centered inside lanes without an adjacent shoulder; the loops in lanes adjacent to shoulders, including the median shoulder, shall be located 1'-8" from the edge of lane, see Details "A".
2. Type 2 Advanced Induction Loops may also be used, see Standard Plan J-8b.
3. The loops and axle sensors shall be cut in the final lift of asphalt.
4. For concrete pavement lanes with asphalt shoulders, install all of the Piezo sensor and splice in the concrete lane. Also for concrete pavement lanes install the loops 4" to 6" away from the expansion joints.
5. The shoulder notch length along the roadway shall be 4" or the conduit size plus 2", whichever is larger. The shoulder notch width perpendicular to the roadway shall be the conduit size plus 1/4".
6. After all the wire leads are installed, seal the end of the conduit with Conduit Sealant. See the Special Provisions in the contract for the material used to fill the notch in the shoulder, or use an asphalt cold-patch.
7. Use Schedule 40 PVC conduit from the junction box to the cabinet. When there are four or more total lanes, use one conduit for each direction of travel. For conduit installation, see Standard Specification 8-20.
8. Use Schedule 80 PVC, HDPE, or Steel Conduit under the roadway. For conduit installation, see Standard Specification 8-20.
9. An inspector from the Traffic Data Office (TDO) shall be on site during all phases of the Traffic Recorder installation. The Contractor shall alert the Engineer 10 days prior to the beginning of any installation activity.

Lane 1 - (drive lane) ~ Loop L1, Piezo P1, Loop L2
Lane 2 - (pass lane) ~ Loop L3, Piezo P2, Loop L4
Lane 3 - (drive lane) ~ Loop L1, Piezo P1, Loop L2
Lane 4 - (pass lane) ~ Loop L3, Piezo P2, Loop L4

TYPICAL 4 LANE FREEWAY WITH MEDIAN

PLAN VIEW

INDUCTION LOOP / PIEZO AXLE SENSOR NUMBER IDENTIFICATION
Lane 1 - (drive lane) ~ Loop L1, Piezo P1, Loop L2
Lane 2 - (pass lane) ~ Loop L3, Piezo P2, Loop L4
Lane 3 - (drive lane) ~ Loop L1, Piezo P1, Loop L2
Lane 4 - (pass lane) ~ Loop L3, Piezo P2, Loop L4

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
TYPICAL 7 LANE FREEWAY WITH MEDIAN

Lane 1 - (drive lane) ~ Loop L1, Piezo P1, Loop L2
Lane 2 - (drive lane) ~ Loop L3, Piezo P2, Loop L4
Lane 3 - (drive lane) ~ Loop L5, Piezo P3, Loop L6
Lane 4 - (pass lane) ~ Loop L7, Piezo P4, Loop L8
Lane 5 - (drive lane) ~ Loop L1, Piezo P1, Loop L2
Lane 6 - (drive lane) ~ Loop L3, Piezo P2, Loop L4
Lane 7 - (pass lane) ~ Loop L5, Piezo P3, Loop L6
The Traffic Data Collection Loops shall be centered inside lanes without an adjacent shoulder; the loops in lanes adjacent to shoulders, including the median shoulder, shall be located 12" from the edge of lane, see Detail "A".

2. Type 3 Advanced Induction Loops may also be used, see Standard Plan J-8b.

3. The loops and axle sensors shall be cut in the final lift of asphalt.

4. For concrete pavement lanes with asphalt shoulders, install all of the Piezo sensor and splice in the concrete lane. Also for concrete pavement lanes install the loops 4" to 8" away from the expansion joints.

5. The shoulder notch length along the roadway shall be 4" or the conduit size plus 2", whichever is larger. The shoulder notch width perpendicular to the roadway shall be the conduit size plus 11/44.

6. After all the wire leads are installed, seal the conduit with Conduit Sealant. See the Special Provisions in the contract for the material used to fill the notch in the shoulder, or use an asphalt cold-patch.

7. Use Schedule 40 PVC conduit from the junction box to the cabinet. When there are four or more total lanes, use one conduit for each direction of travel. See Standard Specification 8-20 for conduit installation.

8. Use Schedule 80 PVC, HDPE, or steel conduit under the roadway. See Standard Specification 8-20 for conduit installation.

9. An inspector from the Traffic Data Office (TDO) shall be on site during all phases of the Traffic Recorder installation. The Contractor shall alert the Engineer 10 days prior to the beginning of any installation activity.

THESE ARE GENERAL INSTALLATION INSTRUCTIONS
SEE SPECIFIC MANUFACTURER'S INSTALLATION INSTRUCTIONS
IN THE SPECIAL PROVISIONS OF THE CONTRACT

1. Using pavement crayons, paint, tape measure and cord, carefully mark the layout of the sensor installation. Ensure sensors are placed exactly perpendicular to the flow of traffic and that all lines are straight. Verify that the passive cable length is enough to reach the cabinet. DO NOT SPLICE CABLE. Leave a 4' minimum cable length inside of the cabinet.

2. Using a wet-cutting pavement saw with a 3/4" diamond blade, wet-cut the slot for the sensor. The slot must be 3/4" wide, +/- 1/16", by 1" minimum deep. Cut the slot 8" longer than the sensor length, (including the lead attachment).

3. Cut home run slots for Piezo sensors. Center the home run slot on the sensor slot. Cut the home run slots 2" minimum to 2 1/2" maximum deep and 1/4" minimum wide. Cut the slots wider if installing conduit.

4. Using a power washer with water, remove and collected all the slurry and loose material from the slots. Sweep the slots with a stiff wire bristled brush. Dry all of the slots with a large capacity air compressor (150 CFM minimum). All of the slots and the pavement 1' on either side must be completely dry.

Using pavement crayons, paint, tape measure and cord, carefully mark the layout of the sensor installation. Ensure sensors are placed exactly perpendicular to the flow of traffic and that all lines are straight. Verify that the passive cable length is enough to reach the cabinet. DO NOT SPLICE CABLE. Leave a 4' minimum cable length inside of the cabinet.

Using a wet-cutting pavement saw with a 3/4" diamond blade, wet-cut the slot for the sensor. The slot must be 3/4" wide, +/- 1/16", by 1" minimum deep. Cut the slot 8" longer than the sensor length, (including the lead attachment).

Cut home run slots for Piezo sensors. Center the home run slot on the sensor slot. Cut the home run slots 2" minimum to 2 1/2" maximum deep and 1/4" minimum wide. Cut the slots wider if installing conduit.

Using a power washer with water, remove and collected all the slurry and loose material from the slots. Sweep the slots with a stiff wire bristled brush. Dry all of the slots with a large capacity air compressor (150 CFM minimum). All of the slots and the pavement 1' on either side must be completely dry.


5. Place 2” duct tape along length of both sides of the sensor slot. Tape 1/16” away from the slot.

8. Clean the sensor with the grit of a steel wool or emery pad. Wipe it down with isopropyl alcohol and a clean, lint free cloth.

10. Place the sensor in the slot in the road. The end of the sensor should be at least 2” from the end of the slot, and should not touch the bottom or the sides of the slot.

11. If any of the 3/4” brackets do not fit snugly against the sides of the slot or are loose, replace them with a 1” bracket.

12. Starting at the lead attachment end, position the sensor so that it is parallel to the surface of the road, approximately 3/8” above the surface of the road. At this depth, the installation brackets are 1/16” below the surface of the road.

13. Visually inspect the length of the sensor to ensure that it is at a uniform depth along its length and that it is level (not twisted, canted or bent).

14. Run the passive wire the length of the home run slot. Place the polypropylene tape under and over the passive cable (inside the slot). This will keep the grout from running out into the deeper home run slot.

15. Place all of the induction loops to the site specifications.


17. Using a low speed mixing drill (400 rpm) and a mixing paddle, mix the grout for 2 minutes or until smooth. Add hardener to the grout and mix according to the manufacturer’s instructions.

18. Pour the grout into the slot using a small bead. Make sure that the grout flows under the sensor slowly, eliminating air pockets. Start at the end and pour towards the lead attachment. Repeat until the slot is completely full of grout, at least in 2 passes (approximately 1/2” thick each).

19. Using a putty knife or a towel lightly spread the grout smooth along the length of the slot. The resin should be slightly higher (1/16”) than the tape as it will shrink while curing.

20. Remove the tape as soon as the final grout pour is complete.

21. Once the grout for the Weigh-in-Motion Piezo Sensors is cured, allow the loop sealant and the grout for both sensor installations to fully cure (45-60 minutes) before opening to traffic.

22. After the loop sealant and the grout for both sensor installations have fully cured (45-60 minutes) before opening to traffic.
1. The Loop and Piezo leads in all Junction Boxes and Cabinets are to be color-coded. Use colored tapes on each specific wire, see table. Wrap the tapes on the wires approximately 6" beyond conduit in all Junction Boxes.

2. The maximum load in the Cabinet is 5 Amps.

3. The Cabinet may be pedestal or pad mount, see Standard Plan J-6c for details.


6. Single Pair Wires in Cable


9. Permanent Traffic Recorder and Weight-in-Motion Details

10. Soldered Compression Connection

11. Color Code Labels on All Wires

12. Adjustable Shelving

13. Loop Wires

14. Piezo Passive Wire

15. Service Cabinet (Typ.)

16. Junction Box Wiring (shown prior to splicing)

17. Single Pair Wires in Cable

18. Ground Rod See Note 6
This plan depicts the Steel Light Standard types and terms commonly referred to in the contract. All Steel Light Standards are fabricated in accordance with the Standard Specifications and the Contract Provisions.

1. The Luminare Pole height shall not exceed 50' (H1).

2. Slip Bases shall not be installed on 50' (H1) poles with Double Mast Arms, nor on poles weighing more than 1000 lbs.

3. The optimal location of the Luminare head is near the edge of the traveled way. Based on the placement of the Steel Light Standard foundation, the position of the Luminare head may vary. See Standard Plan J-28.22.


STEEL LIGHT STANDARD

STANDARD PLAN J-32.10-00

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

POLE BASE
HAND HOLE
STEEL LIGHT STANDARD
BOLT CONNECTION

MOUNTING HEIGHT
= 6.0' L (TYP.)

LUMINAIRE POLE
STEEL LIGHT STANDARD
BOLT CONNECTION

TOP OF BRIDGE DECK
BOTTOM OF POLE BASE
LUMINAIRE POLE
STEEL LIGHT STANDARD
BOLT CONNECTION

BRIDGE MOUNTED
(TYPE 1 MAST ARM SHOWN)

HAND HOLE
STEEL LIGHT STANDARD
BOLT CONNECTION

MOUNTING HEIGHT
= 6.0' L (TYP.)

LUMINAIRE POLE
STEEL LIGHT STANDARD
BOLT CONNECTION

MEDIAN BARRIER MOUNTED
(TYPE 1 MAST ARM SHOWN)

BOLT CONNECTION
OFFSET DISTANCE

HAND HOLE
STEEL LIGHT STANDARD
BOLT CONNECTION

POST TOP MOUNTED LUMINAIRE
(SLIP BASE SHOWN)

EDGE OF TRAVELED WAY
VARIES WITH OFFSET DISTANCE

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

Pasco Bakotich III
08-07-07

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

APPROVED FOR PUBLICATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009
NOTES

1. The Steel Light Standard Placement depicted on this plan is only intended for installations where roadable conditions allow its usage. Roadable conditions may require a special design by the Bridge Office, as determined by the Project Engineer.


