ENGLISH
40’ ROADWAY – 3 SPAN
ROLLED STEEL BEAM
BRIDGE STANDARDS
INDEX FOR RS40-10 STANDARDS:

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ABUTMENT DETAILS, SKEWED | ABUTMENT BACKFILL DETAILS, 0° SKEW |
| WING ARMORING DETAILS | SUBDRAIN DETAILS |
| ADDITIONAL PIER QUANTITIES, 45° Skew | ADDITIONAL PIER QUANTITIES, 10° Skew |
| TEE PIER HP10x57 SRL-2, 45° Skew, STEEL PILE FOOTINGS SHT. 1 |

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<tr>
<td>Beam Deflections 200'-0 Bridge</td>
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WEATHERING STEEL NOTES:

- RS40-10.dgn   RS40-002-10   11x17_pdf.pltcfg

- REVISED 10-2016 - UPDATED SPECIFICATIONS
- DESIGN: AASHTO LRFD (WAS 4th ED., SERIES OF 2007), DECK & SUBSTRUCTURE CONCRETE (WAS SECTION 5, f'c = 4,000 PSI.)

- REVISED 08-2018 - UPDATED BRIDGE ENGINEER SIGNATURE.

- RESISTANCE LEVEL-1 OR 2 (SRL-1 OR SRL-2) OR SPREAD FOOTINGS.
- CONCRETE PILES (P10L), OR STANDARD H-PILES (P10L AND SRL-1).

- PILE BENTS: STANDARD CONCRETE-FILLED STEEL PIPE PILES (P10L), STANDARD PRESTRESSED CONCRETE PIPE PILES.

- OF BRIDGES AND STRUCTURES WEB SITE: HTTP://WWW.IOWADOT.GOV/BRIDGE/INDEX.HTM.

- FOR PILE FOUNDATIONS THE DESIGNER WILL NEED TO BECAUSE THESE BRIDGE STANDARDS HAVE BEEN REVISED FOR LRFD BASED ON 2012-COMPLETED PROJECTS.

- FOR MORE INFORMATION ON SRL-1 AND SRL-2, SEE THE BRIDGE DESIGN MANUAL, LOCATED ON THE RS40-10 BRIDGE STANDARDS, IF PROPERLY USED, PROVIDE THE STRUCTURAL PLANS FOR A 3 SPAN STEEL BRIDGE. THE WORKING SHEETS ARE NECESSARY TO CONSTRUCT CONTINUOUS 40' ROADWAY STEEL ROLLED BEAM BRIDGES.

- GENERAL NOTES:

- DESIGN STRESSES:
- The design of the structural steel members has been based on the following:

- Structural Steel Notes:
- The design of the structural steel members has been based on the following:

- Weathering Steel Notes:
- All structural steel except as noted shall conform to ASTM A588 (GR50) and ASTM A242 (GR50) FOR PLATES AND SQUARES, AND ALL STRUCTURAL STEEL, THE GRADE 50 SPECIMENS, IS TO BE DETERMINED EXCEPT AS NOTED, CVN TESTING IS REQUIRED FOR W20 AND W36 PLATES.

- Flange Specifiers are to be ASTM A588 GRADE 70 OR 60, 5.5 TO 8.5 BEAM SPECIFICATIONS, ARE TO BE ASTM A572 GRADE 50 OR 60.

- ALL STRUCTURAL STEEL PIECES COMFORMING THE ATTACHMENT AND FUSE BEARINGS SHALL COMPLY

- WITH THE REQUIREMENTS AS STATED IN THE NOTES IN THIS SECTION.

- SHIELDED METAL-ARC WELDING. ALTERNATE JOINT DETAILS MAY BE ALLOWED IN THE DESIGNED HOUSES AS DIRECTED BY THE ENGINEER. THE RESULTANT SURFACE SHALL BE FREE OF ALL SIGN OF MECHANICAL PROCESSING.

- FILL 7 THICKNESSES SHOWN ON PLANS ARE BASED ON NORMAL BEAM DIMENSIONS, THESE THICKNESSES ARE TO BE CHANGED AS DIRECTED DURING FABRICATION TO SECURE A STRONG FIT.

- THE DESIGN DRAWINGS ILLUSTRATE ALL PROPOSED DETAILS FOR MANUAL SHEAR-LOAD-BEARING JOINTS AND OTHER DETAILS. IF OTHER DETAILS ARE REQUIRED, MANUFACTURERS SPECIFICATIONS OR SLEET SHEET METAL DETAILS, ALTERNATE DETAILS MAY BE SUBMITTED FOR APPROVAL.

- THE REAMS ARE TO BE FABRICATED SPECIFIED STEEL LOAD-DEFLECTION CONDITION.
TEE PIER NOTES:

The TEE piers shown in these plans are designed for use with the RS40-10 Rolled Steel Beam Bridge Standards. The piers may be used for either grade separation or stream crossing structures. The piers were designed for the following stream force and ice loading conditions and should not be used where these loading conditions are exceeded.

ICE FORCE:

Ice forces were applied at a height of H/2 + 1'-6 above the bottom of the pier footing, where H is the overall height of pier, the effective ice strength was 24 KSF for H/2 of ice cover, a primary ice force was calculated according to the LRFD specifications and applied to the pier step as follows:

- Case 1: 100% of F applied parallel to the pier's long axis and 15% of F applied perpendicular to the pier's long axis.
- Case 2: 50% of F applied parallel to the pier's long axis and 34% of F applied perpendicular to the pier's long axis.

STREAM FORCE:

The stream velocity used was 5 ft/see with the C2 coefficient equal to 1.1. 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'-0.

FOOTING GEOMETRY:

It was assumed that the pier footing will be set approximately 6'-0 below the adjacent streambed or ground surface, it was also assumed that there are no significant unbalanced earth pressures applied to the pier.

All bridges with TEE piers detailed on these standards are intended to have one fixed pier and one expansion pier. The pile layout and reinforcement shown are the same for either fixed or expansion pier, the only distinction between fixed pier and expansion pier lies in the selection of bearings and expansion joint design. It is necessary to have one set of fixed bearings and one set of expansion bearings which may be used on either fixed or expansion pier. The anchor bolts in the top of the cap should be eliminated from the expansion pier.

HP10x57 steel pile shall be used in the pile footings of the piers for either friction or point bearing. Pile conditions, friction bearing includes side friction and end bearing in soil, point bearing includes side friction and point bearing in rock. Normal structural assistance was taken as 500 KSF for 50 ton friction bearing piles and 750 KSF for 75 ton point bearing piles. A normal uplift resistance of 40 KSF per pile was used in the design of the pier footings, the pier shall not be used at sites where the uplift force cannot be assumed due to specific conditions such as unlevel surface rock layers.

When piers are used in grade separation structures, epoxy coated reinforcement may be required for pier column, consult current policy for guidance on the use of epoxy coated reinforcement in such cases. Adjust the U column bar projection into the cap and 1/8" lap distance accordingly.
### BEAM BRIDGE STANDARDS

**Length**

<table>
<thead>
<tr>
<th>Length</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D01</th>
<th>D02</th>
<th>D03</th>
</tr>
</thead>
<tbody>
<tr>
<td>34’0”</td>
<td>22’0”</td>
<td>25’0”</td>
<td>29’0”</td>
<td>30’0”</td>
<td>32’0”</td>
<td>34’0”</td>
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</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
**BEAM BRIDGE STANDARDS**

<table>
<thead>
<tr>
<th>LENGTH</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>R.A. (%)</th>
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<tbody>
<tr>
<td>160'-0</td>
<td>56'</td>
<td>72'</td>
<td>120'-0</td>
<td>30%</td>
</tr>
<tr>
<td>200'-0</td>
<td>60'</td>
<td>72'</td>
<td>160'-0</td>
<td>30%</td>
</tr>
<tr>
<td>240'-0</td>
<td>68'</td>
<td>72'</td>
<td>200'-0</td>
<td>30%</td>
</tr>
<tr>
<td>280'-0</td>
<td>76'</td>
<td>72'</td>
<td>240'-0</td>
<td>30%</td>
</tr>
<tr>
<td>320'-0</td>
<td>84'</td>
<td>72'</td>
<td>280'-0</td>
<td>30%</td>
</tr>
<tr>
<td>360'-0</td>
<td>84'</td>
<td>72'</td>
<td>320'-0</td>
<td>30%</td>
</tr>
<tr>
<td>400'-0</td>
<td>92'</td>
<td>72'</td>
<td>360'-0</td>
<td>30%</td>
</tr>
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**NOTES:**
1. All substructure units are constructed parallel to the skew indicated for each bridge.
2. R.A. = Right Ahead
L.A. = Left Ahead

**REVIEWED:**
- RS40-006-10
- JUNE, 2010
- Highway Division

**SUBSTRUCTURE LAYOUTS**

**ROLLED STEEL BEAM BRIDGES**

**STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES**
ABUTMENT NOTES:

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO REINFORCING BAR IS TO BE 2" UNLESS 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 ENGINEER SHALL BE PROVIDED. THE BRIDGE CONTRACTOR AT NO EXTRA COST TO THE COUNTY OR STATE, ABUTMENT PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

BARRIER RAIL NOT SHOWN IN DETAILS.

