RS40–14 THREE SPAN ROLLED STEEL BEAM BRIDGE STANDARDS
GENERAL NOTES:

THE 1940-1945 BRIDGE STANDARDS, IF PROPERLY Used, PROVIDE THE STRUCTURAL PLANS NECESSARY TO CONSTRUCT CONTINUOUS 50', 60', AND 72' HIGHWAY STEEL SPAN BRIDGES WITH LENGTHS OF 60'-0, 70'-0, 100'-0, 120'-0, 140'-0, 160'-0, 180'-0, 200'-0, 220'-0, AND 240'-0.

ALL BRIDGES MAY BE BUILT ON A 0°, 10°, 20°, 30° OR 45° SKEW. WHERE A SINGLE SKEW IS USED, IT IS USUALLY DESIGNATED AS THE PRIMARY SKEW, AND THE ADDITIONAL SKews ARE DESIGNATED AS THE ACCESS SKEWS.

THE INTEGRAL ABUTMENT DESIGN UTILIZED ON THESE BRIDGES UTILIZES THE SAME DESIGN USED ON THE IODOT HIGHWAY BRIDGE DESIGN MANUAL, WORKING STANDARDS, AND SEED NOTES.

STEEL IN FIELDS SHALL BE USED AT THE ABUTMENTS, IF THE ABUTMENTS ARE TO BE OVER 100' LONG.

THOUGH THESE STANDARDS ARE USING NON-COATED, EPOXY COATED AND STAINLESS STEEL REINFORCING STEELS, THE MINIMUM CLEAR DISTANCE FROM THE FACE OF CONCRETE TO THE NEAREST REINFORCING BAR SHALL BE 2'-6".

THE SUBGRADE SHALL BE COMPACTED TO A MINIMUM DENSITY OF 96% OF THE PROCTOR MAXIMUM DENSITY.

GROUPS OF THREE OR MORE BEAMS OF THE SAME LENGTH WHICH ARE SUPPORTED BY THE SAME SUPPORTING ELEMENT (ABUTMENT OR SHEAR WALL) SHALL BE CONSIDERED AS A COMBINED SUPPORT.

BECAUSE THESE BRIDGE STANDARDS HAVE BEEN REVISED FOR LRFD BASED ON 2012-COMPLETED PROJECTS, THE IOWA DEPARTMENT OF TRANSPORTATION, OFFICE OF BRIDGES AND STRUCTURES WEB SITE.

THE MINIMUM CLEAR DISTANCE FROM THE FACE OF THE CONCRETE TO THE NEAREST REINFORCING BAR SHALL BE 2'-6".

FOR PIERS SUBJECT TO SCOUR, THE DESIGN BEARING SHALL BE OBTAINED BELOW SCOUR ELEVATION.

SHEAR STUD HEIGHTS SHALL BE DETERMINED BY THE FINAL DESIGNER, BASED ON THE SITE SPECIFIC LOADS.

THE EFFECTIVE BRIDGE WIDTH IS EQUIVALENT TO A TWO LANE ROADWAY WITH 20'0" ROADWAY WIDTH.

FOR MORE INFORMATION ON SRL-1 AND SRL-2, SEE THE BRIDGE DESIGN MANUAL, LOCATED ON THE IOWA DEPARTMENT OF TRANSPORTATION, OFFICE OF BRIDGES AND STRUCTURES WEBSITE.

DESIGN STRESSES:

DESIGN STRESSES:  THE DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD 7TH EDITION, SERIES OF 2014.

STEEL H PILES SHALL BE USED AT THE ABUTMENTS.  H PILES MAY BE DRIVEN AS A SINGLE ROW, OR TWO ROWS (3x4).  THE ACTUAL PILE LOADS REQUIRED FOR A GIVEN BRIDGE LENGTH ARE TO BE DETERMINED BY THE FINAL DESIGNER, BASED ON THE SITE SPECIFIC LOADS.

THE PAINTED FINISH ON BEARINGS, FLANGE DEFLECTORS AND WEATHERING STEEL SHALL BE IN ACCORDANCE WITH THE PLAN NOTES AND ARTICLE 2408.20, 21 OF THE STANDARD SPECIFICATIONS.  ALL WEATHERING STEEL EMBEDDED INTO AN INTEGRAL ABUTMENT SHALL BE PAINTED TO A DISTANCE OF 2'-9" FROM THE PLANE THROUGH THE ABUTMENT BEARINGS AND SHEAR SEATS AT EACH LOCATION.

THE STEEL FOR THE EXTERNAL BEAMS OF THE BRIDGE SHALL BE THE SAME TYPE AND FROM THE SAME SOURCE.

BOLTS FOR USE WITH WEATHERING STEEL SHALL BE AT_LEAST #4.12X18, 100' R2X2.8 STEEL, AND THE FABRICATOR MUST PROVIDE BOLTS FOR THE EXTERNAL BEAMS OF THE BRIDGE.

BOLTS USED TO SPICE BEAM SECTIONS ARE TO BE INSTALLED SUCH THAT NUTS AND BOLTS SHALL EXTEND AT LEAST 1'-0" FROM THE BEARINGS, AND ON THE TOP AND BOTTOM TEE BOLTS, FLANGE PLATES shall be painted to a distance of 3'-6" FROM THE PLANE THROUGH THE EXTERNAL BEAMS.

THE STEEL BE科普 TO FREE OF OIL, GREASE, DIRT, CRAYON OR ANY OTHER MATERIAL THAT MAY AFFECT THE NATURAL SURFACE PROPERTIES OF THE STEEL.

THE GRADE 50W STEEL IS A WEATHERING STEEL AND IS TO REMAIN UNPAINTED, FOR PLATES 4" AND UNDER IN THICKNESS, AND ALL STRUCTURAL SHAPES.

ALL STRUCTURAL STEEL PIECES USED FOR BEARING SEATS ARE TO BE ASTM A709 GRADE 50W OR 36.

ALL STRUCTURAL STEEL PIECES CONFIRMED TO ASM A709 GRADE 50W, FOR PLATES 4" AND UNDER IN THICKNESS, AND ALL STRUCTURAL SHAPES, THE GRADE SAWG CLINKLE OF THE BEARING AND THEIR BEARINGS SHALL BE IN ACCORDANCE WITH THE PLANS PRORATED, EXCEPT AS NOTED, CKN TESTING IS REQUIRED FOR KEY BEAMS AND ALL SPRAIL PLATES.

WEATHERING STEEL NOTES:  MANY OF THE BRIDGE STANDARDS HAVE BEEN REVISED FOR LRFD BASED ON 2012-COMPLETED PROJECTS, THE IOWA DEPARTMENT OF TRANSPORTATION, OFFICE OF BRIDGES AND STRUCTURES WEB SITE.

THE PAINTED FINISH ON WEATHERING STEEL SHALL BE A DISTANCE OF 3'-9" FROM THE PLANE THROUGH THE EXTERNAL BEAMS OF THE BRIDGE.

BOLTS USED TO SPICE BEAM SECTIONS ARE TO BE INSTALLED SUCH THAT NUTS AND BOLTS SHALL EXTEND AT LEAST 1'-0" FROM THE BEARINGS, AND ON THE TOP AND BOTTOM TEE BOLTS, FLANGE PLATES shall be painted to a distance of 3'-6" FROM THE PLANE THROUGH THE EXTERNAL BEAMS.

THE GRADE 50W STEEL IS A WEATHERING STEEL AND IS TO REMAIN UNPAINTED, FOR PLATES 4" AND UNDER IN THICKNESS, AND ALL STRUCTURAL SHAPES.

THE GRADE SAWG CLINKLE OF THE BEARING AND THEIR BEARINGS SHALL BE IN ACCORDANCE WITH THE PLANS PRORATED, EXCEPT AS NOTED, CKN TESTING IS REQUIRED FOR KEY BEAMS AND ALL SPRAIL PLATES.
### TEE PIER NOTES:

**Standard Design - 40' Roadway, 3 Span Bridges**

1. **Ice Force:**
   - Ice forces were applied at a height of H/2 + 1.5' above the bottom of the pier footing, where H is the overall height of the pier. The effective ice strength was 24 ksf for H/2 of the pier. Ice force was calculated according to the LRFD Specifications and applied to the pier as follows:
   - Case 1: 75% of F applied parallel to the pier's long axis and 30% of F applied perpendicular to the pier's long axis.
   - Case 2: 50% of F applied parallel to the pier's long axis and 30% of F applied perpendicular to the pier's long axis.

2. **Stream Flow:**
   - The stream velocity used was 5 ft/s with the C, coefficient equal to 1.4. The resulting stream force was assumed to act parallel to the pier's long axis. It was assumed that superstructure elements will clear high water by approximately 3'.

3. **Pier Footing Geometry:**
   - It was assumed that the pier footing will be set approximately 9'-0 below the adjacent streambed or ground surface. It was also assumed that there are no significant undrained earth pressures applied to the pier.

4. **All Bridges with TEE Piers Detailed on These Standards Are Intended to Have One Fixed Pier and One Expansion Pier. The Pier Layout and Reinforcement Shown are the Same for Either Fixed or Expansion Pier. The Pier Section Between Fixed Pier and Expansion Pier Lies in the Selection of Bearings and Pier Details. The Plan Details Will Have One Set of Fixed Bearings and One Set of Expansion Bearings, Which May Be Used on Either Pier 1 or Pier 2. The Anchor Bolts in the Top of the Cap Should Be Eliminated from the Expansion Pier.**

5. **HP10x57 Steel Pile Shall Be Used in the Pier Footings of the Piers for Either Friction or Point Bearing. The Pier Details, Reinforcement, and Bearing Section Shown Are the Same for Either Fixed or Expansion Pier.**

6. **All Bearings Are in Grade Separation Structures.**

7. **Base Coated Reinforcement May Be Required for Pier Collision. Consult Current Policy for Guidance on the Use of Base Coated Reinforcement in Such Cases.**

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**IOWA DOT**

Highway Division

**Standard Design - 40' Roadway, 3 Span Bridges**

**Rolled Steel Beam Bridges**

**October, 2014**
BEAM BRIDGE STANDARDS

<table>
<thead>
<tr>
<th>Length</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>40'-0</td>
<td>60'-0</td>
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<tr>
<td>60'-0</td>
<td>60'-0</td>
<td>100'-0</td>
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<td>120'-0</td>
</tr>
<tr>
<td>120'-0</td>
<td>120'-0</td>
<td>160'-0</td>
</tr>
</tbody>
</table>

NOTES:
1. All substructure units are constructed parallel to the skew indicated for each bridge.
2. R.A. = RIGHT AHEAD
   L.A. = LEFT AHEAD

DETAIL A

DIMENSION D1, D2, D3 APPLIES AT LOCATION SHOWN ALONG THE ABDIMENT BEARING (TYP.)
30° SKEW (R.A.)

30° SKEW (L.A.)

20° SKEW (R.A.)

20° SKEW (L.A.)

10° SKEW (R.A.)

10° SKEW (L.A.)

0° SKEW

DETAIL A
DIMENSION D1, D2, D3 APPLIES AT LOCATION SHOWN ALONG THE 3% ABUTMENT BEARING (TYP.)

NOTES:
1. ALL SUBSTRUCTURE UNITS ARE CONSTRUCTED PARALLEL TO THE SKEW INDICATED FOR EACH BRIDGE.
2. R.A. = RIGHT AHEAD
   L.A. = LEFT AHEAD

BEAM BRIDGE STANDARDS

LENGTH | A | B | C | E | TYP A | TYP B | TYP C
---|---|---|---|---|---|---|---
340'-0" | 82'-0" | 156'-0" | 340'-0" | 21'-0" | 22'-0" | 23'-0" | 25'-0"
45° SKEW (R.A.)
(BRIDGES 160'-0 TO 320'-0)

45° SKEW (L.A.)
(BRIDGES 160'-0 TO 320'-0)

45° SKEW (R.A.)
(340'-0 BRIDGE)

45° SKEW (L.A.)
(340'-0 BRIDGE)

BEAM BRIDGE STANDARDS

<table>
<thead>
<tr>
<th>LENGTH</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>RADIUS OF CURVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>80'-0</td>
<td>58'-0</td>
<td>52'-0</td>
<td>160'-0</td>
<td>30'-0</td>
</tr>
<tr>
<td>160'-0</td>
<td>58'-0</td>
<td>72'-0</td>
<td>180'-0</td>
<td>30'-0</td>
</tr>
<tr>
<td>240'-0</td>
<td>60'-0</td>
<td>80'-0</td>
<td>200'-0</td>
<td>30'-0</td>
</tr>
<tr>
<td>320'-0</td>
<td>60'-0</td>
<td>88'-0</td>
<td>220'-0</td>
<td>30'-0</td>
</tr>
<tr>
<td>400'-0</td>
<td>62'-0</td>
<td>96'-0</td>
<td>240'-0</td>
<td>30'-0</td>
</tr>
<tr>
<td>480'-0</td>
<td>62'-0</td>
<td>104'-0</td>
<td>260'-0</td>
<td>30'-0</td>
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<tr>
<td>560'-0</td>
<td>62'-0</td>
<td>112'-0</td>
<td>280'-0</td>
<td>30'-0</td>
</tr>
<tr>
<td>640'-0</td>
<td>62'-0</td>
<td>120'-0</td>
<td>300'-0</td>
<td>30'-0</td>
</tr>
<tr>
<td>720'-0</td>
<td>62'-0</td>
<td>128'-0</td>
<td>320'-0</td>
<td>30'-0</td>
</tr>
</tbody>
</table>

NOTES:
1. ALL SUBSTRUCTURE UNITS ARE CONSTRUCTED PARALLEL TO THE SKIWS INDICATED FOR EACH BRIDGE.
2. R.A. = RIGHT AHEAD
L.A. = LEFT AHEAD

DETAIL A
DIMENSION OF APPLIED AT LOCATION SHOWN ALONG THE E. ABUTMENT BEARING (TYP.)

DETAIL B
DIMENSION OF APPLIED AT LOCATION SHOWN ALONG THE W. ABUTMENT BEARING (TYP.)

ROADWAY | APPROACH | PIER 2 | PIER 1
L.A. = LEFT AHEAD
R.A. = RIGHT AHEAD
PARALLEL TO THE SKW INDICATED FOR EACH BRIDGE.
ALL SUBSTRUCTURE UNITS ARE CONSTRUCTED
NOTES:
1. ALL SUBSTRUCTURE UNITS ARE CONSTRUCTED PARALLEL TO THE SKW INDICATED FOR EACH BRIDGE.
2. R.A. = RIGHT AHEAD
L.A. = LEFT AHEAD
ABUTMENT NOTES:

Minimum clear distance from face of concrete to near reinforcing bar is to be 7 inches. Otherwise noted or shown.

If necessary to prevent damage to the end of the bridge deck or backfill from construction equipment, an appropriate method of protection approved by the designer shall be provided by the bridge contractor at no extra cost to the county or state. Abutment piles shall be driven to values shown in design plans.

Contractor at no extra cost to the county or state. Abutment piles protection approved by the engineer shall be provided by the bridge.

Backwall from construction equipment, an appropriate method of placing 5h2 bars at 1:6 slope to match traffic side of abutment wing shall be driven to values shown in design plans.

Contractor at no extra cost to the county or state. Abutment piles protection approved by the engineer shall be provided by the bridge.

If necessary to prevent damage to the end of the bridge deck or backfill from construction equipment, an appropriate method of protection approved by the designer shall be provided by the bridge contractor at no extra cost to the county or state. Abutment piles shall be driven to values shown in design plans.

Contractor at no extra cost to the county or state. Abutment piles protection approved by the engineer shall be provided by the bridge.

Backwall from construction equipment, an appropriate method of placing 5h2 bars at 1:6 slope to match traffic side of abutment wing shall be driven to values shown in design plans.

Contractor at no extra cost to the county or state. Abutment piles protection approved by the engineer shall be provided by the bridge.

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Contractor at no extra cost to the county or state. Abutment piles protection approved by the engineer shall be provided by the bridge.

Backwall from construction equipment, an appropriate method of placing 5h2 bars at 1:6 slope to match traffic side of abutment wing shall be driven to values shown in design plans.

Contractor at no extra cost to the county or state. Abutment piles protection approved by the engineer shall be provided by the bridge.
ABUTMENT NOTES:

Maximum clear distance from face of concrete to near reinforcing bar is to be 1" if not otherwise noted or shown.

If necessary to prevent damage to the end of the bridge deck or backwall from construction equipment, an appropriate method of protection approved by the engineer shall be provided by the bridge contractor at no extra cost to the county or state. Abutment piles shall be driven to values shown in design plans.

- Holes drilled through shear keys for piling and footing, using 2-1/2" spiral at the top of each pile to be 7 turns of No. 2 spiral, 2") diameter, 3" pitch with 3"-6" x 3"-4" spacers punched to hold spiral.
- Pile plan approved by Bridge Engineer.
- Look over |- ABUTMENT BEARING PILES.
- Field bend 5h4 bar, unless otherwise noted or shown.
- 3'-0" PLATE DIAPHRAGM OR CHANNEL DIAPHRAGM OR BACKPLATE DIAPHRAGM (WINGS NOT SHOWN)

PART SECTION A-A

ABUTMENT PILE SPACING

<table>
<thead>
<tr>
<th>DIMENSION OR NO.</th>
<th>PILE TO ABUTMENT BEARING</th>
</tr>
</thead>
<tbody>
<tr>
<td>3'-0&quot; PLATE</td>
<td>9</td>
</tr>
<tr>
<td>CHANNEL DIAPHRAGM</td>
<td>4'-1&quot;</td>
</tr>
<tr>
<td>BACKPLATE DIAPHRAGM</td>
<td>3</td>
</tr>
</tbody>
</table>

NOTE:
Abutment Pile Plan provided by designer, see General Information Sheet (Working Standard Design).

INNER FLANGE人に

PART REAR ELEVATION AT ABUTMENT

NOTE:
Shift bar 5 in. in 2' as necessary to meet beam. Place bar 5 in. parallel to longitudinal steel.

NOTES:

- Mb: Required.
- If rock is closer than 15' below abutment footing, special analysis shall be driven to values shown in design plans.
- Contractor at no extra cost to the county or state. Abutment Piles Protection Approved by the Engineer shall be provided by the Bridge Contractor.
- If necessary to prevent damage to the end of the bridge deck or backwall from construction equipment, an appropriate method of protection approved by the engineer shall be provided by the bridge contractor at no extra cost to the county or state. Abutment piles shall be driven to values shown in design plans.
- Holes drilled through shear keys for piling and footing, using 2-1/2" spiral at the top of each pile to be 7 turns of No. 2 spiral, 2") diameter, 3" pitch with 3"-6" x 3"-4" spacers punched to hold spiral.

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

ROLLED STEEL BEAM BRIDGES

OCTOBER, 2014

IOWA DOT
Highway Division

RS40-010-14
**ABUTMENT NOTES:**

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REMOVAL OF BAR IS TO BE 6" UNLESS OTHERWISE NOTED OR SHOWN.

IF NECESSARY TO PREVENT DAMAGE TO THE END OF THE CONCRETE, TYPE OF REBAR ALUMINUM CONSTRUCTION EQUIPMENT TO BE USED MUST BE APPROVED BY THE ENGINEER SHALL BE PROVIDED BY THE CONTRACTOR AT NO EXTRA COST TO THE OWNER.

ABUTMENT PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

PLACE 56 BAR AT AN ANGLE TO MATCH TRAJECTORY OF ABUTMENT WING FACE. (BOTH SIDES TYPICAL)

BARRIER RAIL NOT SHOWN IN DETAILS.

IF ROCK IS CLOSER THAN 15' BELOW ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.

NOTE: PU, STRENGTH 1 DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

**ABUTMENT PILE SPACING**

<table>
<thead>
<tr>
<th>DIMENSION OF</th>
<th>5' TO 6' ABUTMENT BANDING</th>
</tr>
</thead>
<tbody>
<tr>
<td>8F4</td>
<td>10</td>
</tr>
<tr>
<td>8F5</td>
<td>9F6</td>
</tr>
<tr>
<td>6F5</td>
<td>5P4</td>
</tr>
<tr>
<td>5P2</td>
<td>5P1</td>
</tr>
</tbody>
</table>

SPECIAL ANALYSIS MAY BE REQUIRED.

NOTE: ABUTMENT PILE DIAGRAM PROVIDED BY DESIGNER. SEE GENERAL INFORMATION SHEET WORKING STANDARD SHEETS.

NOTE: ABUTMENT PILE PLAN PROVIDED BY ENGINEER. SEE PART REAR ELEVATION AT ABUTMENT (WINDS NOT SHOWN).

PART REAR ELEVATION AT ABUTMENT

PART SECTION A-A

PART SECTION B-B

ABUTMENT DETAILS

30° SKEW

ROLLING STEEL BEAM BRIDGES

OCTOBER, 2014

IOWA DOT

Highway Division

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

RS40-014-14
ABUTMENT PILE PLAN

ABUTMENT PILE SPACING

NOTE: TO HOLD SPIRAL.
3 - L‡ x ‡ x " SPACERS PUNCHED
BAR, 21" DIAMETER, 3" PITCH WITH
EACH PILE TO BE 7 TURNS OF No. 2
2. THE SPIRAL AT THE TOP OF
WEB FOR 5d2 AND 4t2 BARS.
1. HOLES DRILLED THROUGH BEAM
HOLD FOR SIG. AND RAD. BARS.