TAPER NOTE

End Taper (on approach from opposing traffic):

- 20' (longitudinal) = use on one-way roadways or where the Light Standard is not in the Design Clear Zone of the opposing traffic.
- 6H:1V min. taper = use when the Light Standard is in the Design Clear Zone of the opposing traffic.

Case A & B

For End Taper (on approach from opposing traffic):

- 20' (longitudinal) = use on one-way roadways or where the Light Standard is not in the Design Clear Zone of the opposing traffic.
- 6H:1V min. taper = use when the Light Standard is in the Design Clear Zone of the opposing traffic.

Case C

Based on field conditions, Steel Light Standard Placement can be adjusted 35/64 4.0', when approved by the Project Engineer.

Culvert - See Contract Plans for Size and Location.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
**NOTES**


---

**EMBANKMENTS**

**CASE E**

SLOPES 2H:1V OR FLATTER BEHIND TRAFFIC BARRIER

**CASE F**

SLOPES STEEPER THAN 2H:1V BEHIND TRAFFIC BARRIER (SPECIAL DESIGN FOUNDATION)

**CASE G**

ROADSIDE DITCH WITH FORE SLOPE STEEPER THAN 4H:1V (2H:1V MAX)

**CASE H**

CUT SECTION WITH BACK SLOPE STEEPER THAN 2H:1V (2H:1V MAX)

**STEEL LIGHT STANDARD PLACEMENT (FIXED BASE)**

**STANDARD PLAN J-28.24-00**

**Sheet 1 of 1 Sheet**

**EXPIRES AUGUST 9, 2007**

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
SHOULDER VARIANCE WITH OFFSET DISTANCE

SECTION VIEW
CASE I
PORTED SPEED LIMIT 15 MPH OR LESS

SECTION VIEW
CASE J
ROADWAY WITHIN CITY LIMITS
PORTED SPEED LIMIT 35 MPH OR LESS

SECTION VIEW
CASE K
ROADWAY WITH 10H:1V OR FLATTER SIDE SLOPES

SECTION VIEW
CASE L
PAVEMENT LOTS

STREET LIGHT STANDARD FOUNDATION

NOTES

STEEL LIGHT STANDARD FOUNDATION

2. The Strap Template shall be held in place by nuts, 8" from the top of the foundation and 3" from the bottom of the anchor bolts. 18 heavy-duty hex nuts and 6 round washers are required for a Slip Base assembly. 18 heavy duty hex nuts and 6 plate washers are required for a Fixed Base assembly.

3. Use Steel Light Standard Foundation Type A on level ground or slopes not exceeding 4H:1V. Use Type B for slopes steeper than 4H:1V, but not exceeding 2H:1V. Slopes steeper than 2H:1V shall require a special design.

4. These foundations are designed for a minimum of 2000 PSF (TYPE A) or 1500 PSF (TYPE B) allowable lateral bearing pressure for the soil. A special foundation shall be required for soil with lower allowable lateral bearing pressure than 1500 PSF.

5. The Luminaire Pole height shall not exceed 50' (H1).

6. Slip Bases shall not be installed on 80' (H1) poles with Double Mast Arms, nor on poles weighing more than 1000 lbs.

7. Slip Bases are not required on poles placed outside of the Design Clear Zone, nor on poles installed behind traffic barriers.

8. Foundations constructed within Ecology Embankments shall be increased in depth by the depth of the Ecology Embankment.

9. Exposed portions of the foundation shall be trimmed to create a smooth finished surface. All forming shall be removed upon completion of foundation construction.

10. For excavation, concrete placement, and backfill options, see METHOD 1 and METHOD 2 on Sheet 2 of 2.

11. The Anchor Bolts shall be high strength steel, manufactured from ASTM A490, with heavy hex nuts and hardened washers. Galvanize the Anchor Bolts according to AASHTO M222.

12. The foundation shall meet the requirements of Standard Specification Sect. 8-20.3(9).

CONSTRUCTION METHODS


METHOD 1
NO SUBSURFACE FORM

This option is only used when the existing soil in the hole will remain standing and the cement concrete can be placed without causing the soil to collapse. Concrete shall be cast directly against undisturbed soil.

Auger the hole for the foundation. Use paper or cardboard form to achieve a smooth finish on the final exposed cement concrete. Support the form as necessary to remain plumb.


Place the concrete foundation.

After concrete has cured, remove the paper or cardboard form portion.

Construct the embankment widening (if required).

METHOD 2
METAL (SSURFACE) FORM REQUIRED

When the existing soil will not retain a vertical face, over-excavate the foundation area and install a 36" diameter, corrugated metal (pipe) form. The corrugated metal form shall not extend more than 6" below any portion of the foundation that will remain exposed upon final grading. Continue forming to full height using paper or cardboard form to achieve a smooth finish on final exposed cement concrete. Support the form as necessary to remain plumb.


Place the concrete foundation.

After concrete has cured, remove the paper or cardboard form portion.

Backfill with controlled-density fill or compacted borrow in accordance with Standard Specification Section 8-20.3(2).

Construct the embankment widening (if required).
1. All (11) poles with double mast arms or poles weighing in excess of 1000 LBS shall not be installed on a slip base.

2. Galvanizing shall be in accordance with AASHTO M 111.

3. See Standard Plans C-8b, C-14h, and J-28.40 for foundation and base plate requirements when light standards are mounted on cement concrete traffic barriers.

4. See Standard Specification Section 6-03.3 (33) and 8-20.3 (4) for the torque requirements for all of the Anchor Bolt installations. Install 1-inch diameter Clamping Bolts in all Slip Bases to a torque of 95 Foot-Pounds - See Standard Specification Section 8-20.3 (13A).


6. LEAVE 6" HOLLOW IN THE CENTER OF THE GROUT PAD

7. APPLY GROUT EVEN WITH THE BOTTOM OF THE POLE BASE PLATE AFTER PLUMBING THE LUMINAIRE POLE

8. BOLT CAN PROTRUDE 5/8" MAX. WITH A MIN. OF TWO THREADS EXPOSED ABOVE NUT

9. See Standard Plans C-8b, C-14h, and J-28.40 for foundation and base plate requirements when light standards are mounted on cement concrete traffic barriers.

10. See Standard Specification Section 6-03.3 (33) and 8-20.3 (4) for the torque requirements for all of the Anchor Bolt installations. Install 1-inch diameter Clamping Bolts in all Slip Bases to a torque of 95 Foot-Pounds - See Standard Specification Section 8-20.3 (13A).

NOTES:

1. 60’ (H1) poles with double mast arms or poles weighing in excess of 1000 lbs. shall not be installed on a Slip Base.

2. The Slip and Anchor Plates shall be manufactured from ASTM A572 Gr.50 or ASTM A588. All Slip Plates notched surfaces shall be finished smooth.

3. The Clamping Bolts shall be high strength steel, manufactured from AASHTO M164, with heavy hex nut and hardened washer. Galvanize the Clamping Bolts according to AASHTO M232.


5. Galvanize the Anchor/Slip Plate after fabrication according to AASHTO M 111.

6. Clamping Bolt diameters may vary on existing installations. Replace them with the same size as the originals when repairing or replacing a luminaire pole.

EXPLODED ISOMETRIC VIEW

STEEL LIGHT STANDARD ANCHOR/SLIP PLATE FOR SLIP BASE

STANDARD PLAN J-28.42-00
NOTES
1.  Derivatize the Elbow Assembly after fabrication according to AASHTO M 111.

EXPLODED ISOMETRIC VIEW

STEEL LIGHT STANDARD ELBOW DETAIL
FOR LUMINAIRE POLES WITH SINGLE MAST ARM 12' OR LESS, AND DOUBLE MAST ARMS 8' OR LESS, MOUNTED ON BRIDGE OR RETAINING WALLS.

STEEL LIGHT STANDARD ELBOW MOUNTING ON BRIDGE & RETAINING WALL
STANDARD PLAN J-35.46-00

PASCO BAKOTICH III
08-07-07

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

EXPIRES NOVEMBER 14, 2008

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES

1. Pole Base Plate for a Slip Base design shall be 1 1/4" steel manufactured from ASTM A572 Gr. 50 or ASTM A588. Pole Base Plate for a Fixed Base design shall be either 1 1/4" steel manufactured from ASTM A572 Gr. 50, ASTM A588, or 1 1/2" manufactured from ASTM A36. All Pole Base Plate notched surfaces shall be finished smooth.


3. Galvanizing shall be in accordance with AASHTO M 111.

4. See Standard Plan C-46h, C-44h and J-28.80 for foundation and base plate requirements when steel light standards are mounted on concrete traffic barrier.

5. See Standard Plan J-28.82 for details when Slip Base is required.

6. Pole Base Plate for a Slip Base design shall be 1 1/4" steel manufactured from ASTM A572 Gr. 50 or ASTM A588. Pole Base Plate for a Fixed Base design shall be either 1 1/4" steel manufactured from ASTM A572 Gr. 50, ASTM A588, or 1 1/2" manufactured from ASTM A36. All Pole Base Plate notched surfaces shall be finished smooth.


8. Galvanizing shall be in accordance with AASHTO M 111.

9. See Standard Plan C-46h, C-44h and J-28.80 for foundation and base plate requirements when steel light standards are mounted on concrete traffic barrier.

10. See Standard Plan J-28.82 for details when Slip Base is required.

11. Pole Base Plate for a Slip Base design shall be 1 1/4" steel manufactured from ASTM A572 Gr. 50 or ASTM A588. Pole Base Plate for a Fixed Base design shall be either 1 1/4" steel manufactured from ASTM A572 Gr. 50, ASTM A588, or 1 1/2" manufactured from ASTM A36. All Pole Base Plate notched surfaces shall be finished smooth.


13. Galvanizing shall be in accordance with AASHTO M 111.

14. See Standard Plan C-46h, C-44h and J-28.80 for foundation and base plate requirements when steel light standards are mounted on concrete traffic barrier.


16. Pole Base Plate for a Slip Base design shall be 1 1/4" steel manufactured from ASTM A572 Gr. 50 or ASTM A588. Pole Base Plate for a Fixed Base design shall be either 1 1/4" steel manufactured from ASTM A572 Gr. 50, ASTM A588, or 1 1/2" manufactured from ASTM A36. All Pole Base Plate notched surfaces shall be finished smooth.


18. Galvanizing shall be in accordance with AASHTO M 111.

19. See Standard Plan C-46h, C-44h and J-28.80 for foundation and base plate requirements when steel light standards are mounted on concrete traffic barrier.

1. See Standard Plans C-8b and C-14h for foundation and anchor bolt details.
2. Round and smooth all edges around hand hole and along the wire-way to protect the conductors.
4. Install grout after plumbing the pole.