IF ROCK IS CLOSER THAN 12' FROM ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.

ABUTMENT PILE SPACING

<table>
<thead>
<tr>
<th>DIMENSION OR NO.</th>
<th># TO 5' ABUTMENT DECK</th>
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<tbody>
<tr>
<td>S #2</td>
<td>1</td>
</tr>
<tr>
<td>S #4</td>
<td>2</td>
</tr>
<tr>
<td>S #6</td>
<td>3</td>
</tr>
<tr>
<td>S #8</td>
<td>4</td>
</tr>
<tr>
<td>S #10</td>
<td>5</td>
</tr>
<tr>
<td>S #12</td>
<td>6</td>
</tr>
<tr>
<td>S #14</td>
<td>7</td>
</tr>
</tbody>
</table>

NOTE: ALL STEEL BEARING PILING REQUIRED. NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.
ABUTMENT NOTES:
- Minimum clear distance from face of concrete to near neighboring abut is to be 7'-4" unless otherwise noted or shown.
- If necessary to prevent damage to the end of the abutment, use of ballast from construction equipment is not acceptable. The ballast of protection should 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.
- Place one bar at an angle to match flange size 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.

**ABUTMENT PILE SPACING**

<table>
<thead>
<tr>
<th>DIMENSION OF NO.</th>
<th>6 TO 9 ABUTMENT BEARING</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>10</td>
</tr>
<tr>
<td>3&quot;</td>
<td>9</td>
</tr>
<tr>
<td>2&quot;</td>
<td>8</td>
</tr>
<tr>
<td>1 1/2&quot;</td>
<td>7</td>
</tr>
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**ABUTMENT PILE PLAN**

Iowa DOT
Highway Division

ROLED STEEL BEAM BRIDGES
JUNE 2010

**ABUTMENT DETAILS**

30° SKEW

RS40-014-10
NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

NOTE: HP 10 x 57 STEEL BEARING PILING REQUIRED.

PART REAR ELEVATION AT ABUTMENT

ABUTMENT PILE SPACING

<table>
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<tr>
<th>DIMENSION OR NO.</th>
<th>600-0</th>
<th>600-1</th>
<th>600-2</th>
<th>600-3</th>
<th>600-4</th>
<th>600-5</th>
<th>600-6</th>
<th>600-7</th>
<th>600-8</th>
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</thead>
<tbody>
<tr>
<td>&quot;A&quot;</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>&quot;IF IT IS&quot;</td>
<td>4-6</td>
<td>4-6</td>
<td>4-6</td>
<td>5-6</td>
<td>5-6</td>
<td>5-6</td>
<td>5-6</td>
<td>5-6</td>
<td>5-6</td>
</tr>
<tr>
<td>&quot;A&quot; EQUALLY SPACED</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NO. PILES PER ABUT.</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PILE STRENGTH I DESIGN LOAD (KIPS)</td>
<td>124</td>
<td>129</td>
<td>135</td>
<td>141</td>
<td>146</td>
<td>150</td>
<td>156</td>
<td>160</td>
<td>165</td>
</tr>
</tbody>
</table>

NOTE: 10 x 87 STEEL REINFORCEMENT REQUIRED.

NOTE: PILE STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

ABUTMENT NOTES:

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 5" IN ALL AREAS.

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 CONSTRUCTION CONTRACTOR AT NO EXTRA COST TO THE COUNTY OR STATE. ABUTMENT PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

PLACE 8G1 BAR AT 1:6 SLOPE TO MATCH TRAFFIC SIDE OF ABUTMENT WING FACE. (`BOTH SIDES TYPICAL`)

CHANNEL GUTTER OR LINE GUTTER

PART SECTION A-A

PART SECTION B-B

ABUTMENT PILE PLAN

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

ROLLED STEEL BEAM BRIDGES

JUNE, 2010

ABUTMENT DETAILS

45° SKEW

RS40-015-10

HIGHWAY DIVISION

IOWA DOT
A

CONSTR. USED IN THE FIELD FOR DRIVING PILES.

NO. OF PILES PER ABUT.

5D8

"C" EQUAL SPACINGS

ABUTMENT PILE SPACING

DIMENSION OR NO.

"A"

1'-1

DEPTH

OMITTED

S3 x 7.5

3"½ PVC PIPE

1'-3

2

1'-6

4T2

1'-4

W:

HIGHWAY

BRIDGE

STANDARDS

BRIDGES

RS40-10.dgn

RS40-016-10

11x17_pdf.pltcfg

3 - L‡ x ‡ x " SPACERS PUNCHED

NOTES:

340'-0

8G1

4T1

3'-0

5D8

5D6

5D2 (MIN.

5D9

1'-2

5K1

5H4

CL.

2

6G4

5D9

3"½ PVC PIPE

43 - 5K2 BACK FACE

43 - 5K1 BACK FACE

42 - 8G3 BACK FACE

36 - 8G1 FRONT FACE

GUTTER LINE

BY BEVELED 2x8

LEVEL (`TYP.`)

5H2

5H4

CL.

2

56'-6 Ž

1'-9

5P4

5P1 DBL. HOOP

5P2 SPAC. (`TYP.`)

| PILES |

| ABUTMENT |

| BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN. |

| BACKWALL FROM CONSTRUCTION EQUIPMENT, AN APPROPRIATE METHOD OF |

| MAY BE REQUIRED. |

| BARRIER RAIL NOT SHOWN IN DETAILS. |

| ABUTMENT NOTES: |

| BRG. | ABUT. |

| SAME SPACING BETWEEN BEAMS |

| 5 BEAM SPACES @ 10'-5 Œ |

| 5 TO 5 SPACED BEAMS |

| SECTION A-A |

| PARALLEL TO LONGIT. STEEL. |

| TO MISS BEAMS. PLACE 8G3 BARS |

| NOTE: |

| 2'-8 |

| 1'-6 |

| 1'-8 |

| 1'-0 |

| 1'-0 |

| PART REAR ELEVATION AT ABUTMENT |

| 3'-6 MIN. |

| 1'-4 |

| 1'-4 |

| 1'-6 |

| 1'-7 |

| 1'-7 |

| 1'-8 |

| 3

| 2

| 3'-1 |

| 1'-5 |

| 1'-2 |

| 6G1 MIN.

| 3'-0 |

| 8G1 |

| 8G3 |

| 8G1 MIN.

| 8G1 MIN. EMBED. |

| 5D5 |

| 5D8 |

| 5K1 |

| PART SECTION B-B |

| ALL STEEL PILES ARE TO |

| SEE "GENERAL INFORMATION" |

| NOTES:

| PICTURE OF CONSTRUCTION PLAN |

| TOP OF SLAB |

| 1'-6 |

| 1'-0 |

| 4T2 |

| 1'-4 |

| W:

| HIGHWAY |

| BRIDGE |

| STANDARDS |

| BRIDGES |

| RS40-10.dgn |

| RS40-016-10 |

| 11x17_pdf.pltcfg |

| ROADWAY AS SHOWN. |

| ALL STEEL PILES TO |

| BE ALL WROUGHT IRON |

| WITH ROLLED STEEL |

| BEAMS |

| R540-016-10 |
PART LONGITUDINAL SECTION NEAR GUTTER

PART END VIEW AT ABUTMENT

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

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

SEE DETAIL "C"

FOR THE APPROPRIATE LENGTH BRIDGE.

DIMENSION C SEE "MISCELLANEOUS DETAILS"

FOR ELEVATION A, ELEVATION B AND ELEVATION C.

FOAM PRIOR TO BACKFILLING BEHIND ABUTMENTS.

SEE DETAIL "C"
PART LONGITUDINAL SECTION NEAR GUTTER

NOTES:

1. PLACED PVC PIPE prior to backfilling behind abutments.

PART END VIEW AT ABUTMENT

NOTE:

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

SECTION A-A

NOTE:

FOR THE APPROPRIATE LENGTH BRIDGE.

