INSTRUCTIONAL BULLETIN NO. 10-07

Regarding New and Revised Standard Drawings

Effective immediately, new standard drawings RD-TS-9, RD-TS-10, and RP-R-2 to be used design and construction of Roundabouts. Additional guidance will be provided under section 1 of the Roadway Design Guidelines at a later date.

New standard drawings S-SSMB-5 provides catch basin details for single slope barrier walls and S-GR-45 provides installation details when site conditions necessitate omitting a guardrail post. S-GR-46 provides installation details for the guard rails to be placed in a radius.

EC-STR-30 and 30A to be used for the instream diversion during the construction of multi barrel structures and EC-STR-4B provides Enhanced Silt Check Dam design details. Additional guidance can be found in the Drainage Manual.

<table>
<thead>
<tr>
<th>Drawing Number</th>
<th>Drawing Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>RD-TS-9</td>
<td>DESIGN STANDARDS FOR SINGLE LANE URBAN AND RURAL ROUNDABOUTS</td>
</tr>
<tr>
<td>RD-TS-10</td>
<td>DESIGN STANDARDS FOR MULTI - LANE URBAN AND RURAL ROUNDABOUTS</td>
</tr>
<tr>
<td>RP-R-2</td>
<td>STANDARD CONSTRUCTION DETAILS FOR ROUNDABOUTS</td>
</tr>
<tr>
<td>S-SSMB-5</td>
<td>SINGLE SLOPE MEDIAN BARRIER WALL CATCH BASIN DETAIL</td>
</tr>
<tr>
<td>EC-STR-4B</td>
<td>ENHANCED SILT FENCE CHECK DETAILS</td>
</tr>
<tr>
<td>EC-STR-30</td>
<td>INSTREAM DIVERSION (WITHOUT TRAFFIC)</td>
</tr>
<tr>
<td>EC-STR-30A</td>
<td>INSTREAM DIVERSION (WITH TRAFFIC)</td>
</tr>
<tr>
<td>S-GR-45</td>
<td>LONG SPAN GUARDRAIL-ONE POST OMITTED</td>
</tr>
<tr>
<td>S-GR-46</td>
<td>CURVED GUARDRAIL</td>
</tr>
</tbody>
</table>
Effective for the December 10, 2010 letting (October 6, 2010 turn-in date), the Roadway Standard Drawings, **D-PE-6B(2), D-SEW-6DA, D-SEW-6DC, D-SEW-12D, and D-PE-4** are revised to remove the note regarding the use of alternative reinforcement.

<table>
<thead>
<tr>
<th>Drawing Number</th>
<th>Current Revision Date</th>
<th>Drawing Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-PE-6B(2)</td>
<td>07-19-10</td>
<td>CONCRETE ENDWALL TYPE &quot;U&quot; WITH STEEL PIPE GRATE (FOR 18&quot; THRU 48&quot; PIPES) (6:1 SLOPE)</td>
</tr>
<tr>
<td>D-SEW-6DA</td>
<td>07-19-10</td>
<td>CONCRETE ENDWALL TYPE &quot;SD&quot; WITH STEEL PIPE GRATE (FOR 15&quot; THRU 48&quot; PIPES) (6:1 SLOPE)</td>
</tr>
<tr>
<td>D-SEW-6DC</td>
<td>07-19-10</td>
<td>CONCRETE ENDWALL TYPE &quot;SD&quot; WITH STEEL PIPE GRATE (FOR 18&quot; THRU 30&quot; PIPES) (6:1 SLOPE)</td>
</tr>
<tr>
<td>D-SEW-12D</td>
<td>07-19-10</td>
<td>CONCRETE ENDWALL TYPE &quot;SD&quot; WITH STEEL PIPE GRATE (FOR 15&quot; AND 18&quot; PIPES) (12:1 SLOPE)</td>
</tr>
<tr>
<td>D-PE-4</td>
<td>07-19-10</td>
<td>STRAIGHT, “L” AND &quot;U&quot; TYPE CONCRETE ENDWALL</td>
</tr>
</tbody>
</table>

These drawings shall be identified on the lower left side of the index sheet “To be printed with plans” until the drawings are formally distributed.