NOTE: 1-½ TUBE FORMED AT 21°
To match traffic side of abutment
web. (both sides typical)

ABUTMENT PILE PLAN

PART REAR ELEVATION AT ABUTMENT

TOP OF SLAB
3½ PVC PIPE

PART SECTION A-A

S3 x 7.5 x 1'-0

PART SECTION B-B

45° SKEW

NOTE: ABUTMENT STEP DIAGRAM
PROVIDED BY DESIGNER, SEE GENERAL INFORMATION SHEET WORKING STANDARD 12016.

NOTE: ABUTMENT NOTES:
MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING
BAR IS TO BE 0" UNLESS OTHERWISE NOTED OR SHOWN.
If necessary to prevent damage to the end of the bridge deck or backwall from construction equipment, an appropriate method of
protection approved by the engineer shall be provided by the bridge contractor at no extra cost to the county or state. Abutment pile
shall be driven to values shown in design plans.
Place 5h2 bar at 1:6 slope to match traffic side of abutment web. (both sides typical)
Barrier rail not shown in details.
If road is closer than 15' below abutment footing, special analysis may be required.

PART REAR ELEVATION AT ABUTMENT
**ABUTMENT PILE SPACING**

<table>
<thead>
<tr>
<th>DIMENSION OR NO.</th>
<th>3 TO 5 ABUTMENT BEARING</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;A&quot;</td>
<td>8&quot;</td>
</tr>
<tr>
<td>&quot;B&quot;</td>
<td>8&quot;</td>
</tr>
<tr>
<td>&quot;C&quot;</td>
<td>4</td>
</tr>
</tbody>
</table>

**NOTES:**
- 10 x 5 STEEL BEARING PILES REQUIRED.
- "C" EQUAL SPACES = 4

**NOTES:**
- STRENGTH DESIGN LOAD (KIPS) NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

**ABUTMENT NOTES:**
- Minimum clear distance from face of concrete to end of reinforcing bar to be 3" unless otherwise noted.
- If necessary to prevent damage to the end of the bridge deck or backwall, form construction equipment, an appropriate method of protection approved by the engineer shall be provided by the bridge contractor at no extra cost to the county or state. Abutment piles shall be driven to values shown in design plans.
- Barriers not shown in details.
- If deck is located more than 0.5 below abutment footing, special analysis may be required.

**ABUTMENT PILE PLAN**

**PART SECTION A-A**

- Channel spandrel on "A" pipe.
- Top of slab.
- Keyway formed by drilled 2½" gutter line.

**PART SECTION B-B**

- 3½" PVC pipe for clarity.
- 53 x 72 pipe.

**PART REAR ELEVATION AT ABUTMENT**

(RIGHTS NOT SHOWN.)

- Grade 50 steel piles.
- 3½" PVC pipe.
- Keyway formed by drilled 2½" gutter line.

**ABUTMENT PILE PLAN**

- Standard design - 40' roadway, 3 span bridges.
- Rolled steel beam bridges.

**ABUTMENT DETAILS**

45° skew

OCTOBER, 2014

RS40-016-14
PART LONGITUDINAL SECTION NEAR GUTTER

NOTE:
PLUG 3½ PVC PIPE WITH EXPANDING FOAM PRIOR TO BACKFILLING BEHIND ABUTMENTS.

NOTE:
FOR ELEVATION A, ELEVATION B AND DIMENSION C SEE MISCELLANEOUS DETAILS* FOR THE APPROPRIATE LENGTH BRIDGE.

PART END VIEW AT ABUTMENT

SECTION A-A

PART PLAN

(Steel Shop Drawings Not Shown)

NOTE:
ABUTMENTS.

FOAM PRIOR TO BACKFILLING BEHIND PLUG 3½ PVC PIPE WITH EXPANDING FOAM.

NOTE:
ABUTMENT BEARING

SEE DETAIL "C"

PART LONGITUDINAL SECTION NEAR GUTTER

SEE SKEW 0°

PARALLEL TO THE THEORETICAL & GUTTER

PART PLAN

(Steel Shop Drawings Not Shown)

NOTE:
ABUTMENT BEARING

SEE DETAIL "C"
PART LONGITUDINAL SECTION NEAR GUTTER

NOTE:
- Plan 3" PVC pipe with expanding foam prior to backfilling behind abutments.
- For Elevation A, Elevation B, Elevation C and Dimension C see "Miscellaneous Details" for the appropriate length bridge.

PART END VIEW AT ABUTMENT

NOTE:
- See Detail "C" for Saw and Bar Spool on RS40-088-14.

SECTION A-A

### DETAIL "C"

EDGE 1" BEVELED

- 5D8 (Traffic Face)
- 7H4 (Back Face)
- 5D9 (`Back Face`)
- 7H2 (`Traffic Face`)

### ROLLED STEEL BEAM BRIDGES

- Standard Design - 40' Roadway, 3 Span Bridges
- Latest Revision Date: October, 2014
- Approved By Bridge Engineer

### IOWA DOT Highway Division

- Longitudinal Section
- 0° Skew
- RS40-020-14
PART PLAN

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

ELEVATION: A

SECTION A-A

DETAIL "C"

PART END VIEW AT ABUTMENT

NOTE: 
FOR ELEVATION A, ELEVATION B AND 
DIMENSION C SEE "MISCELLANEOUS DETAILS" 
FOR THE APPROPRIATE LENGTH BRIDGE.

PART LONGITUDINAL SECTION NEAR GUTTER

NOTE: 
PLUG 3½ PVC PIPE WITH EXPANDING FOAM PRIOR TO BACKFILLING BEING 
ABUTMENTS.

RS40-021-14

OCTOBER, 2014

IOWADOT
Highway Division

ROLLED STEEL BEAM BRIDGES

LONGITUDINAL SECTION

10° SKEW

RS40-021-14

REvISED 08-2018 - UPDATED BRIDGE ENGINEER SIGNATURE.
PART LONGITUDINAL SECTION NEAR GUTTER

NOTE:
ABUTMENTS.
TO BACKFILLING BEHIND EXPANDING FOAM PRIOR TO BACKFILLING ABUTMENTS.

PART END VIEW AT ABUTMENT

NOTE:
PLUG 3½ PVC PIPE WITH EXPANDING FOAM PRIOR TO BACKFILLING ABUTMENTS.

SECTION A-A

NOTE:
FOR ELEVATION A, ELEVATION B, ELEVATION C AND DIRECTION C SEE "MISCELLANEOUS DETAILS" FOR THE APPROPRIATE LENGTH BRIDGE.

DETAIL "C"

FOR THE APPROPRIATE LENGTH BRIDGE.
PART LONGITUDINAL SECTION NEAR GUTTER

NOTE:
PLUG 3" PVC PIPE WITH EXPANDING FOAM PRIOR TO BACKFILLING BEARING ABUTMENTS.

NOTE:
FOR ELEVATION A, ELEVATION B, ELEVATION C AND DIRECTION C SEE "MISCELLANEOUS DETAILS" FOR THE APPROPRIATE LENGTH BRIDGE.

PART END VIEW AT ABUTMENT

FIELD END SHEAR BAR AS NECESSARY TO AVOID PIPE IN ABUTMENT RING.

SECTION A-A

DETAIL "C"

NOTE:
"C" RADIUS

PART PLAN
(STEEL DIAPHRAGMS NOT SHOWN)
PART LONGITUDINAL SECTION NEAR GUTTER

PART END VIEW AT ABUTMENT

NOTE:
PLUG 3½ PVC PIPE WITH EXPANDING
PLUG PRIOR TO BACKFILLING BEHIND
ABUTMENTS.

NOTE:
FOR ELEVATION A, ELEVATION B AND
ABUTMENTS. OBSERVE "MISCELLANEOUS DETAILS"
FOR THE APPROPRIATE LENGTH BRIDGE.

PVC PIPE

PVC PIPE

PART PLAN

PVC PIPE

T-6

SECTION A-A

DETAIL "C"
NOTE: ABUTMENTS. TO BACKFILLING BEHIND EXPANDING FOAM PRIOR TO BARRIERS PLUG 3½ PVC PIPE WITH 3" PVC PIPE AS NEEDED TO AVOID PILE IN ABUTMENT WING.

PART LONGITUDINAL SECTION NEAR GUTTER

NOTE:

NOTE FOR ELEVATION A, ELEVATION B, ELEVATION C AND DIMENSION C SEE "MISCELLANEOUS DETAILS" FOR THE APPROPRIATE LENGTH BRIDGE.

SEE DETAIL "C" FOR EARS AND BAR SPCG. ON RS40-088-14 FOR BARS AND BARS SPACING.

SEE BARRIER RAIL DETAILS ON RS40-088-14 FOR BARRIERS LAYOUT.

SEE DETAIL "C" FOR EARS AND BAR SPCG. ON RS40-088-14 FOR BARS AND BARS SPACING.

SEE DETAIL "C" FOR EARS AND BAR SPCG. ON RS40-088-14 FOR BARS AND BARS SPACING.

SEE DETAIL "C" FOR EARS AND BAR SPCG. ON RS40-088-14 FOR BARS AND BARS SPACING.
ABUTMENTS.

TO BACKFILLING BEHIND EXPANDING FOAM PRIOR PLUG 3"½ PVC PIPE WITH NOTE:

2'-8 MIN. LAP PVC PIPE

ABUTMENT WING - ELEVATION VIEW

SECTION B-B

REINFORCING BARS 6c3, 6c4, 5c5-10 & 4t1 ARE INCLUDED IN THE BARRIER RAIL QUANTITIES.

NOTE:

1. USE FOR BRIDGES 160'-0 THRU 200'-0
2. USE FOR BRIDGES 220'-0 THRU 320'-0
3. REINFORCING STEEL QUANTITY IS INCLUDED IN THE DECK AND ABUTMENT REINFORCEMENT QUANTITIES.
4. SEE CONCRETE PLACEMENT QUANTITIES TABLE FOR VALUES.

NOTE:

PLUG 3"½ PVC PIPE WITH EXPANDING FOAM PRIOR TO BACKFILLING BEHIND ABUTMENTS.
ABUTMENT WING - ELEVATION VIEW

SECTION B-B
A RAIL END SECTION BARS TO BE PLACED WITH ABUTMENT WING.

NOTE:
1. USE FOR 340'-0 BRIDGES.
2. REINFORCING STEEL QUANTITY IS INCLUDED IN THE DECK AND ABUTMENT REINFORCEMENT QUANTITIES.
3. SEE CONCRETE PLACEMENT QUANTITIES TABLE FOR VALUES.

NOTE:
FIELD BEND 5h4 BAR AS NECESSARY TO AVOID FRIEZE IN ABUTMENT WING.

NOTE:
BARRELED END SECTION

NOTE:
EXPANDING FOAM PRIOR PLC 3½ PVC PIPE WITH 2" CL.

NOTE:
6 TYP. PVC PIPE LOCATION

NOTE:
SEE END SECTION DETAILS ON SHEET RS40-030-14 FOR DETAILS OF RAIL END SECTION REINFORCING BARS 6c3, 6c4, 6c5, 6c6, & 6c7. INCLUDED IN THE RAIL END SECTION.

NOTE:
FIELD BEND 5h4, 5h5, 5h6, & 5h7 BARS TO BE PLACED WITH ABUTMENT WING.

NOTE:
FIELD BEND 5h4, 5h5, 5h6, & 5h7 BARS TO BE PLACED WITH ABUTMENT WING.

NOTE:
FIELD BEND 5h4, 5h5, 5h6, & 5h7 BARS TO BE PLACED WITH ABUTMENT WING.

NOTE:
FIELD BEND 5h4, 5h5, 5h6, & 5h7 BARS TO BE PLACED WITH ABUTMENT WING.

NOTE:
FIELD BEND 5h4, 5h5, 5h6, & 5h7 BARS TO BE PLACED WITH ABUTMENT WING.

NOTE:
FIELD BEND 5h4, 5h5, 5h6, & 5h7 BARS TO BE PLACED WITH ABUTMENT WING.

NOTE:
FIELD BEND 5h4, 5h5, 5h6, & 5h7 BARS TO BE PLACED WITH ABUTMENT WING.

NOTE:
FIELD BEND 5h4, 5h5, 5h6, & 5h7 BARS TO BE PLACED WITH ABUTMENT WING.

NOTE:
FIELD BEND 5h4, 5h5, 5h6, & 5h7 BARS TO BE PLACED WITH ABUTMENT WING.

NOTE:
FIELD BEND 5h4, 5h5, 5h6, & 5h7 BARS TO BE PLACED WITH ABUTMENT WING.
CONCRETE PLACEMENT DIAGRAM SHOWING SLAB REINFORCING

REINFORCEMENT DIMENSIONS [CONCRETE PLACEMENT DIAGRAM SHOWING SLAB REINFORCING]

<table>
<thead>
<tr>
<th>SPAN LENGTHS</th>
<th>SPAN 1</th>
<th>SPAN 2</th>
<th>SPAN 3</th>
</tr>
</thead>
<tbody>
<tr>
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<td>102'-0</td>
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<tr>
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<td>276'-0</td>
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<td>282'-0</td>
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<td>288'-0</td>
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<td>300'-0</td>
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<td>306'-0</td>
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<td>312'-0</td>
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<td>318'-0</td>
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<td>324'-0</td>
<td>324'-0</td>
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<td>330'-0</td>
<td>330'-0</td>
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<td>330'-0</td>
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<td>336'-0</td>
<td>336'-0</td>
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<td>336'-0</td>
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<td>342'-0</td>
<td>342'-0</td>
<td>342'-0</td>
<td>342'-0</td>
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<tr>
<td>348'-0</td>
<td>348'-0</td>
<td>348'-0</td>
<td>348'-0</td>
</tr>
</tbody>
</table>

NOTE: CONCRETE QTYs SHALL BE LISTED ON THE SUMMARY QUANTITIES SHEET.

A CONCRETE PLACEMENT QTYs, (SUPERSTRUCTURE PLUS INTEGRAL ABUTMENTS)

<table>
<thead>
<tr>
<th>SLAB, AND AHNT CEIL NBD.</th>
<th>SECTION 1</th>
<th>SECTION 2</th>
<th>SECTION 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>80'-0</td>
<td>200'-0</td>
<td>300'-0</td>
<td>400'-0</td>
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<tr>
<td>84'-0</td>
<td>204'-0</td>
<td>304'-0</td>
<td>404'-0</td>
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<tr>
<td>88'-0</td>
<td>208'-0</td>
<td>308'-0</td>
<td>408'-0</td>
</tr>
<tr>
<td>92'-0</td>
<td>212'-0</td>
<td>312'-0</td>
<td>412'-0</td>
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<tr>
<td>96'-0</td>
<td>216'-0</td>
<td>316'-0</td>
<td>416'-0</td>
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<tr>
<td>100'-0</td>
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<td>104'-0</td>
<td>224'-0</td>
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<td>424'-0</td>
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<td>428'-0</td>
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<td>112'-0</td>
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<td>432'-0</td>
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<td>116'-0</td>
<td>236'-0</td>
<td>336'-0</td>
<td>436'-0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>200'-0</td>
<td>300'-0</td>
<td>400'-0</td>
</tr>
</tbody>
</table>

NOTE: CONCRETE QTYs SHALL BE LISTED ON THE SUMMARY QUANTITIES SHEET.

ESTIMATED QTYs (SUPERSTRUCTURE PLUS INTEGRAL ABUTMENTS)

| NUMBER OF STEEL BARS FOR TWO AUBMENTS (16 X 16) |
|-----------------|-----------|-----------|-----------|
| LE F16 (SPL. R 16) | LE F16 (SPL. R 16) | LE F16 (SPL. R 16) | LE F16 (SPL. R 16) |

NOTE: CONCRETE QTYs SHALL BE LISTED ON THE SUMMARY QUANTITIES SHEET.

CONCRETE PLACEMENT DIAGRAM SHOWING SLAB REINFORCING

- Reinforcement dimensions are detailed with specific spacing and direction for each section.
- Estimated quantities are listed for slabs, sections, and abutments, including steel bars and reinforcement details.
- The diagram shows the placement of construction joints and transverse slab construction joints.
- Notes indicate the importance of accurate placement and alignment to maintain structural integrity.

This page is part of a comprehensive engineering document, likely used for the construction of bridges, detailing the placement of concrete and reinforcement for structural integrity and durability.
CONCRETE PLACEMENT DIAGRAM SHOWING SLAB REINFORCING

REINFORCEMENT DIMENSIONS

<table>
<thead>
<tr>
<th>Slab, Section 2</th>
<th>Abutment Wings</th>
<th>Two Abutment Footings</th>
<th>Slab, and Abut Diaphragm, Section 1 &amp; 3</th>
<th>Slab, Section 4 &amp; 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimate Qtys.</td>
<td>Estimate Qtys</td>
<td>Estimate Qtys</td>
<td>Estimate Qtys</td>
<td>Estimate Qtys</td>
</tr>
<tr>
<td>~Concrete Place</td>
<td>~Concrete Place</td>
<td>~Concrete Place</td>
<td>~Concrete Place</td>
<td>~Concrete Place</td>
</tr>
<tr>
<td>~Z (<code>SPACES</code>)</td>
<td>~Z (<code>SPACES</code>)</td>
<td>~Z (<code>SPACES</code>)</td>
<td>~Z (<code>SPACES</code>)</td>
<td>~Z (<code>SPACES</code>)</td>
</tr>
<tr>
<td>Y (<code>IN.</code>)</td>
<td>Y (<code>IN.</code>)</td>
<td>Y (<code>IN.</code>)</td>
<td>Y (<code>IN.</code>)</td>
<td>Y (<code>IN.</code>)</td>
</tr>
</tbody>
</table>

CONCRETE QUANTITIES SHEET IN THE BRIDGE PLANS.

FOR QUANTITIES OF STRUCTURAL STEEL AND STRENGTH STEEL REFER TO THE SUMMARY QUANTITIES SHEET IN THE BRIDGE PLANS.

NOTE:

1. CONCRETE DECK SHALL BE PLACED IN SECTIONS AND SEQUENCES INDICATED. ALTERNATE PROCEDURES FOR PLACING DECK CONCRETE MAY BE SUBMITTED FOR APPROVAL TOGETHER WITH A STATEMENT OF THE PROPOSED METHOD AND EVIDENCE THAT THE CONTRACTOR POSSESSES THE NECESSARY EQUIPMENT AND FACILITIES TO ACCOMPLISH THE REQUIRED RESULTS. FOR APPROVED ALTERNATE PROCEDURES THE ENGINEER SHALL DETERMINE IF A RETARDING ADMIXTURE IS REQUIRED TO MAINTAIN PLASTICITY OF THE CONCRETE DECK DURING PLACEMENT.

END OF SLAB REINFORCING

(TYPICAL EACH END OF DECK)
CONCRETE PLACEMENT DIAGRAM SHOWING SLAB REINFORCING  

**REINFORCEMENT DIMENSIONS**  

<table>
<thead>
<tr>
<th>L#</th>
<th>BF</th>
<th>CY</th>
<th>LF</th>
<th>CF</th>
<th>CY</th>
<th>LF</th>
<th>CF</th>
<th>CY</th>
<th>LF</th>
<th>CF</th>
<th>CY</th>
<th>LF</th>
<th>CF</th>
<th>CY</th>
<th>LF</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>214</td>
<td>234</td>
<td>272</td>
<td>272</td>
<td>288</td>
<td>288</td>
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<td>292</td>
<td>288</td>
<td>288</td>
<td>272</td>
<td>272</td>
<td>214</td>
</tr>
</tbody>
</table>

**Notes:**  
- Concrete near slab shall be placed in sections and sequences indicated. 
- Alternate procedures for placing slab concrete may be submitted for approval together with a statement of the proposed method and evidence that the contractor possesses the necessary equipment and facilities to accomplish the required results. 
- Alternate procedures for the engineer shall determine if a retarding admixture is required to maintain plasticity of the concrete mix during placement.

**END OF SLAB REINFORCING**  

(TYPICAL EACH END OF DECK)
CONCRETE PLACEMENT DIAGRAM SHOWING SLAB REINFORCING (RIGHT HAND SHEET SHOWN, LEFT HAND SHEET SIMILAR)

REINFORCEMENT DIMENSIONS

<table>
<thead>
<tr>
<th>X (FT.-IN.)</th>
<th>Y (IN.)</th>
<th>Z (SPACES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td><code>ABUTMENT BEARINGS</code></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td><code>PREBORED HOLES</code></td>
</tr>
</tbody>
</table>

NOTE:

A CONCRETE (DNC) SHALL BE PLACED IN SECTIONS AND SEQUENCES INDICATED.