See Standard Plans C-8b and C-14h for foundation and anchor bolt details. Round and smooth all edges around hand hole and along the wire-way to protect the conductors. See Standard Plan J-28.70 for wiring details. Install grout after plumbing the pole.
### Sign Spacing

<table>
<thead>
<tr>
<th>Post-Mile</th>
<th>Speed (MPH)</th>
<th>In Taper (Feet)</th>
<th>In Tangent (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 / 70</td>
<td>60 / 65</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>35 / 45</td>
<td>40 / 50</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>25 / 30</td>
<td>30 / 40</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

### Channelizing Device Spacing

- **R11-2**
- **B/W**
- **W1-4R**
- **W1-6L**
- **W13-1**
- **XX**
- **W24-1**
- **W20-1A**
- **W20-1B**

### Notes

1. Sign sequence is the same for both directions of travel. Adjust for the direction of roadway curves.
2. Flashing Warning Lights (Type B per MUTCD) and/or flags may be used to call attention to the advance warning signs.
3. Existing conflicting pavement markings and signs that are no longer applicable shall be removed or obliterated. Temporary pavement markings shall be used to delineate bypass detour.
4. Raised pavement markers and/or temporary guideposts may be used on bypass as directed by the Engineer.
5. Steady Burning Warning Light (Type C per MUTCD) shall be used to mark Channelizing Devices at night.
6. Where advisory speed is 30 mph or less, reverse turn signs should be used. Other curve or turn warning signs may be substituted to depict roadway alignment.
7. Temporary barriers and end treatments shall be crashworthy.
8. To improve visibility, consider use of temporary illumination at closure points.
10. Consider using a PCMS for additional advance warning.

### Legend

- **CHANNELIZING DEVICES**
- **BARRIERS**
- **TEMPORARY IMPACT ATTENUATION**
- **SIGN LOCATION**

---

**FOR LOCAL AGENCY USE ONLY**

**NOT FOR USE ON STATE ROUTES**

---

**STANDARD PLAN K-10.20-01**

**APPROVED FOR PUBLICATION**

**FIDELITY CERTIFICATE**

**WASHINGTON STATE DEPARTMENT OF TRANSPORTATION**

**APPROVED FOR PUBLICATION**

**PASCO BAKOTICH III**

**NOTE:** THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES
1. Modify Regulatory Traffic Control Devices, as needed, for the duration of the detour.
2. Two Flashing Warning Lights (Type A per MUTCD) may be used to mark each barricade at night.
3. Trail Blazers shall be installed throughout the detour, as appropriate.
4. Signing shown for the one direction only.
5. Coordinate with emergency services.
6. For signs sizes refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

LEGEND

1. All sign spacing may be adjusted to accommodate at-grade intersections and driveways.
2. This sign spacing may be reduced in urban areas to fit roadway conditions.

SIGN SPACING = X (1)

RURAL ROADS 45 / 55 MPH 300' (2)
RURAL ROADS & URBAN ARTERRIALS 35 / 40 MPH 300' (2)
RESIDENTIAL & BUSINESS DISTRICTS 25 / 30 MPH 300' (2)
URBAN STREETS 25 MPH OR LESS 100' (2)
ALL SIGNS ARE BLACK ON ORANGE UNLESS DESIGNATED OTHERWISE

1. All sign spacing may be adjusted to accommodate at-grade intersections and driveways.
2. This sign spacing may be reduced in urban areas to fit roadway conditions.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

RURAL ROADS & URBAN ARTERRIALS

25 MPH OR LESS

35 / 55 MPH

25 / 30 MPH

45 / 55 MPH

RURAL ROADS

100'  35/64  (2)

200'  35/64  (2)

350'  35/64

500'  35/64

NOT FOR USE ON STATE ROUTES

FOR LOCAL AGENCY USE ONLY

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES
1. This plan is intended for use on roadways when traffic volumes create sufficient gaps for motor vehicles to yield.
2. Steady Burning Warning Lights (Type C per MUTCD) shall be used to mark Channelizing Devices at night.
3. Adequate sight distance shall be provided for drivers to see opposing traffic, otherwise use flaggers and/or Temporary Signal.
4. Extend Channelizing Device taper across shoulder ~ recommended.
5. Post mount signs when in place for 3 days or longer.
6. For speed limit 35 mph or higher replace W1-3R with W1-4R.
7. For signs size refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.
8. Consider using a PCMS for additional advance warning.

SIGN SPACING = X

LONGITUDINAL BUFFER SPACE = B

CHANNELIZING DEVICES

LEGEND

1. This plan is intended for use on roadways when traffic volumes create sufficient gaps for motor vehicles to yield.
2. Steady Burning Warning Lights (Type C per MUTCD) shall be used to mark Channelizing Devices at night.
3. Adequate sight distance shall be provided for drivers to see opposing traffic, otherwise use flaggers and/or Temporary Signal.
4. Extend Channelizing Device taper across shoulder ~ recommended.
5. Post mount signs when in place for 3 days or longer.
6. For speed limit 35 mph or higher replace W1-3R with W1-4R.
7. For signs size refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.
8. Consider using a PCMS for additional advance warning.
1. A Protective Vehicle is recommended regardless if a Truck Mounted Attenuator (TMA) is available; a work vehicle may be used. When no TMA is used, the Protective Vehicle shall be strategically located to shield workers, with no specific Roll-Ahead distance.

2. Night work requires additional roadway lighting at flagging stations. See WSDOT Standard Specifications for additional details.

3. Extend Channelizing Device across shoulder ~ recommended.

4. Sign sequence is the same for both directions of travel on the roadway.

5. Channelizing Device spacing for the downstream taper option shall be 20’ O.C.

6. For sign size refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

### NOTES

- **Sign Location:**
  - Road Work Ahead
  - One Lane Road Ahead
  - W20-1
  - W20-4

- **Legend:**
  - Flagging Station
  - Sign Location
  - Channelizing Device
  - Protective Vehicle - Recommended

### RURAL ROADS & URBAN ARTERIALS

<table>
<thead>
<tr>
<th>POSTED SPEED (MPH)</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
</tr>
</thead>
<tbody>
<tr>
<td>LENGTH (FT)</td>
<td>100</td>
<td>200</td>
<td>300</td>
<td>400</td>
<td>500</td>
<td>600</td>
<td>700</td>
</tr>
</tbody>
</table>

### BUFFER DATA

<table>
<thead>
<tr>
<th>VEHICLE TYPE</th>
<th>LOADING WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Yard Dump-Truck</td>
<td>Minimum weight: 15,000 LBS. (Maximum weight shall be in accordance with manufacturer's recommendation)</td>
</tr>
<tr>
<td>Service Truck</td>
<td></td>
</tr>
<tr>
<td>FLAT BED</td>
<td></td>
</tr>
</tbody>
</table>

### Buffer Area

- **LONGITUDINAL BUFFER SPACE = B**

### Sign Spacing

#### RURAL HIGHWAYS

- 40 / 45 MPH
  - 100’ 35/64 (2)
- 60 / 65 MPH
  - 250’ 35/64

#### RURAL ROADS & URBAN ARTERIALS

- 25 / 30 MPH
  - 350’ 35/64
- 35 / 40 MPH
  - 250’ 35/64

#### URBAN STREETS

- 35 / 40 MPH
  - 250’ 35/64
- 45 / 55 MPH
  - 360’ 35/64

#### RESIDENTIAL & BUSINESS DISTRICTS

- 45 / 55 MPH
  - 450’ 35/64
- 60 / 65 MPH
  - 800’ 35/64

### Standard Plan K-20.40-00

- **PREPARED BY:** Elena Brunstein
- **DRAWN BY:** G20-2A
- **SIGN LOCATION:**
  - Road Work Ahead
  - One Lane Road Ahead
  - W20-1
  - W20-4

- **LEGEND:**
  - Flagging Station
  - Sign Location
  - Channelizing Device
  - Protective Vehicle - Recommended
Channelizing Devices are recommended along centerline to separate traffic from work operation. Devices are required at tapers to shift traffic movement between lanes and to protect all flagging stations. Night work requires additional roadway lighting at flagging stations. See WSDOT Standard Specifications for additional details.

For signs size refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-06.

See Standard Plan K-20.60 for additional details.
LONGITUDINAL BUFFER SPACE = B

<table>
<thead>
<tr>
<th>POINTED SPEED (MPH)</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>LENGTH B (FEET)</td>
<td>182</td>
<td>200</td>
<td>230</td>
<td>260</td>
<td>300</td>
<td>340</td>
<td>390</td>
<td>425</td>
<td>470</td>
<td>520</td>
</tr>
</tbody>
</table>

MINIMUM TAPER LENGTH = L (FEET)

<table>
<thead>
<tr>
<th>POINTED SPEED (MPH)</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>LENGTH L (FEET)</td>
<td>182</td>
<td>200</td>
<td>230</td>
<td>260</td>
<td>300</td>
<td>340</td>
<td>390</td>
<td>425</td>
<td>470</td>
<td>520</td>
</tr>
</tbody>
</table>

BUFFER DATA

TYPICAL PROTECTIVE VEHICLE WITH TMA. (SEE NOTE 1)

VEHICLE TYPE

4 YARD DUMP TRUCK, SERVICE TRUCK, FLAT BED, ETC.

MINIMUM WEIGHT 15,000 LBS. (MAXIMUM WEIGHT SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS)

ROLL AHEAD STOPPING DISTANCE = B (DRY PAVEMENT ASSUMED)

MINIMUM WEIGH 15,000 LBS. (MAXIMUM WEIGHT SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS)

LONGITUDINAL BUFFER SPACE = B

END OF WORK AREA ~ SEE NOTE 6

DOWNSTREAM TAPER TO SHOW G20-2A OR 25 MPH OR LESS

CHANNELIZING DEVICE SPACING

POSTED SPEED (MPH) 10 / 15 MPH 20 / 30 MPH 40 / 55 MPH 60 / 65 MPH

IN TAPER (FEET) 80 90 100 120

IN TAILGATE (FEET) 100 120 150 200

SIGN SPACING = X (1)

NOTE:  THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
**NOTES**

1. A Protective Vehicle is recommended regardless if a Truck Mounted Attenuator (TMA) is available; a work vehicle may be used. When no TMA is used, the Protective Vehicle shall be strategically located to shield workers, with no specific Roll-Ahead distance.

2. Devices shall not encroach into adjacent lanes.

3. Extend device taper (L/3) across shoulder ~ recommended.

4. Portable Changeable Message Sign (PCMS) ~ recommended.

5. Use Transverse Devices in closed lane every 1000’ ~ recommended.

6. Traffic Safety Drums for all tapers on high speed roadway ~ recommended.

7. Channelizing Device spacing for the downstream taper option shall be 20’ O.C.

8. Use Portable Changeable Message Sign (PCMS) ~ recommended.

For signs size refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

**SIGN LOCATION**

- **CHANNELIZING DEVICES**
- **PORTABLE CHANGEABLE MESSAGE SIGN**
- **ARROW PANEL**

**LEGEND**

- **B** = WORK AREA
- **L** = BUFFER DATA
- **M** = POSTED SPEED
- **N** = MINIMUM TAPER LENGTH = L (FEET)
- **O** = SIGN SPACING = X (1)
- **P** = CHANNELIZING DEVICE SPACING
- **Q** = PCMS SAMPLE MESSAGE
- **R** = DOWNSTREAM TAPER TO SHOW END OF WORK AREA ~ SEE NOTE 7
- **S** = FIELD LOCATE IN ADVANCE OF LANE CLOSURE SIGNING

**CHANNELIZING DEVICE SPACING**

<table>
<thead>
<tr>
<th>POSTED SPEED (MPH)</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>L/75</td>
<td>40</td>
<td>30</td>
<td>20</td>
<td>15</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40 / 40</td>
<td>30</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PCMS SAMPLE MESSAGE**

1. **W20-1**
2. **W20-5**
3. **PCMS**
4. **SAMPLE MESSAGE**
5. **2 LANES CLOSED AHEAD**
6. **ONE MILE AHEAD**
7. **FIELD LOCATION IN ADVANCE OF LANE CLOSURE SIGNING**

**LONGITUDINAL BUFFER SPACE = B**

<table>
<thead>
<tr>
<th>POSTED SPEED (MPH)</th>
<th>20</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
</tr>
</thead>
<tbody>
<tr>
<td>LENGTH (FEET)</td>
<td>36</td>
<td>50</td>
<td>60</td>
<td>80</td>
<td>100</td>
<td>125</td>
<td>150</td>
</tr>
</tbody>
</table>
| MINIMUM WEIGHT     | 15,000 LBS. (MAXIMUM WEIGHT SHALL BE IN ACCORDANCE WITH MANUFACTURER RECOMMENDATION)

**signed by ELENA BRUNSTEIN**

**Passed Bakotich III**

**EXPIRES AUGUST 9, 2009**

**NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.**
1. A Protective Vehicle is recommended regardless if a Truck Mounted Attenuator (TMA) is available; a work vehicle may be used. When no TMA is used, the Protective Vehicle shall be strategically located to shield workers, with no specific Roll-Ahead distance.