Copies of the new and revised standard drawings are attached.

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Original signed by Jeff C. Jones  
Jeff C. Jones, Civil Engineering Director  
Design Division

July 23, 2010  
JCJ:arh
**ROUNDABOUT DESIGN CHECKS**

1. **Fastest Path** checks should be completed prior to intersection sight distance being checked. Stopping sight distance and intersection sight distance should be checked for all approaches. 
2. **Roundabout Sight Distance** is NOT present.
4. Use of a right-turn bypass lane may be warranted from the roundabout traffic model.
5. Use of 2 point-turn lane may be warranted from the roundabout traffic model.
6. Roundabout approaches with speeds of 25 or 30 mph should be considered with full access to all approaches. 
7. Design standards for roundabouts should be followed for split islands.
8. U.S. & S.W. curbs should be considered for all approaches. 
9. For roundabouts with sufficient width, 3 point-turn lane may be warranted from the roundabout traffic model.

**DESIGN STANDARDS FOR MULTI-LANE ROUNDABOUTS**

<table>
<thead>
<tr>
<th>Design Standard</th>
<th>Urban</th>
<th>Rural</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Speed</td>
<td>25 MPH</td>
<td>30 MPH</td>
<td></td>
</tr>
<tr>
<td>Circulating Entry Radius</td>
<td>150' - 220'</td>
<td>150' - 220'</td>
<td>Measured from curb to curb face</td>
</tr>
<tr>
<td>Entry Width</td>
<td>24' - 28'</td>
<td>24' - 28'</td>
<td>Measured from curb to curb face</td>
</tr>
<tr>
<td>Exit Width</td>
<td>45' - 100'</td>
<td>45' - 100'</td>
<td></td>
</tr>
<tr>
<td>Approach/Departure Offset</td>
<td>200' - 1000'</td>
<td>200' - 1000'</td>
<td></td>
</tr>
<tr>
<td>Appraoch/Departure Width of Approach Lane</td>
<td>SAME AS EXIT RADIUS</td>
<td>SAME AS EXIT RADIUS</td>
<td></td>
</tr>
<tr>
<td>Approach/Departure Width of Approach Island</td>
<td>SAME AS EXIT RADIUS</td>
<td>SAME AS EXIT RADIUS</td>
<td></td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

- For specific conditions not covered on this sheet, reference should be made to the policy on geometric design of highways and streets, AASHTO, 2000.
- This standard should be followed for all approaches.
- Fastest Path templates should be designed on all roundabouts within the intersection.
- Final design template should be provided for all roundabouts.
- Standard templates for oval design should be followed for ovals.
- Standard templates for island design should be followed for island design.
- Standard templates for circular design should be followed for circular design.
- Standard templates for roundabout design should be followed for roundabout layout.
- Standard templates for right-turn bypass lane should be followed for right-turn bypass lane.
- Standard templates for left-turn bypass lane should be followed for left-turn bypass lane.
- Standard templates for roundabout construction details should be followed for roundabout construction details.
- Standard templates for roundabout traffic model should be followed for roundabout traffic model.
**GENERAL NOTES**

1. **BICYCLE EXIT RAMP DETAIL**
   - All construction details shown on the bicycle exit ramp shall be followed. A bicycle exit ramp shall be used between the truck apron and the central island.

2. **SPLITTER ISLAND CROSSING SECTION A-A**
   - The design of the bicycle exit ramp shall be as shown on the standard drawing. The bicycle exit ramp shall be used between the truck apron and the central island.

3. **DESIGN NOTES**
   - **SPLITTER ISLAND** should be a raised median with concrete hard-scaping (preferably). SPLITTER ISLAND should extend 3 feet from the field line (see standard drawing RP-H-6 for details).

4. **CONCRETE QUANTITY** for Type 4-30R CURB & GUTTER shall be computed using 0.06731 cubic yards per linear foot. Concrete pavers shall be used between the truck apron and the central island.