DIMENSION C SEE "MISCELLANEOUS DETAILS"

FOR ELEVATION A, ELEVATION B, ELEVATION C AND SPACING.


SEE DETAIL "C"

DETAIL "C"


NOTE:

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

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

NOTE:


NOTE:


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PART LONGITUDINAL SECTION NEAR GUTTER

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

PART END VIEW AT ABUTMENT

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

PART PLAN

(Steel expansions not shown)

DETAIL "C"

RS40-021-10

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

JUNE, 2010

Highway Division

IOWA DOT

LONGITUDINAL SECTION
10° SKEW

REVIEWED BY:

REVISED 08-2018 - UPDATED BRIDGE ENGINEER SIGNATURE.

APPROVED BY BRIDGE ENGINEER

ROLLED STEEL BEAM BRIDGES

LATEST REVISION DATE

ABUTMENTS.
FOAM PRIOR TO BACKFILLING BEHIND PLUG 3" PVC PIPE WITH EXPANDING
NOTE:
FOR ELEVATION A, ELEVATION B AND DIMENSIONS C, SEE "MISCELLANEOUS DETAILS" FOR THE APPROPRIATE LENGTH BRIDGE.

PART LONGITUDINAL SECTION NEAR GUTTER

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

PART END VIEW AT ABUTMENT

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

PART PLAN

(Steel expansions not shown)

DETAIL "C"

RS40-021-10

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

JUNE, 2010

Highway Division

IOWA DOT

LONGITUDINAL SECTION
10° SKEW

REVIEWED BY:

REVISED 08-2018 - UPDATED BRIDGE ENGINEER SIGNATURE.

APPROVED BY BRIDGE ENGINEER

ROLLED STEEL BEAM BRIDGES

LATEST REVISION DATE

ABUTMENTS.
FOAM PRIOR TO BACKFILLING BEHIND PLUG 3" PVC PIPE WITH EXPANDING
NOTE:
FOR ELEVATION A, ELEVATION B AND DIMENSIONS C, SEE "MISCELLANEOUS DETAILS" FOR THE APPROPRIATE LENGTH BRIDGE.

PART LONGITUDINAL SECTION NEAR GUTTER

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

PART END VIEW AT ABUTMENT

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

PART PLAN

(Steel expansions not shown)

DETAIL "C"
NOTE:

ABUTMENTS.

TO BACKFILLING BEHIND
EXPANDING FOAM PRIOR
PLUG 3½ PVC PIPE WITH

NOTE:

RADIUS

DETAIL "C"

ABUTMENT WING.

FIELD BEND 5h4 BAR
AS NECESSARY TO
AVOID PILE IN
ABUTMENT WING.
PART LONGITUDINAL SECTION NEAR GUTTER

NOTE:
PLUS 3½ PVC PIPE TO UNTOUCHING BEARING
TO BACKFILLING BEARING
ABUTMENTS.

PART END VIEW AT ABUTMENT

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

SECTION A-A

NOTE:
FIELD BEND 5H4 BAR AS NECESSARY TO
AVOID PILE IN ABUTMENT WING.

NOTE:
REVIEWED EDGE OF ABUTMENT WING
SEE DETAIL "C" TO FACE OF BARRIER RAIL END SECTIONS
(SEE RS40-088-10 FOR BARRIER RAIL LAYOUT).

NOTE:
SEE SHEET RS40-094-10, RS40-095-10
SEE SHEET RS40-093-10, RS40-096-10
FOR BARS AND SPACING.
SEE BARRIER RAIL DETAILS
FOR BARS AND SPACING.
SEE BARRIER RAIL DETAILS
ON RS40-088-10
FOR BARS AND SPACING.

NOTE:
PIPE PVC
1'-7
1'-3
1'-6
1'-6
5D6
5D6
5D6
5D6
5K2
5K2
5K2
5K2
5K2
5K2
6 (`TYP`) 3½ PVC PIPE
353'-0 FACE TO FACE OF BARRIER RAIL END SECTIONS
PARALLEL TO THE THEORETICAL E.GRADE
THEORETICAL GRADE
ELEV. C
ELEV. A
ELEV. B
GUTTER LINE
GUTTER LINE
ABUT. BRG
ABUT. BRG
1'-7
2'-1
6'-6 ABUTMENT EXTENSION
6'-6 ABUTMENT WING
20° SKEW
LONGITUDINAL SECTION
PVC PIPE
PVC PIPE
1" RADIUS
DETAIL "C"

FOR THE APPROPRIATE LENGTH STREET.

RS40-024-10

ROLLED STEEL BEAM BRIDGES
JUNE, 2010

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES
LATEST REVIEW DATE
APPROVED BY BRIDGE ENGINEER
HIGHWAY DIVISION

REVIEWED - ADDED FIELD BEND 5H4 BAR TO AVOID PILE IN ABUTMENT WING.
REVIEWED 08-2018 - UPDATED BRIDGE ENGINEER SIGNATURE.
JUNE, 2010

RS40-024-10
PART LONGITUDINAL SECTION NEAR GUTTER

PART END VIEW AT ABUTMENT

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

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

SEE SHEET RS40-029-10, RS40-039-10-1, RS40-091-10, RS40-092-10.

SEE DETAIL "C" FOR BARRIER RAIL LAYOUT.

30° SKEW

PART PLAN

LONGITUDINAL SECTION

30° SKEW

RS40-025-10

IOWA DOT
Highway Division

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

JUNE, 2010

REVISED 08-2018 - UPDATED BRIDGE ENGINEER SIGNATURE.

RS40-094-10, RS40-095-10

SEE SHEET RS40-093-10, RS40-094-10, RS40-095-10.

RS40-10.dgn   RS40-025-10   11x17_pdf.pltcfg

30° SKEW

PART LONGITUDINAL SECTION NEAR GUTTER

PART END VIEW AT ABUTMENT

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

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

SEE SHEET RS40-029-10, RS40-039-10-1, RS40-091-10, RS40-092-10.

SEE DETAIL "C" FOR BARRIER RAIL LAYOUT.

30° SKEW

PART PLAN

LONGITUDINAL SECTION

30° SKEW

RS40-025-10

IOWA DOT
Highway Division

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

JUNE, 2010

REVISED 08-2018 - UPDATED BRIDGE ENGINEER SIGNATURE.

RS40-094-10, RS40-095-10

SEE SHEET RS40-093-10, RS40-094-10, RS40-095-10.

RS40-10.dgn   RS40-025-10   11x17_pdf.pltcfg
PART LONGITUDINAL SECTION NEAR GUTTER

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

PART END VIEW AT ABUTMENT

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

SECTION A-A

DETAIL "C"

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

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

PART END VIEW AT ABUTMENT

NOTE:
FOR ELEVATION A, ELEVATION B AND ABUTMENTS.

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

NOTE:
FOR THE APPROPRIATE LENGTH BRIDGE.

DIMENSION C SEE "MISCELLANEOUS DETAILS" FOR ELEVATION A, ELEVATION B AND ABUTMENTS.

SEE ABUTMENT WING BAR 5H2 BARS SPACED 2'-0 INDENTATION SPACED @ 2'-0.

SEE ABSOLUTE WING END SECTIONS.

PART PLAN

STEEL (MARKINGS NOT SHOWN)

PARALLEL TO THE THEORETICAL GRADE
PART LONGITUDINAL SECTION NEAR GUTTER

NOTE:
- Plug 3" PVC pipe with expanding foam prior to backfilling beam actuities.

NOTE:
- For elevation A, elevation B, elevation C and dimension C see "miscellaneous details" for the appropriate length bridge.

PART END VIEW AT ABUTMENT

SECTION A-A

DETAIL "C"

PART PLAN
(Steel dimensions not shown)
ABUTMENTS.

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

2'-8 MIN. LAP PVC PIPE

ABUTMENT WING - ELEVATION VIEW

SECTION B-B

See: Drawn null end section bars to be placed with abutment wing.

NOTE:
1. Use for bridges 160'-0 thru 200'-0.
2. Use for bridges 220'-0 thru 320'-0.

3. Reinforcing steel quantity and concrete quantity are included in the superstructure quantities shown elsewhere in these plans.
ABUT. BRG. (`SUPERSTRUCTURE PLUS INTEGRAL ABUTMENTS`)

CONCRETE PLACEMENT QTYS.

- NO. OF STEEL H-PILES FOR ABUTMENT FOOTINGS SLAB, AND ABUT DIAPHRAGM, SECTION 1 & 3

REINFORCEMENT DIMENSIONS

1. (ABUT. BEARING)
   - Z (`SPACES`) 0.2 SPAN 2
   - 1 ST + 3 CT (10 CTR.);
   - 6a1 TOP SLAB BAR
     - EACH SIDE

CONCRETE PLACEMENT DIAGRAM

SHOWING SLAB REINFORCING

CONCRETE PLACEMENT QTYS.