LONGITUDINAL SLAB CONSTRUCTION JOINT

BEVELED 1"x3" NAILS TO HEAD

TOP OF DECK

TRANVERSE SLAB CONSTRUCTION JOINT

BEVELED 1"x3" NAILS TO HEAD

TOP OF DECK

NOTE:

FOR QUANTITIES OF STRUCTURAL CONCRETE REINFORCING STEEL AND STRUCTURAL STEEL REFER TO THE SUMMARY QUANTITIES SHEET IN THE DECK PLAN.
BROKENHIT  2018   Y:\MyDocuments\BROKENHIT\Images\33\3312.pdf  October 2018

## Bridge Length

<table>
<thead>
<tr>
<th>Type</th>
<th>Length</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>5B1 Slab Transfer, Top &amp; Bottom</td>
<td>448</td>
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</tr>
<tr>
<td>5B2 Slab Longitudinal, Top &amp; Bottom</td>
<td>485</td>
<td></td>
</tr>
<tr>
<td>5G2 Abutment Extension, Longitudinal</td>
<td>485</td>
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</tr>
<tr>
<td>5G3 Abutment Extension, Longitudinal + E</td>
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<td>5G4 Abutment Extension, Longitudinal - E</td>
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<td>5G5 Abutment Extension, Longitudinal - X</td>
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<td>5G6 Abutment Extension, Longitudinal - X</td>
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</table>

## Bent Bar Details

### Note
- All dimensions are cut to size or per dimension.
- The reinforcing steel quantity is to be included on the summary quantities sheet in the plan.
## Epoxy Coated Reinforcing Bar List

### Dimensions

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>Slab Transfer 3-Span Bottom</td>
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<td>28'-0</td>
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<td>28'-0</td>
<td></td>
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<tr>
<td>Slab Transfer 3-Span Top</td>
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<tr>
<td>Slab Transfer 3-Span Bottom</td>
<td>93</td>
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</tbody>
</table>

**NOTE: ALL DIMENSIONS ARE OUT TO OUT.**

## B.E.N.T. Bar Details

### Epoxy Coating

- Slab Transfer 3-Span Bottom
- Slab Transfer 3-Span Top
- Slab Transfer 3-Span Bottom

### Shape

- 93
- 28'-0
- 28'-0
- 28'-0
- 28'-0
- 28'-0
- 28'-0
- 28'-0
- 28'-0
- 28'-0
- 28'-0
- 28'-0
- 28'-0
- 28'-0
- 28'-0
- 28'-0
- 28'-0

## Bridge Length

### Standard Design - 40' Roadway, 3 Span Bridges

**NOTE:** The reinforcing steel quantity is to be included on the summary quantities sheet in the "FL."
### EPOXY COATED REINFORCING BAR LIST

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<th>160°</th>
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<th>200°</th>
<th>220°</th>
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<th>280°</th>
<th>300°</th>
<th>320°</th>
<th>340°</th>
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<tr>
<td>Flat</td>
<td>34 136</td>
<td>69 136</td>
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<tr>
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<tr>
<td>Z Flat</td>
<td>34 136</td>
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<td>SS Z Flat</td>
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<tr>
<td>Flat Tip</td>
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<td>SS Z Flat Tip</td>
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</tbody>
</table>

### BRIDGE LENGTH

- **WEIGHT**
  - 126,258
  - 54,643
  - 46,040
  - 45,704
  - 44,400
  - 43,400
- **LOCATION**
  - 300'-0
- **LENGTH**
  - 97,529

### BENT BAR DETAILS

**RS40-038-14**

**Highway Division**

**REINFORCEMENT 20° SKEW**

**Deck and Abutment Reinforcement**

**Rolled Steel Beam Bridges**

**October, 2014**

**NOTES:**
- All dimensions are out to cutline.
- Bars are for diameters 6-8.
- Epoxy coating not required.
- Epoxy coating not included.

**Standard Design - 40' sidewalks, 3 span bridges**

**Epoxy Coated Steel Bar List**

**Standard**

- 5d5
- 5d8
- 5d6, 8T1
- 8f5, 8f4, 8f5
- 8g3
- 4T1
- 4T2
- 4T3
- 4f1

**Note:** The reinforcing steel quantity is to be included on the summary quantities sheet in the plan.
## EPOXY COATED REINFORCING BAR LIST

<table>
<thead>
<tr>
<th>BAR</th>
<th>LOCATION</th>
<th>DIA.</th>
<th>LENGTH</th>
<th>BAR</th>
<th>LOCATION</th>
<th>DIA.</th>
<th>LENGTH</th>
<th>BAR</th>
<th>LOCATION</th>
<th>DIA.</th>
<th>LENGTH</th>
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</thead>
<tbody>
<tr>
<td>H1</td>
<td>SLAB TRANSVERSE &amp; BOTTOM</td>
<td>1/2</td>
<td>8'</td>
<td>H1</td>
<td>SLAB TRANSVERSE &amp; TOP</td>
<td>1/2</td>
<td>8'</td>
<td>H1</td>
<td>ABUTMENT</td>
<td>3/8</td>
<td>6'</td>
</tr>
<tr>
<td>H2</td>
<td>VARIOUS</td>
<td>3/8</td>
<td>6'</td>
<td>H2</td>
<td>VARIOUS</td>
<td>3/8</td>
<td>6'</td>
<td>H2</td>
<td>VARIOUS</td>
<td>3/8</td>
<td>6'</td>
</tr>
<tr>
<td>H3</td>
<td>VARIOUS</td>
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<td>H3</td>
<td>VARIOUS</td>
<td>3/8</td>
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<td>H3</td>
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<td>H4</td>
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<td>6'</td>
<td>H4</td>
<td>VARIOUS</td>
<td>3/8</td>
<td>6'</td>
<td>H4</td>
<td>ANCHORAGE</td>
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<td>6'</td>
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### BRIDGE LENGTH

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<th>NO.</th>
<th>LOCATION</th>
<th>LENGTH</th>
<th>LENGTH</th>
<th>LENGTH</th>
<th>LENGTH</th>
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</thead>
<tbody>
<tr>
<td>300'</td>
<td>104,743</td>
<td>117,665</td>
<td>340'</td>
<td>89,058</td>
<td>220'</td>
<td>260'</td>
<td>240'</td>
</tr>
</tbody>
</table>

- **EPOXY COATING NOT REQUIRED**
- **BARRIER RAIL REINFORCING NOT INCLUDED**

### BENT BAR DETAILS

- **NOTE:** ALL DIMENSIONS ARE OUT TOagna, 2D FOR DIAMETER.

### ROLLED STEEL BEAM BRIDGES

- **STANDARD DESIGN:** 40' MIDSPAN, 3 SPAN BRIDGES
- **DECK AND ABUTMENT REINFORCEMENT 30° SKY**

#### ROLLED STEEL BEAM BRIDGES

- **RS40-039-14**

---

*The table and diagrams represent detailed specifications for the bridge, including dimensions, materials, and reinforcement types.*
<table>
<thead>
<tr>
<th>EPOXY COATED REINFORCING BAR LIST</th>
<th>BRIDGE LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>100'-0</strong></td>
</tr>
<tr>
<td><strong>S/C LONGITUDINAL TOP &amp; BOTTOM</strong></td>
<td>4d</td>
</tr>
<tr>
<td><strong>S/C TRANSVERSE LONGITUDINAL &amp; BOTTOM</strong></td>
<td>4d</td>
</tr>
<tr>
<td><strong>S/C TRANSVERSE TOP &amp; BOTTOM</strong></td>
<td>4d</td>
</tr>
<tr>
<td><strong>BENT BABE DETAILED</strong></td>
<td>![Diagram of bent bar details]</td>
</tr>
</tbody>
</table>

**NOTES:**
- All dimensions are cut to full 24" for diamond.
- Highway Division.

**STANDARD DESIGN - 40° SKEW A/B, 3 SPAN BRIDGE**

**ROLLED STEEL BEAM BRIDGES**

**DECK AND ABUTMENT REINFORCEMENT 45° SKEW**

**RS40-040-14**
45° SKewed Framing Plan

NOTE:
Dimensions shown apply at intersection of E. Ext. Beam and E. Diaphragm

68'-0 44'-0 68'-0 14'-0 14'-0 54'-0

5 SPAN @ 7'-4\(\text{"} (-) = 37'-0\)

SEE NOTE
45° SKewed Framing Plan

Note: Dimensions shown apply at intersection of E. Ext., beam and E. diaphragm.

- 1" = 1'-0"
- 1/2" = 6'-0"
- 1/4" = 12'-0"
- 1/8" = 24'-0"

45° Skewed Framing Plan
(R.A. shown, L.A. similar)
0° SKEW FRAMING PLAN

SKEWED FRAMING PLAN

NOTE:

- Dimensions shown apply at intersection of each beam and diaphragm.
- R.A. shown, L.A. similar.
- See note for additional details.
45° SKewed Framing Plan
(R.A. Shown, L.A. Similar)

NOTE: DIMENSIONS SHOWN APPLY AT INTERSECTION OF #1 EXT.
BEAM AND #2 DIAPHRAGM

SKEW

OF BEAMS

DIAPHRAGM

RS40-048-14

Rolled Steel Beam Bridges
October, 2014

Framing Plan
220′-0 Bridge

IOWADOT
Highway Division
45° SKewed Framing Plan

Beam 1
Beam 2
Beam 3
Beam 4
Beam 5
Beam 6

91'-0
58'-0
H'-0
58'-0
H'-0
91'-0

96'-0
72'-0
240'-0

5 S P A @ 7'-4" = 37'-0

NOTE:
DIMENSIONS SHOWN APPLY AT INTERSECTION OF E EXT.
BEAM AND E DIAPHRAGM

See Note
0° SKewed Framing Plan

SKewed Framing Plan

NOTE: Dimensions shown apply at intersection of E. Ext. Beam and E. Diaphragm.
45° SKEWED FRAMING PLAN
(R.L. SHOWN, L.A. SIMILAR)

NOTE:
DIMENSIONS SHOWN APPLY
AT INTERSECTION OF E. EXT.
BEAM AND E. DIAPHRAGM

E OF BEAMS

DIAPHRAGM

HIGHWAY.BRIDGE/STANDARDS/BRIDGES/RS40-14.dgn   RS40-052-14   11x17_pdf.pltcfg
0° SKewed Framing Plan

- Beam 1
- Beam 2
- Beam 3
- Beam 4
- Beam 5
- Beam 6

- Pier 1
- Pier 2

- Bolted splice

- ABUTMENT BEARING

- DIAPHRAGM

- Pier 1
- Pier 2

- See Note

- Roller Steel Beam Bridges

- IOWA DOT
  Highway Division

- Standard Design - 40' Roadway, 3 Span Bridges

- Latest Revision Date

- Approved by Bridge Engineer

- October, 2014
45° SKEWED FRAMING PLAN
(RA SHOWN, LA SIMILAR)

NOTE: DIMENSIONS SHOWN APPLY AT INTERSECTION OF EA. EXCEPT BEAM AND DIAPHRAGM.

SKEW

NOTE: SPF USED FOR BEAMS.

45° SKEWED FRAMING PLAN
(R.A. SHOWN, L.A. SIMILAR)
45° SKewed FRAMING PLAN
(H.A. SHOWN, L.A. VIEW)

NOTE:
DIMENSIONS SHOWN APPLY AT INTERSECTION OF E. EXT. BEAM AND E. DIAPHRAGM

SKEW
0

45° 0 (FR-N)

E. DIAPHRAGM

RS40-058-14

320'-0 BRIDGE

IOWA DOT
Highway Division

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

ROLLED STEEL BEAM BRIDGES

OCTOBER, 2014

FRAMING PLAN
320'-0 BRIDGE

RS40-058-14

REvised 08-2018 - UPDATE Bridge Engineer Signature.
DEAD LOAD DEFLECTION DIAGRAM

NOTES:
1. ENCIRCLED NUMBERS INDICATE ANTICIPATED DEFLECTION DUE TO CONCRETE ONLY.
2. DEFLECTIONS ARE IN INCHES.

NAME
LOAD
TOTAL
POSITIVE MOMENT
EXTERIOR
INTERIOR
NEGATIVE MOMENT
EXTERIOR
INTERIOR
MOMENT AND REACTION TABLE

LOAD NAME
LOAD - k/ft
DC1
DC2
DW

DC1
0.15
0.15
0.635
0.772

DC2
0.15
0.15
0.681
0.681

DW
0.14
0.14
0.74*

LOAD - kips
DC1
DC2
DW

DC1
0.695
-339
39
38

DC2
0.699
-699
36
35

DW
0.82
-577
25
24

MOMENTS AND REACTIONS SHOWN ARE UNFACTORED.
MOMENT AND REACTION VALUES DO INCLUDE GIRDER WEIGHT.
* LOAD VALUES DO NOT INCLUDE GIRDER WEIGHT.
MOMENTS AND REACTIONS SHOWN ARE FACTURATED.

OCTOBER, 2014

ROLLED STEEL BEAM BRIDGES

HIGHWAY DIVISION

RS40-061-14

BEAM DEFLECTIONS
160'-0 BRIDGE

IOWA DOT

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES
DEAD LOAD DEFLECTION DIAGRAM

NOTES:
1. ENCLOSED NUMBERS INDICATE ANTICIPATED DEFLECTION DUE TO CONCRETE ONLY.
2. DEFLECTIONS ARE IN INCHES.

MOMENT AND REACTION TABLE

<table>
<thead>
<tr>
<th>LOAD NAME</th>
<th>LOAD - k/ft</th>
<th>POSITIVE MOMENT</th>
<th>NEGATIVE MOMENT</th>
<th>REACTION</th>
</tr>
</thead>
</table>
|           | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERIOR | EXTERIOR | INTERI
DEAD LOAD DEFLECTION DIAGRAM

NOTES:
1. ENCIRCLED NUMBERS INDICATE ANTICIPATED DEFLECTION DUE TO CONCRETE ONLY.
2. DEFLECTIONS ARE IN INCHES.

MOMENT AND REACTION TABLE

<table>
<thead>
<tr>
<th>LOAD NAME</th>
<th>LOAD - k/ft</th>
<th>LARGE END SPAN</th>
<th>DECK CENTER SPAN</th>
<th>LARGE END</th>
<th>DECK CENTER</th>
<th>ABUTMENT BEARINGS</th>
<th>PIER 1</th>
<th>PIER 2</th>
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<tbody>
<tr>
<td>D1</td>
<td>0.74</td>
<td>0.14</td>
<td>0.08</td>
<td>0.04</td>
<td>-</td>
<td>0.14</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>D2</td>
<td>0.14</td>
<td>0.41</td>
<td>0.36</td>
<td>0.31</td>
<td>-</td>
<td>0.36</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>DW</td>
<td>0.03</td>
<td>0.03</td>
<td>0.03</td>
<td>0.03</td>
<td>-</td>
<td>0.03</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

* LOAD VALUES DO NOT INCLUDE GIRDER WEIGHT. MOMENT AND REACTION VALUES DO INCLUDE GIRDER WEIGHT. MOMENTS AND REACTIONS SHOWN ARE UNFACTORED.
DEAD LOAD DEFLECTION DIAGRAM

NOTES:
1. ENCIRCLED NUMBERS INDICATE ANTICIPATED DEFLECTION DUE TO CONCRETE ONLY.
2. DEFLECTIONS ARE IN INCHES.

DEFLECTIONS ARE IN INCHES.
DEFLECTION DUE TO CONCRETE ONLY.

TOTAL MOMENTS AND REACTIONS SHOWN ARE UNFACTORED.
MOMENT AND REACTION VALUES DO INCLUDE GIRDER WEIGHT.
LOAD VALUES DO NOT INCLUDE GIRDER WEIGHT.

MOMENTS AND REACTIONS SHOWN ARE UNFACTORED.
DEAD LOAD DEFLECTION DIAGRAM

NOTES:
1. ENCIRCLED NUMBERS INDICATE ANTICIPATED DEFLECTION DUE TO CONCRETE ONLY.
2. DEFLECTIONS ARE IN INCHES.

MOMENTS AND REACTION TABLE

<table>
<thead>
<tr>
<th>LOAD NAME</th>
<th>LOAD - k/ft</th>
<th>MOMENT - ft-kips</th>
<th>REACTION - kips</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>INTERIOR</td>
<td>EXTERIOR</td>
</tr>
<tr>
<td>DC1</td>
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<td>0.14</td>
<td>0.32</td>
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<tr>
<td>DC2</td>
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<td>0.53</td>
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<td>DW</td>
<td>0.15</td>
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LOAD VALUES DO NOT INCLUDE GIRDER WEIGHT.
MOMENT AND REACTION VALUES DO INCLUDE GIRDER WEIGHT.

NOTE: MOMENTS AND REACTIONS SHOWN ARE UNFACTORED.
MOMENT AND REACTION TABLE

<table>
<thead>
<tr>
<th>LOAD - k/ft</th>
<th>MOMENT - foot-kips</th>
<th>REACTION - kips</th>
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</thead>
<tbody>
<tr>
<td>EXTERIOR</td>
<td>INTERIOR</td>
<td>EXTERIOR</td>
</tr>
<tr>
<td>0.4 PT. END SPAN</td>
<td></td>
<td>0.14</td>
</tr>
<tr>
<td>0.14</td>
<td>0.5 PT. CENTER SPAN</td>
<td>0.15</td>
</tr>
</tbody>
</table>

NAME

LOAD

DC1

DC2

DW

HL-93

+IMPACT

LIVE

DISTRIBUTION FACTOR

0.15

0.15

0.618

0.772

0.681

0.681

2021

-1004

114

109

794

1940

-870

113

109

848

-1391

86

83

411

-1163

62

60

362

-1053

63

60

385

2021

-1004

114

109

794

1940

-870

113

109

848

-1391

86

83

411

-1163

62

60

362

-1053

63

60

385

263x661
DEAD LOAD DEFLECTION DIAGRAM

NOTES:
1. ENCIRCLED NUMBERS INDICATE ANTICIPATED DEFLECTION DUE TO CONCRETE ONLY.
2. DEFLECTIONS ARE IN INCHES.

MOMENTS AND REACTION TABLE

<table>
<thead>
<tr>
<th>LOAD NAME</th>
<th>LOAD - k/ft</th>
<th>POSITIVE MOMENT</th>
<th>NEGATIVE MOMENT</th>
<th>REACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>EXTERIOR INTERIOR</td>
<td>EXTERIOR INTERIOR</td>
<td>EXTERIOR INTERIOR</td>
</tr>
<tr>
<td>D3</td>
<td>0.14k</td>
<td>0.32k</td>
<td>0.12k</td>
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<td>D5</td>
<td>0.15k</td>
<td>0.30k</td>
<td>0.12k</td>
<td>0.27k</td>
</tr>
</tbody>
</table>

* LOAD VALUES DO NOT INCLUDE GIRDER WEIGHT, MOMENTS AND REACTIONS SHOWN ARE UNFACTORED.

MOMENTS AND REACTIONS SHOWN ARE UNFACTORED.

ROLLING STEEL BEAM BRIDGES
STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES
OCTOBER, 2014

HIGHWAY DIVISION

RS40-068-14
REVIEWED
10/22/18
APPROVED
10/24/18
RS40-14
REvised 08-2018 - UPDATED BRIDGE ENGINEER SIGNATURE

RS40-068-14
10/22/18
APPROVED
10/24/18
RS40-14
REViewed
10/22/18
RS40-14
REvised 08-2018 - UPDATED BRIDGE ENGINEER SIGNATURE
DEAD LOAD DEFLECTION DIAGRAM

NOTES:
1. ENCIRCLED NUMBERS INDICATE ANTICIPATED DEFLECTION DUE TO CONCRETE ONLY.
2. DEFLECTIONS ARE IN INCHES.

MOMENTS AND REACTION TABLE

<table>
<thead>
<tr>
<th>LOAD NAME</th>
<th>LOAD - k/ft</th>
<th>POSITIVE MOMENT</th>
<th>REACTIVE MOMENT</th>
<th>REACTION</th>
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<tbody>
<tr>
<td></td>
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<td>INTERIOR</td>
<td>EXTERIOR</td>
<td>INTERIOR</td>
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<td>0.44</td>
<td>0.59</td>
<td>0.64</td>
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<tr>
<td>0.15 PT. CENTER SPAN</td>
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<td>0.28</td>
<td>0.42</td>
<td>0.56</td>
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<tr>
<td>0.72* LOAD</td>
<td>0.14</td>
<td>0.28</td>
<td>0.42</td>
<td>0.56</td>
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<tr>
<td>0.77* LOAD</td>
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<td>0.56</td>
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</table>

* LOAD VALUES DO NOT INCLUDE GIRDER WEIGHT. MOMENTS AND REACTIONS SHOWN ARE UNFACTORED.
### MOMENT AND REACTION TABLE

<table>
<thead>
<tr>
<th>LOAD NAME</th>
<th>LOAD - k/ft</th>
<th>MOMENT - foot-kips</th>
<th>REACTION - kips</th>
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<tr>
<td></td>
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<td>EXTERIOR</td>
</tr>
<tr>
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</tr>
<tr>
<td>DW</td>
<td>0.45</td>
<td>0.57</td>
<td>0.45</td>
</tr>
</tbody>
</table>

### Notes
- ENCIRCLED NUMBERS INDICATE ANTICIPATED DEFLECTION DUE TO CONCRETE ONLY.
- DEFLECTIONS ARE IN INCHES.

### DEFLECTIONS

- MOMENTS AND REACTIONS SHOWN ARE UNFACTORED.
- MOMENT AND REACTION VALUES DO INCLUDE GIRDER WEIGHT.
- LOAD VALUES DO NOT INCLUDE GIRDER WEIGHT.

### BEAM DEFLECTIONS
- 340'-0 BRIDGE

---

**Highway Division**

**Standard Design - 40’ Roadway, 3 Span Bridges**

**Rolled Steel Beam Bridges**

**October, 2014**

---

**RS40-070-14**
SHEAR STUD DETAILS

NOTE: ALL STUDS TO BE 3/4" HIGH FOR ABUTMENT SHEAR BARS

Beams and Piers

W30 x 99

Beams Elevation

Beam Plan and Elevation

160'-0 Bridge

RS40-071-14

Iowa DOT
Highway Division

Negative Moment Region
Top Flange Tension
3'-3
38 Spa. @ 11 = 34'-10
4 Spa. @ 1'-10 = 7'-4
W30 x 99

Positive Moment Region
Top Flange Tension
1'-0
W30 x 99

Bowled Splice

Symmetrical about Beam

W30 x 99

Shear Stud Details

3 Studs Per Row

3 Studs Per Row

Structural Steel

Table Corresponding to the Zones Listed on This Sheet. Stud Heights Can be Identified by the Designer in a Table Corresponding to the Zones Listed on This Sheet. Stud Heights (3", 4" or 5") for the Locations Shown Shall Be Determined by the Designer on 'Miscellaneous Details, 160'-0 Bridge Sheet'.