5. **ALL CONCRETE QUANTITY** for Type 4-30R CURB & GUTTER shall be computed using 0.06731 cubic yards per linear foot. Concrete pavers shall be used between the truck apron and the central island.

6. **FILLER MATERIAL** shall be used between the truck apron and the central island. Concrete pavers shall be used between the truck apron and the central island.

7. **CONCRETE QUANTITY** for Type 4-30R CURB & GUTTER shall be computed using 0.06731 cubic yards per linear foot. Concrete pavers shall be used between the truck apron and the central island.
**SNAP PT**

**STATE OF TENNESSEE**

**DEPARTMENT OF TRANSPORTATION**

**10-15-09**

**S-SSMB-5**

**GENERAL NOTES**

A  DRAWING TO BE USED FOR SINGLE SLOPE CONCRETE MEDIAN BARRIER WALLS WHEN SPECIFYING A NO. 31, 32, 41, NO. 46, OR 51 CONCRETE CATCH BASINS AND ALL PRECAST NO. 32 CONCRETE CATCH BASINS.

B  SEE STANDARD DRAWING S-SSMB-2 FOR ADDITIONAL DETAILS AND GENERAL NOTES REGARDING SINGLE SLOPE CONCRETE BARRIER WALL.

C  SEE CATCH BASINS STANDARD DRAWINGS FOR ADDITIONAL DETAILS AND GENERAL NOTES REGARDING CATCH BASINS.

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**PLAN VIEW**

No. 31, No. 32, and No. 46 Catch Basins

**SECTION A-A**

No. 31, No. 32 and No. 46 Catch Basins

**SECTION B-B**

No. 41 and 45S Catch Basins

**SECTION C-C**

No. 51 and 52 Catch Basins

**SECTION D-D**

No. 31, No. 32, and No. 46 Catch Basins

**SECTION E-E**

No. 45S Catch Basins

**DETAIL 1**

SINGLE SLOPE CONCRETE MEDIAN BARRIER WALL

PORTLAND CEMENT GROUT

3" CURB OPENING (TYP.)

FRONT EDGE OF CURB IRON TO BE SET 0.5" DEEP INTO SINGLE SLOPE CONCRETE BARRIER WALL.

GRATE

PAVEMENT

GRATE FRAME

SINGLE SLOPE CONCRETE MEDIAN BARRIER WALL

SECTION E-E

No. 45S Catch Basins

FINISHED GRADE OR SURFACE OF SHOULDER

14"

SINGLE SLOPE CONCRETE MEDIAN BARRIER WALL

SECTION D-D

No. 31, No. 32, No. 41, No. 46, No. 51, and No. 52 Catch Basins

SECTION B-B

No. 41 and 45S Catch Basins

SECTION C-C

No. 51 and 52 Catch Basins

HALF SIZE SINGLE SLOPE CONCRETE MEDIAN BARRIER WALL

NOISE BARRIER OR RETAINING WALL

CURB OPENING

34"

PORTLAND CEMENT GROUT

VARIES

SINGLE SLOPE CONCRETE MEDIAN BARRIER WALL

0.5" (TYP.)

1" (TYP.)

3" CURB OPENING (TYP.)

DETAIL 1

SEE DETAIL 1

SEE DETAIL 1

SEE DETAIL 1

SECTION E-E

No. 45S Catch Basins

FINISHED GRADE OR SURFACE OF SHOULDER

14"

SINGLE SLOPE CONCRETE MEDIAN BARRIER WALL

SECTION A-A

No. 31, No. 32, and No. 46 Catch Basins

SECTION B-B

No. 41 and 45S Catch Basins

SECTION C-C

No. 51 and 52 Catch Basins

HALF SIZE SINGLE SLOPE CONCRETE MEDIAN BARRIER WALL
ENHANCED SILT FENCE CHECK DETAILS

D  FOR INSTALLATION DETAILS FOR ENHANCED SILT FENCE SEE STANDARD DRAWING EC-STR-3D AND EC-STR-3E.