- SLAB, AND ABUT. BEARING (SECTION 1 & 3)
  - (1"-1") SPACES 10 CTR. 40.375" 1" TOP SLAB BARS (EACH SIDE)

TOTAL

- ("Z" SPACES @ 10 CTR.);
- 6a1 TOP SLAB BARS
- 354.0 CY
- 243 LI

ESTIMATED QTYS.

- NO. OF STEEL IPE FOR TWO ABUTMENTS (40" X 57")

- CONCRETE PLACEMENT
  - SUPERSTRUCTURE PLUS INTEGRAL ABUTMENTS

- TRANSVERSE SLAB CONSTRUCTION JOINT

- NOTE:
  - CONCRETE DECK SHALL BE PLACED IN SECTIONS AND SCHEDULES INDICATED. ALTERNATE PROCEDURES FOR PLACING DECK CONCRETE MAY BE SUBMITTED FOR APPROVAL. THE CONTRACTOR IS TO MAINTAIN PLASTICITY OF THE CONCRETE DECK DURING PLACEMENT.

- WEIGHT OF STRUCTURAL STEEL SHOWN ON THIS SHEET INCLUDES HEAVY HEAVY SCAFFOLDING, SPACERS, SHEAR STUDS, BEARINGS, MEETS, AND GUN HARDWARE.

- QUANTITY OF STRUCTURAL STEEL SHOWN ON THIS SHEET IS TABBED FOR DEPTH PLATE TRASOHANION SYSTEM. PAYMENT FOR STRUCTURAL STEEL WILL BE BASED ON THE QUANTITIES SHOWN THE CONTRACTOR MAY CHOOSE TO PROVIDE ROLLER SHEAR DIAPHRAGM AT NO ADDITIONAL COST.

- QUANTITY OF STRUCTURAL STEEL SHOWN ON THIS SHEET IS BASED ON THE USE OF 5" HIGH SHEAR STUDS. CONTRACTOR WILL BE PAID ON QUANTITY SHOWN. BENT PLATE IS REQUIRED TO ADJUST HEIGHT OF STUDS AS REQUIRED PER USE OF 5" HIGH SHEAR STUDS. CONTRACTOR WILL BE PAID ON AMOUNT TO PROVIDE ROLLED SHAPE DIAPHRAGMS AT NO ADDITIONAL COST.

- SHEET. ALTERNATE PROCEDURES FOR PLACING DECK CONCRETE MAY BE SUBMITTED.
CONCRETE PLACEMENT DIAGRAM SHOWING SLAB REINFORCING

REINFORCEMENT DIMENSIONS

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<th>Component</th>
<th>Length</th>
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<th>Thickness</th>
<th>Quantity</th>
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<tr>
<td>Bridge</td>
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<td>10'</td>
<td>1000</td>
</tr>
<tr>
<td>Pier</td>
<td>600'</td>
<td>50'</td>
<td>12'</td>
<td>500</td>
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<tr>
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<td>30'</td>
<td>8'</td>
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CONCRETE PLACEMENT QTY'S, INFRASTRUCTURE PLUS INTERNAL ALIGNMENTS

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ESTIMATED QTY'S, INFRASTRUCTURE PLUS INTERNAL ALIGNMENTS

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END OF SLAB REINFORCING

NOTES:

1. Concrete deck shall be placed in sections and sequences directed by alternate procedures for placing deck concrete. The contractor may be required to submit evidence that the Contractor possesses the necessary equipment and attainment for alternate procedures for placing concrete. The Engineer shall determine if a retarding admixture is required to maintain workability of the concrete during placement.

2. Weight of structural steel shown on this sheet includes beams, columns, frames, shear studs, beams, and all necessary equipment.

3. Quantity of structural steel shown on this sheet is based on the use of high-strength steel. The contractor shall be prepared to apply high-strength steels, as above.

4. ORDER OF STANDARDIZED DESIGN - 40' SPANS, 3 SPANS BEAMS

5. SUPERSTRUCTURE QUANTITIES 10° SKEW

6. RS40-032-10
CONCRETE PLACEMENT DIAGRAM
SHOWING SLAB REINFORCING
(both area seen shown, left area seen similar)

REINFORCEMENT DIMENSIONS
 primary reinforcement spacing
primary spacing
secondary spacing

REINFORCEMENT Q'TYS.
CONCRETE PLACEMENT PLUGS / INTERNAL ASCENTS

SPAN LENGTHS

END OF SLAB REINFORCING
(TYPICAL EACH END OF SLAB)

REINFORCING STEEL EPOXY COATED
STRUCTURAL CONCRETE, "BRIDGE"

SLAB, SECTION 2
ABUTMENT FOOTINGS
ABUTMENT WINGS
REINFORCEMENT DIMENSIONS
Z ("SPACES")
Y ("IN.")
X (FT.- IN.")

NOTES:
1. CONCRETE SLAB SHALL BE PLACED IN SEGMENTS AND SECTIONS RESPECTIVE TO THE PAVEMENT JOINTS. THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH A COPY OF THE PLACEMENT PLANS
2. WEIGHT OF STRUCTURAL STEEL SHOWN ON THIS SHEET INCLUDES BOLTS, BOLTING HARDWARE, BEAMS, DIAPHRAGMS, SPLICES, SHEAR STUDS, BEARINGS, WELDS AND PAYMENT FOR STRUCTURAL STEEL FOR FORMWORK HARDWARE.
3. QUALITY OF STRUCTURAL STEEL SHOWN ON THIS SHEET IS BASED ON THE QUANTITIES SHOWN. THE CONTRACTOR MAY CHOOSE FOR BENT PLATE DIAPHRAGM OPTION. PAYMENT FOR STRUCTURAL STEEL WILL BE BASED ON THE QUANTITIES SHOWN. THE CONTRACTOR MAY CHOOSE TO PROVIDE ROLLED SHAPE DIAPHRAGMS AT NO ADDITIONAL COST.

-BRIDGE LENGTHS 200'-0 TO 340'-0.

REVISED 08-2018, UPDATED ESTIMATED Q'NTY STRUCTURAL STEEL WEIGHT...

IOWA DOT
Highway Division

ROADWAY SUPERSTRUCTURE
QUANTITIES 20° SKEW
RS40-033-10
JUNE 2010

CONCRETE PLACEMENT Q'TYS.
CONCRETE PLACEMENT PLUGS / INTERNAL ASCENTS

SPAN LENGTHS

END OF SLAB REINFORCING
(TYPICAL EACH END OF SLAB)

REINFORCING STEEL EPOXY COATED
STRUCTURAL CONCRETE, "BRIDGE"

SLAB, SECTION 2
ABUTMENT FOOTINGS
ABUTMENT WINGS
REINFORCEMENT DIMENSIONS
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-BRIDGE LENGTHS 200'-0 TO 340'-0.

REVISED 08-2018, UPDATED ESTIMATED Q'NTY STRUCTURAL STEEL WEIGHT...

IOWA DOT
Highway Division

ROADWAY SUPERSTRUCTURE
QUANTITIES 20° SKEW
RS40-033-10
JUNE 2010

CONCRETE PLACEMENT Q'TYS.
CONCRETE PLACEMENT PLUGS / INTERNAL ASCENTS

SPAN LENGTHS

END OF SLAB REINFORCING
(TYPICAL EACH END OF SLAB)

REINFORCING STEEL EPOXY COATED
STRUCTURAL CONCRETE, "BRIDGE"

SLAB, SECTION 2
ABUTMENT FOOTINGS
ABUTMENT WINGS
REINFORCEMENT DIMENSIONS
Z ("SPACES")
Y ("IN.")
X (FT.- IN.")