Shear Stud Spacing

Notes: Structural Steel Weight Is Included on the Summary Quantities Sheet.

3 Studs Per Row

Notes: Structural Steel Weight Is Included on the Summary Quantities Sheet.

Structural Steel

Shear Weight
15,339 Lbs.
3 STUDS PER ROW

SHEAR STUD DETAILS

NOTE: ALL STUDS TO BE 3/8""

ABUTMENT DIAPHRAGMS

| 1½" HOLES FOR ABUTMENT DIAPHRAGM BARS |

BEAM ELEVATION

| 132 STUDS - ZONE A |
| 24 STUDS - ZONE B |
| 48 STUDS - ZONE C |
| 48 STUDS - ZONE D |

SHEAR STUD SPACING

| 3 STUds PER ROW |

STUD HEIGHTS CAN BE IDENTIFIED BY THE DESIGNER IN A TABLE CORRESPONDING TO THE ZONES LISTED ON THIS SHEET.

NOTES: STRUCTURAL STEEL WEIGHT (21,740 LBS.) IS INCLUDED ON THE SUMMARY QUANTITIES SHEET.

NOTE: STUD HEIGHTS (3¼", 4" OR 5") FOR THE LOCATIONS SHEAR STUD TABLE SHALL BE DETERMINED BY THE DESIGNER. STUD HEIGHTS CAN BE IDENTIFIED BY THE DESIGNER IN A TABLE CORRESPONDING TO THE ZONES LISTED ON THIS SHEET.

PHASE 02-2017 - CHANGED NOTE STATING "MISCELLANEOUS DETAILS 180' BRIDGE" (WAS 160' IN ERROR).

PHASE 08-2018 - UPDATED BRIDGE ENGINEER SIGNATURE.

HIGHWAY BRIDGE STANDARD - 40' ROADWAY, 3 SPAN BRIDGES

LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

OCTOBER, 2014

Highway Division

REVISIONS:

- SHEAR STUD TABLE SHALL BE DETERMINED BY THE DESIGNER. STUD HEIGHTS CAN BE IDENTIFIED BY THE DESIGNER IN A TABLE CORRESPONDING TO THE ZONES LISTED ON THIS SHEET.

- PHASE 02-2017 - CHANGED NOTE STATING "MISCELLANEOUS DETAILS 180' BRIDGE" (WAS 160' IN ERROR).

- PHASE 08-2018 - UPDATED BRIDGE ENGINEER SIGNATURE.

- HIGHWAY BRIDGE STANDARD - 40' ROADWAY, 3 SPAN BRIDGES.

- LATEST REVISION DATE.

- APPROVED BY BRIDGE ENGINEER.

- OCTOBER, 2014.

- HIGHWAY DIVISION.

- STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES.

- ROLLED STEEL BEAM BRIDGES.

- OCTOBER, 2014.

- RS40-072-14.
3 STUDS PER ROW

BEAM ELEVATION

SHEAR STUD SPACING

SHEAR STUD DETAILS

NOTES:

1. All stud heights to be 3" unless otherwise noted.

2. Shear stud details are included on the summary quantities sheet.

3. Positive moment region: bottom flange tension
   - 43'-6" (RS40 x 141)
   - 48'-0" (RS40 x 118)

4. Negative moment region: top flange tension
   - 33'-0" (RS40 x 141)
   - 200'-0" (Rolled Steel Beam)

5. Studs are spaced as follows:
   - Zone A: 8 studs at 3'-9" intervals
   - Zone B: 27 studs at 1'-0" intervals
   - Zone C: 7 studs at 10" intervals


7. MISC. DETAILS - STANDARDS ARE NOT INCLUDED, SEE TABLE CORRESPONDING TO THE ZONES LISTED ON THIS SHEET.

8. STUD HEIGHTS CAN BE IDENTIFIED BY THE DESIGNER IN A TABLE CORRESPONDING TO THE ZONE LINES ON THIS SHEET.

9. Note stud heights (3", 4", or 5") for the locations shown.

10. Positive moment region: bottom flange tension
    - 28 studs at 3'-9" intervals
    - 34 studs at 11'-6" intervals
    - 9 studs at 11" intervals

11. Negative moment region: top flange tension
    - 60 studs at 3'-9" intervals
    - 200'-0" (Rolled Steel Beam)

12. Design Engineer: Standard Design - 40' roadway, 3 span bridges
    - Latest revision date: October, 2014
    - Approved by Bridge Engineer

13. ODOT Roll No. 08-2018

14. Project No. RS40-073-14

15. Highway Division

16. DOT ID: 08-2018

17. Bridge Engineer: Standard Design - 40' roadway, 3 span bridges

18. Rolling Steel Beam Bridges

19. October, 2014

20. Contract: Highway Bridges
**BEAM ELEVATION**

**SHEAR STUD SPACING**

- **Note:** Shear stud heights (3", 4", or 5") for the locations shown are identified by the designer in a table corresponding to the zones listed on this sheet.

- **Notes:** Structural steel weights are not included in the table. Shear stud details and standards are shown to scale.

- **Structural Steel:**
  - Beam Weight:
    - 14,000 lbs.
  - Studs per row:
    - 3 studs per row

**Summary Quantities Sheet:**

- **Shear Stud Details:**
  - 3 studs per row
  - Note all studs to be 2"

**Shear Stud Heights:**

- **Positive Moment Region:**
  - Bottom Flange Tension
  - Top Flange Tension

- **Negative Moment Region:**
  - Bottom Flange Tension

**Notes:**

- **Structural Steel Weight:** 14,000 lbs.
- **Miscellaneous Details:** Standards are not included, see weight of shear studs.
**Shear Stud Details**

**Shear Stud Spacing**

**Beam Elevation**

**Note:** All studs to be 3/4".

**Structural Steel**

<table>
<thead>
<tr>
<th>Beam Height</th>
<th>A131, Grade 50, L80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>45&quot; (1143 mm)</td>
</tr>
</tbody>
</table>

**Shear Stud on Splice Plate Details**

- 2 studs per row
- 3 studs per row

**Shear Stud Details**

- 3/4" Studs

**Summary Quantities Sheet**

- Structural Steel Weight: 43,166 lbs.
- Miscellaneous Details - Standards are not included, see "Weight of Shear Studs" and "Beam Weight".

**Recommended Notes**

- Stud heights (3", 4" or 5") for the locations shown shall be determined by the designer.
- Shear Stud on Splice Plate Details are included on the summary quantities sheet.

**Suggested Changes**

- "Miscellaneous Details 240'-0 Bridge" (was 160'-0 in error).
- Revised 02-2017 - Added 4 Shear Studs at "Centerline of Bolted Splice...".
SHEAR STUD DETAILS

SHEAR STUD SPACING

BEAM ELEVATION

NOTE: ALL STUDS TO BE 1 1/2"
SHEAR STUD DETAILS

NOTES:
- All studs to be 2 1/2".

BEAM ELEVATION

SHEAR STUD SPACING

*NOTE: Stud heights (3", 4" or 5") for the locations shown shall be determined by the designer.

In miscellaneous details, 320'-0 bridge sheet, stud heights can be identified by the designer in a table corresponding to the ones listed on this sheet.

SHEAR STUD ON SPlice PLATE DETAILS

**NOTE: Structural steel height includes details on the summary quantities sheet.

**NOTE: All studs to be 2 1/2".
**BEAM ELEVATION**

**SHEAR STUD SPACING**

- **3 STUDS PER ROW**
  - **52 STUDS - ZONE A**
  - **50 STUDS - ZONE B**
  - **36 STUDS - ZONE C**
  - **219 STUDS - ZONE D**

**NOTE:** ALL STUDS TO BE 3/8" LONG

**BEAM PLAN AND ELEVATION**

**340'-0 BRIDGE**

**RS40-080-14**

**HIGHWAY BRIDGE STANDARDS**

**ROLLIED STEEL BEAM BRIDGES**

**OCTOBER, 2014**

**Standard Design - 40' Roadway, 3 Span Bridges**

**NOTE:** SHEAR STUDS ARE NOT INCLUDED; SEE MISC. DETAILS - STANDARDS SHEET FOR SHEAR STUD DETAILS.

**NOTICE: STRUCTURAL STEEL HEIGHTS ARE IDENTIFIED IN THE SUMMARY QUANTITIES SHEET, WHERE APPROPRIATE.**

**NOTE:** ALL STUDS TO BE 3/8" LONG.

**IOWA DOT**

**Highway Division**
**Standard Design - 40' Roadway, 3 Span Bridges**

**Rolled Steel Beam Bridges**

**October, 2014**

**Diaphragm Details**

**RS40-081-14**

---

**Diaphragm Options**

**Diaphragm Member Options**

<table>
<thead>
<tr>
<th>Diaphragm Location</th>
<th>Beam Size</th>
<th>Rolled Steel Option</th>
<th>Bent Plate Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERMEDIATE</td>
<td>W21x50</td>
<td>2&quot; - 3&quot;</td>
<td>2&quot; - 3&quot;</td>
</tr>
<tr>
<td>INTERMEDIATE</td>
<td>W24x62</td>
<td>2&quot; - 3&quot;</td>
<td>2&quot; - 3&quot;</td>
</tr>
<tr>
<td>PIER</td>
<td>W30x60</td>
<td>2&quot; - 3&quot;</td>
<td>2&quot; - 3&quot;</td>
</tr>
<tr>
<td>PIER</td>
<td>W44x92</td>
<td>2&quot; - 3&quot;</td>
<td>2&quot; - 3&quot;</td>
</tr>
</tbody>
</table>

---

**Notes:**

1. Either rolled shape or bent plate diaphragm option may be selected at contractor's option.
2. Clip plates of W24 and W24 diaphragms at connection plates, use of a 12" diag. plate shall be in contact with connection plate for full height of diaphragm.
**Diaphragm Weights (Except in LOS, Includes Diaphragm, nuts, bolts, connection plates and welds)**

### 0° Skew
- **Bridge Length**: 160'-0
- **Diaphragm**:
  - Rolled Shape: 14,036 lbs.
  - Bent Plate: 14,799 lbs.
- **Summary**:
  - Top Flange at Piers: 15,284 lbs.
  - CLIP PLATE:
    - 1 ½ Vertical (TYP.)
    - 2° Horizontal (TYP.)

### 10° Skew
- **Bridge Length**: 160'-0
- **Diaphragm**:
  - Rolled Shape: 13,770 lbs.
  - Bent Plate: 14,002 lbs.
- **Summary**:
  - Top Flange at Piers: 15,002 lbs.
  - CLIP PLATE:
    - 1 ½ Vertical (TYP.)
    - 2° Horizontal (TYP.)

### 20° Skew
- **Bridge Length**: 160'-0
- **Diaphragm**:
  - Rolled Shape: 13,430 lbs.
  - Bent Plate: 13,248 lbs.
- **Summary**:
  - Top Flange at Piers: 14,480 lbs.
  - CLIP PLATE:
    - 1 ½ Vertical (TYP.)
    - 2° Horizontal (TYP.)

### 30° Skew
- **Bridge Length**: 160'-0
- **Diaphragm**:
  - Rolled Shape: 12,697 lbs.
  - Bent Plate: 12,463 lbs.
- **Summary**:
  - Top Flange at Piers: 15,407 lbs.
  - CLIP PLATE:
    - 1 ½ Vertical (TYP.)
    - 2° Horizontal (TYP.)

### 45° Skew
- **Bridge Length**: 160'-0
- **Diaphragm**:
  - Rolled Shape: 12,600 lbs.
  - Bent Plate: 13,000 lbs.
- **Summary**:
  - Top Flange at Piers: 18,038 lbs.
  - CLIP PLATE:
    - 1 ½ Vertical (TYP.)
    - 2° Horizontal (TYP.)

---

**Note:** The structural steel quantity required for the appropriate bridge length and skew are to be included on the summary quantities sheet in the bridge plan. The bent plate option should be shown on the summary quantities sheet. The contractor may choose to provide rolled shape diaphragms at no additional cost.
FLANGE DEFLECTOR DETAILS

<table>
<thead>
<tr>
<th>BRIDGE LENGTH</th>
<th>WEIGHT (lbs)</th>
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<tbody>
<tr>
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<td>180'-0</td>
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<td>200'-0</td>
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<td>220'-0</td>
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<td>7.5</td>
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<td>280'-0</td>
<td>7.5</td>
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<td>300'-0</td>
<td>7.5</td>
</tr>
<tr>
<td>320'-0</td>
<td>7.6</td>
</tr>
</tbody>
</table>

Includes weight of plates, angles, bolts, nuts and washers.

NOTE:
1. Flange deflectors are required on the outside of the exterior beam location and number of flange deflectors determined by final designer.
2. Flange deflector layout is shown on the general information sheet (drawing standard sheets) in the bridge plans.
BOLTED SPLICE DETAILS

320' BEAM SPLICE
NOTE: ALL BOLTS \( \frac{1}{2} \)

<table>
<thead>
<tr>
<th>STRUCTURAL STEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ONE SPLICE</td>
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<tr>
<td>1,270 LBS.</td>
</tr>
</tbody>
</table>

340' BEAM SPLICE
NOTE: ALL BOLTS \( \frac{1}{2} \)

<table>
<thead>
<tr>
<th>STRUCTURAL STEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ONE SPLICE</td>
</tr>
<tr>
<td>1,304 LBS.</td>
</tr>
</tbody>
</table>

NOTE: STRUCTURAL STEEL WEIGHT INCLUDES WEIGHT OF SPLICE PLATES, FILL PLATES, BOLTS, NUTS AND WASHERS.

NOTE: STRUCTURAL STEEL WEIGHT IS INCLUDED ON THE SUMMARY QUANTITIES SHEET.
TABLE OF BARRIER RAIL DIMENSIONS AND NUMBERS

<table>
<thead>
<tr>
<th>BRIDGE LENGTH</th>
<th>160'-0</th>
<th>200'-0</th>
<th>240'-0</th>
<th>260'-0</th>
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<tbody>
<tr>
<td>SHEN</td>
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<td></td>
<td>330°</td>
<td>330°</td>
<td>330°</td>
<td>330°</td>
</tr>
</tbody>
</table>

BARRIER RAIL NOTES:

1. Minimum clear distance from face of concrete to near reinforcing bar is 2" unless otherwise noted or shown.
2. The permissible construction joints are to be placed between vertical bars at a minimum of 20 ft. Construction joint concrete surfaces are to be coated with an approved bond breaker.
3. Cost of the joint sealer and bond breaker shall be considered incidental to other construction.
4. All barrier rail reinforcing steel is to be included on the summary quantities sheet in the plan.
5. Barrier rail reinforcing steel is to be either epoxy-coated or stainless steel as shown or noted.
6. Concrete barrier rails placed using the slipform method shall require the use of a Class C concrete in accordance with 
   with the Standard Specifications. Class C concrete is not permitted for concrete barrier rails cast-in-place or slipformed using
   the slipform method.
7. Top of the barrier rail is to be parallel to the theoretical grade.
8. Cross-sectional area of the standard section of the barrier rail = 2.84 square feet.
9. Concrete barrier rails placed using the slipform method shall require the use of a Class C concrete in accordance with 
   the Standard Specifications. Class C concrete is not permitted for concrete barrier rails cast-in-place or slipformed using
   the slipform method.

BARRIER RAIL NOTATIONS:

- F (IN) = Min. clear distance from face of concrete to near reinforcing bar
- M (IN) = Min. clear distance from face of concrete to reinforcement steel
- I.M. = Incidental Material
- I.M. = Incidental Material
- P.C. = Poured Concrete
- S.C. = Slipped Concrete
- S.B. = Steel Bar
- S.S. = Stainless Steel
- E.P. = Epoxy-Primed
- S.E. = Stainless Steel

**PART SECTION C-C**

**ELEVATION OF BARRIER RAIL LAYOUT**

**PART PLAN VIEW**

**PART SECTION E-E**

**PART SECTION F-F**

**PART SECTION G-G**

**PART ELEVATION VIEW**

**BARRIER RAIL JOINT DETAILS**

**PART SECTION C-C**

**ELEVATION OF BARRIER RAIL LAYOUT**

**PART PLAN VIEW**

**PART SECTION E-E**

**PART SECTION F-F**

**PART SECTION G-G**

**PART ELEVATION VIEW**

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**PART SECTION C-C**

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**PART SECTION F-F**

**PART SECTION G-G**

**PART ELEVATION VIEW**

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**PART SECTION C-C**

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**PART PLAN VIEW**

**PART SECTION E-E**

**PART SECTION F-F**

**PART SECTION G-G**

**PART ELEVATION VIEW**

**BARRIER RAIL JOINT DETAILS**

**PART SECTION C-C**
BARRIER RAIL NOTES:

1. MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR-BARRIER RAIL REINFORCING BAR IS TO BE 3' UNLESS OTHERWISE NOTED ON SHEETS.
2. THE PERMISSIBLE CONSTRUCTION JOINTS ARE TO BE PLACED BETWEEN VERTICAL BARS AT A MINIMUM SPACE OF 30 FEET, CONTACT SURFACES ARE TO BE COATED WITH AN APPROVED BOND BREAKER.
3. COST OF THE BARRIER RAIL JOINT DETAILS IS TO BE INCLUDED INCIDENTAL TO OTHER CONSTRUCTION.
4. ALL BARRIER RAIL REINFORCING STEEL IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

EPOXY REINF. STEEL - TWO BARRIER RAILS

STAINLESS REINF. STEEL - TWO BARRIER RAILS

CONCRETE BARRIER RAIL QUANTITIES

CONCRETE PLACEMENT SUMMARY

TOTAL (CU. YD.)

EPOXY COATED REINFORCING STEEL TOTAL LBS.

STAINLESS STEEL REINFORCING STEEL TOTAL LBS.

ALL BARRIER RAIL REINFORCING STEEL IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

NOTE: THE REINFORCING STEEL QUANTITY IS TO BE INCLUDED INCIDENTAL TO OTHER CONSTRUCTION.

CONTACT SURFACES ARE TO BE COATED WITH AN APPROVED BOND BREAKER.

PART ELEVATION VIEW

PART PLAN VIEW

PART SECTION C-C

PART SECTION F-F

BARRIER RAIL joint DETAILS

TOP AND SIDES ("TYPICAL")

VERTICAL BARS AT A MINIMUM SPACING OF 20 FEET.

CONSTRUCTION JOINTS ARE TO BE PLACED BETWEEN

THE PERMISSIBLE CONSTRUCTION JOINTS ARE TO BE PLACED BETWEEN

VERTICAL BARS AT A MINIMUM SPACING OF 20 FEET.

CONSTRUCTION JOINTS ARE TO BE PLACED BETWEEN

HIGHWAY DIVISION

340'-0 BRIDGE

RS40-088-14

OCTOBER, 2014

BARRIER RAIL DETAILS

ROLLED STEEL BEAM BRIDGES

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

HIGHWAY BRIDGE SOFTWARE
NOTE: REINFORCING STEEL QUANTITIES ARE TO BE INCLUDED ON THE SUMMARY SHEET IN THE PLAN.

CONCRETE PLACEMENT SUMMARY

<table>
<thead>
<tr>
<th>SECTION</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>BARRIER RAIL ONE END SECTION</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

EPOXY REINFORCING STEEL - ONE END SECTION

<table>
<thead>
<tr>
<th>BAR</th>
<th>LOCATION</th>
<th>SHAPE</th>
<th>NO.</th>
<th>LENGTH</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
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<td>2'-10&quot;</td>
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<tr>
<td>6c1</td>
<td>VERTICAL</td>
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<td>2'-10&quot;</td>
<td>37</td>
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<tr>
<td>6c3</td>
<td>VERTICAL</td>
<td>6</td>
<td>6'-0&quot;</td>
<td>50</td>
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<td>15</td>
<td>3'-3&quot;</td>
<td>4</td>
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</tr>
</tbody>
</table>

EPOXY COATED TOTAL WEIGHT (LBS.): 205

STAINLESS REINFORCING STEEL - ONE END SECTION

<table>
<thead>
<tr>
<th>BAR</th>
<th>LOCATION</th>
<th>SHAPE</th>
<th>NO.</th>
<th>LENGTH</th>
<th>WEIGHT</th>
</tr>
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<tbody>
<tr>
<td>5c2</td>
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<td>6'-0&quot;</td>
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<td>2</td>
<td>6'-0&quot;</td>
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STAINLESS STEEL TOTAL WEIGHT (LBS.): 192

NOTE: REINFORCING STEEL QUANTITIES ARE TO BE INCLUDED ON THE SUMMARY SHEET IN THE PLAN.