E  THE SPACING OF ENHANCED SILT FENCE CHECKS, ALONG A DITCH, SHOULD BE BASED ON COMBINATION OF HYDRAULIC PROPERTIES OF FENCE MATERIAL, LENGTH OF FENCE (X1 AND X2), AND THE SPACING TABLE.

A  ENHANCED SILT FENCE CHECKS ARE USED TO REMOVE SUSPENDED SEDIMENTS FROM STORM WATER FLOW VIA SETTLING AND FILTRATION. THEY ALSO HELP REDUCE VELOCITY. ENHANCED SILT FENCE CHECKS SHOULD NOT BE PLACED IN STREAMS OR OTHER NATURAL WATER RESOURCES.

B  IT MAY BE NECESSARY TO FLATTEN THE DITCH SIDE SLOPES AND/OR WIDEN THE DITCH BOTTOM WIDTH IN THE VICINITY OF THE CHECK IN ORDER TO ACHIEVE THE SURFACE AREA OF FABRIC REQUIRED FOR THE CHECK. REFER TO LIMITS OF FLOW TABLE ON EC-STR-4 AND EC-STR-4A.

C  FOR ADDITIONAL INSTALLATION INFORMATION REFER TO EC-STR-4B FOR ENHANCED SILT FENCE CHECKS USED IN TRAPEZOIDAL DITCHES AND EC-STR-4A FOR ENHANCED SILT FENCE CHECKS USED IN V-DITCHES.

F  UPON REMOVAL OF THE ENHANCED SILT FENCE CHECK THE WIDENED ZONE SHOULD BE IMMEDIATELY RESHAPED TO MATCH THE PROPOSED DITCH SIZE. IT SHOULD BE COVERED WITH SEEDING AND EROSION CONTROL BLANKETS OR SODDING.

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
FLOW WIDENED ZONE

BOTTOM WIDTH (FT) SIDE SLOPE (H:1) LENGTH (FT) TRANSITION RATIO LENGTH (FT)

AMOUNT OF ENHANCED SILT FENCE CHECKS

L = LENGTH BETWEEN FENCE MEASURED ALONG GROUND (FT) 18" MAX.

ALLOWABLE BACKWATER BEHIND FENCE SPACING FOR ENHANCED SILT FENCE CHECKS

GROUND SURFACE RECOMMENDED SPACING (L) BETWEEN ENHANCED SILT FENCE CHECKS (FT)

APPROVAL NOT REQUIRED.

MINOR REVISION -- FHWA 01-01-10

EC-STR-4B

SNAP PT

SNAP PT

POINT Y

PROFILE VIEW

WIDENED ZONE

OVERFLOW LENGTH (FT)

TOTAL LENGTH OF ESF (FT)

BOTTOM LENGTH (FT)

SIDE SLOPE (H:1)

LENGTH (FT)

TRANSITION RATIO

RECOMMENDED SPACING, L (FT)

MAXIMUM ENHANCED SILT FENCE CHECKS (FT)

<references>
[None]
</references>
EXISTING CHANNEL AND INTO BARREL(S) OF THE EXISTING STRUCTURE.

**PHASE 1**

1. **INSTREAM DIVERSION** SHALL BE USED FOR NEW CONSTRUCTION OR REPLACEMENT OF A STRUCTURE FOR AN EXAMPLE WHEN TRAFFIC IS MAINTAINED DURING CONSTRUCTION SEE NOTE A.

2. **INSTREAM DIVERSION** MAY BE CONSTRUCTED OF SANDBAGS, JERSEY BARRIER, SHEET PILING, ETC.) (WITHOUT TRAFFIC) OR RIPRAP, SHEET PILING, OR OTHER MATERIALS USED TO SEPARATE THE FLOWING WATER.

3. **INSTREAM DIVERSION** SHALL BE INSPECTED WEEKLY OR AFTER EVERY RAIN EVENT.

4. **INSTREAM DIVERSION** SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS: SFB (TYP.), GEOTEXTILE, AND RIPRAP. THE EXCAVATED AREA SHOULD BE LIMITED TO CONSTRUCTION LIMITS OF THE STRUCTURE.