NOTES:
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-BRIDGE LENGTHS 200'-0 TO 340'-0.
**Concrete Placement Diagram**

**Showing Slab Reinforcing**

- **Concrete Placement Q'Ts.**
  - **Conventional Slab:** 600'-0"  500'-0"  350'-0"  270'-0"  200'-0"  100'-0"  0'-0"
  - **Right 3' High Shear Studs:** 700'-0"  600'-0"  500'-0"  400'-0"  300'-0"  200'-0"  100'-0"

**Concrete Reinforcement Dimensions**

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Dimensions</th>
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<td>3/8&quot;</td>
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<tr>
<td>1/2&quot;</td>
<td>12'-0&quot;</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>18'-0&quot;</td>
</tr>
</tbody>
</table>

- **Reinforcement Spacing:**
  - 6'-6" SPAN 1
  - 6'-6" SPAN 2
  - 7'-6" SPAN 3

**Longitudinal Slab Construction Joint**

- **Top of Deck**
- **Headed Out to Fit Shape of Grade and Drilled for Transverse Reinforcing.**

**Transverse Slab Construction Joint**

- **Top of Deck**
- **Headed Out to Fit Shape of Grade and Drilled for Transverse Reinforcing.**

**Notes:**

1. **Concrete Deck shall be placed in sections and sequences indicated.** Alternate procedures for placing each concrete may be submitted, provided, 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.

2. **Weight of structural steel shown on this sheet includes beams, columns, splices, shear studs, bearings, and bolt hardware.**

3. **Quantity of structural steel shown on this sheet is tabulated for deck plate. Data shown on this sheet is not to be used for estimating purposes. Payment for structural steel will be based on the quantities shown. The contractor may choose to provide rolled shear stud materials at no additional cost.**

4. **Quantity of structural steel shown on this sheet is based on the use of high strength steel. Contractor shall be paid at amount shown.**

**Superstructure Quantities 30° Skew RS40-034-10**

**Iowa DOT Standard Design 40’ Span Bridges**

- **Rolled Steel Beam Bridges**
- **June, 2010**

---

**Iowa DOT - Highway Division**

**L.C. Paoletti**

**Department Manager**

**Superstructure**

**Quantities 30° Skew RS40-034-10**

**Approved by Bridge Engineer**

**Latest Revision Date:** 07/06/2010

**Viewing Date:** 07/17/2010
CONCRETE PLACEMENT DIAGRAM
SHOWING SLAB REINFORCING
(RIGHT HEAD SIDE SHOWN, LEFT HEAD SIDE SIMILAR)

REINFORCEMENT DIMENSIONS

<table>
<thead>
<tr>
<th>SPAN 1</th>
<th>SPAN 2</th>
<th>SPAN 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>480'-0</td>
<td>480'-0</td>
<td>480'-0</td>
</tr>
</tbody>
</table>

CONCRETE PLACEMENT QTYS.

<table>
<thead>
<tr>
<th>SPAN 1</th>
<th>SPAN 2</th>
<th>SPAN 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>640'-0</td>
<td>640'-0</td>
<td>640'-0</td>
</tr>
</tbody>
</table>

LONGITUDINAL SLAB CONSTRUCTION JOINT

TRANSVERSE SLAB CONSTRUCTION JOINT

NOTE:

1. CONCRETE DECK SHALL BE PLACED IN SETTING B AND SEQUENCES RECOMMENDED FOR PLACING DECK CONCRETE MAY BE USED FOR APPROVED PROJECTS. THE CONTRACTOR SHALL PROVIDE ALL EQUIPMENT AND FACILITIES TO ACCOMPLISH THE REQUIRED RESULTS. FOR APPROVED EQUIPMENT, THE CONTRACTOR SHALL DETERMINE THE REQUIRED ADVANCE TIME ALLOWED TO CONTROL PLACEMENT OF THE CONCRETE DECK DURING PLACEMENT.

2. WEIGHT OF STRUCTURAL STEEL SHOWN ON THIS SHEET INCLUDES MEANS, TRUSS, SPACES, BEAMS, SLOTS, WIRING, BEAMS AND BARS AND IS TO BE COST.

3. QUANTITY OF STRUCTURAL STEEL SHOWN ON THIS SHEET IS APPROXIMATE.

4. QUANTITY OF STRUCTURAL STEEL SHOWN ON THIS SHEET IS BASED ON THE USE OF 47 H½ HIGH STEEL SLEDges. CONSTRUCTION WILL BE BASED ON THE QUANTITIES SHOWN THE CONTRACTOR MAY CHOOSE TO PROVIDE ROLLED SIMPLE TRUSS AT NO ADDITIONAL COST.
| NO.  | 66   | 64   | 32   | 12   | 42'-10 | 22'-3 | 1'-10 | 160'-0 | 6'-9 | 7'-6 | 7'-8 | 10'-6 | 6'-8 | 4'-3 | 2543 | 373 | 37 | 148 | 48 | 66 | 56 | 64 | 0 8 -2 0 1 8 |
|------|------|------|------|------|--------|-------|-------|--------|------|------|------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|      |      |      |      |      |        |       |       |        |      |      |      |       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |

**BENT BAR DETAILS**

**REINFORCED BENT LIST**

| NO.  | 66   | 64   | 32   | 12   | 42'-10 | 22'-3 | 1'-10 | 160'-0 | 6'-9 | 7'-6 | 7'-8 | 10'-6 | 6'-8 | 4'-3 | 2543 | 373 | 37 | 148 | 48 | 66 | 56 | 64 | 0 8 -2 0 1 8 |
|------|------|------|------|------|--------|-------|-------|--------|------|------|------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|      |      |      |      |      |        |       |       |        |      |      |      |       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |

**BRIDGE LENGTH**

**REINFORCEMENT 0° SKEW**

**ROLLED STEEL BEAM BRIDGES**

**DATE**

**NOTE**

*All dimensions are given in feet and inches.*

*Epoxy coated bars are used as shown.*

*The bent details are provided for reinforcement purposes.*

*The bridge lengths are given in feet and inches.*

*The bent bar details are listed for each bent.*

*The reinforcement is provided for each bent.*

*The table includes the following columns: number, length, weight, and other relevant details.*

*The diagram shows the bent details with the appropriate bar configurations.*

*The figure includes the bent bar details with the relevant dimensions and weights.*

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*The figure includes the bent bar details with the relevant dimensions and weights.**
REINFORCING BAR LIST

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<tr>
<th>BAR NO.</th>
<th>LOCATION</th>
<th>BAR SIZE</th>
<th>SHAPE</th>
<th>NO. LENGTH</th>
<th>REGEN</th>
<th>NO. LENGTH</th>
<th>REGEN</th>
<th>NO. LENGTH</th>
<th>REGEN</th>
<th>NO. LENGTH</th>
<th>REGEN</th>
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<tbody>
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<td>SLAB TRANSVERSE AT MID</td>
<td>5d5</td>
<td>5d5</td>
<td>2'-9</td>
<td>101</td>
<td>2'-9</td>
<td>101</td>
<td>2'-9</td>
<td>101</td>
<td>2'-9</td>
<td>101</td>
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<tr>
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<td>BOTTOM</td>
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</tr>
<tr>
<td>6d</td>
<td>SLAB TRANSVERSE AT MID</td>
<td>5d8</td>
<td>5d8</td>
<td>2'-11</td>
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<td>2'-11</td>
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<td>101</td>
<td>2'-11</td>
<td>101</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6d</td>
<td>SLAB TRANSVERSE AT MID</td>
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<td>5d6, 5d8</td>
<td>2'-9</td>
<td>101</td>
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<td>2'-9</td>
<td>101</td>
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<tr>
<td></td>
<td>BOTTOM</td>
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</table>

| BRIDGE LENGTH |

<table>
<thead>
<tr>
<th>160'-0</th>
<th>180'-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>
<th>340'-0</th>
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<td>48</td>
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<td>66</td>
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<td>78</td>
<td>84</td>
<td>90</td>
<td>96</td>
<td>102</td>
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</table>

BENT BAR DETAILS

NOTE: ALL DIMENSIONS ARE TO BE USED AS A GUIDE.
### BENT BAR DETAILS

<table>
<thead>
<tr>
<th>BENT</th>
<th>BAR</th>
<th>DIMENSIONS</th>
<th>MATERIAL</th>
<th>QUANTITY</th>
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<tbody>
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</table>

### BRIDGE LENGTH

<table>
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<tr>
<th>LENGTH</th>
<th>MATERIAL</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

**NOTE:** ALL DIMENSIONS ARE OUT TO OUT.
0° SKEW FRAMING PLAN

SKewed Framing Plan

NOTE: DIMENSIONS SHOWN APPLY AT INTERSECTION OF ζ EXT., BEAM AND ɛ DIAPHRAGM.

160°-0 E - ɛ, ABUTMENT BEARINGS

BEAM 1
BEAM 2
BEAM 3
BEAM 4
BEAM 5
BEAM 6

ABUT. BRG.

BOLTED SPLICE

5 SPA. @ 7'-4" = 3 7'-0"

Pier 1
Pier 2

ABUTMENT DIAPHRAGM (TYP.)

INTERMEDIATE DIAPHRAGM (TYP.)