BENT BAR DETAILS

<table>
<thead>
<tr>
<th>BENT</th>
<th>&quot;X&quot;</th>
<th>&quot;X&quot;</th>
<th>&quot;X&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>6c1</td>
<td>6c2</td>
<td>6c3</td>
<td>6c5</td>
</tr>
<tr>
<td>6c4</td>
<td>5c5</td>
<td>5c6</td>
<td>5c7</td>
</tr>
<tr>
<td>5c8</td>
<td>5c9</td>
<td>5c10</td>
<td>5c11</td>
</tr>
</tbody>
</table>

NOTE: ALL DIMENSIONS ARE OUT TO OUT.
<table>
<thead>
<tr>
<th>Section</th>
<th>Bar</th>
<th>Location</th>
<th>Shape</th>
<th>No.</th>
<th>Length</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Epoxy Reinforced Steel - Two Barrier Rails - 0°, 10°, 20° and 30° Skew**

<table>
<thead>
<tr>
<th>Bridge Length</th>
<th>0°-0</th>
<th>200'-0</th>
<th>220'-0</th>
<th>240'-0</th>
<th>260'-0</th>
<th>280'-0</th>
<th>300'-0</th>
<th>320'-0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epoxy Coated Reinforcing Steel Total Lbs.</td>
<td>3,240</td>
<td>3,280</td>
<td>3,880</td>
<td>4,020</td>
<td>5,040</td>
<td>5,760</td>
<td>6,600</td>
<td>7,440</td>
</tr>
</tbody>
</table>

**Stainless Steel Reinforced Steel - Two Barrier Rails - 0°, 10°, 20° and 30° Skew**

<table>
<thead>
<tr>
<th>Bridge Length</th>
<th>0°-0</th>
<th>200'-0</th>
<th>220'-0</th>
<th>240'-0</th>
<th>260'-0</th>
<th>280'-0</th>
<th>300'-0</th>
<th>320'-0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless Steel Reinforcing Steel Total Lbs.</td>
<td>2,160</td>
<td>2,200</td>
<td>2,700</td>
<td>2,840</td>
<td>3,860</td>
<td>4,580</td>
<td>5,400</td>
<td>6,220</td>
</tr>
</tbody>
</table>

**Epoxy Reinforced Steel - Two Barrier Rails - 45° Skew**

<table>
<thead>
<tr>
<th>Bridge Length</th>
<th>0°-0</th>
<th>200'-0</th>
<th>220'-0</th>
<th>240'-0</th>
<th>260'-0</th>
<th>280'-0</th>
<th>300'-0</th>
<th>320'-0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epoxy Coated Reinforcing Steel Total Lbs.</td>
<td>3,270</td>
<td>3,700</td>
<td>5,600</td>
<td>5,640</td>
<td>7,540</td>
<td>8,070</td>
<td>9,540</td>
<td>10,070</td>
</tr>
</tbody>
</table>

**Stainless Steel Reinforced Steel - Two Barrier Rails - 45° Skew**

<table>
<thead>
<tr>
<th>Bridge Length</th>
<th>0°-0</th>
<th>200'-0</th>
<th>220'-0</th>
<th>240'-0</th>
<th>260'-0</th>
<th>280'-0</th>
<th>300'-0</th>
<th>320'-0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless Steel Reinforcing Steel Total Lbs.</td>
<td>2,150</td>
<td>2,200</td>
<td>3,100</td>
<td>3,250</td>
<td>5,150</td>
<td>5,750</td>
<td>6,650</td>
<td>7,250</td>
</tr>
</tbody>
</table>

**Concrete Placement Summary**

<table>
<thead>
<tr>
<th>Bridge Length</th>
<th>0°-0</th>
<th>200'-0</th>
<th>220'-0</th>
<th>240'-0</th>
<th>260'-0</th>
<th>280'-0</th>
<th>300'-0</th>
<th>320'-0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total (cu.yd.)</td>
<td>31.6</td>
<td>34.4</td>
<td>41.6</td>
<td>44.0</td>
<td>51.6</td>
<td>58.0</td>
<td>64.0</td>
<td>68.4</td>
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</tbody>
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**Concrete Barrier Rail Quantities**

<table>
<thead>
<tr>
<th>Bridge Length</th>
<th>Unit</th>
<th>0°-0</th>
<th>200'-0</th>
<th>220'-0</th>
<th>240'-0</th>
<th>260'-0</th>
<th>280'-0</th>
<th>300'-0</th>
<th>320'-0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Barrier Railings</td>
<td>L.F.</td>
<td>3040</td>
<td>3040</td>
<td>3040</td>
<td>3040</td>
<td>3040</td>
<td>3040</td>
<td>3040</td>
<td>3040</td>
</tr>
</tbody>
</table>

**Bent Bar Details**

<table>
<thead>
<tr>
<th>Bar</th>
<th>Location</th>
<th>Shape</th>
<th>No.</th>
<th>Length</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes**

- The reinforcing steel quantities are to be included on the summary quantities sheet in the plan.
- All dimensions are out.
- All dimensions are cut to out.
- 

**Iowa DOT**

Highway Division

**Standard Design - 40' Roadway, 3 Span Bridges**

**October, 2014**

**Barrier Rail Details**

**RS40-090-14**
LI-104 JUNCTION BOX

LIGHTING NOTES

NOTE: SEE STANDARD SHEET 1030Aa1 FOR LI-104 JUNCTION BOX DETAILS AND LIGHTING NOTES.

EXTERIOR ELEVATION

NOTE: SEE STANDARD SHEET 1030Aa2 FOR REINFORCING AND DETAILS REGARDING THE PLACEMENT OF CONDUIT AND JUNCTION BOXES IN BARRIER RAILS WITH STAINLESS STEEL REINFORCING. (SECTION THRU BARRIER RAIL, JUNCTION BOX AND PART PLAN AT WING).
NOTE: SEE STANDARD SHEET 1030Aa1 FOR LI-104 JUNCTION BOX DETAILS AND LIGHTING NOTES.

LI-104 JUNCTION BOX

NOTE: SEE STANDARD SHEET 1030Aa2 FOR REINFORCING AND DETAILS REGARDING THE PLACEMENT OF CONDUIT AND JUNCTION BOXES IN BARRIER RAILS WITH STAINLESS STEEL REINFORCING. (SECTION THRU BARRIER RAIL, JUNCTION BOX AND PART PLAN AT WING).

EXTerior ELEVATION

NOTE: SEE STANDARD SHEET 1030Aa1 FOR LI-104 JUNCTION BOX DETAILS AND LIGHTING NOTES.
EXPANSION PIER BEARING


7/30/2018   7:26:42 AM

**FLAT & TRUE**

**CURVED SOLE {**

**MASONRY { / CURVED SOLE { ASSEMBLY**

**PINTLES**

**1 ½ HOLE WASHER (TYP.)**

**4”½ X PLATE LAMINATED NEOPRENE PADS**

**EXPANSION PIER BEARING**

**ANCHOR BOLT SETTING DIAGRAM**

**ANCHOR BOLT SWEDGE DETAIL**

**BEARING NOTES:**

1. SURFACES WASHED "V" SMALL WELD AND 25D SURFACE MACHINED.
2. MASONRY PLATES ARE TO BE SET ON A 1 INCH NEOPRENE SHEET.
3. PINTLE PLATES, FIXED PLATES, ANCHOR BOLTS, AND MASONRY PLATES, ARE A PART OF THE STRUCTURAL STEEL.
4. EXPANSION PIER BEARING PADS MUST BE REMOVED FROM THE STRUCTURAL STEEL AND STAFFED IN THE PINTLE PLATES, MASONRY PLATES, AND ANCHOR BOLTS.
5. THE PINTLE PLATES, PINTLE PLATES AND MASONRY PLATES, ARE TO BE GALVANIZED.
6. WEIGHT INCLUDES SOLE {, PINTLE {, AND WASHERS AND WELDS.
7. THE REQUIREMENTS OF I.M. 453.08.
8. BEARINGS SHOWN ON THIS SHEET MAY BE USED FOR APPLICATIONS WITH LOCAL BEAM SLOPES BETWEEN 0% - 6%. FOR SITUATIONS OUTSIDE OF THIS SLOPE RANGE, THE DESIGNER SHALL EVALUATE THE BEARINGS APPLIED TO IN ACCORDANCE WITH CURRENT IOWA DEPARTMENT OF TRANSPORTATION AND ASSET SPECIFICATIONS ON BEARING DESIGN.
9. THE 1 INCH NEOPRENE SHEETS ARE TO BE 50, 60, OR 70 DUROMETER NEOPRENE. PADS TO BE OF 50 MATERIAL FOR NEOPRENE SHEETS AND NEOPRENE BEARING PADS.

**NOTES:**

- Structural steel weight is included on the summary quantities sheet.
- Structural steel data for one bearing is shown.
- Structural steel welds are inclusive of the bearing.
- Structural steel includes the bearing cap.
- Structural steel includes the base plate.
- Structural steel includes the bearing cap.

**PIER BEARING DETAILS 280'-0 TO 340'-0 SPAN**

<table>
<thead>
<tr>
<th>SECTION</th>
<th>EXPANSION PIER BEARING</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-A</td>
<td>LAMINATED NEOPRENE / CURVED SOLE { ASSEMBLY</td>
</tr>
<tr>
<td>B-B</td>
<td>LAMINATED NEOPRENE / CURVED SOLE { ASSEMBLY</td>
</tr>
</tbody>
</table>

**IOWA DOT**

Highway Division

**ROLLED STEEL BEAM BRIDGES**

**STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES**

**OCTOBER, 2014**

**PIER BEARING DETAILS RS40-095-14**
PILE BENT NOTES:

These pile bends are designed for use in locations where ice and drift conditions are not severe.

For details of trestle piles, types 1, 2, and 3, see standard PRL.

Minimum clear distance from face of concrete to near reinforcing bar shall be 2 inches unless otherwise noted or shown.

Pier piles shall be driven to values shown in design plans.

PILE ORIENTATION DETAIL FOR
TYPE 3 TRESTLE BENT PILES
TYPICAL PLAN

PILE SPACING

SYMMETRICAL ABOUT PIER

NOTE:
ANCHOR BELTS REQUIRED FOR FIXED PIER
BEARINGS ONLY, FOR BOLT AND BEARING SIZES,
SEE SCHK0050, RS40-094-14 OR SCHK0051.

BEARINGS ONLY. FOR BOLT AND BEARING SIZES,
ANCHOR BOLTS REQUIRED FOR FIXED PIER

NOTE:
ANCHOR BELTS REQUIRED FOR FIXED PIER
BEARINGS ONLY, FOR BOLT AND BEARING SIZES,
SEE SCHK0050, RS40-094-14 OR SCHK0051.

BEARINGS ONLY. FOR BOLT AND BEARING SIZES,
ANCHOR BOLTS REQUIRED FOR FIXED PIER

NOTE:
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BEARINGS ONLY, FOR BOLT AND BEARING SIZES,
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BEARINGS ONLY. FOR BOLT AND BEARING SIZES,
ANCHOR BOLTS REQUIRED FOR FIXED PIER

NOTE:
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NOTE:
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ANCHOR BOLTS REQUIRED FOR FIXED PIER

NOTE:
ANCHOR BELTS REQUIRED FOR FIXED PIER
BEARINGS ONLY, FOR BOLT AND BEARING SIZES,
SEE SCHK0050, RS40-094-14 OR SCHK0051.

BEARINGS ONLY. FOR BOLT AND BEARING SIZES,
PILE BENT NOTES:

These pile bents are designed for use in locations where ice and drift conditions are not severe.

For details of trestle piles, see standard P10L.

Minimum clear distance from face of concrete to near reinforcing bar shall be 2 inches unless otherwise noted or shown.

Pier piles shall be driven to values shown in design plans.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

BAR SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING FOR DETAILS OF TRESTLE PILES, SEE STANDARD P10L.

DRIFT CONDITIONS ARE NOT SEVERE.

THESE PIER BENTS ARE DESIGNED FOR USE IN LOCATIONS WHERE ICE AND DRIFT CONDITIONS ARE NOT SEVERE.

NOTE: FRICTION BEARING INCLUDES SIDE FRICTION AND END BEARING IN SOIL.

POINT BEARING INCLUDES SIDE FRICTION AND POINT BEARING IN ROCK.

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

NOTES:

1. The reinforcing steel quantity is to be included on the summary quantities sheet in the plan.
2. The concrete quantity is to be included on the summary quantities sheet in the plan.
3. The reinforcing steel quantity is to be included on the summary quantities sheet in the plan.

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

NOTE: FRICTION BEARING INCLUDES SIDE FRICTION AND END BEARING IN SOIL.

POINT BEARING INCLUDES SIDE FRICTION AND POINT BEARING IN ROCK.

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

NOTE: FRICTION BEARING INCLUDES SIDE FRICTION AND END BEARING IN SOIL.

POINT BEARING INCLUDES SIDE FRICTION AND POINT BEARING IN ROCK.
PILE BENT NOTES:

These pier bends are designed for use in locations where ice and drift conditions are not severe.

For details of trestle piles, Types 1, 2, and 3, see Standard Pile.

Minimum clear distance from face of concrete to near reinforcing bar shall be 2 inches unless otherwise noted on drawings. Piers shall be driven to values shown in design plans.

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

---

```
REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

<table>
<thead>
<tr>
<th>PILE BENT 1</th>
<th>PILE BENT 2</th>
<th>PILE BENT 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE 1</td>
<td>TYPE 1</td>
<td>TYPE 1</td>
</tr>
<tr>
<td>NUMBER OF TRESTLE PILES</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>LEAD PILE LENGTH</td>
<td>164'</td>
<td>164'</td>
</tr>
<tr>
<td>LEAD PILE DIAMETER</td>
<td>8&quot;</td>
<td>8&quot;</td>
</tr>
<tr>
<td>TENSION STRENGTH</td>
<td>106000 PSI</td>
<td>106000 PSI</td>
</tr>
<tr>
<td>COMPRESSION STRENGTH</td>
<td>202000 PSI</td>
<td>202000 PSI</td>
</tr>
</tbody>
</table>

FRINGE BEARING PILING

<table>
<thead>
<tr>
<th>PILE TYPE 1 OR 2</th>
<th>Fringe Bearing Piling</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUMBER OF TRESTLE PILES</td>
<td>11</td>
</tr>
<tr>
<td>LEAD PILE LENGTH</td>
<td>164'</td>
</tr>
<tr>
<td>LEAD PILE DIAMETER</td>
<td>8&quot;</td>
</tr>
<tr>
<td>TENSION STRENGTH</td>
<td>106000 PSI</td>
</tr>
<tr>
<td>COMPRESSION STRENGTH</td>
<td>202000 PSI</td>
</tr>
</tbody>
</table>

FRINGE OR POINT BEARING PILING

<table>
<thead>
<tr>
<th>PILE TYPE 3</th>
<th>Fringe or Point Bearing Piling</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUMBER OF TRESTLE PILES</td>
<td>12</td>
</tr>
<tr>
<td>LEAD PILE LENGTH</td>
<td>192'</td>
</tr>
<tr>
<td>LEAD PILE DIAMETER</td>
<td>8&quot;</td>
</tr>
<tr>
<td>TENSION STRENGTH</td>
<td>106000 PSI</td>
</tr>
<tr>
<td>COMPRESSION STRENGTH</td>
<td>202000 PSI</td>
</tr>
</tbody>
</table>
```

---

**NOTE:**

1. See Sheet RS40-166-14 for Pile Reinforcement Steel Quantities and Details.
2. Concrete quantities shown have been adjusted for the volume of embedded piles deducted for Types 1 and 2 piers on a per-foot basis. The concrete quantities for Type 3 piles do not include deductions for pile embedment.
3. See standard pile for "N" dimension.
4. Notation STRENGTH is the design load in psi and is not the value used in the field for driving piles.

---

IOWA DOT - STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

ROLLING STEEL BEAM BRIDGES

OCTOBER, 2014

---

PILE BENT PIERS

**RS40-101-14**

---

[Diagram of pile orientation detail for Type 3 trestle bent piles]

---

[Diagram of pile bar details]
PILE BENT NOTES:

These pile bents are designed for use in locations where ice and drift conditions are not severe.

For details of trestle piles, see standard pile.

Minimum clear distance from face of concrete to near reinforcing bar shall be 2 inches unless otherwise noted or shown. Pile bents shall be driven to values shown in design plans.

PILE BENT DETAILS:

Structural pile type

Concrete (cy)

Reinforcing steel (lb.)

Reinforcing steel type

Point or friction bearing piling

Out to out. D = pin diameter.

NOTE: ALL DIMENSIONS ARE

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

PILE BENT PIERS

Pile bents are driven to values shown in design plans.

NOTE: THE REINFORCING STEEL QUANTITY IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

NOTE: THE CONCRETE QUANTITY IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

PILE BENT PIERS

PILE BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

<table>
<thead>
<tr>
<th>BENT</th>
<th>LENGTH</th>
<th>BAR</th>
<th>SHEET</th>
<th>TYPE</th>
<th>LENGTH</th>
<th>SHEET</th>
<th>TYPE</th>
<th>LENGTH</th>
<th>SHEET</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>5</td>
<td>1/2</td>
<td>1/2</td>
<td>HP14</td>
<td>12'8</td>
<td>1/2</td>
<td>1/2</td>
<td>12'8</td>
<td>1/2</td>
<td>1/2</td>
</tr>
<tr>
<td>200</td>
<td>5</td>
<td>1/2</td>
<td>1/2</td>
<td>HP14</td>
<td>21'8</td>
<td>1/2</td>
<td>1/2</td>
<td>21'8</td>
<td>1/2</td>
<td>1/2</td>
</tr>
<tr>
<td>200</td>
<td>5</td>
<td>1/2</td>
<td>1/2</td>
<td>HP14</td>
<td>21'8</td>
<td>1/2</td>
<td>1/2</td>
<td>21'8</td>
<td>1/2</td>
<td>1/2</td>
</tr>
<tr>
<td>200</td>
<td>5</td>
<td>1/2</td>
<td>1/2</td>
<td>HP14</td>
<td>21'8</td>
<td>1/2</td>
<td>1/2</td>
<td>21'8</td>
<td>1/2</td>
<td>1/2</td>
</tr>
<tr>
<td>200</td>
<td>5</td>
<td>1/2</td>
<td>1/2</td>
<td>HP14</td>
<td>21'8</td>
<td>1/2</td>
<td>1/2</td>
<td>21'8</td>
<td>1/2</td>
<td>1/2</td>
</tr>
</tbody>
</table>

DETAILS OF TRESTLE PILES:

See sheet RS40-103-14 for step reinforcing steel quantities and details.

NOTE: THE REINFORCING STEEL QUANTITY IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

NOTE: THE CONCRETE QUANTITY IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

NOTE: THE PILE TYPE IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.
NOTE:
- The height of the steps on the bridge is equal to the difference in elevations of the top of slab at adjacent beams along a pier.
- Anchor bolts required for fixed pier bearings only. For bolt and bearing sizes, see RS40-093-14, RS40-094-14, RS40-095-14.

**STEP ELEVATIONS**

Through 180° rotation except symmetrical about a pier except steps

**TYPICAL PLAN**

**TYPICAL PLAN**

**VIEW A-A**

For 9, 11, 13, 15 & 17 pile bents

**ROLLIED STEEL BEAM BRIDGES**

**OCTOBER, 2014**

**PILING BENTS PIER**

**RS40-104-14**
PILE BENT NOTES:

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING FOR DETAILS OF TRESTLE PILES, TYPES 1, 2 AND 3, SEE STANDARD P10L.

DRIFT CONDITIONS ARE NOT SEVERE.

NOTE: FRICTION BEARING INCLUDES SIDE FRICTION AND END BEARING IN SOIL.
NOTE: THE REINFORCING STEEL QUANTITY IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.
NOTE: THE CONCRETE QUANTITY IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.
NOTE: THE PILE TYPE IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES
NOTE:

The height of the steps on the bridge bent is equal to the difference in elevations of the top of slab at adjacent beam along \( \pm 20^\circ \).

Anchor bolts required for fixed end bearings only. For bolt and bearing sizes, see RS40-093-H, RS40-093-H or RS40-095-H.

ROLLING STEEL BEAM BRIDGES

OCTOBER, 2014

Highway Division

PIL BENT PIER

HP14 PILES

20° SKILL

RS40-106-14
PILE BENT NOTES:
These pile bents are designed for use in locations where ice and drift conditions are not severe. For details of trestle piles, see standard P10L. Minimum clear distance from face of concrete to near reinforcing bar shall be 2 inches unless otherwise noted on plans. Pile bents shall be driven to values shown in design plans.

REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

<table>
<thead>
<tr>
<th>NO.</th>
<th>TYPE</th>
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<th>LENGTH</th>
<th>QTY</th>
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PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

NOTE: THE REINFORCING STEEL QUANTITY IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN. THE CONCRETE QUANTITY IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN. THE PILE TYPE IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

PILE PILE CAP & R FILES

NOTES:
- #1 see sheet RS40-107-14 for step reinforcing steel quantities and details.
- #2 note: strength 1 design load #1 is not the value used in the field for driving piles.

NOTES:
- FRICTION BEARING INCLUDES SIDE FRICTION AND END BEARING IN SOIL.
- NOTE: THE REINFORCING STEEL QUANTITY IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN. THE CONCRETE QUANTITY IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.
**TYPICAL PLAN**

**NOTED**
- The height of the steps on the bridge seat is equal to the difference in elevations of the top of beam at adjacent beams along e, piers.
- Anchor bolts required for fixed pier bearings only. For bolt and bearing, see RS40-093-14, RS40-094-14 or RS40-095-14.

**STEP ELEVATIONS**
Through 180° rotation except symmetrical about | Pier except steps.

**10 PILE BENT**

**12 PILE BENT**

**14 PILE BENT**

**16 PILE BENT**

**18 PILE BENT**

**VIEW A-A**
For 10 & 12 pile bents.

**VIEW A-A**
For 14, 16 & 18 pile bents.

**FOR 100'-0, 120'-0 & 200'-0 SPANS**

**FOR 200'-0, 240'-0, 260'-0, 280'-0, 300'-0, 320'-0 & 340'-0 SPANS**
PILE BENT NOTES:

These pier bents are designed for use in locations where ice and drift conditions are not severe.