2. Devices shall not encroach into adjacent lanes.

3. Extend device taper (L/3) across shoulder ~ recommended.

4. Portable Changeable Message Sign (PCMS) ~ recommended.

5. Traffic Safety Drums for all tapers on high speed roadway ~ recommended.

6. Use Transverse Devices in closed lane every 1000' ~ recommended.

7. Channelizing Device spacing for the downstream taper option shall be 20' O.C.

8. For signs size refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

NOTES:

1. Buffer Data
   - Typical Protective Vehicle with TMA (See Note 1)
   - Loaded Weight
     - 4 Yard Dump Truck, Service Truck, Flat Bed, etc.
   - Roll Ahead Stopping Distance = .95 Feet

2. Channelizing Device Spacing
   - Minimum Taper Length = L (Feet)
   - Typical Protective Vehicle
   - Loaded Weight
   - Roll Ahead Stopping Distance = .95 Feet

3. Sign Spacing = X (1)
   - Rural Highways
   - Rural Roads
   - Urban Roads
   - Urban Highways

4. Buffers Data
   - Work Area
   - Minimum Weight 15,000 LBS (Maximum Weight shall be in accordance with Manufacturer Recommendations)
   - Roll Ahead Stopping Distance = .95 Feet

5. Minimum Taper Length = L (Feet)
   - LANE WIDTH (FEET)
     - 10
     - 11
     - 12
   - POURED SPEED (MPH)
     - 30
     - 40
     - 50
   - TAPER LENGTH (FEET)
     - 1.5

6. Longitudinal Buffer Space = B
   - POSTED SPEED (MPH)
     - 10
     - 20
     - 30
     - 40
   - BUFFER SPACE (FEET)
     - 10
     - 20
     - 30

7. Minimum Taper Length = L (Feet)
   - POSTED SPEED (MPH)
     - 25
     - 35
     - 45
   - Buffer Length (Feet)
     - 10
     - 20

8. Lane Width
   - POSTED SPEED (MPH)
     - 25
     - 35
     - 45
   - Length (Feet)
     - 10
     - 20
     - 30

9. Minimum Taper Length = L (Feet)
   - POSTED SPEED (MPH)
     - 35
     - 45
     - 55
   - Buffer Length (Feet)
     - 10
     - 20

10. Buffer Data
    - Typical Protective Vehicle with TMA (See Note 1)
    - Loaded Weight
      - 4 Yard Dump Truck, Service Truck, Flat Bed, etc.
    - Roll Ahead Stopping Distance = .95 Feet

11. Minimum Taper Length = L (Feet)
    - POSTED SPEED (MPH)
      - 25
      - 35
      - 45
    - Buffer Length (Feet)
      - 10
      - 20

12. Channelizing Device Spacing
    - Minimum Taper Length = L (Feet)
      - POSTED SPEED (MPH)
        - 25
        - 35
        - 45
      - Buffer Length (Feet)
        - 10
        - 20

13. Sign Spacing = X (1)
    - Rural Highways
    - Rural Roads
    - Urban Roads
    - Urban Highways

14. Channelizing Device Spacing
    - POSTED SPEED (MPH)
      - 25
      - 35
      - 45
    - Buffer Length (Feet)
      - 10
      - 20

15. Sign Spacing = X (1)
    - Rural Highways
    - Rural Roads
    - Urban Roads
    - Urban Highways

16. Channelizing Device Spacing
    - POSTED SPEED (MPH)
      - 25
      - 35
      - 45
    - Buffer Length (Feet)
      - 10
      - 20

17. Buffer Data
    - Work Area
    - Minimum Weight 15,000 LBS (Maximum Weight shall be in accordance with Manufacturer Recommendations)
    - Roll Ahead Stopping Distance = .95 Feet
**NOTES**

1. A Protective Vehicle is recommended regardless if a Truck Mounted Attenuator (TMA) is available; a work vehicle may be used. When no TMA is used, the Protective Vehicle shall be strategically located to shield workers, with no specific Roll-Ahead distance. Extend device taper (L/3) across shoulder - recommended.

2. For signs size refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

3. Portable Changeable Message Sign (PCMS) - recommended.

4. If the lane shift is short and has minimal radius curve (30mph or less) use sign W1-3 in lieu of sign WH-4L.

5. All signs are black on orange unless designated otherwise.

**CHANNELIZING DEVICE SPACING**

- **Device Spacing ~ 1/2 Distance for Opposing Traffic Devices**

**WORK AREA**

- KEEP RIGHT

- **R4-7B** 24" x 30"

- **W20-1**

- **W20-5R**

- **X**

- **W4-2L** ~ Compliance Date 12/23/13

**POLICE CARS**

- **SAMPLE MESSAGE #1**

  - LANES CLOSED AHEAD

- **SAMPLE MESSAGE #2**

  - NO LEFT TURN

  - CENTER LANE CLOSED AHEAD

- **SEE NOTE 2**

**SIGN LOCATION**

- **PORTABLE CHANGEABLE MESSAGE SIGN** ~ recommended.

- **LEGEND**

  - PCMS
  - PORTABLE CHANGEABLE MESSAGE SIGN

- **BUFFERS**

  - **MINIMUM TAPER LENGTH = L (feet)**

  - **LONGITUDINAL BUFFER SPACE = S (feet)**

  - **MINIMUM WEIGHT 15,000 LBS.**

  - **(MAXIMUM WEIGHT SHALL BE IN ACCORDANCE WITH MANUFACTURER RECOMMENDATION)**

- **CHANNELIZING DEVICES**

  - **PROTECTIVE VEHICLE ~ RECOMMENDED**
MINIMUM WEIGHT 15,000 LBS. (MAXIMUM WEIGHT SHALL BE IN ACCORDANCE WITH MANUFACTURER RECOMMENDATION)

TYPICAL PROTECTIVE VEHICLE WITH TMA (SEE NOTE 1)

LOADED WEIGHT

ROLL AHEAD STOPPING DISTANCE = 30 FEET MIN. (DRY PAVEMENT ASSUMED)

POSTED SPEED (MPH)

LONGITUDINAL BUFFER SPACE = B

LENGTH (FEET)

B

LENGTH

B

LANE WIDTH 1/2 MIL - SEE STANDARD PLAN K-26.40-01 FOR ALTERNATE ENCROACHMENT

WORK AREA

L2

L1

L3

IN TAPER

LANE WIDTH (FEET)

IN TANGENT

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)

DISTANCE (FEET)
NOTES:

1. If the work space extends across a crosswalk, the crosswalk should be closed (see Standard Plan K-34.20).

2. The normal procedure is to close on the near side of the intersection any lane that is not carried through the intersection. However, when this results in the closure of a right lane having significant right turning movements, then the right lane may be restricted to right turn only, as shown. This procedure increases the through capacity by eliminating right turns from the open through lane.

3. Prohibit turns as necessary for traffic conditions.

4. Flashing Warning Lights (Type A per MUTCD) should be used, as needed, to mark barricades at night.

5. Steady Burning Warning Lights (Type C per MUTCD) shall be used to mark channelizing devices at night.

6. For long term projects, conflicting pavement markings that are no longer applicable shall be removed or obliterated. Temporary markings shall be used as necessary.

7. For signs size refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.
NOTES

1. If the work space extends across a crosswalk, the crosswalk should be closed (see Standard Plan K-34.20).

2. The normal procedure is to close on the near side of the intersection any lane that is not carried through the intersection. However, when the results in the closure of a left lane having significant left-turning movements, then the left lane may be reopened as a turn bay for left turns only, as shown.

3. Prohibit turns as necessary for traffic conditions.

4. Flashing Warning Lights (Type A per MUTCD) should be used, as needed, to mark barricades at night.

5. Steady Burning Warning Lights (Type C per MUTCD) shall be used to mark channelizing devices at night.

6. For long term projects, conflicting pavement markings that are no longer applicable shall be removed or obliterated. Temporary markings shall be used as necessary.

7. For signs size refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

For Local Agency Use Only
Not for use on State Routes

For the project plan, please contact the State Department of Transportation.
NOTES

1. Prohibit turns as necessary for traffic conditions.
2. Flashing Warning Lights (Type A per MUTCD) should be used, as needed, to mark barricades at night.
3. Steady Burning Warning Lights (Type C per MUTCD) shall be used to mark channelizing devices at night.
4. For long term projects, conflicting pavement markings that are no longer applicable shall be removed or obliterated. Temporary markings shall be used as necessary.
5. For signs refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-0A.
Exception: August 4, 2008 to April 5, 2009

NOTES

1. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

2. Controls shown are for pedestrian traffic only.

3. Use Warning Lights on barricades.

4. Maintain a minimum width of 3 feet for pedestrian path.

5. For signs also refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

6. For left turn arrow, use 5 feet.

Ken L. Smith 02-15-07

NOTES: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. A Protective Vehicle is recommended regardless if a TMA is available; a work vehicle may be used. When no TMA is used, the Protective Vehicle shall be strategically located to shield workers, with no specific Roll-Ahead distance.

2. Channelizing Device spacing for the downstream taper option shall be 20' O.C.

3. No Encroachment on the traveled lane is permitted. If Encroachment is necessary, the lane shall be closed (see Standard Plan K-24.25).

4. Signs to be post mounted for long term projects.

5. For sign sizes refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

6. For local agency use only. Not for use on State Routes.
---

**LONGITUDINAL BUFFER SPACE = B**

<table>
<thead>
<tr>
<th>POSTED SPEED (MPH)</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>LENGTH B (FEET)</td>
<td>100</td>
<td>155</td>
<td>200</td>
<td>250</td>
<td>300</td>
<td>350</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>550</td>
</tr>
</tbody>
</table>

**MINIMUM TAPER LENGTH = L (FEET)**

<table>
<thead>
<tr>
<th>POSTED SPEED (MPH)</th>
<th>25</th>
<th>30</th>
<th>35</th>
<th>40</th>
<th>45</th>
<th>50</th>
<th>55</th>
<th>60</th>
<th>65</th>
<th>70</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAPER IN FEET</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
<td>35</td>
<td>40</td>
<td>45</td>
<td>50</td>
<td>55</td>
</tr>
</tbody>
</table>

**BUFFER DATA**

<table>
<thead>
<tr>
<th>VEHICLE TYPE</th>
<th>CHANNELIZING DEVICE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 YARD DUMP TRUCK</td>
<td>20' O.C.</td>
</tr>
<tr>
<td>SERVICE TRUCK</td>
<td></td>
</tr>
<tr>
<td>FLAT BED, ETC.</td>
<td></td>
</tr>
</tbody>
</table>

**CHANNELIZING DEVICE SPACING**

<table>
<thead>
<tr>
<th>POSTED SPEED (MPH)</th>
<th>IN TAPER (FEET)</th>
<th>IN TAMPER (FEET)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 / 30</td>
<td>20'</td>
<td>40'</td>
</tr>
<tr>
<td>35 / 40</td>
<td>10'</td>
<td>30'</td>
</tr>
</tbody>
</table>

**NOTES**

1. A Protective Vehicle is recommended regardless if a Truck Mounted Attenuator (TMA) is available; a work vehicle may be used. When no TMA is used, the Protective Vehicle shall be strategically located to shield workers, with no specific Roll-Ahead distance.