5. **INSTREAM DIVERSION** SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS: SFB (TYP.), GEOTEXTILE, AND RIPRAP. THE EXCAVATED AREA SHOULD BE LIMITED TO CONSTRUCTION LIMITS OF THE STRUCTURE.

6. **INSTREAM DIVERSION** SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS: SFB (TYP.), GEOTEXTILE, AND RIPRAP. THE EXCAVATED AREA SHOULD BE LIMITED TO CONSTRUCTION LIMITS OF THE STRUCTURE.

**PHASE 2**

1. **INSTREAM DIVERSION** SHALL BE USED FOR NEW CONSTRUCTION OR REPLACEMENT OF A STRUCTURE FOR AN EXAMPLE WHEN TRAFFIC IS MAINTAINED DURING CONSTRUCTION SEE NOTE A.

2. **INSTREAM DIVERSION** MAY BE CONSTRUCTED OF SANDBAGS, JERSEY BARRIER, SHEET PILING, ETC.) (WITHOUT TRAFFIC) OR RIPRAP, SHEET PILING, OR OTHER MATERIALS USED TO SEPARATE THE FLOWING WATER.

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5. **INSTREAM DIVERSION** SHALL BE PAID FOR UNDER THE FOLLOWING ITEM NUMBERS: SFB (TYP.), GEOTEXTILE, AND RIPRAP. THE EXCAVATED AREA SHOULD BE LIMITED TO CONSTRUCTION LIMITS OF THE STRUCTURE.

**Erosion Control Plan Legend:**

- EN-01 - Instream Diversion

**Instream Diversion General Notes:**

1. **Instream Diversion** is to be used where it is necessary to maintain the stream flow within the existing channel during the construction of a structure. Instream Diversion shall be included in the plans of work and shall be designed to ensure that the emerging water from the work area will not interfere with other traffic or safety standards.

2. **Instream Diversion** shall be designed to include provisions for inlet and outlet protection. The inlet and outlet protection shall be designed to prevent erosion of the stream bed and bank.

3. **Instream Diversion** shall be designed to include provisions for temporary dewatering structures. The dewatering structure shall be designed to prevent erosion of the stream bed and bank.

4. **Instream Diversion** shall be designed to include provisions for sediment control. The sediment control shall be designed to prevent sedimentation in the stream.

5. **Instream Diversion** shall be designed to include provisions for vegetation control. The vegetation control shall be designed to prevent erosion of the stream bank.

6. **Instream Diversion** shall be designed to include provisions for stream and canopy protection. The stream and canopy shall be designed to prevent erosion of the stream bank.

7. **Instream Diversion** shall be designed to include provisions for water quality. The water quality shall be designed to prevent contamination of the stream.

8. **Instream Diversion** shall be designed to include provisions for fish habitat. The fish habitat shall be designed to provide suitable habitat for fish.

9. **Instream Diversion** shall be designed to include provisions for wildlife. The wildlife shall be designed to provide suitable habitat for wildlife.

10. **Instream Diversion** shall be designed to include provisions for water supply. The water supply shall be designed to ensure that the emerging water from the work area will not interfere with water supply systems.

11. **Instream Diversion** shall be designed to include provisions for water quality. The water quality shall be designed to prevent contamination of the stream.

12. **Instream Diversion** shall be designed to include provisions for fish habitat. The fish habitat shall be designed to provide suitable habitat for fish.

13. **Instream Diversion** shall be designed to include provisions for wildlife. The wildlife shall be designed to provide suitable habitat for wildlife.

14. **Instream Diversion** shall be designed to include provisions for water supply. The water supply shall be designed to ensure that the emerging water from the work area will not interfere with water supply systems.
**PHASE 2**

**PHASE 2**

**STRUCTURE**

PILING, ETC.)

SEDIMENT FILTER

NOTE: FOR TYPICAL

STANDARD DRAWINGS.