For details of trestle piles, Types 1, 2, and 3, see Standard P10L.

Minimum clear distance from face of concrete to near reinforcing bar shall be 2 inches unless otherwise noted or shown.

Pier piles shall be driven to values shown in design plans.

REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

<table>
<thead>
<tr>
<th>PILE TYPE</th>
<th>LRFD Pu, Design Load (Kips)</th>
<th>STRENGTH 1, Percent of LRFD Pu</th>
<th>STRENGTH 2, Percent of LRFD Pu</th>
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</tr>
<tr>
<td>202-1</td>
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<td>204-1</td>
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<td>208-1</td>
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</tr>
<tr>
<td>300-1</td>
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<td>308-1</td>
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PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

NOTE: THE REINFORCING STEEL QUANTITY IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

NOTE: THE CONCRETE QUANTITY IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

NOTE: THE REINFORCING STEEL QUANTITY IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

NOTE: THE CONCRETE QUANTITY IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

NOTE: THE REINFORCING STEEL QUANTITY IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

NOTE: THE CONCRETE QUANTITY IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

NOTE: THE REINFORCING STEEL QUANTITY IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

NOTE: THE CONCRETE QUANTITY IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.
TYPICAL PLAN

7 PILE BENT

8 PILE BENT

9 PILE BENT

10 PILE BENT

11 PILE BENT

12 PILE BENT

13 PILE BENT

NOTE:
The height of the steps on the bridge seat in equal to the difference in elevations of the top of slab at adjacent beams along | Pier. Anchor bolts required for fixed | Pier bearings only, for | Pier and bearing steps, see RS40-095-14, RS40-096-14 or RS40-098-14.

VIEW A-A

FOR 7, 8, 9, 10, 11, 12 & 13 PILE BENTS

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

OCTOBER, 2014

RS40-110-14
PILE BENT NOTES:

These pile bents are designed for use in locations where ice and drift conditions are not severe. For details of these piles, see standard pile notes.

Minimum clear distance from face of concrete to near bearing face shall be 2 inches unless otherwise noted as shown. Pile bents shall be driven to values shown in design plans.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

<table>
<thead>
<tr>
<th>NO.</th>
<th>LENGTH</th>
<th>STEEL</th>
<th>REINFORCING</th>
<th>CONCRETE</th>
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<tr>
<td>1</td>
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<td>10639</td>
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<tr>
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<td>26'-0</td>
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NOTE: THE CONCRETE QUANTITY IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

NOTE: THE REINFORCING STEEL QUANTITY IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

BENT BAR DETAILS

NOTE: ALL DIMENSIONS ARE GAGE TO GAGE, EXCEPT DIAMETERS.

STRENGTH 1

FRICTION OR POINT BEARING PILING

<table>
<thead>
<tr>
<th>NO.</th>
<th>LENGTH</th>
<th>PILE TYPE</th>
<th>300'-0</th>
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<th>340'-0</th>
<th>320'-0</th>
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</tbody>
</table>

NOTE: FRICTION BEARING INCLUDES SIDE FRICTION AND END BEARING IN SOIL. POINT BEARING INCLUDES SIDE FRICTION AND POINT BEARING IN ROCK.

NOTE: HP14 PILES ARE TO BE USED IN THE FIELD FOR DRIVING PILES.

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

ROLLIED STEEL BEAM BRIDGES

OCTOBER, 2014

IOWA DOT

Highway Division

RS40-111-14
PILE BENT NOTES:

These pile bents are designed for use in locations where ice and drift conditions are not severe.

For details of trestle piles, Types 1, 2 and 3, see Standard Pile.

Minimum clear distance from face of concrete to near reinforcing bar shall be 2 inches unless otherwise noted or shown.

Pile piles shall be driven to values shown on design plans.

REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

PILE TYPE

<table>
<thead>
<tr>
<th>NO.</th>
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<th>DIAM.</th>
<th>LENGTH</th>
<th>DIAM.</th>
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<td>40-0</td>
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<td>40-0</td>
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</tbody>
</table>

Note: The reinforcing steel quantity is to be included on the summary quantities sheet in the plan.

BENT BAR DETAILS

5cl

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

PILE PENT BENTS

1. See Sheet RS40-113-14 for Steel Reinforcing Steel Quantities and Details.
2. Concrete quantities shown have and the volume of embedded piles deducted for Types 1 and 2 bars. On quantity per foot of length, the concrete quantities for Type 3 piles do not require deduction for pile embedment.
4. Note: Strength 1 design load kips is not the value used in the field for driving piles.
## Standard Design - 40' Roadway, 3 Span Bridges

**File Reference:** RS40-115-14

### Reinforcing Bar List and Estimated Quantities - Per Pile Bent

<table>
<thead>
<tr>
<th>Pile Bent No.</th>
<th>Bent Design</th>
<th>Pile Type</th>
<th>Length (Ft)</th>
<th>Size (Bar)</th>
<th>No.</th>
<th>Weight (Lb.)</th>
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<tbody>
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<td>105</td>
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<tr>
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<td>TYPE 3</td>
<td>5'-6</td>
<td>2&quot;x2&quot;</td>
<td>8</td>
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<td>HP14</td>
<td>TYPE 3</td>
<td>5'-6</td>
<td>2&quot;x2&quot;</td>
<td>8</td>
<td>105</td>
</tr>
<tr>
<td>11</td>
<td>HP14</td>
<td>TYPE 3</td>
<td>5'-6</td>
<td>2&quot;x2&quot;</td>
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<td>105</td>
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<tr>
<td>14</td>
<td>HP14</td>
<td>TYPE 3</td>
<td>5'-6</td>
<td>2&quot;x2&quot;</td>
<td>8</td>
<td>105</td>
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</tbody>
</table>

**Notes:**
- The reinforcing steel quantity is to be included on the summary quantities sheet in the plan.
- The concrete quantity is to be included on the summary quantities sheet in the plan.
- The pile type is to be included on the summary quantities sheet in the plan.

---

### Pile Bent Notes:

These pile Bent are designed for use in locations where ice and drift conditions are not severe. For details of the pile Bent, see the standard pile. Minimum clear distance from face of concrete to near reinforcing bar shall be 2 inches unless otherwise noted or shown. Piler piles shall be driven to values shown in design plans.

---

### Friction or Point Bearing Piling

<table>
<thead>
<tr>
<th>No.</th>
<th>Pile Orientation</th>
<th>Pile Type</th>
<th>pile Cap &amp; 5 Piles</th>
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<tr>
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<td>5c1</td>
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<td>2'-6</td>
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**Notes:**
- See sheet RS40-115-14 for step reinforcing steel quantities and details.
- Note: design load (Kips) is not the value used in the field for driving piles.

---

### Pile Orientation Detail for Type 3 Trestle Bent Piles

- **Type 3 Trestle Bent Piles**

---

### Standard Design - 40' Roadway, 3 Span Bridges

**File Reference:** RS40-115-14

**Standard Design - 40' Roadway, 3 Span Bridges**

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**Iowa DOT Highway Division**

**October, 2014**

---

**Pile Bent Piers**

**HP14 Piles**

---

**Note:** Friction bearing includes side friction and end bearing in soil. Point bearing includes side friction and point bearing in rock.
CAP PLAN

50'-0 TO 240'-0 SPANS
5c1 - 5 ALG SPACES @ 1'-10'(-) = 9'-0
5c3 - 9 ALG SPACES @ 1'-0 = 9'-0
5c3 - 12 ALG SPACES @ 9'-0
5c1 - 2 ALG SPACES @ 6'-0
5c4 - 4 ALG SPACES @ 1'-10'(-)
5n1 - 2 ALG SPACES @ 4'-0
5n1 - 2 ALG SPACES @ 6'-0
5n1 - 2 ALG SPACES @ 8'-0
5n1 - 2 ALG SPACES @ 10'-0
5m1 - 2 ALG SPACES @ 4'-0
5m1 - 2 ALG SPACES @ 6'-0
5m1 - 2 ALG SPACES @ 8'-0
5m1 - 2 ALG SPACES @ 10'-0
5m1 & 5n1 - 4 ALG SPACES @ 1'-10'(-)
5m1 & 5n1 - 2 ALG SPACES @ 6'-0
5m1 & 5n1 - 2 ALG SPACES @ 8'-0
5m1 & 5n1 - 2 ALG SPACES @ 10'-0

BAR LAYOUT

LOW STEP

SECTION B-B

END ELEVATION

SECTION A-A

FRONT ELEVATION

NOTES:
1. BEVELED KEY 3X10X15'-0
2. SEE FOOTING DETAILS

5c1 - 5 SPA. @ 1'-10'(-) = 9'-0
5c3 - 9 SPA. @ 1'-0 = 9'-0
5c3 - 12 SPA. @ 9'-0
5c1 - 2 SPA. @ 6'-0
5c4 - 4 SPA. @ 1'-10'(-)
5n1 - 2 SPA. @ 4'-0
5n1 - 2 SPA. @ 6'-0
5n1 - 2 SPA. @ 8'-0
5n1 - 2 SPA. @ 10'-0
5m1 - 2 SPA. @ 4'-0
5m1 - 2 SPA. @ 6'-0
5m1 - 2 SPA. @ 8'-0
5m1 - 2 SPA. @ 10'-0
5m1 & 5n1 - 4 SPA. @ 1'-10'(-)
5m1 & 5n1 - 2 SPA. @ 6'-0
5m1 & 5n1 - 2 SPA. @ 8'-0
5m1 & 5n1 - 2 SPA. @ 10'-0
5m1 & 5n1 - 2 SPA. @ 12'-0

SYMMETRICAL ABOUT | PIER

NOTE:
ANCHOR BOLTS (REQUIRED) FOR FIXED
PIER BEARINGS ONLY, FOR BOLT AND
ANCHOR BOLTS, SEE RS40-094-14,
RS40-095-14 OR RS40-096-14.
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<th>NO.</th>
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<th>WEIGHT</th>
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<td>9'-10&quot;</td>
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<td>13</td>
<td>42'-0&quot;</td>
<td>24</td>
</tr>
</tbody>
</table>

**BENT BAR DETAILS**

- **5cl, 5c2 & 5c3**
- **5c4**
- **4e1**
- **4e2**

**PIER NOTES:**

- See TEE Pier notes on RS40-03-14 for notes regarding application of these Pier standards.
- Minimum clear distance from face of concrete to edge of reinforcing bar shall be 3 inches unless otherwise noted on the summary quantities sheet in the plan.
### Footing Notes:

(1) Noted pile strength is design load impressing the value used in the field for driving piles.

### Typical Section

#### Footing Size

<table>
<thead>
<tr>
<th>Location</th>
<th>Strength 1 (Kips)</th>
<th>Total Weight (LB.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Steel Pile Footing

<table>
<thead>
<tr>
<th>Footing Size</th>
<th>Bar No.</th>
<th>Side &amp; Spacing</th>
<th>Length</th>
<th>Height</th>
<th>Concrete (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Structural Load

- Footing Size
- Design Level
- Load Capacity

### Typical Section Image

- 5 equal spaces
- 4 - d1 & d2 Bars
- Symmetrical about Pier

### Pier Pile Details

- Distance center to center
- Column details of the Tee piers as shown on Sheet RS40-116-14.
4'-0 x 9'-0 x 24'-0 FOR 15A, 16A, 17A & 18A

4'-0 x 10'-0 x 24'-0 FOR 16B & 18B

4'-0 x 11'-0 x 24'-0 FOR 17C & 18D

4'-0 x 11'-0 x 28'-0 FOR 16C, 17B & 18C

4'-0 x 10'-0 x 26'-0 FOR 16C, 17B & 18C

NOTE:
SEE SHEET RS40-118-14 FOR FOOTING NOTES.
4'0 x 12'-0 x 30'-0 FOR 20B, 21B, 22A, 23A & 24A

4'0 x 12'-0 x 32'-0 FOR 23B, 24B, 25A & 26A

4'0 x 14'-0 x 32'-0 FOR 26B & 27A

NOTE: SEE SHEET RS40-118-14 FOR FOOTING NOTES.
TYP. 45°

4'-0 x 9'-0 x 25'-0 FOR 10B, 11B & 12B

4'-0 x 10'-0 x 25'-0 FOR 13C, 14C, 15C & 16C

4'-0 x 11'-0 x 25'-0 FOR 11D & 12D

SEE SHEET RS40-122-14 FOR FOOTING NOTES.

NOTE:
STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

4'-0 x 9'-0 x 25'-0 FOR 13B, 14B, 15B & 16B

4'-0 x 10'-0 x 25'-0 FOR 10C, 11C & 12C

4'-0 x 11'-0 x 25'-0 FOR 11D & 12D
TYP. 45°

SEE SHEET RS40-121-14 FOR FOOTING NOTES.
REINFORCING
TOP FOOTING
SYMMETRICAL ABOUT PIER
REINFORCING
BOTT. FOOTING
4'-0 x 8'-0 x 26'-0

36 SPA @ 9 = 28'-6; 37 - 6g1
12 SPA @ 8 = 29'-4; 45 - 6g1
9 SPA @ 10 = 29'-0; 30 - 5f1

SEE SHEET RS40-124-14 FOR FOOTING NOTES.

NOTE:
STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

RS40-125-14
11x17_pdf.pltcfg
**BENT BAR DETAILS**

**NOTE:** All dimensions are to outside of a 2" pipe diameter.

**REINFORCING STEEL**

**NOTE:** The reinforcing steel quantity is to be included on the summary quantities sheet in the plan.

**NOTE:** The concrete quantity is to be included on the summary quantities sheet in the plan.

**NOTE:** The file type is to be included on the summary quantities sheet in the plan.

**PIER NOTES:**

See plan RS40-003-14 for notes regarding application of these pier standards.

Minimum clear distance from face of concrete to near reinforcing bar shall be 3 inches unless otherwise noted or shown.

**SEE SHEET RS40-106-14 FOR STEEL REINFORCING STEEL QUANTITIES AND DETAILS.**
FOOTING NOTES:

These footings are designed and detailed to be used with the cap and column details of the tee piers as shown on sheet RS40-128-14. Piated piles in exterior rows, B, D, and E, are shown in the direction shown.

Steel piling used as joint bearing shall have a minimum distance of approximately 10 feet from bottom of footing to top of bearing rock. The field layouts are shown that the distance center to center of adjacent piling shall not exceed 5 feet.

Pier piles shall be driven to values shown in design plans.
SEE SHEET RS40-128-14 FOR FOOTING NOTES.

NOTE:

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

Highway Division

ROPPED STEEL BEAM BRIDGES

OCTOBER, 2014

RS40-129-14
## TYPICAL SECTION

### FOOTING NOTES:

- **NOTE:** The reinforcing steel quantity is to be included on the summary quantities sheet in the plan.
- **NOTE:** The concrete quantity is to be included on the summary quantities sheet in the plan.

**FOOTING NOTES:**

These spread footings are designed and detailed to be used with the cap and column details shown on Sheet RS40-126-14.

These spread footings shall extend at least 12 inches into suitable foundation rock and the last 12 inches of rock excavation shall be to neat lines of masonry. The foundation rock shall have a minimum LFD bearing resistance of 20 kips per square foot and a minimum LFD bearing value of at least 10 kips per square foot.

### TYPICAL SECTION

- **d2 BAR LAYOUT**
  - Symmetrical about the pier

### FOOTING SIZE

<table>
<thead>
<tr>
<th>BRIDGE</th>
<th>FOOTING SIZE</th>
<th>DIMENSIONS</th>
<th>MATERIALS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4' x 11' x 30'</td>
<td>37 - #8 @ 0'-9&quot;</td>
<td>5062 (LB.)</td>
</tr>
<tr>
<td></td>
<td>4' x 10' x 30'</td>
<td>11 - #5 @ 1'-0&quot;</td>
<td>5831 (LB.)</td>
</tr>
<tr>
<td></td>
<td>4'-8&quot; MIN. INTO ROCK</td>
<td>54 - #9 AS SHOWN</td>
<td>3950 (LB.)</td>
</tr>
</tbody>
</table>

### STRUCTURAL CONCRETE

<table>
<thead>
<tr>
<th>FOOTING SIZE</th>
<th>CUBIC YARDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4' x 11' x 30'</td>
<td>29'-8</td>
</tr>
<tr>
<td>4' x 10' x 30'</td>
<td>29'-8</td>
</tr>
<tr>
<td>4'-8&quot; MIN. INTO ROCK</td>
<td>29'-8</td>
</tr>
</tbody>
</table>

### WEIGHT

<table>
<thead>
<tr>
<th>FOOTING SIZE</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>4' x 11' x 30'</td>
<td>52.1</td>
</tr>
<tr>
<td>4' x 10' x 30'</td>
<td>48.9</td>
</tr>
<tr>
<td>4'-8&quot; MIN. INTO ROCK</td>
<td>44.4</td>
</tr>
</tbody>
</table>

### BEARING VALUE

<table>
<thead>
<tr>
<th>FOOTING SIZE</th>
<th>BEARING VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4' x 11' x 30'</td>
<td>30.8</td>
</tr>
<tr>
<td>4' x 10' x 30'</td>
<td>37.3</td>
</tr>
<tr>
<td>4'-8&quot; MIN. INTO ROCK</td>
<td>34.7</td>
</tr>
</tbody>
</table>
NOTE:

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

SEE SHEET RS40-134-14 FOR FOOTING NOTES.

ROLLED STEEL BEAM BRIDGES

Highway Division

ROLLING 2018 - UPDATED BRIDGE ENGINEER SIGNATURE.

10° SKEW - SHEET 2

RS40-135-14
### Bridge Engineering - Revised 08-2018 - Updated Bridge Engineer Signature

1. **BENT BAR DETAILS**

   - **8b1**: 3 21" bars at each column shelf, 3 8" bars at column shelf above.
   - **5c1, 5c2 & 5c3**: 3 21" bars at each column shelf, 3 8" bars at column shelf above.
   - **5c4**: 3 21" bars at each column shelf, 3 8" bars at column shelf above.

   **NOTE**: All dimensions are out to out, not pin diameter.

   **NOTE**: The reinforcing steel quantity is to be included on the summary quantities sheet in the plan.

2. **PIER NOTES**:

   - See the pier notes on RS40-005-M for notes regarding application of these pier standards.
   - Minimum clear distance from face of concrete to near reinforcing bar shall be 3 inches unless otherwise noted or shown.
   - See sheet RS40-167-M for step reinforcing steel quantities and details.

---

### Structural Bridge Details

<table>
<thead>
<tr>
<th><strong>CAP</strong></th>
<th><strong>COLUMN</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CAP</strong></td>
<td><strong>COLUMN</strong></td>
</tr>
</tbody>
</table>

- **Reinforcing Steel**
- **Structural Concrete**
- **Electrical Steel**

---

### Bridge Engineering - Revised 08-2018 - Updated Bridge Engineer Signature

1. **BENT BAR DETAILS**

   - **8b1**: 3 21" bars at each column shelf, 3 8" bars at column shelf above.
   - **5c1, 5c2 & 5c3**: 3 21" bars at each column shelf, 3 8" bars at column shelf above.
   - **5c4**: 3 21" bars at each column shelf, 3 8" bars at column shelf above.

   **NOTE**: All dimensions are out to out, not pin diameter.

   **NOTE**: The reinforcing steel quantity is to be included on the summary quantities sheet in the plan.

2. **PIER NOTES**:

   - See the pier notes on RS40-005-M for notes regarding application of these pier standards.
   - Minimum clear distance from face of concrete to near reinforcing bar shall be 3 inches unless otherwise noted or shown.
   - See sheet RS40-167-M for step reinforcing steel quantities and details.

---

### Bridge Engineering - Revised 08-2018 - Updated Bridge Engineer Signature

1. **BENT BAR DETAILS**

   - **8b1**: 3 21" bars at each column shelf, 3 8" bars at column shelf above.
   - **5c1, 5c2 & 5c3**: 3 21" bars at each column shelf, 3 8" bars at column shelf above.
   - **5c4**: 3 21" bars at each column shelf, 3 8" bars at column shelf above.

   **NOTE**: All dimensions are out to out, not pin diameter.

   **NOTE**: The reinforcing steel quantity is to be included on the summary quantities sheet in the plan.

2. **PIER NOTES**:

   - See the pier notes on RS40-005-M for notes regarding application of these pier standards.
   - Minimum clear distance from face of concrete to near reinforcing bar shall be 3 inches unless otherwise noted or shown.
   - See sheet RS40-167-M for step reinforcing steel quantities and details.

---

### Bridge Engineering - Revised 08-2018 - Updated Bridge Engineer Signature

1. **BENT BAR DETAILS**

   - **8b1**: 3 21" bars at each column shelf, 3 8" bars at column shelf above.
   - **5c1, 5c2 & 5c3**: 3 21" bars at each column shelf, 3 8" bars at column shelf above.
   - **5c4**: 3 21" bars at each column shelf, 3 8" bars at column shelf above.

   **NOTE**: All dimensions are out to out, not pin diameter.

   **NOTE**: The reinforcing steel quantity is to be included on the summary quantities sheet in the plan.

2. **PIER NOTES**:

   - See the pier notes on RS40-005-M for notes regarding application of these pier standards.
   - Minimum clear distance from face of concrete to near reinforcing bar shall be 3 inches unless otherwise noted or shown.
   - See sheet RS40-167-M for step reinforcing steel quantities and details.
CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2"").