2. Channelizing Device spacing for the downstream taper option shall be 20' O.C.

3. For signs size refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

**SIGN SPACING = X (1)**

- RURAL ROADS & URBAN ARTERIALS
  - POSTED SPEED (MPH): 25 / 30
  - CHANNELIZING DEVICE SPACING: 20' O.C.

- URBAN STREETS
  - POSTED SPEED (MPH): 25 / 30
  - CHANNELIZING DEVICE SPACING: 10' O.C.

- ALL SIGNS ARE BLACK ON ORANGE UNLESS DESIGNATED OTHERWISE

(1) ALL SIGN SPACING MAY BE ADJUSTED TO ACCOMMODATE INTERCHANGE RAMPS, AT GRADE INTERSECTIONS, AND DRIVeways.

(2) THIS SIGN SPACING MAY BE REDUCED IN URBAN AREAS TO FIT ROADWAY CONDITIONS.
---
### SHEET 1 OF 1 SHEET

**MINIMUM WEIGHT 15,000 LBS.**

(Maximum weight shall be in accordance with manufacturer recommendation)

**LEGEND**

- **IN**: Sign location
- **N**: Protective vehicle
- **TMA**: Truck mounted attenuator ~ recommended
- **S**: Warning beacon ~ required

**DRAWN BY: ELENA BRUNSTEIN**

**SHEET 1 OF 1 SHEET**

**NOTE:**

1. In those situations where multiple work locations within a limited distance make it practical to place stationary signs, the distance between the advance warning sign and the work area should not exceed 5 miles.
2. In those situations where the distance between the advance signs and the work area is 2 to 5 miles, a supplemental distance plaque should be used with the road work ahead sign.
3. No encroachment into traffic lane is permitted with this plan.
4. Work vehicle and shadow vehicle shall use warning beacon.
5. Shadow vehicle shall maintain 600' to 1000' of sight distance to approaching traffic.

For signs size refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual 128-06.

**DATE**

**STATE DESIGN ENGINEER**

**Washington State Department of Transportation**

**EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009**

**NOT FOR USE ON STATE ROUTES**

FOR LOCAL AGENCY USE ONLY

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
**NOTES**

1. The sign shown is not required in the following cases: the work space is behind a barrier, or more than 2' behind the curb, or more than 15' from the edge of a roadway.

2. For sign sizes, refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

---

**LEGEND**

- **H**: SIGN LOCATION

**SIGN SPACING = X (1)**

<table>
<thead>
<tr>
<th>Road Type</th>
<th>Speed Limits</th>
<th>Sign Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural Roads</td>
<td>25 / 30 MPH</td>
<td>35/64 (2)</td>
</tr>
<tr>
<td>Rural Roads &amp; Urban Arterials</td>
<td>35 / 40 MPH</td>
<td>35/64</td>
</tr>
<tr>
<td>Rural Roads, Urban Arterials</td>
<td>25 / 30 MPH</td>
<td>35/64 (2)</td>
</tr>
<tr>
<td>Residential &amp; Business Districts</td>
<td>30 / 40 MPH</td>
<td>35/64</td>
</tr>
<tr>
<td>Urban Streets</td>
<td>35 MPH OR LESS</td>
<td>35/64 (2)</td>
</tr>
</tbody>
</table>

All signs are black on orange unless designated otherwise.

(1) All sign spacing may be adjusted to accommodate at-grade intersections and driveways.

(2) This sign spacing may be reduced in urban areas to fit roadway conditions.

---

The sign shown is not required in the following cases: the work space is behind a barrier, or more than 2' behind the curb, or more than 15' from the edge of a roadway.

For sign sizes, refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

---

**WORK BEYOND THE SHOULDER**

**STANDARD PLAN K-40.60-00**

---

**FOR LOCAL AGENCY USE ONLY**

**NOT FOR USE ON STATE ROUTES**

---

**EXPIRES AUGUST 9, 2007**

---

**NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.**
**NOTE**

1. Implement this plan when the initial roadway assessment is complete and determined to be passable with caution.


3. Spot hazards shall be marked with barricades or channelizing devices to alert motorists.

4. For signs sizes refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

---

**LEGEND**

- **INSTALL THESE OR OTHER WARNING SIGNS AS NEEDED FOR THE SPECIFIC HAZARD**

- Overhanging trees or obstacles below 16'

- Water or debris (passable)

- Water over roadway

- Road closed to thru traffic

-

- Roadway

- Bump

- Nd shoulders

- Retractable lane closure

- Road lane end

---

**NOTES**

1. Install PCMS: 1.5 sec

2. Install PCMS: 1.5 sec

3. PCMS: 1.8 sec

4. PCMS: 1.5 sec

---

**SPECIFIC PLAN**

- Spot hazards shall be marked with barricades or channelizing devices to alert motorists.

- For signs sizes refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

---

**FOR LOCAL AGENCY USE ONLY**

- Not for use on state routes

---

**STATIONERY**

- Emergency passable hazard

- Standard Plan K-55.20-00

---

**EXPIRES AUGUST 9, 2007**

Ken L. Smith 02-15-07

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
**NOTE:**


2. **MOTORCYCLES USE EXTREME CAUTION** signs shall be installed when the following roadway conditions exist:
   - grooved pavement
   - abrupt lane edge
   - steel plates
   - loose gravel of earth
   Specific signs for each of these conditions noted shall be installed along with **MOTORCYCLES USE EXTREME CAUTION** signs.

3. For signs also refer to Manual on Uniform Traffic Control Devices (MUTCD) and WSDOT Sign Fabrication Manual M55-05.

---

RURAL ROADS & URBAN ARTERIALS

SHEET 1 OF 1 SHEET

1. **URBAN STREETS**

2. **RURAL ROADS, URBAN ARTERIALS, RESIDENTIAL & BUSINESS DISTRICTS**

3. **25 MPH OR LESS**

4. **35 / 40 MPH**

5. **25 / 30 MPH**

6. **45 / 55 MPH**

7. **RURAL ROADS**

8. **60 / 65 MPH**

9. **RURAL HIGHWAYS**

10. **100' 35/64  (2)**

11. **200' 35/64  (2)**

12. **350' 35/64**

13. **500' 35/64**

14. **800' 35/64**

---

**LEGEND**

- Motorcycles
  - Use extreme caution
  - 1 mile spacing
  - Throughout the work zone
  - Where the condition exists
  - As part of the sequence of other appropriate standard warning signs on 1 mile spacing.

---

**SUPPLEMENTAL SIGNING**

**STANDARD PLAN K-60.40-00**

**SIGN SPACING = X (1)**

<table>
<thead>
<tr>
<th>ROADWAY TYPE</th>
<th>POSTED SPEED (MPH)</th>
<th>IN TAPER (FEET)</th>
<th>IN TANGENT (FEET)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RURAL ROADS</td>
<td>25 / 65</td>
<td>45</td>
<td>10</td>
</tr>
<tr>
<td>RURAL ROADS</td>
<td>35 / 60</td>
<td>50</td>
<td>20</td>
</tr>
<tr>
<td>RURAL ROADS</td>
<td>25 / 30</td>
<td>50</td>
<td>40</td>
</tr>
<tr>
<td>URBAN STREETS</td>
<td>25 MPH OR LESS</td>
<td>140'</td>
<td>6 (2)</td>
</tr>
</tbody>
</table>

---

**CHANNELIZING DEVICES**

**NOTES**

- All sign spacing may be adjusted to accommodate interchange ramps, at-grade intersections, and driveways.

- This sign spacing may be reduced in urban areas to fit roadway conditions.

---

**WORK AREA**

---

**SHOULDER EROSION DRAINS**

---

**MOTORCYCLE WARNING SIGN (W21-1701) SHOULD BE INSTALLED AT 1 MILE SPACING, THROUGHOUT THE WORK ZONE WHERE THE CONDITION EXISTS, AS PART OF THE SEQUENCE OF OTHER APPROPRIATE STANDARD WARNING SIGNS ON 1 MILE SPACING.**
1. For long term projects conflicting pavement markings that are no longer applicable shall be removed or obliterated. Temporary markings shall be used as necessary.

2. For Hot Mixed Asphalt Pavement, a temporary striping tape shall be installed in conjunction with DO NOT PASS and "PASS WITH CARE" sign locations.

3. Temporary roadside delineation with Channelization Devices is optional. The appropriate taper length shall be L/2. See Standard Plan K-24.20 for minimum taper length (L).

4. For long term projects a channelization/pavement marking plan should be implemented.

5. Temporary Raised Pavement Marker (TRPM) may be used on a pattern spacing 5' O.C. to simulate a solid line.

6. For long term projects conflicting pavement markings that are no longer applicable shall be removed or obliterated. Temporary road markings shall be used as necessary.
NOTE:
1. For sign installation details, see Std. Plan G-series.
2. In rural areas, the "V" Height can be a minimum of 7 feet for primary signs and 6 feet for the supplemental plaques for greater visibility, as directed by the engineer.
3. The "V" height for signs on an area of more than 50 square feet and two or more sign supports, is 7 feet in both rural and urban areas.

The "V" height for signs, with an area of more than 50 square feet and two or more sign supports, is 7 feet in both rural and urban areas.

In rural areas, the "V" Height can be a minimum of 7 feet for primary signs and 6 feet for the supplemental plaques for greater visibility, as directed by the engineer.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
WARNING LIGHT ATTACHMENT DETAIL

1. All fasteners may be zinc plated, galvanized or stainless steel. All steel angle and tubular steel shall be hot-rolled, high carbon steel, painted or galvanized.

2. Install one low-intensity Type A flashing warning light on the traffic side of the barricade. Install two Type A low-intensity flashing warning lights per barricade when the barricades are used to close a roadway. Attach the light to the barricade according to the light manufacturer's recommendations or use the details shown on this plan.

3. Stripes on barricade rails shall be alternating orange and white retroreflective stripes (sloping downward at an angle of 45 degrees in the direction traffic is to pass).

4. The Type 3 barricade design shown on this plan meets the crash test requirements of NCHRP 350. Alternative designs may be approved if they conform to the NCHRP 350 crash test criteria and the MUTCD.

5. When a sign is mounted on the barricade, it shall be securely bolted to at least two plywood panels. The top of the sign shall not be higher than the top panel of the barricade.

6. When sandbags are used in freezing weather, urea fertilizer shall be mixed with the sand in a quantity to prevent the sand from freezing.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
**BARRICADE PLACEMENT**

- **TYPE 3L BARRICADE**
- **TYPE 3R BARRICADE**

**STRIPE**

- Stripes on the barricades shall slope downward in the direction traffic is to pass.