PROPOSED

INSTREAM DIVERSION

STRUCTURE

BAG OR

DEWATERING

FOR TEMPORARY TRAFFIC LANES. PLACE INLET/OUTLET PROTECTION.

BARRIER, SHEET

8. REMOVE INSTREAM DIVERSION.

WATER FROM THE WORK AREA.

BARRIER, SHEET

DEWATERING STRUCTURES, SEDIMENT FILTER BAGS, SILT FENCE, AND SILT

CROSS-SECTION

INSTREAM DIVERSION

RESPECTIVE STANDARD DRAWINGS.

FLOWING WATER.

ADJUSTMENTS SHOULD BE MADE TO THE INSTREAM DIVERSION FOR WHEN A BRIDGE

BAG OR

SEE NOTE E

J  ONLY GEOTEXTILE FABRIC (TYPE III) LISTED ON THE QUALIFIED PRODUCTS

LIST SHALL BE USED.

6. USE INSTREAM DIVERSION TO DIVERT FLOW TO OTHER SIDE OF THE

EXISTING CHANNEL AND INTO BARREL(S) OF THE EXISTING STRUCTURE.

EXAMPLE SHOWN IS FOR REPLACEMENT OF A MULTI-BARREL STRUCTURE.

I  INSTREAM DIVERSION MAY BE CONSTRUCTED OF SANDBAGS, JERSEY

BARRIER, SHEET

DEWATERING (SANDBAGS, JERSEY

SEE NOTE A

IN DIV

CONSTRUCTION OF A MULTI-BARREL CULVERT, BOX BRIDGE, OR SLAB BRIDGE.

PROPOSED

USED SHOULD BE BASED UPON FIELD CONDITIONS OF THE SPECIFIC PROJECT AT

TRAFFIC CONTROL SHOULD BE BASED ON THE SPECIFIC PROJECT, NOT ON THE

REMAINING BARREL(S) OF THE PROPOSED STRUCTURE. PLACE INLET/OUTLET

PROTECTION.

THE EXISTING CHANNEL AND INTO BARREL(S) OF THE NEWLY CONSTRUCTED

PROPOSED STRUCTURE.

7. REMOVE REMAINING PORTION OF EXISTING STRUCTURE AND CONSTRUCT

ONE OR MORE BARRELS OF THE PROPOSED STRUCTURE. PLACE INLET/OUTLET

PROTECTION.

THE EXISTING CHANNEL AND INTO BARREL(S) OF THE PROPOSED STRUCTURE.

EXAMPLE SHOWN.

ACCORDINGLY.

PHASE 3

G  CONSTRUCTION SHALL PROCEED AS FOLLOWS:

1. USE INSTREAM DIVERSION TO DIVERT FLOW TO ONE SIDE OF THE

EXISTING CHANNEL AND INTO BARREL(S) OF THE NEWLY

CONSTRUCTED STRUCTURE OR THE SPAN OF EXISTING STRUCTURE.

2. REMOVE PORTION OF EXISTING STRUCTURE, IF APPLICABLE, AND CONSTRUCT

REMAINING PORTION OF THE PROPOSED STRUCTURE TO A LENGTH SUFFICIENT

FOR TEMPORARY TRAFFIC LANES. PLACE INLET/OUTLET PROTECTION.

3. USE INSTREAM DIVERSION TO DIVERT FLOW TO ONE SIDE OF THE

EXISTING CHANNEL AND INTO BARREL(S) OF THE PROPOSED STRUCTURE.

4. REMOVE PORTION OF EXISTING STRUCTURE, IF APPLICABLE, AND CONSTRUCT

REMAINING PORTION OF THE PROPOSED STRUCTURE TO A LENGTH SUFFICIENT

FOR TEMPORARY TRAFFIC LANES. PLACE INLET/OUTLET PROTECTION.

5. MOVE TRAFFIC, REMOVE PORTION OF EXISTING STRUCTURE, AND CONSTRUCT

REMAINING BARRELS OF THE PROPOSED STRUCTURE. PLACE INLET/OUTLET

PROTECTION.