REvised 08-2018 - Updated Bridge Engineer Signature.
4'-0 x 12'-0 x 30'-0 FOR 21E

4'-0 x 14'-0 x 30'-0 FOR 21F, 22A & 23A

4'-0 x 14'-0 x 32'-0 FOR 24A, 25A, 26A, 27A & 28A

4'-0 x 14'-0 x 32'-0 FOR 29A
TYP. 45°

SEE SHEET RS40-141-14 FOR FOOTING NOTES.

NOTE:
STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

ROLLLED STEEL BEAM BRIDGES
OCTOBER, 2014

Highway Division

REVISED 08-2018 - UPDATED BRIDGE ENGINEER SIGNATURE.

IOWA DOT

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

TEE PIER-HP10x57 SRL-2
STEEL PILE FOOTINGS
RS40-142-14
SEE SHEET RS40-141-14 FOR FOOTING NOTES.

NOTE:
STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

ROLLED STEEL BEAM BRIDGES
OCTOBER, 2014

APPLE DIT RENEW ON SHEET 3

REVISED 08-2018 - UPDATED BRIDGE ENGINEER SIGNATURE.

4'-0 x 12'-0 x 28'-0 FOR 16B, 17A, 18A & 19A

4'-0 x 13'-0 x 28'-0 FOR 19B & 20A
**FOOTING NOTES:**

These spread footings are designed and detailed to be used with the cap and column details of the tee piers as shown on sheet RS40-144A.

These spread footings shall extend at least 10 inches into suitable foundation rock. The last 12 inches of rock excavation shall be to a depth of 12 inches into the rock foundation. The foundation rock shall have a maximum bed yielding value of at least 10 kips per square foot and shall have a maximum bed yielding value of at least 10 kips per square foot.

**FOOTING LAYOUTS:**

- **d2 BAR LAYOUT**
- **TYPICAL SECTION**

**REINFORCING STEEL (ONE FOOTING):**

- 26'-8" x 28'-8"
- 28'-8" x 33'
- 31'-0" x 31'
- 33'-4" x 31'
- 34'-0" x 31'

**FOOTING SIZES:**

- 4' x 10' x 29'
- 4' x 10' x 31'
- 4' x 11' x 33'
- 4' x 9' x 29'
- 4' x 9' x 27'
- 4' x 8' x 27'

**DIMENSIONS ARE OUT TO OUT.**

**NOTE:** The concrete quantity is to be included on the summary quantity sheet in the plan.

**REMARKS:**

- These spread footings are designed and detailed to be used with the cap and column details of the tee piers as shown on sheet RS40-144A.

**FOOTING NOTES:**

These spread footings shall extend at least 10 inches into suitable foundation rock. The last 12 inches of rock excavation shall be to a depth of 12 inches into the rock foundation. The foundation rock shall have a maximum bed yielding value of at least 10 kips per square foot.
### Footings

#### 4' x 8' x 27'

- **Top Footing**
  - Symmetrical about Pier
- **Bottom Footing**
  - 26 SPA, 8" x 26" = 26'-0, 27" = 27'-0

#### 4' x 9' x 27'

- **Top Footing**
  - Symmetrical about Pier
- **Bottom Footing**
  - 30 SPA, 10" x 26" = 30'-0, 31" = 31'-0

#### 4' x 9' x 29'

- **Top Footing**
  - Symmetrical about Pier
- **Bottom Footing**
  - 33 SPA, 10" x 27" = 33'-0, 34" = 34'-0

#### 4' x 10' x 29'

- **Top Footing**
  - Symmetrical about Pier
- **Bottom Footing**
  - 39 SPA, 10" x 32" = 39'-0, 33" = 33'-0

### Notes

- TEE PIER - SPREAD FOOTINGS
- RS40-145-14

### Design Information

- Standard Design - 40' Roadway, 3 Span Bridges
- Latest Revision Date: October, 2014
- Approved by Bridge Engineer

### Diagrams

- Diagrams showing cross-sections of footings with reinforcing details.

### Additional Information

- SEE SHEET RS40-144-14 FOR FOOTING NOTES.
### TEE PIER CAP & COLUMN DETAILS

<table>
<thead>
<tr>
<th>Pier No.</th>
<th>Cap Section</th>
<th>Column Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>5c1, 5c2, 5c3</td>
<td>5c4</td>
<td>5c4</td>
</tr>
</tbody>
</table>

#### REINFORCING STEEL

- **D=2"**
- **4e1 BAR**
- **4e2 BAR**

#### CAP

- **TOTAL (LB.)**
  - 45'-0"
  - 38'-3"
  - 47'-2"
  - 31'-6"

#### PIER NOTES:

- The reinforcing steel bars and reinforcement details shall be as shown on the drawings. The quantities of reinforcing steel shall be as shown on the plan.

#### COLUMN DETAILS

- **FEET**
  - 30
  - 36
  - 26
  - 39
  - 29
  - 37
  - 35
  - 34
  - 33
  - 32
  - 24
  - 19
  - 18
  - 17
  - 15
  - 10
  - 20
  - 26
  - 25
  - 22
  - 10
  - 9
  - 8
  - 7
  - 5

- **INCHES**
  - 1218
  - 962
  - 756
  - 425
  - 145
  - 514
  - 115
  - 95

- **CAP**

#### BENT BAR DETAILS

- **LATEST REVISION DATE**
  - OCTOBER, 2014

- **APPROVED BY BRIDGE ENGINEER**

- **RS40-141-10**

- **ROLLED STEEL BEAM BRIDGES**
NOTE: PU, STRENGTH 1 DESIGN LOAD (KIPS) IS NOT THE VALUE

NOTE THE REINFORCING STEEL QUANTITY IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET IN THE PLAN.

FOOTING NOTES:

THese FOOTINGS ARE DESIGNED AND DETAILs TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET RS40-146-14.

PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

STEEl PIles USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE LAYOUT DETAILS ARE SHOWN THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PIles SHALL NOT EXCEED 8'-0".

PIER PIles SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.
4'-0 x 8'-0 x 28'-0 FOR 17A, 18A, 19A & 20A

4'-0 x 9'-0 x 28'-0 FOR 18B, 19B & 20B

4'-0 x 11'-0 x 28'-0 FOR 18C, 19C & 20C

4'-0 x 11'-0 x 30'-0 FOR 19D, 20D, 21A, 22A & 23A

4'-0 x 14'-0 x 30'-0 FOR 22B, 23B, 24A & 25A
SEE SHEET RS40-148-14 FOR FOOTING NOTES.

NOTE:

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

HIGHWAY DIVISION

ROLLED STEEL BEAM BRIDGES

OCTOBER, 2014

Highway Division

Rev. 08-2018 - Updated Bridge Engineer Signature.

RS40-140-14

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

ROLLED STEEL BEAM BRIDGES

OCTOBER, 2014

TIE PIER HP10x57 SRL-1

STEEL PILE FOOTINGS

30° SKILD - SHEET 3

RS40-150-14

Rev. 08-2018 - Updated Bridge Engineer Signature.

SEE SHEET RS40-148-14 FOR FOOTING NOTES.

NOTE:

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

HIGHWAY DIVISION

ROLLED STEEL BEAM BRIDGES

OCTOBER, 2014

Rev. 08-2018 - Updated Bridge Engineer Signature.

SEE SHEET RS40-148-14 FOR FOOTING NOTES.

NOTE:

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

HIGHWAY DIVISION

ROLLED STEEL BEAM BRIDGES

OCTOBER, 2014

Rev. 08-2018 - Updated Bridge Engineer Signature.

SEE SHEET RS40-148-14 FOR FOOTING NOTES.

NOTE:

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

HIGHWAY DIVISION

ROLLED STEEL BEAM BRIDGES

OCTOBER, 2014

Rev. 08-2018 - Updated Bridge Engineer Signature.

SEE SHEET RS40-148-14 FOR FOOTING NOTES.

NOTE:

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

HIGHWAY DIVISION

ROLLED STEEL BEAM BRIDGES

OCTOBER, 2014

Rev. 08-2018 - Updated Bridge Engineer Signature.

SEE SHEET RS40-148-14 FOR FOOTING NOTES.

NOTE:

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

HIGHWAY DIVISION

ROLLED STEEL BEAM BRIDGES

OCTOBER, 2014

Rev. 08-2018 - Updated Bridge Engineer Signature.

SEE SHEET RS40-148-14 FOR FOOTING NOTES.

NOTE:

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

HIGHWAY DIVISION

ROLLED STEEL BEAM BRIDGES

OCTOBER, 2014

Rev. 08-2018 - Updated Bridge Engineer Signature.

SEE SHEET RS40-148-14 FOR FOOTING NOTES.

NOTE:

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

HIGHWAY DIVISION

ROLLED STEEL BEAM BRIDGES

OCTOBER, 2014

Rev. 08-2018 - Updated Bridge Engineer Signature.

SEE SHEET RS40-148-14 FOR FOOTING NOTES.

NOTE:

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

HIGHWAY DIVISION

ROLLED STEEL BEAM BRIDGES

OCTOBER, 2014

Rev. 08-2018 - Updated Bridge Engineer Signature.

SEE SHEET RS40-148-14 FOR FOOTING NOTES.

NOTE:

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

HIGHWAY DIVISION

ROLLED STEEL BEAM BRIDGES

OCTOBER, 2014

Rev. 08-2018 - Updated Bridge Engineer Signature.
4'-0 x 12'-0 x 27'-0 FOR 16B & 17A

4'-0 x 12'-0 x 29'-0 FOR 16C, 17B, 18A & 19A

4'-0 x 13'-0 x 29'-0 FOR 19B & 20A

4'-0 x 14'-0 x 29'-0 FOR 20B

SEE SHEET RS40-153-14 FOR FOOTING NOTES.

NOTE: SEE SHEET RS40-153-14 FOR FOOTING NOTES.
### Footing Notes:

These spread footings are designed and detailed to be used with the cap and column details of the tee piers as shown on sheet RS40-146-14.

These spread footings shall extend at least 12 inches into suitable foundation rock. The last 6 inches of rock excavation shall be to neat lines of masonry. The foundation rock shall have a minimum lateral bearing resistance of 20 kips per square foot or a lateral bearing value of at least 10 kips per square foot.

### TYPICAL SECTION

Note: D = pin diameter, dimensions are cut to cut.

### Structural Concrete

<table>
<thead>
<tr>
<th>Pier</th>
<th>Total</th>
<th>Weight (LB.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2' CL.</td>
<td>3843</td>
<td>3462</td>
</tr>
<tr>
<td>3' CL.</td>
<td>47.4</td>
<td>40.0</td>
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</tbody>
</table>

### Footings

<table>
<thead>
<tr>
<th>Footing Size</th>
<th>Bar Layout</th>
</tr>
</thead>
<tbody>
<tr>
<td>4' x 8' x 28'</td>
<td>d1, d2</td>
</tr>
<tr>
<td>4' x 9' x 28'</td>
<td>d1, d2</td>
</tr>
<tr>
<td>4' x 10' x 30'</td>
<td>d1, d2</td>
</tr>
<tr>
<td>4' x 11' x 32'</td>
<td>d1, d2</td>
</tr>
<tr>
<td>4' x 9' x 30'</td>
<td>d1, d2</td>
</tr>
<tr>
<td>4' x 10' x 32'</td>
<td>d1, d2</td>
</tr>
<tr>
<td>4' x 11' x 34'</td>
<td>d1, d2</td>
</tr>
<tr>
<td>4' x 9' x 32'</td>
<td>d1, d2</td>
</tr>
<tr>
<td>4' x 10' x 34'</td>
<td>d1, d2</td>
</tr>
</tbody>
</table>

### Rebar Quantities

<table>
<thead>
<tr>
<th>Pier</th>
<th>28' - d1 &amp; d2 Bars EA. Face</th>
<th>30° Skew - Sheet 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>02-17</td>
<td>28 SPA. @ 9 = 20'-3</td>
<td></td>
</tr>
</tbody>
</table>
SEE SHEET RS40-154-14 FOR FOOTING NOTES.

NOTE:

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

ROLLED STEEL BEAM BRIDGES

OCTOBER, 2014

Highway Division

RS40-155-14

T E E P I E R - S P R E A D F O O T I N G S

30° S K E W - S H E E T 2
### TEE PIER CAP & COLUMN DETAILS

#### R340-157-14

#### ROLLED STEEL BEAM BRIDGES

<table>
<thead>
<tr>
<th>LENGTH</th>
<th>COLUMN</th>
<th>CAP</th>
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</thead>
<tbody>
<tr>
<td>11'-5</td>
<td>46</td>
<td>801</td>
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<tr>
<td>11'-5</td>
<td>801</td>
<td>24.8</td>
</tr>
<tr>
<td>11'-5</td>
<td>24.8</td>
<td>12.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NO.</th>
<th>34</th>
<th>140</th>
</tr>
</thead>
</table>

**NOTES:**
- The reinforcing steel quantity is to be included on the summary quantities sheet in the plan.
- The bar sizes and quantities are to be included in the plan.

**Section:** Highway Division
**Date:** 06-2016
**Engineer:** John Miller
FOOTING SIZE

REINFORCING STEEL SHEET NOTES

<table>
<thead>
<tr>
<th>FOOTING SIZE</th>
<th>BAR NO. SIZE &amp; SPACING</th>
<th>BAR LENGTH</th>
<th>DESIGN STRENGTH</th>
<th>TOTAL CONCRETE</th>
</tr>
</thead>
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</tbody>
</table>

NOTES:
1. The precast concrete strength is not the value used in the field for driving piles.
2. **TYPICAL SECTION**

**FOOTING NOTES:**

- These footings are designed and detailed to be used with the cap and column details of the tee piers as shown on Sheet RS-156-14.
- Piles in exterior rows, in the direction shown.
- Steel piling used as point bearing shall have a minimum distance of approximately 10 feet from bottom of footing to top of bearing rock. The pile layouts are such that the distance center to center of adjacent piling shall not exceed 60 feet.
- Pile piles shall be driven to values shown in design plans.

**CONCRETE WEIGHT**

- **FOOTING UNDERPIELED WITH 32" x 32" SQUARE PILES**

**HIGHWAY DIVISION**

**IOWA DOT**

**STANDARD DESIGN - 40 MIDWAY, 3 SPAN BRIDGE**

**ROLLED STEEL BEAM BRIDGES**

**OCTOBER, 2014**

**TEE PIER-HPO10x57 SRL-2 STEEL PILE FOOTINGS**

**RS40-161-14**
4'-0 x 7'-0 x 32'-0 FOR 12A

4'-0 x 9'-0 x 32'-0 FOR 12C, 13B, 14B, 15B & 16A

4'-0 x 8'-0 x 32'-0 FOR 12B, 13A, 14A & 15A

4'-0 x 10'-0 x 32'-0 FOR 13C, 14C, 15C, 16B & 17A

SEE SHEET RS40-161-14 FOR FOOTING NOTES.

NOTE:
STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

ROLLED STEEL BEAM BRIDGES

HIGHWAY DIVISION

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

ROLLED STEEL BEAM BRIDGES

OCTOBER, 2014

IORA DOT
See Sheet RS40-163-14 for footing notes.

4' - 0 x 11' - 0 x 32' - 0 for 15D, 16C, 17B, 18A, 19A & 20A

4' - 0 x 12' - 0 x 32' - 0 for 17C, 18B, 19B & 20B

4' - 0 x 14' - 0 x 32' - 0 for 19C, 20C & 21A

4' - 0 x 14' - 0 x 34' - 0 for 20D & 21B

45° SKEW - SHEET 3

Rolled Steel Beam Bridges

Iowa DOT
Highway Division

Standard Design - 40' Roadway, 3 Span Bridges

October, 2014

RS40-163-14

4'-0 x 11'-0 x 32'-0 FOR 15D, 16C, 17B, 18A, 19A & 20A

4'-0 x 12'-0 x 32'-0 FOR 17C, 18B, 19B & 20B

4'-0 x 14'-0 x 32'-0 FOR 19C, 20C & 21A

4'-0 x 14'-0 x 34'-0 FOR 20D & 21B

NOTE: See Sheet RS40-163-14 for footing notes.

Steel Pile Footings

Tee Pier-HP10x57 SRL-2

Revision 08-2018 - Updated Bridge Engineer Signature

08-2018
SEE SHEET RS40-164-14 FOR FOOTING NOTES.

NOTE:

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

REINFORCING

TOP FOOTING
SYMMETRICAL ABOUT | PIER

REINFORCING
BOTT. FOOTING

4'-0 x 7'-0 x 34'-0

4'-0 x 8'-0 x 34'-0

4'-0 x 8'-0 x 36'-0

4'-0 x 9'-0 x 36'-0

4'-0 x 9'-0 x 38'-0

4'-0 x 10'-0 x 38'-0

4'-0 x 10'-0 x 40'-0

REVISED 08-2018 - UPDATED BRIDGE ENGINEER SIGNATURE.
STEP REINFORCING BAR LIST
ONE PIER

<table>
<thead>
<tr>
<th>PIER LENGTH</th>
<th>NO.</th>
<th>SPANS</th>
<th>4&quot; BAR</th>
<th>6&quot; BAR</th>
<th>8&quot; BAR</th>
<th>10&quot; BAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>40'-0</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80'-0</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PART ELEVATION VIEW OF PIER CAP
GRADE 5% < 0 < 5%

PART ELEVATION VIEW OF PIER CAP
GRADE 5% > 5%

NOTES:
- The reinforcing steel quantities are to be included on the summary quantities sheet in the plan.
- The concrete quantities are to be included on the summary quantities sheet in the plan.
- The table below lists the additional concrete volume required in each abutment footing/pier cap based on the roadway grade at each abutment footing/pier cap. Additional concrete should be added to the plans for each abutment footing/pier cap that has 0.5 cubic yards or more of additional concrete. Values should be excluded for scenarios that have less than 0.5 cubic yards of additional concrete per substructure unit. Values may be interpolated for grades between the values shown in the table.

ADDITIONAL CONCRETE VOLUME PER SUBSTRUCTURE UNIT (C.Y.)

<table>
<thead>
<tr>
<th>ROADWAY GRADE AT SUBSTRUCTURE UNIT</th>
<th>10</th>
<th>25</th>
<th>30</th>
<th>40</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>5% to 6% REINFORCED</td>
<td>--</td>
<td>--</td>
<td>0.4</td>
<td>0.8</td>
<td>1.0</td>
</tr>
<tr>
<td>6% to 8% STRENGTH H. CONCRETE SPANS</td>
<td>--</td>
<td>--</td>
<td>0.4</td>
<td>0.8</td>
<td>1.0</td>
</tr>
<tr>
<td>8% to 10% STRENGTH H. CONCRETE SPANS</td>
<td>--</td>
<td>--</td>
<td>1.0</td>
<td>1.5</td>
<td>2.0</td>
</tr>
</tbody>
</table>

NOTES:
- Values will include the necessary quantities for the abutment footings/pier caps and the necessary quantities for the additional concrete in the pier caps.
- The table above should be included in the summary quantities sheet.
- The quantities for the additional concrete in the abutment footings/pier caps should be included in the summary quantities sheet.
- The quantities for the additional concrete in the pier caps should be included in the summary quantities sheet.
**Rolled Steel Beam Bridges**

**October, 2014**

Highway Division

**Standard Design - 40' roadway, 3 span bridges**

**RS40-167-14**

**Additional Quantities**

**Notations:**
- The reinforcing steel quantities are to be included on the summary quantities sheet in the plan.
- The concrete quantities are to be included on the summary quantities sheet in the plan.

**Notes:**
- The table below lists the additional concrete volume required in each abutment footing/pier cap based on the roadway grade at each abutment footing/pier cap. Additional concrete should be added to the plans for each abutment footing/pier cap that has 0.5 cu. yds. or more of additional concrete. Values should be excluded for scenarios that have less than 0.5 cu. yds. of additional concrete per substructure unit. Values may be interpolated for grades between the values shown in the table.

**Table: Additional Concrete Volume Per Substructure Unit (C.Y.)**

<table>
<thead>
<tr>
<th>Grade (G)</th>
<th>0%</th>
<th>1%</th>
<th>2%</th>
<th>3%</th>
<th>4%</th>
<th>5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.6%</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0.7%</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0.8%</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0.9%</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1.0%</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1.1%</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1.2%</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1.3%</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1.4%</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1.5%</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1.6%</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Bent Bar Details**

**Notes:**
- All dimensions are out to out.
-_values may be extrapolated for grades between the values shown in the table.

---

**Part Elevation View of Pier Cap**

**Typical Section**

**Figure:**

- Diagrams showing part elevation view of pier cap for different grades and spans.
- Reinforcing bar list and details.
- Step reinforcing bar list for one pier.

---

**Additional Information:**

- Interpolated for grades between the values shown in the table.
- Notes on additional concrete quantities for substructure units.
- Concrete quantities to be included on the summary quantities sheet in the plan.
- Reinforcing steel quantities to be included on the summary quantities sheet in the plan.
### Step Reinforcing Bar List

| Pier Cap | 
| --- | --- |
| **3 SPA. @ 1'-6 = 25'-6** | **3 SPA. @ 10 (TYP.)** |
| **5 SPA. @ 10 (TYP.)** | **5 SPA. @ 10 (TYP.)** |
| **5 SPA. @ 1'-6 = 25'-6** | **5 SPA. @ 10 (TYP.)** |

### Bent Bar Details

Bent bar details with dimensions and notes.