25'-0
40'-0
48'-0
64'-0

DIAPHRAGM (TYP.)

ABUTMENT BEARINGS

RS40-10.dgn
RS40-041-10
11x17_pdf.pltcfg

IOWADOT
Highway Division

Standard Design - 40' Roadway, 3 Span Bridge
Rolled Steel Beam Bridges
June, 2010

FRAMING PLAN
160°-0 BRIDGE
RS40-041-10
45° SKewed Framing Plan
(R.A. Shown, L.A. Similar)

NOTE: Dimensions shown apply at intersection of s. ext. beam and s. diaphragm.

BEAM 1
BEAM 2
BEAM 3
BEAM 4
BEAM 5
BEAM 6

PIER 1
PIER 2

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

SKEW

$45^\circ$
0° SKEW FRAMING PLAN

SKEWED FRAMING PLAN

NOTE: DIMENSIONS SHOWN APPLY AT INTERSECTION OF 90° DIYR AND DIYR DIAPHRAGM.

RS40-047-10
45° SKewed Framing Plan

Note: Dimensions shown apply at intersection of E, PIER, PIER 2, BEAM and DIAPHRAGM.
45° SKewed Framing Plan

PJ, (Joint Line, Similar)

Note:
Dimensions shown apply at intersection of ext. beam and horiz. diaphragm.

Note:
Skew of beams.

Note:
Skew of horiz. diaphragm.
0° SKEW FRAMING PLAN

SKEWED FRAMING PLAN

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

<table>
<thead>
<tr>
<th>Beam</th>
<th>0° Skew</th>
<th>10°</th>
<th>20°</th>
<th>30°</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4 SPA @ 19'-6&quot; x 78'-0&quot;</td>
<td>6'-3&quot;</td>
<td>8'-2&quot;</td>
<td>10'-3&quot;</td>
</tr>
<tr>
<td>2</td>
<td>3 SPA @ 24'-8&quot; x 74'-0&quot;</td>
<td>6'-3&quot;</td>
<td>8'-2&quot;</td>
<td>10'-3&quot;</td>
</tr>
<tr>
<td>3</td>
<td>4 SPA @ 19'-6&quot; x 78'-0&quot;</td>
<td>6'-3&quot;</td>
<td>8'-2&quot;</td>
<td>10'-3&quot;</td>
</tr>
</tbody>
</table>

RS40-051-10

Highway Division

Standard Design - 40' Roadway, 3 Span Bridges

Rolled Steel Beam Bridges

Framing Plan 260'-0 Bridge

June, 2010

IOWA DOT
45° SKEWED FRAMING PLAN

NOTES:

1. Dimensions shown apply at intersection of 45° skew beam and diaphragm.
2. Skew 6 (FRW) = 45°
3. Skew 3 (FRW) = 45°
**0° SKEW FRAMING PLAN**

- **Details:**
  - Beam 1
  - Beam 2
  - Beam 3
  - Beam 4
  - Beam 5
  - Beam 6

- **Framing Features:**
  - Bolted Splice
  - Pier 1
  - Pier 2

**SKEWED FRAMING PLAN**

- **Details:**
  - Beam 1
  - Beam 2
  - Beam 3
  - Beam 4
  - Beam 5

- **Framing Features:**
  - Bolted Splice
  - Pier 1
  - Pier 2

**Notes:**
- Dimensions shown apply at intersection of all ext. beam and diaphragm.
- Use note for 320° bridge.
BEAM AND DIAPHRAGM AT INTERSECTION OF EXT.

NOTE:

SKEW 10° 20° 30°

1'-3" 2'-8" 4'-3"

<table>
<thead>
<tr>
<th>BOLTED SPLICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beam 1</td>
</tr>
<tr>
<td>Beam 2</td>
</tr>
<tr>
<td>Beam 3</td>
</tr>
<tr>
<td>Beam 4</td>
</tr>
<tr>
<td>Beam 5</td>
</tr>
<tr>
<td>Beam 6</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>ABUT. BRG.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pier 1</td>
</tr>
<tr>
<td>Pier 2</td>
</tr>
<tr>
<td>Pier 3</td>
</tr>
</tbody>
</table>

0° SKEW FRAMING PLAN

SKEWED FRAMING PLAN

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

SKEW 10° 20° 30°

1'-3" 2'-8" 4'-3"

<table>
<thead>
<tr>
<th>BOLTED SPLICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pier 1</td>
</tr>
<tr>
<td>Pier 2</td>
</tr>
</tbody>
</table>

Intermediate Diaphragm (Typ.)

ABUTMENT Diaphragm (Typ.)
45° SKewed Framing Plan

**NOTE:** Dimensions shown apply at intersection of E, Ext. beam and E diaphragm.
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>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
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</tr>
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<td>O-1</td>
<td>0.14</td>
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<td>O-2</td>
<td>0.14</td>
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<tr>
<td>O-3</td>
<td>0.14</td>
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LIVE LOAD IMPACT FACTOR 1.00

<table>
<thead>
<tr>
<th>LOAD NAME</th>
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<th>MOMENT</th>
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<tbody>
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TOTAL

<table>
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<tr>
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<tbody>
<tr>
<td></td>
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</tr>
<tr>
<td>O-3</td>
<td>0.14</td>
<td>0.91</td>
</tr>
</tbody>
</table>

* LOAD VALUES DO NOT INCLUDE GIRDERS' WEIGHT.
MOMENTS AND REACTION VALUES DO INCLUDE GIRDERS' WEIGHT.
MOMENTS AND REACTIONS SHOWN ARE UNFACTORED.

REVIEWED 04-14 - MOVED THE REACTION LIVE LOAD IMPACT COLUMN NUMBERS IN THE MOMENT ROW TO THE REACTION ROW.
REVIEWED 08-2018 - UPDATED BRIDGE ENGINEER SIGNATURE.
STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGE
ROLLED STEEL BEAM BRIDGES
JUNE, 2010
Highway Division
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>
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<tr>
<td>Q2</td>
<td>0.45</td>
<td>0.55</td>
<td>0.45</td>
<td>0.55</td>
</tr>
<tr>
<td>Q3</td>
<td>0.31</td>
<td>0.69</td>
<td>0.31</td>
<td>0.69</td>
</tr>
<tr>
<td>TOTAL</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

LOAD NAME | LOAD - k/ft | POSITIVE MOMENT | REACTIVE MOMENT | REACTION |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INTERIOR</td>
<td>EXTERIOR</td>
<td>INTERIOR</td>
<td>EXTERIOR</td>
</tr>
<tr>
<td>Q1</td>
<td>0.24</td>
<td>0.76</td>
<td>0.24</td>
<td>0.76</td>
</tr>
<tr>
<td>Q2</td>
<td>0.45</td>
<td>0.55</td>
<td>0.45</td>
<td>0.55</td>
</tr>
<tr>
<td>Q3</td>
<td>0.31</td>
<td>0.69</td>
<td>0.31</td>
<td>0.69</td>
</tr>
<tr>
<td>TOTAL</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

* LOAD VALUES DO NOT INCLUDE GIRDAR WEIGHT.
* MOUNTS AND REACTIONS VALUES DO INCLUDE GIRDAR WEIGHT.
* MOUNTS AND REACTIONS SHOWN ARE UNFACTORED.

MOMENTS AND REACTIONS SHOWN ARE UNFACTORED.

MOMENT AND REACTION VALUES DO INCLUDE GIRDER WEIGHT.

LOAD VALUES DO NOT INCLUDE GIRDAR WEIGHT.

REVISED 04-14 - MOVED THE REACTION LIVE LOAD IMPACT COLUMN NUMBERS IN THE MOMENT ROW TO THE REACTION ROW.

REVISED 08-2018 - UPDATED Bridge Engineer Signature.