6. REMOVE INSTREAM DIVERSION.

7. REMOVE REMAINING PORTION OF EXISTING STRUCTURE AND CONSTRUCT

REMAINING BARREL(S) OF THE NEWLY CONSTRUCTED PROPOSED STRUCTURE.

8. REMOVE INSTREAM DIVERSION.

**PHASE 4**

**PHASE 4**

**HIGHER THAN THE ORDINARY FLOW IN THE REDUCED CHANNEL WIDTH.

PILING, ETC.)

EXITING DIVERSION

SEE NOTE A

INSTREAM

SEE NOTE E

K  FOR INSTALLATION DETAILS AND ITEM NUMBERS FOR DEWATERING STRUCTURES

FOR INSTALLATION DETAILS AND ITEM NUMBERS FOR DEWATERING STRUCTURES

INSTREAM DIVERSION

SEE NOTE E

INSTREAM DIVERSION

SEE NOTE A

INSTREAM DIVERSION

SEE EC-STR-30

INSTREAM DIVERSION

SEE EC-STR-30

INSTREAM DIVERSION

THE CONSTRUCTION PHASING SHOWN IS AN EXAMPLE. THE CONSTRUCTION PHASING

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THE CONSTRUCTION PHASING SHOWN IS AN EXAMPLE. THE CONSTRUCTION PHASING
GENERAL NOTES

A. DRAWING TO BE USED FOR GUARDRAIL PLACEMENT WHEN ENCOUNTERING AN OBSTRUCTION SMALLER THAN 12.5 FT WIDE.
B. A POST MAY BE OMITTED ON A RUN OF GUARDRAIL ONLY. THIS APPLICATION IS NOT TO BE USED AS PART OF AN ANCHOR.
C. ONLY ONE POST MAY BE OMITTED AT AN OBSTRUCTION.
D. WHEN MORE THAN ONE OBSTRUCTION IS ENCOUNTERED ON A RUN OF GUARDRAIL, THREE CONSECUTIVE POSTS SHALL BE INSTALLED PRIOR TO OMITTING ANOTHER POST.
E. SEE STANDARD DRAWING RD01-SERIES FOR SLOPE CRITERIA.

SECTION "A-A"  SECTION "B-B"

SEE NOTE B  SEE NOTE B

SLOPE (VARIES)

25' NESTED W-BEAM (705-01.01)
37'-6" NESTED W-BEAM (705-01.01)

CASE A
CASE B

A  DRAWING TO BE USED FOR GUARDRAIL PLACEMENT WHEN ENCOUNTERING AN OBSTRUCTION SMALLER THAN 12.5 FT WIDE.
B  A POST MAY BE OMITTED ON A RUN OF GUARDRAIL ONLY. THIS APPLICATION IS NOT TO BE USED AS PART OF AN ANCHOR.
C  ONLY ONE POST MAY BE OMITTED AT AN OBSTRUCTION.
D  WHEN MORE THAN ONE OBSTRUCTION IS ENCOUNTERED ON A RUN OF GUARDRAIL, THREE CONSECUTIVE POSTS SHALL BE INSTALLED PRIOR TO OMITTING ANOTHER POST.
E  SEE STANDARD DRAWING RD01-SERIES FOR SLOPE CRITERIA.

LONG SPAN GUARDRAIL
- ONE POST OMITTED
This standard drawing is to be used at intersections with radii of 35 feet or less. Designer is to verify the entire length can be constructed within the proposed right-of-way.

See standard drawings (S-GR-22, S-GR-23, S-GR-23A) for guardrail connection to bridge rail and concrete barrier.

The slope from the edge of the roadway into the face of guardrail should not be steeper than 10(H):1(V).

See standard drawings (S-GR-12, S-GR-13, S-GR-13A, S-GR-14) for posts, rail, and hardware standards for construction.

Use appropriate end terminal per standard drawings (S-GR-19, S-GR-26, S-GR-43).

For the 8'-6" radius, five posts are required including the post at point B.