### Typical Section

Typical section of the bridge showing details.

### Additional Concrete Volume per Substructure Unit (C.Y.)

<table>
<thead>
<tr>
<th>Roadway Grade at Substructure Unit</th>
<th>C.Y.</th>
<th>0%</th>
<th>2%</th>
<th>4%</th>
<th>6%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Each Abutment Footing</strong></td>
<td><strong>Each Abutment Footing with Strip Spans</strong></td>
<td>—</td>
<td>0.6</td>
<td>1.2</td>
<td>1.8</td>
</tr>
<tr>
<td><strong>Each Abutment Pier Cap</strong></td>
<td><strong>Each Abutment Pier Cap with Strip Spans</strong></td>
<td>—</td>
<td>0.6</td>
<td>1.2</td>
<td>1.8</td>
</tr>
</tbody>
</table>

### Notes

- Reinforcing steel quantities are to be included on the summary quantities sheet in the plans.
- Concrete quantities are to be included on the summary quantities sheet in the plans.

**The table below lists the additional concrete volume required in each abutment footing/pier cap based on the roadway grade at each abutment footing/pier cap. Additional concrete should be added to the plans for each abutment footing/pier cap that has 0.5 cu. y. or more of additional concrete. Values should be excluded for scenarios that have less than 0.5 cu. y. of additional concrete per substructure unit. Values may be interpolated for grades between the values shown in the table.**

---

**NOTE:** The reinforcing steel quantities are to be included on the summary quantities sheet in the plans. The concrete quantities are to be included on the summary quantities sheet in the plans.

**NOTES:**

- The table below lists the additional concrete volume required in each abutment footing/pier cap based on the roadway grade at each abutment footing/pier cap. Additional concrete should be added to the plans for each abutment footing/pier cap that has 0.5 cu. y. or more of additional concrete. Values should be excluded for scenarios that have less than 0.5 cu. y. of additional concrete per substructure unit. Values may be interpolated for grades between the values shown in the table.
SUBDRAIN DETAILS

SITUATION PLAN

Refer to Situation Plan for North Arrow.

PROTECTION LAYOUT 0° SKEW

PROTECTION LAYOUT SKewed

TYPICAL SECTION OF SUBDRAIN OUTLET

OUTLET DETAILS

The 6'-0 metal outlet pipe, then fully seal the entire opening with grout.

4"½ PERFORATED SUBDRAIN TO BE SLOPED DOWNWARD FROM THE ROADWAY AND UNDERNEATH THE SLOPE PROTECTION AND OUTLET AS INDICATED. RATE OF SLOPE SHALL NOT BE FLATTER THAN 2%.

OUTLET DETAILS

MIN. DRILLED HOLES FOR ATTACHMENT PIN

GUARD DETAILS

REMOVABLE RODENT GUARD. SEE MATERIALS I.M. 443.01 REMOVABLE RODENT TUBING (POLYETHYLENE CORRUGATED)

ONE OF THE TWO FOLLOWING WAYS. IF METAL PIPE IS USED, THE PIPES SHOULD BE COUPLED IN ONE OF THE TWO FOLLOWING WAYS.

1. Use an inside fit reducer couple.
2. Insert 1'-0 of the 4"½ subdrain into the 6'-0 metal outlet pipe. The pipe should be fully inserted to the bottom of CMP. (COUPLER MUST BE INSERTED A MINIMUM 1'-0 INTO CMP). THE 6'-0 METAL OUTLET PIPE, THEN FULLY SEAL THE ENTIRE OPENING WITH GROUT.

NOTE: SEE ABUTMENT BACKFILL DETAILS SHEET FOR DETAILS NOT SHOWN ON THIS SHEET WHICH ARE PERTINENT TO THIS STRUCTURE.
EDGING DETAILS

4" x 6" TREATED TIMBER

SURFACE OF TREATED TIMBER.

VERTICALLY TO 6" (½) BELOW TOP OR REBAR. DRIVE PIN OR REBAR |
†3½ HOLES FOR ½" x 1'-6 STEEL PIN OR REBAR, DRIVE PIN OR REBAR VERTICALLY TO ½" ABOUNDS OF TREATED TIMBER, \n
MIN.

NOTE: THESE DETAILS TO BE USED FOR 160'-0 TO 320'-0 BRIDGE LENGTHS.

GENERAL NOTES:

MACADAM STONE SHALL BE PLACED ALONG THE SIDE OF THE WING AND ABUTMENT FOOTING AS SHOWN IN SECTION A-A. THIS IS TYPICAL AT EACH CORNER OF THE BRIDGE. UNLESS OTHERWISE NOTED IN THE PLANS, THE MACADAM STONE AT THESE LOCATIONS SHALL BE UNDERLINED WITH ENGINEERING FABRIC. IN ACCORDANCE WITH ARTICLE 4196.01, OF THE STANDARD SPECIFICATIONS.

THE MACADAM STONE SHALL BE IN ACCORDANCE WITH SECTION 4132, OF THE STANDARD SPECIFICATIONS, COARSE MATERIAL (NO 4% SLOPE)

WOOD PRESERVATIVE TREATMENT FOR THE TIMBER EDGING SHALL MEET THE REQUIREMENTS FOR GUARDRAIL POSTS, SAWN FOUR SIDES, IN ACCORDANCE WITH SECTION 4123, OF THE STANDARD SPECIFICATIONS.

WING WALL

ENGINEERING FABRIC

ABUTMENT FOOTING

FOOTING

TYPICAL SECTION

OF SUBDRAIN OUTLET

MIN.

ENGINEERING FABRIC

ABUTMENT

FOOTING

MACADAM STONE

6" THICKNESS"

ENGINEERING FABRIC

ABUTMENT

FOOTING

MACADAM STONE

6" THICKNESS"

ENGINEERING FABRIC

ABUTMENT

FOOTING

MACADAM STONE

6" THICKNESS"

ENGINEERING FABRIC

ABUTMENT

FOOTING

MACADAM STONE

6" THICKNESS"

ENGINEERING FABRIC

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ENGINEERING FABRIC

ABUTMENT

FOOTING

MACADAM STONE

6" THICKNESS"

ENGINEERING FABRIC

ABUTMENT

FOOTING

MACADAM STONE

6" THICKNESS"

ENGINEERING FABRIC

ABUTMENT
TOP VIEW OF WING ARMORING WITH WING EXTENSION

PROFILE VIEW OF WING ARMORING WITH WING EXTENSION (SHOWN FOR INTERNAL ARMORING WITH WING EXTENSIONS)

NOTE: THESE DETAILS TO BE USED FOR 340'-0 BRIDGE LENGTH.

THE MACADAM STONE USED IN THE BRIDGE WING ARMORING DETAILS SHALL NOT BE SUBSTITUTED WITH REVETMENT MATERIAL. IF CLASS B OR CLASS E REVETMENT IS PRESENT, THE CONTRACTOR SHALL REMOVE THE REVETMENT TO THE ARMORING DIMENSIONS. THE REMOVED REVETMENT SHALL BE PLACED AS DIRECTED BY THE ENGINEER. IN ADDITION, A CHECK SHALL BE MADE AT THE SUBDRAIN OUTLET TO INSURE THAT IT IS DRAINING PROPERLY DURING THE BACKFILL FLOODING PROCESS.

GENERAL NOTES:

MACADAM STONE SHALL BE PLACED ALONG THE SIDE OF THE WING AND ARMORING FOOTING AS SHOWN IN SECTION A-A. THIS IS TYPICAL AT EACH END OF THE BRIDGE UNLESS OTHERWISE NOTED IN THE PLANS. THE MACADAM STONE AT THESE LOCATIONS SHALL BE UNDERLAIRED WITH ENGINEERING FABRIC IN ACCORDANCE WITH FIGURE 4122, OF THE STANDARD SPECIFICATIONS.

THE MACADAM STONE SHALL BE IN ACCORDANCE WITH SECTION 4120 OF THE STANDARD SPECIFICATIONS, COARSE MATERIAL (NO FINE STONE IS ALLOWED).

WOOD PRESERVATIVE TREATMENT FOR THE TIMBER EDGING SHALL MEET THE REQUIREMENTS FOR GUARDRAIL POSTS, SAWED FOUR SIDES, IN ACCORDANCE WITH SECTION 4116 OF THE STANDARD SPECIFICATIONS.

THE MACADAM STONE SHALL BE DEPOSITED, SPREAD, CONSOLIDATED AND SHAPED BY MECHANICAL OR HAND METHODS THAT WILL PROVIDE UNIFORM DEPTH AND DENSITY AND PROVIDE UNIFORM SURFACE APPEARANCE.

PAYMENT FOR THE BRIDGE WING ARMORING WILL BE BID PER SQUARE YARD. COST WILL INCLUDE ENGINEERING FABRIC, MACADAM STONE, TREATED TIMBER EDGING, ELEVATION, SAMPLING AND COMPACT TO DIMENSIONS SHOWN IN THESE PLANS. 60 TYPICAL AT EACH CORNER OF THE BRIDGE UNLESS OTHERWISE NOTED IN THE PLANS. THE MACADAM STONE AT THESE LOCATIONS SHALL BE UNDERLAIRED WITH ENGINEERING FABRIC IN ACCORDANCE WITH FIGURE 4122, OF THE STANDARD SPECIFICATIONS, COARSE MATERIAL (NO FINE STONE IS ALLOWED).
NOTE: THESE DETAILS TO BE USED FOR 160'-0 TO 320'-0 BRIDGE LENGTHS.

ABUTMENT BACKFILL PROCESS:

The base of the excavation subgrade behind the abutment is to be graded with a 4% slope away from the abutment footing and a 2% cross slope in the direction of the subgrade outlet. This excavation shaping is to be done prior to beginning installation of the geotextile and backfill material.

After the subgrade has been shaped, the geotextile fabric shall be installed in accordance with the details shown. The fabric is intended to be installed in the subgrade excavation and extended horizontally to the foot (backwall, abutments, and wings), and excavation face to a height that will be approximately 1 to 2 feet higher than the height of the porous backfill placement. As shown in the backfill details on this sheet, the strips of the fabric placed small overlap approximately 1 foot and shall be pinned in place. The fabric shall be attached to the abutment by using lath folded in the fabric and secured to the concrete with shallow concrete nails. The fabric placed against the excavation face shall be pinned.

When the fabric is in place, the subdrain shall be installed directly on the fabric at the toe of the rear excavation slope. A slot will need to be cut in the fabric at the point where the subdrain exits the fabric near the end of the abutment wing wall.

Porous backfill is then placed and leveled, no compaction required.

The remaining work involves backfilling with floodable backfill, surface flooding, and vibratory compaction. The floodable backfill material shall be in accordance with the standard specifications. The floodable backfill shall be placed in individual lifts, surface flooded, and compacted with vibratory compaction to ensure full consolidation. Lifts to no more than 2 feet in thickness.

Start surface flooding for each floodable backfill lift at the high point of the subdrain and progress to the low point where the subdrain exits the fabric to ensure uniform surface flooding. Water running full in a 2-inch diameter pipe should be applied by successive 3-foot sprays to subdrain inlets for 5 minutes within each increment.

Floodable backfill lift placement, flooding, and compaction shall progress until the required full thickness of the abutment backfill has been completed.

Water required for flooding, subdrains, porous backfill, floodable backfill, and geotextile fabric furnished at the bridge abutments will not be measured separately for payment.

The cost of water required for flooding, subdrains, porous backfill, floodable backfill, and geotextile fabric furnished at the bridge abutments shall be included in the contract unit price bid for structural concrete.

NOTE: Subdrain small slope downward 2% from approach roadway when outletting both sides of the abutment. Subdrain small slope downward 2% from high end when outletting at the end of the abutment.

The geotextile fabric shall be in accordance with article 4196.01, B, 6 of the standard specifications. If the engineering designer is modified the fabric shall be a minimum 1 foot in height. Single fabric with a 30° slop, lap piece on top and stapled for continuity.
ABUTMENT BACKFILL PROCESS:

The base of the excavation subgrade behind the abutment is to be graded with a 4% slope away from the abutment footing and a 2% cross slope in the direction of the subdrain outlet. This excavation grading is to be done prior to beginning installation of the geotextile and backfill materials.

After the subdrains have been installed, the geotextile fabric shall be installed in accordance with the details shown. The fabric is to be installed in the subdrain excavation and extended horizontally of the abutment backfill, abutment wing wall, and excavation face to a height that will be approximately 3 to 4 feet higher than the height of the porous backfill, placement as shown in the "backfill details" on this sheet. The strips of the fabric placed small overlap approximately 1 foot and shall be pinned in place. The fabric shall be attached to the abutment by using lath folded in the fabric and secured to the concrete with shallow concrete nails. The fabric placed shall overlap approximately 1 to 2 feet higher than the height of the porous backfill, placed against the excavation face shall be pinned.

When the fabric is in place, the subdrain shall be installed directly on the fabric at the toe of the rear excavation slope. A slot will need to be cut in the fabric at the point where the subdrain exits the fabric near the end of the abutment wing wall.

Porous backfill is then placed and leveled, no compaction is required.

The remaining work involves backfilling with floodable backfill, surface flooding, and vibratory compaction. The floodable backfill material shall be placed in individual lifts, surface flooded, and compacted with vibratory compactor to ensure full consolidation. Limit the loose lifts to no more than 2 feet of thickness.

Start surface flooding for each floodable backfill lift at the high point of the subdrain and progress to the low point where the subdrain exits the fabric to ensure uniform surface flooding. Water running full in a 2-hour summer mix should be sprayed in successive 6 to 8-foot increments for 5 minutes within each increment.

Floodable backfill lift placement, flooding, and compaction shall proceed until the required full thickness of the abutment backfill has been completed.

Water required for flooding, subdrains, porous backfill, floodable backfill, and geotextile fabric furnished at the bridge abutments will not be measured separately for payment.

The cost of water required for flooding, subdrains, porous backfill, floodable backfill, and geotextile fabric furnished at the bridge abutments shall be included in the contract unit price bid for structural concrete.

NOTE: SEE CLARIFY DETAILS SHEET FOR DETAILS NOT SHOWN ON THIS SHEET WHICH ARE APPLICABLE TO THIS STRUCTURE.
NOTE: THESE DETAILS TO BE USED FOR 160'-0 TO 320'-0 BRIDGE LENGTHS.

ABUTMENT BACKFILL PROCESS:
The base of the excavation subsurface behind the abutment is to be graded with a 4% slope away from the abutment footing and a 2% cross slope in the direction of the subdrain outlet. The excavation shaping is to be done prior to beginning installation of the geotextile and backfill material.

After the subdrains have been installed, the geotextile fabric shall be installed in accordance with the details shown in the plans. The fabric is intended to be installed in the back of the abutment and extended horizontally along the abutment backwall, abutment wing walls, and subdrain face to a height that will be approximately 1 to 2 feet higher than the height of the porous backfill placement as shown in the subdrain details on this sheet. The strips of the fabric placed small overlap approximately 1 foot and shall be fastened in place. The fabric shall be attached to the abutment wing using latex held in the fabric and secured to the concrete with shall concrete nails. The fabric placed shall overlap approximately 1 to 2 foot higher than the height of the porous backfill.

Porous backfill is then placed and leveled, no compaction is required.

The remaining work involves backfilling with floodable backfill, surface flooding, and vibratory compaction. The floodable backfill material shall be in accordance with the standard specifications. The floodable backfill shall be placed in small lifts. Surface flooding and compacted with vibratory compaction to ensure uniform flooding. Limit the loose lifts to no more than 2 feet of thickness.

Start surface flooding for each floodable backfill lift at the high point of the subdrain and proceed to the low point where the subdrain exits the fabric to ensure uniform surface flooding. Water running full in a 2-hour subdrain will be applied by sprinkler system to cover the entire ground for 5 minutes within each increment.

Floodable backfill lift placement, flooding, and compaction shall progress until the required full thickness of the abutment backfill has been completed.

Water required for flooding, subdrains, porous backfill, floodable backfill, and geotextile fabric furnished at the bridge abutments shall be included in the contract unit price bid for structural concrete.

**NOTE:** Subdrains small slope downward from approach roadway when outletting both sides of the abutment. Subdrains small slope downward from higher end when outletting at the end of the abutment.

The geotextile fabric shall be in accordance with Article XII, Section 3 of the standard specifications. If the engineering analysis is lifted the lifts shall be a minimum of one foot in length. Single fabric run up slope lap piece on top and stapled for continuity.

**NOTE:** The completed subdrain details sheet for details not shown in this sheet which are pertinent to this structure.
ABUTMENT BACKFILL PROCESS:

The base of the excavation subgrade behind the abutment is to be graded with a 4% slope away from the abutment footing and a 2% cross slope in the direction of the abutment outlet. This excavation shaping is to be done prior to beginning installation of the geotextile and backfill material.

After the subgrade has been shaped, the geotextile fabric shall be installed in accordance with the details shown on the fabric detail page to be installed in the base of the excavation. The subgrade is then excavated to the limits of the abutment backfill, bottom of the excavation, and excavation face to a height that will be approximately 3 to 5 feet higher than the height of the porous backfill placement shown in the backfill details. The strip of the fabric placed small overlap approximately 1 foot and shall be formed in place. The fabric shall be attached to the abutment by using lath folded in the fabric and secured to the concrete and below the concrete to allow any additional concrete, the fabric placed against the excavation face shall be trimmed.

When the fabric is in place, the subbase shall be installed directly on the fabric at the top of the excavation. When using lath folded in the fabric and placed in the fabric, the lath will need to be cut in place. The fabric shall be trimmed to the height of the porous backfill placement shown in the backfill details. The strip of the fabric placed small overlap approximately 1 foot and shall be formed in place. The fabric shall be attached to the abutment using lath folded in the fabric and secured to the concrete and below the concrete to allow any additional concrete, the fabric placed against the excavation face shall be trimmed.

Porous backfill is then placed and leveled, no compaction is required.

The remaining work involves backfilling with floodable backfill, surface flooding, and vibratory compaction. The floodable backfill material shall be placed in accordance with the standard specifications. The floodable backfill shall be placed in individual lifts, surface flooded, and compacted with vibratory compaction. To ensure full consolidation, limit the loose lifts to no more than 2 feet of thickness.

Start surface flooding for each floodable backfill lift at the high point of the subgrade and proceed to the low point where the subgrade exits. The fabric to ensure uniform surface flooding, water running full in a 2-inch submerged nozzle should be applied by suction hose to suction and inject hydraulic static water for 5 minutes within each increment.

Floodable backfill lift placement, flooding, and compaction shall proceed until the required full thickness of the abutment backfill has been completed. Water required for flooding, subgrade, porous backfill, floodable backfill, and geotextile fabric furnished at the bridge abutments will not be measured separately for payment.

The cost of water required for flooding, subgrade, porous backfill, floodable backfill, and geotextile fabric furnished at the bridge abutments shall be included in the contract unit price bid for structural concrete.
TEMPORARY DECK OVERHANG BRACKET NOTES:

The spacing of the overhang bracket and the angle of the diagonal member shall be determined per the manufacturer's design manual, including the type and size of overhang bracket and the anticipated construction loads.

If the vertical height of the overhang bracket is adjustable, the base of the bracket is to be located as close as possible to the bottom flange of the beam.

TEMPORARY BRACING SYSTEM NOTES:

Temporary bracing systems shall be adjusted during permanent diaphragms in order to supplement permanent bracing, stabilize beams, and reduce the deck thickness loss during the deck placement. Maximum spacing between adjacent ties or between ties and permanent diaphragms is 6 feet. The span consists of a compression strut pipe, a tie, and hangers or clips. The hangers or clips shall be used to connect the beam to the shear studs or steps. The top and bottom flange of an exterior beam shall be braced with temporary bracing systems. The temporary bracing system shall consist of a tie bar and hangers or clips. Special consideration may be required at temporary bracing systems (TBS) shall be added between permanent diaphragms in order to supplement permanent bracing systems, stabilize beams, and reduce the deck thickness loss during the deck placement. Maximum spacing between adjacent TBS or between TBS and permanent diaphragms is 6 feet. The span consists of a compression strut pipe, a tie, and hangers or clips. The hangers or clips shall be used to connect the beam to the shear studs or the top flanges of exterior and interior beams. The compression pipe, strut, and beam tie shall be within a plane perpendicular to the beam web.

Above each of adjacent ties and intermediate diaphragms, a TBS shall be used consisting of a beam tie and hangers or clips. Above the beam web and abutment diaphragms, it is at contractor's option that the TBS for skewed permanent diaphragms may be placed along deck or perpendicular to the centerline of the beam. If the TBS is not installed directly above and parallel to the centerline of the beam, the temporary bracing system shall consist of a strut pipe, a tie bar, and hangers or clips. If the TBS is installed directly above the centerline of the beam, the temporary bracing system shall consist of a tie bar and hangers or clips. Special consideration may be required at TBS at the top junction corner of the exterior beam and the bottom junction cornea of the interior beam. The compression pipe, strut, and beam tie shall be within a plane perpendicular to the beam web.

If the finishing machine railing is located directly above the exterior beam, temporary bracing systems are not required for bridge lengths 150' or greater. One TBS shall be required between each permanent diaphragm for the 160' bridge only. The TBS shall also be required at each permanent diaphragm for the 160' bridge only.

The ultimate capacity of the TBS at the connection to the beam flanges shall be a minimum of 15,000 lbs. The field strength of the steel of the tie and strut shall be a minimum of 160,000 psi. Welding to the beam flanges or shear studs is not allowed.

Temporary bracing shall be considered incidental to the cost of structural steel.