**AREA CLOSED TO TRAFFIC**

- 2' minimum

**UNEASABLE TRAFFIC LANE**

- 2' minimum

**ROAD CLOSURE AT INTERSECTION**

- **WORK AREA**

**ROAD CLOSURE AT OTHER LOCATIONS**

- **WORK AREA**
1. The reinforcing steel details for the NARROW BASE barrier are the same as those shown for the 2' wide barrier except that the bars along the vertical face run vertically with a 1 1/2" clearance.

2. The vertical dimensions for the side and loop bar locations on the NARROW BASE barrier are the same as those shown on the END views of the 2' wide barrier.

3. The reinforcing steel details for the NARROW BASE barrier are the same as those shown for the 2' wide barrier except that the bars along the vertical face run vertically with a 1 1/2" clearance.

4. The vertical dimensions for the side and loop bar locations on the NARROW BASE barrier are the same as those shown on the END views of the 2' wide barrier.
Type 3 Anchor
Temporary Installation of Precast Concrete Barrier Type 2 (STD. Plan C-8) and Temporary Concrete Barrier (F-Shape) (STD. Plan K-80.30) on Hot Mix Asphalt Pavement

1. Use Type 1 Anchors when the concrete pavement or bridge deck is 6" or thicker with 2" wide concrete barrier only. Use Type 2 Anchors (Standard Plan K-80.37) with narrow base barrier.

2. Adjust the location of the Type 1 Anchors to avoid the main reinforcing in the deck when drilling holes.

3. Use shims to properly fit the Type 1 Anchors to the barrier and roadway surfaces.

4. Upon removal of the Type 1 Anchors, clean the bolt holes and fill them with grout according to Standard Specification 6.02.3(20).

5. Remove the Type 3 Anchors by first driving the steel pins down through the barrier further into the pavement to allow lifting the barrier without interference, then remove the pins from the pavement.

6. After removing the Type 3 Anchors, clean the pin holes and fill them with sealant according to Standard Specification 9-04.2.

NOTE:

1. Use Type 1 Anchors when the concrete pavement or bridge deck is 6" or thicker with 2" wide concrete barrier only. Use Type 2 Anchors (Standard Plan K-80.37) with narrow base barrier.

2. Adjust the location of the Type 1 Anchors to avoid the main reinforcing in the deck when drilling holes.

3. Use shims to properly fit the Type 1 Anchors to the barrier and roadway surfaces.

4. Upon removal of the Type 1 Anchors, clean the bolt holes and fill them with grout according to Standard Specification 6.02.3(20).

5. Remove the Type 3 Anchors by first driving the steel pins down through the barrier further into the pavement to allow lifting the barrier without interference, then remove the pins from the pavement.

6. After removing the Type 3 Anchors, clean the pin holes and fill them with sealant according to Standard Specification 9-04.2.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
The intended use of this plan is for the temporary installation of Alternative Temporary Concrete Barrier (F-Shape), Narrow Base (see Standard Plan K-80.30) on cement concrete pavement or bridge deck.

Use Class 1 when the concrete pavement or bridge deck is 9" or thicker; use Class 2 when it is 6" or thicker.

Adjust the location of the anchors to avoid the main reinforcing in the deck when drilling holes.

Use shims to properly fit the anchors to the barrier and roadway surfaces.

Upon removal of the anchors, clean the bolt holes and fill them with grout according to Standard Specification 6.02.3(20).

NOTES

1. Use Class 1 when the concrete pavement or bridge deck is 9" or thicker; use Class 2 when it is 6" or thicker.

2. Adjust the location of the anchors to avoid the main reinforcing in the deck when drilling holes.

3. Use shims to properly fit the anchors to the barrier and roadway surfaces.

4. Upon removal of the anchors, clean the bolt holes and fill them with grout according to Standard Specification 6.02.3(20).

5. Use shims to properly fit the anchors to the barrier and roadway surfaces.

6. Upon removal of the anchors, clean the bolt holes and fill them with grout according to Standard Specification 6.02.3(20).

7. Use shims to properly fit the anchors to the barrier and roadway surfaces.

8. Upon removal of the anchors, clean the bolt holes and fill them with grout according to Standard Specification 6.02.3(20).

9. Use shims to properly fit the anchors to the barrier and roadway surfaces.

10. Upon removal of the anchors, clean the bolt holes and fill them with grout according to Standard Specification 6.02.3(20).
1. The bracing and pull post details for Wire Fence Type 2 are the same as for Type 1.

2. Attach the wire mesh to the posts using four fasteners. Three additional fasteners per post are required within and at the limits of sag conditions. Use additional fasteners on posts which mark the angle point of any sudden changes in topography.

3. Wood anchors (for wood posts) shall be 2×4 lumber, 12" long minimum, and fastened with three 16d galvanized nails.

The bracing and pull post details for Wire Fence Type 2 are the same as for Type 1.

Attach the wire mesh to the posts using four fasteners. Three additional fasteners per post are required within and at the limits of sag conditions. Use additional fasteners on posts which mark the angle point of any sudden changes in topography.

Wood anchors (for wood posts) shall be 2×4 lumber, 12" long minimum, and fastened with three 16d galvanized nails.
1. All concrete post bases shall be 10" minimum diameter.

2. Along the top and bottom, using Hog Rings, fasten the Chain Link Fence Fabric to the Tension Wire and Tension Cable within the limits of the first full fabric weave.

3. Details are illustrative and shall not limit hardware design or post selection of any particular fence type.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
TURNBUCKLE
EYE NUT
TENSION WIRE
TENSION CABLE
TURNBUCKLE
TENSION CABLES
ROPE THIMBLE
FABRIC BAND (TYP.)
STRETCHER BAR (TYP.)
SHACKLE
SEIZING (TYP.)
WIRE ROPE CLIP (TYP.)

DETAIL A

EYE BOLT
TENSION WIRE
STRETCHER BAR
FABRIC BAND
HOG RING - SPACED @ 24 MAX.
TIE WIRE - SPACED @ 14 MAX. (TYP.)

DETAIL B

EYE BOLT
TENSION CABLE
WIRE ROPE CLIP (TYP.)
ROPE THIMBLE
SEIZING (TYP.)

DETAIL C

EYE BOLT
TENSION CABLE
WIRE ROPE CLIP (TYP.)
ROPE THIMBLE (TYP.)

DETAIL D

END OR CORNER (BRACE) POST
PULL POST (WITHIN RUN)
PULL POST (AT END OR CORNER)

STRETCHER BAR (TYP.)
SHACKLE
SEIZING
WIRE ROPE CLIP (TYP.)

DRAWN BY: LISA CYFORD

CHAIN LINK FENCE
TYPES 3 AND 4
STANDARD PLAN L-30.10-00

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT
BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY
THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON
FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION.
A COPY MAY BE OBTAINED UPON REQUEST.

KEN L. SMITH
02-07-07
02-07-07

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

EXPIRES AUGUST 26, 2007
NOTES

1. All glare screen posts shall be 1 5/8" × 2 1/4" Galvanized Steel H-Columns.

2. Post Bolts shall be:
   - On Timber Posts: Hex head bolt 60-18 UNC × 8" with lock washer.
   - On Steel Posts: Hex head bolt 66-18 UNC × 2 1/2" with lock washer.

Either with nut and washer, or eye nut and washer where shown in the plan.

---

**ELEVATION VIEW**

- *HOG RINGS (~ Typ.)* 3' - 0" ELEVATION VIEW
- *BRACE POST (~ Typ.)* 12' - 6" MAX. (Typ.)
- *TENSION CABLE (~ Typ.)* 12' - 6" MAX.
- *FABRIC BAND (~ Typ.)* SPACED @ 12" MAX.
- *TURNBUCKLE (~ Typ.)* 3/8" EYE BOLT
- *POST BOLT (~ See Note 3)* 3/8" EYE NUT
- *SHACKLE (~ Typ.)* 3/8" EYE BOLT
- *ROPE THIMBLE (~ Typ.)* 3/8" EYE BOLT
- *STRETCHER BAR (~ Typ.)*

---

**NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.**
GLARE SCREEN TYPE 1
DESIGN B
STANDARD PLAN L-40.15-00

PULL POST
DETAIL A

LINE POST
DETAIL B

BRACE POST
DETAIL C

LINE POST
DETAIL D

END OR CORNER (BRACE) POST

FABRIC BAND (TYP.)
STRETCHER BAR (TYP.)
TENSION CABLE
TENSION WIRE

HOG RINGS (TYP.)
SPACED @ 24" MAX.

TENSION CABLE
TENSION WIRE

TURNBUCKLE
EYE NUT
SHACKLE

4" (TYP.)

眼线
眼绳

ELEVATION VIEW

TIE WIRE ~ SPACED @ 14" MAX.
FABRIC BAND (TYP.)
SEIZING (TYP.)
ROPE THIMBLE (TYP.)
WIRE ROPE CLIP (TYP.)

PULL POST ~ SPACED @ 150" MAX. (TYP.)

TIE WIRE (TYP.)

HOG WIRE (TYP.)

LINE POST

PULL POST (WITHIN RUN)

DETAIL E

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
ELEVATION

NOTE

Hardware shall be stainless steel or galvanized in accordance with AASHTO M233.

6/8" R.H. RIVET STRAP - FASTENED TO THE HIGH PANEL WITH 6" FLAT HEAD 10D RIVETS AND 2 HEX NUTS (TYP.)

SECTION A

SHEET 1 OF 1 SHEET

ACCESS CONTROL
DOUBLE GATE
STANDARD PLAN L-70.20-01

EXPRESSED JULY 17, 2008

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009
NOTES

1. Where shown on the plans or specified in the Special Provisions, raised pavement markers shall be used for supplementing or substituting the painted pavement markings shown herein. See the Standard Plans for RPM supplement and substitution patterns.

2. The channelization shown on this plan assumes optimal roadway geometric design. The dimensions may vary to fit existing conditions. See Contract.

LEGEND

R = RAMP LANE WIDTH
L = LANE WIDTH
1. Where shown on the plans or specified in the Special Provisions, raised pavement markers shall be used for supplementing or substituting the painted pavement markings shown herein. See the Standard Plans for RPM supplement and substitution patterns.

2. The channelization shown on this plan assumes optimal geometric design. The dimensions may vary to fit existing conditions. See Contract.
**LEGEND**

1. Where shown on the plans or specified in the Special Provisions, raised pavement markers shall be used for supplementing or substituting the painted pavement markings shown herein. See the Standard Plans for RPM supplement and substitution patterns.

2. When weaving section is more than 3/4 of a mile in length use lane line.

3. The channelization shown on this plan assumes optimal roadway geometric design. The dimensions may vary to fit existing conditions. See Contract.

**SINGLE LANE, PARALLEL TYPE ON-CONNECTION**

<table>
<thead>
<tr>
<th>POSTED MAINLINE SPEED</th>
<th>D (SEE TABLE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>35 MPH</td>
<td>D07</td>
</tr>
<tr>
<td>40 MPH</td>
<td>D07</td>
</tr>
<tr>
<td>45 MPH</td>
<td>D07</td>
</tr>
<tr>
<td>50 MPH</td>
<td>D07</td>
</tr>
<tr>
<td>55 MPH</td>
<td>D07</td>
</tr>
<tr>
<td>60 MPH</td>
<td>D07</td>
</tr>
<tr>
<td>65 MPH</td>
<td>D07</td>
</tr>
<tr>
<td>70 MPH</td>
<td>D07</td>
</tr>
</tbody>
</table>

**DOUBLE LANE, PARALLEL TYPE ON-CONNECTION**

**RAMP CHANNELIZATION**

**PARALLEL ON & WEAVING SECTION**

**STANDARD PLAN M-1.80-02**

**NOTE:** THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. Install a minimum of 3 sets of diagonals/chevrons in the gore area. A 50' spacing is standard; however, for gore areas shorter than 150' use a 25' spacing, and for gore areas greater than 400' a spacing of 100' may be used.