8-JUNE-2010

Highway Division

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES
ROLLED STEEL BEAM BRIDGES
JUNE, 2010

BEAM DEFLECTIONS 180'-0 BRIDGE
RS40-062-10
DEAD LOAD DEFLECTION DIAGRAM

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

MOMENTS AND REACTION TABLE

LOAD NAME | LOAD - k/ft | POSITIVE MOMENT - ft-kips | NEGATIVE MOMENT - ft-kips | REACTION - kips
--- | --- | --- | --- | ---
1. PT. END | 0.4 PT. | 0.14 | 0.74* | ABUTMENT
2. CENTER | 0.15 | 0.70* | 0.67 | ABUTMENT
PIER | 0.15 | 0.629 | 0.681 | INTERIOR
3. PT. END | 0.15 | 0.681 | 0.681 | PIER
LIVE LOAD IMPACT f=0.53

NAME | LOAD - k/ft | MOMENT | REACTION | REACTION - kips
--- | --- | --- | --- | ---
G72 | 0.688 | - | - | 205
TOTAL | - | - | - | 187

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

IOWA DOT
Highway Division

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

JUNE, 2010

Rolled Steel Beam Bridges

BEAM DEFORMATIONS
200'-0 BRIDGE
RS40-063-10
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>MOMENT - foot-kips</th>
<th>REACTION - kips</th>
</tr>
</thead>
<tbody>
<tr>
<td>(0.014)</td>
<td>0.72x626</td>
<td>280 245 303 296 574 540</td>
<td>33 22 80 79</td>
</tr>
<tr>
<td>(0.14)</td>
<td>0.14 455</td>
<td>46 44 66 67 75 76</td>
<td>4 4 87 11</td>
</tr>
<tr>
<td>(0.15)</td>
<td>0.15 467</td>
<td>46 46 60 64 73 79</td>
<td>4 4 90 15</td>
</tr>
<tr>
<td>(0.74)</td>
<td>0.74 1434</td>
<td>841 915 943 935 646 738</td>
<td>- - - -</td>
</tr>
<tr>
<td>(0.626)</td>
<td>0.626 1381</td>
<td>79 79 79 79 79 79</td>
<td>111 111 111</td>
</tr>
</tbody>
</table>

**NOTES:**
1. Load values do not include girder weight. Moments and reactions shown are unfactored.
2. Load values do not include girder weight. Moments and reactions shown are unfactored.

**TOTAL:**
- - - - 1341 1341 108 98 223 204
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>DC1</th>
<th>DC2</th>
<th>DW</th>
<th>HL-93</th>
<th>+IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.74*</td>
<td>0.15</td>
<td>0.620</td>
<td>0.772</td>
<td>0.681</td>
<td>0.681</td>
<td></td>
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<tr>
<td>0.14</td>
<td>0.15</td>
<td>0.72*</td>
<td>0.77</td>
<td>0.74</td>
<td>0.74</td>
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<tr>
<td>0.4</td>
<td>0.15</td>
<td>0.14</td>
<td>0.14</td>
<td>0.4</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>0.5 PT. END SPAN</td>
<td>0.74*</td>
<td>0.72*</td>
<td>0.681</td>
<td>0.681</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.5 PT. CENTER SPAN</td>
<td>0.14</td>
<td>0.14</td>
<td>0.4</td>
<td>0.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DC1: DISTRIBUTION FACTOR
DC2: DISTRIBUTION FACTOR
DW: DESIGN WIND
HL-93: ACI-93
+IMPACT: LOAD IMPACT

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

REVISED 04-14 - MOVED THE REACTION LIVE LOAD IMPACT COLUMN NUMBERS IN THE MOMENT ROW TO THE REACTION ROW.

REVISED 08-2018 - UPDATED BRIDGE ENGINEER SIGNATURE.

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

RS40-065-10
DEAD LOAD DEFLECTION DIAGRAM

NOTES:
1. ENCLOSED 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 - kips</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EXTERIOR</td>
<td>INTERIOR</td>
<td>EXTERIOR</td>
<td>INTERIOR</td>
</tr>
<tr>
<td>DC1</td>
<td>0.44</td>
<td>0.72</td>
<td>0.44</td>
<td>0.72</td>
</tr>
<tr>
<td>DC2</td>
<td>0.14</td>
<td>0.5</td>
<td>0.14</td>
<td>0.5</td>
</tr>
<tr>
<td>DW</td>
<td>0.05</td>
<td>0.35</td>
<td>0.35</td>
<td>0.05</td>
</tr>
</tbody>
</table>

TOTAL

- DC1: 1053 + 1159 + 1163 + 1163 + 870 + 1004
- DC2: 0.14 + 0.14 + 0.14 + 0.14 + 0.14 + 0.14
- DW: 0.05 + 0.05 + 0.05 + 0.05

* Load values do not include girder weight. Moments and reactions values do include girders weight. Moments and reactions shown are unfactored.
DEAD LOAD DEFLECTION DIAGRAM

NOTES:
1. ENCLOSED 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 - k-ft</th>
<th>REACTION - kips</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>INTERIOR</td>
<td>EXTERIOR</td>
<td>INTERIOR</td>
</tr>
<tr>
<td>D1</td>
<td>0.14</td>
<td>0.72</td>
<td>-</td>
</tr>
<tr>
<td>D2</td>
<td>0.14</td>
<td>0.72</td>
<td>-</td>
</tr>
<tr>
<td>D3</td>
<td>0.15</td>
<td>0.72</td>
<td>-</td>
</tr>
<tr>
<td>D4</td>
<td>0.72</td>
<td>-</td>
<td>-</td>
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<td>D5</td>
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<tr>
<td>D6</td>
<td>0.72</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

LOAD VALUES DO NOT INCLUDE GIRDER WEIGHT. MомENTS 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.
MOMENT AND REACTION TABLE

<table>
<thead>
<tr>
<th>LOAD NAME</th>
<th>LOAD - k/ft</th>
<th>MOMENT</th>
<th>REACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>POSITIVE</td>
<td>INTERIOR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MOMENT</td>
<td>DIAMETER</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EXTERIOR</td>
<td>INTERIOR</td>
</tr>
<tr>
<td>C01</td>
<td>0.48</td>
<td>0.72</td>
<td>0.65</td>
</tr>
<tr>
<td>C02</td>
<td>0.44</td>
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<tr>
<td>DC</td>
<td>0.45</td>
<td>0.75</td>
<td>0.63</td>
</tr>
</tbody>
</table>

DEAD LOAD DEFLECTION DIAGRAM

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

Moments and reactions shown are unfactored.

Load values do not include girder weight, moments and reactions shown are unfactored.

REVISIONS:
- Revised 04-14 - Moved the reaction live load impact column numbers in the moment row to the reaction row.
- Revised 09-2018 - Updated bridge engineer signature.
- Revision Date: 08-2018
- Standard Design - 40' Roadway, 3 Span Bridges
- Rolled Steel Beam Bridges

Highway Division

BEAM DEFLECTIONS 320' Bridge
RS40-069-10

IOWA DOT

RS40-069-10
DEAD LOAD DEFLECTION DIAGRAM

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>
<th>REACTION - kips</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 | 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 | 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 | EXTE
3 STUDS PER ROW

SHEAR STUD DETAILS

NOTE ALL STUDS TO BE ⅜"-⅝"

3 STUDS PER ROW

ABUTMENT, DOCK:

BEAM ELEVATION

BEAM PLAN AND ELEVATION

160'-0 BRIDGE

RS40-071-10

IOWA DOT

Highway Division

RS40-10.dgn   RS40-071-10   11x17_pdf.pltcfg
3 STUDS PER ROW

SHEAR STUD DETAILS

3 STUDS PER ROW

NOTE: ALL STUDS TO BE 2½"
3 STUDS PER ROW

SHEAR STUD DETAILS

NOTE: ALL STUDS TO BE ½""
**BEAM ELEVATION**

**SHEAR STUD SPACING**

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

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

**NOTE:** ALL STUDS TO BE "½" in diameter.

**ABUTMENT DIAPH. BARS**

- 1½" holes for bolted splice

**BEAM PLAN AND ELEVATION**

**3 STUDS PER ROW**

**SHEAR STUD DETAILS**

- **3 Studs Per Row**

**BEAM PLAN AND ELEVATION**

**220'-0 Bridge**

**RS40-074-10**

**IOWADOT**

**Highway Division**
**SHEAR STUD DETAILS**

**SHEAR STUD SPACING**

*NOTE: STUD HEIGHTS (3", 4", OR 5") FOR THE LOCATIONS SHOWN 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.*

- **ZONES**
  - Zone A: 195 studs - Zone A
  - Zone B: 24 studs - Zone B
  - Zone C: 30 studs - Zone C
  - Zone D: 60 studs - Zone D

**BEAM ELEVATION**

- **BEAM PLAN AND ELEVATION**
  - ABUTMENT DIAPH. BARS
  - 1½" HOLES FOR ABUTMENT DIAPH. BARS

**SHEAR STUD ON SPLICE PLATE DETAILS**

- **2 STUDS PER ROW**
  - SHEAR STUD HEIGHT
  - 3 STUDS PER ROW
  - SHEAR STUD DETAILS

**BREAKDOWN FOR ZONES**

- **ZONE A**
  - Positive Moment Region
    - Bottom Flange Tension
    - 3 holes required, 3 equal spaces
  - Negative Moment Region
    - Top Flange Tension
    - 4 holes required, 4 equal spaces

- **ZONE B**
  - Positive Moment Region
    - Bottom Flange Tension
    - 6 holes required, 6 equal spaces
  - Negative Moment Region
    - Top Flange Tension
    - 8 holes required, 8 equal spaces

- **ZONE C**
  - Positive Moment Region
    - Bottom Flange Tension
    - 9 holes required, 9 equal spaces
  - Negative Moment Region
    - Top Flange Tension
    - 10 holes required, 10 equal spaces

- **ZONE D**
  - Positive Moment Region
    - Bottom Flange Tension
    - 11 holes required, 11 equal spaces
  - Negative Moment Region
    - Top Flange Tension
    - 12 holes required, 12 equal spaces

**REVISED 08-2018**

- A STUD HEIGHT OF 4" WAS ADDED TO THE SHEET.