The clear area behind the guardrail shall remain unobstructed and unencumbered to allow the guardrail to function properly. Holes, ditches, wetlands, etc., remain posts and must be staggered, relocated, or redesigned.

The flat washer is used under the nut, behind the post only. No washer is used at the rail.

**GENERAL NOTES**

1. The slope from the edge of the roadway into the face of the guardrail should not be steeper than 10(H):1(V).
2. See standard drawings (S-GR-12, S-GR-13, S-GR-13A, S-GR-14) for posts, rail, and hardware standards for construction.
3. Use appropriate end terminal per standard drawings (S-GR-19, S-GR-26, S-GR-43).
4. For the 8'-6" radius, five posts are required including the post at point B.
5. The clear area behind the guardrail shall remain unobstructed and unencumbered to allow the guardrail to function properly. Holes, ditches, wetlands, etc., remain posts and must be staggered, relocated, or redesigned.
6. The flat washer is used under the nut, behind the post only. No washer is used at the rail.
BENDING DIMENSIONS

NO. 7.

GENERAL NOTE 7.

NO. 611-07.03.

THE COST OF FURNISHING BOLTS, NUTS, AND WASHERS, INCLUDING ALL MATERIALS, LABOR AND
GALVANIZING FOR BOLTS, NUTS, AND WASHERS SHALL CONFORM TO THE FOLLOWING
ITEMS:

REV. 7-17-07: ADDED

REV. 6-1-09: ADDED

REV. 7-19-10: DELETED

THE MATERIAL FOR STRUCTURAL STEEL GRATE SHALL CONFORM TO THE FOLLOWING
SPECIFICATIONS:

24" PIPE

REV. 6-1-09: ADDED

TT-E-489J.
DESCRIPTION FOR ITEM NO. 2:

**ANCHOR BOLTS AND STEEL PIPE**

- **Dimensions:** The units shall be subset 3/32" to 1/4" and torqued, with steel pipe.
- **Revision:** REV. 6-1-09: Added 5/8" dia. anchor more than 1/2" above.
- **Quantity:** 12 pipes - 6:1 slope

**NOTE 2 ADDED:**

- **Subsection:** of the pipe + 2" pipes - 6:1 slope.
- **Endwall:** Not extend more than 2" this endwall may be used for sidedrains.

**REINFORCING STEEL IN ULTIMATE LOAD FOR 5/8" DIAMETER ANCHORS IS 11,000 POUNDS.**

**STRUCT.:**

- **Concrete:** The grate in place, to an equivalent direct pull out load 60 percent outside diameter.
- **Slippage:** Shall not exceed 1/4".
- **The grate:** In place requirements must be corrected at the contractor's expense.

**GENERAL NOTES 5 E.:**

- This endwall may be used for sidedrains only.
- **Standard Drawing:** D-SEW-6DA. It is to be used for sidedrains only.
- **Certification:** The contractor shall furnish certified anchor pull out data from the fabricator to assure appropriate sizing and location of the four (4) lifting inserts shall be the responsibility of the contractor.
- **Bolts:** Shall not extend more than 2" this endwall may be used for sidedrains.

**DEPARTMENT WILL PERFORM TESTING OF ANCHORS ON SITE TO INSURE THE ANCHOR INSERTS 3 1/2"."
### Table of Dimensions and Estimated Quantities for One Straight Concrete Endwall (Slope 3:1)

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1'-6&quot;</td>
<td>1.71</td>
<td>0.34</td>
<td>2.05</td>
<td>0.035</td>
</tr>
<tr>
<td>2'-6&quot;</td>
<td>3.14</td>
<td>0.55</td>
<td>3.69</td>
<td>0.075</td>
</tr>
<tr>
<td>4'-0&quot;</td>
<td>4.15</td>
<td>0.74</td>
<td>4.89</td>
<td>0.115</td>
</tr>
</tbody>
</table>

*Note: Use "U" type Endwall shown on standard drawings D-PE-3B, D-PE-4B, and D-PE-6B for 3:1 slope. Use "L" type for all other slopes.*