2. The acute angle of the diagonals shall always point in the direction of mainline traffic.

NOTES

1. Install a minimum of 3 sets of diagonals/chevrons in the gore area. A 50' spacing is standard; however, for gore areas shorter than 150' use a 25' spacing, and for gore areas greater than 400' a spacing of 100' may be used.

2. The acute angle of the diagonals shall always point in the direction of mainline traffic.
1. Install a minimum of 3 sets of diagonals/chevrons in the gore area. A 50' spacing is standard; however, for gore areas shorter than 150' use a 25' spacing, and for gore areas greater than 400' a spacing of 100' may be used.

2. The acute angle of the diagonals shall always point in the direction of mainline traffic.

NOTES

1. SEE NOTE 1

CONTINUE GORE MARKINGS AT SAME SPACING TO END OF GORE AREA ~ SEE NOTE 1

GORE AREA MARKING LAYOUT WITH DIAGONALS

5. SEE NOTE 1

CONTINUE GORE MARKINGS AT SAME SPACING TO END OF GORE AREA ~ SEE NOTE 1

GORE AREA MARKING LAYOUT WITH CHEVRONS
1. Install a minimum of 3 sets of diagonals/chevrons in the gore area. A 50' spacing is standard; however, for gore areas shorter than 150' use a 25' spacing, and for gore areas greater than 400' a spacing of 100' may be used.

2. The acute angle of the diagonals shall always point in the direction of mainline traffic.

NOTES

1. Continue gore markings at same spacing to end of gore area ~ SEE NOTE 1

2. Diagonal markings with chevrons

3. Yellow edge line

4. White edge line

5. Centerline of gore area

6. Type 2Y RPM (TYP.)

7. 80' spacing

8. 45°


GORE AREA MARKINGS WITH CHEVRONS

GORE AREA MARKINGS WITH DIAGONALS

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

EXPIRES AUGUST 9, 2007

01-30-07

Ken L. Smith

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
**LEFT TURN CHANNELIZATION**

**SYMMETRICAL WIDENING ABOUT CENTERLINE**

- **Approach Taper A**
  - DIMENSION A: 82
  - DIMENSION B: 82
  - NO PASS LINE (WHEN REQUIRED)

- **Double Center Line (Yellow)** (Narrow Pattern)

**ASYMMEETRICAL WIDENING LEFT OF CENTERLINE**

- **Approach Taper C**
  - DIMENSION A: 82
  - DIMENSION B: 82
  - NO PASS LINE (WHEN REQUIRED)

- **Double Center Line (Yellow)** (Narrow Pattern)

**ASYMMEETRICAL WIDENING RIGHT OF CENTERLINE**

- **Approach Taper D**
  - DIMENSION A: 82
  - DIMENSION B: 82
  - NO PASS LINE (WHEN REQUIRED)

- **Double Center Line (Yellow)** (Narrow Pattern)

**GENERAL NOTES**

1. The channelization shown on this plan assumes optimal roadway geometric design. The dimensions may vary to fit existing conditions. See Contract.

L = 12' Typical Lane Width. See Contract for specified lane widths.

**LEGEND**

Type 2L Traffic Arrow

**POSTED SPEED**

<table>
<thead>
<tr>
<th>SPEED (MPH)</th>
<th>DIMENSION A</th>
<th>DIMENSION B</th>
<th>DIMENSION C</th>
<th>DIMENSION D</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>55</td>
<td>55</td>
<td>55</td>
<td>55</td>
<td>55</td>
</tr>
<tr>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>65</td>
<td>65</td>
<td>65</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>75</td>
<td>75</td>
<td>75</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>85</td>
<td>85</td>
<td>85</td>
<td>85</td>
<td>85</td>
</tr>
<tr>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>95</td>
<td>95</td>
<td>95</td>
<td>95</td>
<td>95</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>105</td>
<td>105</td>
<td>105</td>
<td>105</td>
<td>105</td>
</tr>
<tr>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
</tr>
</tbody>
</table>

**NOTE:**

This plan is not a legal engineering document but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.
LEFT TURN CHANNELIZATION
REDUCED TAPER LENGTHS - SYMMETRICAL WIDENING
(FOR LIMITED USE IN URBAN AREAS WITH POSTED SPEEDS OF 40 MPH OR LESS)

LEFT TURN CHANNELIZATION
REDUCED TAPER LENGTHS - ASYMMETRICAL WIDENING RIGHT OF CENTERLINE
(FOR LIMITED USE IN URBAN AREAS WITH POSTED SPEEDS OF 40 MPH OR LESS)

LEFT TURN CHANNELIZATION
REDUCED TAPER LENGTHS - ASYMMETRICAL WIDENING LEFT OF CENTERLINE
(FOR LIMITED USE IN URBAN AREAS WITH POSTED SPEEDS OF 40 MPH OR LESS)

GENERAL NOTES
1. The channelization shown on this plan assumes optimal roadway geometric design. The dimensions may vary to fit existing conditions. See Contract.

L = 1/2 Typical Lane Width. See Contract for specified lane widths.

LEGEND
- Type 2L Traffic Arrow

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
LEFT TURN CHANNELIZATION
TEE INTERSECTION

VARIES
SEE CONTRACT

50' R.

LEFT TURN CHANNELIZATION
TEE INTERSECTION

47.5'

LEFT TURN CHANNELIZATION
BACK TO BACK LEFT TURN LANES

VARIES
SEE CONTRACT

40 MPH
240'

45 MPH
270'

50 MPH
300'

55 MPH
330'

60 MPH
360'

80 MPH
90'

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
LEFT TURN CHANNELIZATION IN TWO-WAY LEFT TURN LANE

GENERAL NOTES
1. The channelization shown on this plan assumes optimal roadway geometric design. The dimensions may vary to fit existing conditions. See Contract.

L = 12' Typical Lane Width. See Contract for specified lane widths.

LEGEND
\( \square \) Type 2L Traffic Arrow

DOUBLE CENTER LINE (YELLOW) (NARROW PATTERN)

CENTER LINE

YELLOW WIDE LINE

PAINTED OR PLASTIC MEDIAN - SEE DETAIL

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
1. The channelization shown on this plan assumes optimal roadway geometric design. The dimensions may vary to fit existing conditions. See Contract.

2. The lane message "ONLY" may be added to the Traffic Arrow Type 2R locations shown, in which case, substitute the Arrow as per the LANE MESSAGE DETAIL.
NOTE

When specified in the Contract Plans, the HOV Symbol Marking shall be installed with an offset of 1 foot max. from the lane centerline.
Standard Plan M-9.50-01

**BICYCLE LANE SYMBOL**

**LAYOUT**

**KEY NOTES**

1. Bid item "Bicycle Lane Symbol" includes Bike Lane Arrow and Bike Rider Symbol.
2. 2' x 6' White Bike Lane Arrow
3. Bike Rider Symbol

**DETAIL**

**GRID IS 1" SQUARE**

**GENERAL NOTE**

See contract for location and material requirements.
1. See the Contract Plans for locations of crosswalk centerlines.

2. To the maximum extent possible, curb ramp centerlines should be perpendicular to the crosswalk centerline.

3. To the maximum extent possible, crosswalks should be perpendicular to the centerline of the traveled way.
NOTES

1. Three, four and five accessible stall arrangements may be either 90° (angled) or 60° (perpendicular) parking arrangements. See Contract.

2. An Access Parking Space Symbol is required for each accessible parking stall. A blue background and white border are required when the symbol is installed on a cement concrete surface.

3. All accessible stalls shall have wheelchair stops. Place wheelchair stops in other stalls when specified in the contract. Wheelchair stops shall be approximately 9" high and a minimum of 9" long.


LEGEND

- Reserved Parking Sign and post with NSHA, Pecos, if indicated (See Sign Fabrication Manual)
- Access Parking Space Symbol
- Manufactured wheelchair stop
- Detectable Warning Pattern
NOTES:

1. Dotted Extension Line shall be the same color as the line it is extending.

2. Edge Line shall be white on the right edge of traveled way, and yellow on the left edge of traveled way (on one-way roadways). Solid Lane Line shall be white.

3. The distance between the lines of the Double Center Line shall be 12" everywhere, except 4" for left turn channelization and narrow roadways with lane widths of 10 feet or less. Local Agencies (on non-State Routes) may specify a 4" distance for all locations.

4. Wide Line shall be yellow or white as specified in the Plans.

Longitudinal Marking Patterns

Standard Plan M-20.10-01

Ken L. Smith 01-30-07

Washington State Department of Transportation
1. Raised Pavement Markers Types 2YY and 2W shall be spaced at 80' intervals on tangents and on horizontal curves with a radius of 5000' or more, and at 40' intervals on horizontal curves having radii of less than 5000'. Center the RPM's in the gaps between the pavement marking lines.

2. Type 2Y RPM's, when specified, shall be placed outside the left edge line at 80' intervals. See "LEFT EDGE OF LANE PLACEMENT DETAIL".

3. Recessed pavement markers, when specified, shall be installed at the locations shown for Type 2W RPM's on multilane one-way roadways, and Type 2YY RPM's on two lane two-way roadways.

4. The Type 2W RPM's placed on multilane one-way roadways and all RPM's set in recesses shall have an abrasion resistant coating.

**NOTES**

- **TYPE 2YY RPM (TYP.)**
- **TYPE 2W RPM (ONE-WAY)**
- **TYPE 2Y RPM (ONE-SIDE ONLY)**
- **YELLOW AND YELLOW ~ ONE SIDE ONLY**
- **YELLOW ~ ONE SIDE ONLY**
- **TYPE 2 RPM RAISED FACE COLORS**

---

**Drawing Information**

- **DRAWN BY:** MARK SUJKA
- **PLAN VIEW**
- **TOP OF PAVEMENT MARKER**
- **TOP OF PAVEMENT**
- **ADHESIVE 40 1 40**

---

**Section A**

- **LONGITUDINAL MARKING SUPPLEMENT WITH RAISED PAVEMENT MARKERS**
- **STANDARD PLAN M-20.30-01**
- **SHEET 1 OF 1 SHEET**
- **APPROVED FOR PUBLICATION**

---

**Ken L. Smith 01-30-07**

---

**Expiry:** August 9, 2007

**Note:** This plan is not a legal engineering document but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.
1. Raised pavement markers shall be installed only when specified in the Contract Plans.

2. See the Standard Plans for marker designation.

3. The portion labeled "OPTIONAL" is only used when the Optional Marked Deceleration Taper (see Standard Plans M-3.10 and M-3.20) is specified in the contract plans.

Notes:

- Raised pavement markers shall be installed only when specified in the Contract Plans.
- See the Standard Plans for marker designation.
- The portion labeled "OPTIONAL" is only used when the Optional Marked Deceleration Taper (see Standard Plans M-3.10 and M-3.20) is specified in the contract plans.

Ken L. Smith 01-30-07
DRAWN BY: ADAM COCHRAN

DETAIL A

LEFT TURN LANE

TYPE 2YY RPM (TYP.)

40' - 0" SPACING

DOUBLE CENTER LINE (YELLOW) (NARROW PATTERN)

DETAIL B

LEFT TURN LANE

TYPE 2YY RPM (TYP.)

40' - 0" SPACING

DOUBLE CENTER LINE (YELLOW) (NARROW PATTERN)

DETAIL C

TWO-WAY LEFT-TURN CENTER LINE

40' RPM SPACING

DOUBLE CENTER LINE (YELLOW) (NARROW PATTERN)

DETAIL D

20' RPM SPACING FOR DECELERATION TAPER

DETAIL E

20' RPM SPACING FOR DECELERATION TAPER

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

Ken L. Smith
01-30-07
1. The NO PASS LINE (when required) is applied parallel to the CENTER LINE, 4" away, with the Type 2yy RPM's aligned (similar to TWO-WAY LEFT-TURN LINE).

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTE: Use the dimensions shown on this plan for each type Traffic Arrow being placed on roadways with a posted speed limit of 45 mph or higher.

Harold J. Petersen 05-31-06
SYMBOL MARKINGS
TRAFFIC ARROWS FOR
HIGH SPEED ROADWAYS
STANDARD PLAN M-34.20-01

SYMMETRICAL ABOUT CENTERLINE

CENTER POINT OF ELLIPSES

SYMMETRICAL ABOUT CENTERLINE

MARKING AREA
35.88 SQ.FT.

MARKING AREA
35.88 SQ.FT.

MARKING AREA
45.17 SQ.FT.

SYMBOL MARKINGS
TRAFFIC ARROWS FOR
HIGH SPEED ROADWAYS
STANDARD PLAN M-34.20-01

DRAWN BY: MARK SUJKA

EFFECTIVE: AUGUST 4, 2008 TO APRIL 5, 2009
NOTE

Use the dimensions shown on this plan for each type Traffic Arrow being placed on roadways with a posted speed limit of 40 mph or lower.

SYMBOL & LANE CENTERLINE

SYMBOL & LANE CENTERLINE
SYMBOL MARKINGS
TRAFFIC ARROWS FOR LOW SPEED ROADWAYS
STANDARD PLAN M-24.40-01

TYPE 5 TRAFFIC ARROW

TYPE 6SR (RIGHT) TRAFFIC ARROW
MIRROR IMAGE OF TYPE 6SL, (MIRRORED ABOUT LANE CENTERLINE) (SHOWN AT REDUCED SCALE)

TYPE 6SL (LEFT) TRAFFIC ARROW

MIRROR IMAGE OF TYPE 6SL (MIRRORED ABOUT LANE CENTERLINE) (SHOWN AT REDUCED SCALE)

SYMBOL & LANE CENTERLINE

MARKING AREA
19.58 SQ.FT.

MARKING AREA
23.14 SQ.FT.

MARKING AREA
15.94 SQ.FT.

MARKING AREA
15.94 SQ.FT.

SYMMETRICAL ABOUT CENTERLINE

GRID IS 4" SQUARE

CONSTRUCTION DRAWING SCALE 1" = 20' 1" = 1' 0"

SYMMETRICAL ABOUT CENTERLINE

CENTER POINT OF ELLIPSES

MARKING AREA 3.14 SQ FT.

MARKING AREA
3.14 SQ FT.

MARKING AREA
3.14 SQ FT.

MARKING AREA
3.14 SQ FT.

MARKING AREA
3.14 SQ FT.
AERIAL SURVEILLANCE MARKERS

HALF MARKER
(1/2 MILE INTERVAL)

FULL MARKER
(1 MILE INTERVAL)

PAVED SHOULDER

MARKING AREA = 11.73 SQ.FT.

MARKING AREA = 0.56 SQ.FT.

DRAINAGE STRUCTURE INLET

MARKING AREA = 1.06 SQ.FT.

MARKING AREA = 6.00 SQ.FT.

MARKING AREA = 11.73 SQ.FT.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
When guardrail runs concurrent, the contractor shall either:
A. Drive the flexible guide post in line with the guardrail posts, or
B. Mount the shorter flexible guide post onto the guardrail post.

Guide posts shall be fastened to the guardrail posts using two 2" × 3/8" lag screws with washers, along centerline of post. Also acceptable is any approved method submitted by the guide post manufacturer.

When concrete barrier runs concurrent, the contractor shall mount barrier delineators where guideposts are required.

Spacing of barrier delineators shall be as shown in the plans.

The housing or bracket can be flexible or rigid, molded from a durable plastic or other durable material approved by the engineer, and shall be attached to the barrier with an adhesive recommended by the manufacturer. The attachment point on the barrier surface shall be free of dirt, curing compound, moisture, paint, or any other matter that would adversely affect the adhesive bond.

Barrier delineators shall be one-sided for single direction traffic, or two-sided for bi-directional traffic. Color shall be white on the right of traffic, and yellow on the left of traffic.

The reflective surface shall be rectangular or trapezoidal.

Reflective sheeting: 12 square inches minimum surface area; Type III, IV, V, or VI, selected from approved materials listed in the Qualified Products List.

Plastic reflector: 9 square inches minimum surface area; acrylic or polycarbonate conforming to AASHTO M290. Reflectors shall equal or exceed the following minimum values of Specific Intensity:

<table>
<thead>
<tr>
<th>Color</th>
<th>Specific Intensity (cd/ft-c)</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>126</td>
</tr>
<tr>
<td>Yellow</td>
<td>50</td>
</tr>
<tr>
<td>White</td>
<td>30</td>
</tr>
<tr>
<td>Yellow</td>
<td>75</td>
</tr>
</tbody>
</table>

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

2. Guide posts shall be placed at 100' spacing on ramp tangents and tapers.

3. "S" dimension shown on Standard Plan M-40.40 or 100', whichever is smaller.

4. One half of "S" dimension shown on Standard Plan M-40.40 or 50', whichever is smaller.

5. Two spaces at 100'.

6. Three equal spaces when $R < 75'$, four equal spaces when $R \geq 75'$.

7. Two equal spaces.

8. Locate the initial Guide Post so that it does not hinder the visibility of the Bridge Delineator for approaching traffic. The distance between the bridge and the initial Guide Post shall be 50 feet maximum.
GUIDE POST PLACEMENT
GRADE INTERSECTIONS

THREE EQUAL SPACES WHEN \( R < 75' \)

FOUR EQUAL SPACES WHEN \( R \geq 75' \)

187 DECELERATION TAPER

187 (TYP.)

100' DECELERATION TAPER

DIVIDED HIGHWAY

FOUR EQUAL SPACES WHEN \( R \geq 75' \)

THREE EQUAL SPACES WHEN \( R < 75' \)

REFLECTIVE SHEETING APPLICATIONS

<table>
<thead>
<tr>
<th>TYPE</th>
<th>FRONT</th>
<th>BACK</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>WHITE</td>
<td>WHITE</td>
</tr>
<tr>
<td>WW</td>
<td>WHITE</td>
<td>WHITE</td>
</tr>
<tr>
<td>Y</td>
<td>WHITE</td>
<td>WHITE</td>
</tr>
</tbody>
</table>

LEGEND

- TYPE W
- TYPE WW
- TYPE Y

NOTE: This plan is not a legal engineering document but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.
1. The first guide post is positioned "S" distance from the beginning of curvature.

2. If the last guide post beyond the curve is 1/2 "S" or more, no additional posts are required.

3. If the last guide post beyond the curve is less than 1/2 "S", one additional post is required.


NOTE 1: This plan is not a legal engineering document but an electronic duplicate. The original, signed by the engineer and approved for publication, is kept on file at the Washington State Department of Transportation. A copy may be obtained upon request.
NOTES

1. Locate the initial Guide Post so that it does not hinder the visibility of the Bridge Delineator for approaching traffic. The distance between the bridge end and the initial Guide Post shall be 60 feet max.

2. Locate the initial Guide Post so that its visibility is unhindered for traffic departing the bridge. The distance between the bridge end and the initial Guide Post shall be 60 feet max.

NOTE

LEGEND
- TYPE W
- TYPE Y

MIDIAN Crossovers

LANE REDUCTIONS
SHOULDER RUMBLE STRIP
TYPE 1
FOR DIVIDED HIGHWAYS
STANDARD PLAN M-60.10-00

TYPICAL SHOULDER INSTALLATION

ISOMETRIC VIEW

PERSPECTIVE VIEW

MULTIPLE-LANE DIVIDED HIGHWAY

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
SHOULDER RUMBLE STRIP
FOR DIVIDED HIGHWAYS
TYPE 1
STANDARD PLAN M-60.10-00
SHEET 2 OF 4 SHEETS

TWO LANE OFF-CONNECTION

SINGLE LANE OFF-CONNECTION

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
SHOULDER RUMBLE STRIP

TYPE 1

FOR DIVIDED HIGHWAYS

STANDARD PLAN M-60.10-00

SHEET 3 OF 4 SHEETS

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

SHOULDER RUMBLE STRIP ON LEFT SHOULDER

SHOULDER RUMBLE STRIP ON OUTSIDE SHOULDER

SHOULDER RUMBLE STRIPS ON MEDIAN SHOULDERS

MEDIAN CROSSOVER

STRUCTURE OR OTHER FEATURE NECESSITATING A REDUCTION IN SHOULDER WIDTH

SHOULDER TAPER DETAIL

SHOULDER RUMBLE STRIP ON OUTSIDE SHOULDER

SHOULDER RUMBLE STRIP ON MEDIAN SHOULDERS

MEDIAN SHOULDER

OUTSIDE SHOULDER

EXPIRES JUNE 19, 2008

Pasco Bakotich III
If a median acceleration taper is included, start the rumble strip at the end of the taper.

Terminate the shoulder rumble strips at the beginning of the deceleration taper.

Rumble strip placement at intersections

Terminates the shoulder rumble strips at the beginning of the deceleration taper.

Radius point of front turn radius (Typ.)

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
Rumble strips are not installed in certain reduced-width shoulder locations. See the SHOULDER TAPER DETAIL on Standard Plan M-60.10.
SHOULDER RUMBLE STRIPS
TYPES 2, 3, & 4
FOR UNDIVIDED HIGHWAYS
STANDARD PLAN M-60.20-00

TYPE 2 - 12' GAP AND 12" WIDE STRIP
TYPE 3 - 16' GAP AND 16" WIDE STRIP

TYPE 4 - 12" WIDE STRIP

TERMINATE SHOULDER RUMBLE STRIPS
AT THE BEGINNING OR END
OF EACH RIGHT TURN TAPER.

TERMINATE SHOULDER RUMBLE STRIPS
40' FROM THE BEGINNING OR END
OF EACH RIGHT TURN RADIUS.

DRAWN BY: MARK SUJKA

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT
BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY
THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON
FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.
NOTES
1. Center Line Rumble Strip installation requires a minimum distance of 12 feet from Center Line to edge of paved shoulder.

2. When directed by the Engineer, Rumble Strips may be installed along the turn pocket taper where there is a history of run-off road collisions in the turn pocket.
1. Typically four times the letter or numeral height — minimum, up to lane lines — maximum, or according to plans.
SIX FOOT HIGH LETTERS AND NUMERALS SHOWN ON A THREE-INCH SQUARE GRID

TEN FOOT HIGH LETTERS SHOWN ON A FIVE-INCH SQUARE GRID

FOR USE ON ROADWAYS WITH A POSTED SPEED OF 40 MPH OR LESS

TRAFFIC LETTERS AND NUMERALS
(LOW SPEED ROADWAYS)
STANDARD PLAN H-60.30-06

APPROVED FOR PUBLICATION
Pete Bakosich MD 06-10-06
Washington State Department of Transportation