**APPROVED BY BRIDGE ENGINEER**

**RS40-077-10**

**IOWADOT Highway Division**
SHEAR STUD SPACING

A NOTE: STUD HEIGHTS (3", 4", OR 5") FOR THE LOCATIONS SHOWN 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.

NOTE: ALL STUDS TO BE 2""
**BEAM PLAN AND ELEVATION**

- **Rolled Steel Beam Bridges**
- **Standard Design - 40' Roadway, 3 Span Bridges**
- **June, 2010**

**SHEAR STUD SPACING**

- 2 Studs per Row
- 3 Studs per Row

**NOTES:**

- Studs shall be determined by the designer on miscellaneous details.
- Studs shall be identified by the designer in a table corresponding to the zones listed on this sheet.

**REVISED 08-2018 - UPDATED BRIDGE ENGINEER SIGNATURE.**

**REVISED 02-2014 - STUD HEIGHT OF 4" WAS ADDED TO THE * NOTE.**

**REVISED 10-2016 - ADDED 8 SHEAR STUDS AT EACH "CENTERLINE OF BOLTED SPLICE" AND "ZONE A & B" AND "ZONE C & D". ADDED "SHEAR STUD ON SPLICE PLATE DETAILS".**

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

**RS40-079-10**
SHEAR STUD DETAILS

BEAM ELEVATION

BEAM PLAN AND ELEVATION

SKEW

RS40-080-10

340'-0 BRIDGE

ROLLED STEEL BEAM BRIDGES

JUNE, 2010

Highway Division
<table>
<thead>
<tr>
<th>Bridge Length</th>
<th>Diaphragm Weights (in lbs, includes diaphragm, nuts, bolts, connection plates and welds)</th>
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</thead>
<tbody>
<tr>
<td>0° Skew</td>
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</tr>
<tr>
<td></td>
<td>ROLLED SHAPE</td>
</tr>
<tr>
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<tr>
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<td>PLATE</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>10° Skew</td>
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</tr>
<tr>
<td></td>
<td>ROLLED SHAPE</td>
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<tr>
<td></td>
<td>ROLLED SHEET</td>
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<tr>
<td></td>
<td>PLATE</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>20° Skew</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ROLLED SHAPE</td>
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<tr>
<td></td>
<td>ROLLED SHEET</td>
</tr>
<tr>
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<td>PLATE</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>30° Skew</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ROLLED SHAPE</td>
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<tr>
<td></td>
<td>ROLLED SHEET</td>
</tr>
<tr>
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<td>PLATE</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>45° Skew</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ROLLED SHAPE</td>
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<tr>
<td></td>
<td>ROLLED SHEET</td>
</tr>
<tr>
<td></td>
<td>PLATE</td>
</tr>
</tbody>
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Note: Weights tabulated on this sheet are already included in total weight of structural steel. Given elsewhere in these standards.
FLANGE DEFLECTOR DETAILS

<table>
<thead>
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<tr>
<td>0-5</td>
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<tr>
<td>5-10</td>
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<tr>
<td>10-15</td>
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<tr>
<td>25-30</td>
<td>0.7</td>
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<td>30-35</td>
<td>0.7</td>
</tr>
<tr>
<td>35-40</td>
<td>1.0</td>
</tr>
</tbody>
</table>

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

NOTES:

1. Flange deflectors are required on the outside of the exterior beam, location and number of flange deflectors determined by final designer.

2. Weights tabulated on this sheet are incidental to the weight of structural steel.
BOLTED SPLICE DETAILS

240' BEAM SPLICE
NOTE: ALL BOLTS 2 x 9

260' BEAM SPLICE
NOTE: ALL BOLTS 2 x 9

280' BEAM SPLICE
NOTE: ALL BOLTS 2 x 9

300' BEAM SPLICE
NOTE: ALL BOLTS 2 x 9

TOP AND BOTTOM FLANGE

W36 x 182
W36 x 170

W40 x 199
W40 x 167

W40 x 215
W40 x 183

W40 x 249
W40 x 199

NOTE: ALL BOLTS 2 x 9
BOLTED SPLICE DETAILS

320' BEAM SPLICE
NOTE: ALL BOLTS 2" x 5 x ½

340' BEAM SPLICE
NOTE: ALL BOLTS 2" x 5 x ½

TOP AND BOTTOM FLANGE

W40 x 297
W44 x 290

NOTE: ALL BOLTS 2" x 5 x ½

14 x ½
20 x ½

FILL 14 x ½
ONE EACH SIDE OF WEB

10 SPA. @ 3 = 2'-9
11 SPA. @ 3 = 2'-6

FILL 20 x ½
ONE EACH SIDE OF WEB

W40 x 297
W40 x 230

W44 x 290
W44 x 230

2-½ x 3 x 6
2-½ x 3 x 6

BOLTED SPLICE DETAILS

ROLLED STEEL BEAM BRIDGES
JUNE, 2010

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

REVIEWED - UPDATED BRIDGE ENGINEER SIGNATURE

APPROVED BY BRIDGE ENGINEER

IOWA DOT
Highway Division

RS40-086-10
SPLICE DETAILS
SHEET 3

BOLTED FIELD

REVISION 08 - 2018 - UPDATED BRIDGE ENGINEER SIGNATURE

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES
JUNE, 2010

Highway Division
### 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>
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<td>A</td>
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<tr>
<td>F</td>
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### Table of Barrier Rail Dimensions and Numbers - Cont.

<table>
<thead>
<tr>
<th>Bridge Length</th>
<th>160'-0</th>
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<th>240'-0</th>
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<tr>
<td>F</td>
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</tbody>
</table>

### Barrier Rail Notes

1. The minimum clear distance from face of concrete to near reinforcing bar is to be 2" unless otherwise noted or shown.
2. The permissible construction joints are to be placed between vertical bars at a minimum spacing of 20 ft. Construction Joint contact surfaces are to be coated with an approved bond breaker.
3. Cost of the joint sealers and bond breakers shall be considered incidental to other construction.
4. All barrier rail reinforcing steel is to be epoxy coated.
5. The concrete barrier rail is to be set on a linear foot basis. The number of linear feet of barrier rail installed shall be paid for at the contract price per linear foot basis on plan quantity. Piece box for concrete barrier rail shall be full compensation for furnishing all materials, excluding reinforcing steel, and all of the equipment and labor required to erect the rail in accordance with these plans and current specifications. If coating is required in this plan the steel concrete joint, plates, fittings including labor and any additional work to do the installation is considered incidental to the cost of the railing.

### Barrier Rail Notes - Cont.

6. All barrier rail reinforcing steel is to be included with the superstructure reinforcing steel.
7. The joint sealers shall be light gray non-toxic latex caulking sealers marketed for outdoor use. No testing or certification is required.
8. Top of the barrier rail is to be parallel to the road surface.
9. Cross sectional area of the standard section of the barrier rail = 2.2 square feet.
10. Concrete barrier rails placed using the self-supporting metal rail require the use of a class B concrete in accordance with Article 2513.03A of the standard specifications. Class B concrete is not permitted for concrete barrier rails (cast-in-place or precast).
**BARRIER RAIL NOTES:***

1. **MINIMUM CLEARANCE DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.**

2. **THE PERMISSIBLE CONSTRUCTION JOINTS ARE TO BE PLACED BETWEEN VERTICAL BARS AT A MINIMUM SPACING OF 20 FEET. CONSTRUCTION JOINT CONTACT SURFACES ARE TO BE COATED WITH AN APPROVED BOND BREAKER.**

3. **CROSS SECTIONAL AREA OF THE STANDARD SECTION OF THE BARRIER RAIL = 2.84 SQUARE FEET.**

4. **MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.**

5. **ALL BARRIER RAIL REINFORCING STEEL IS INCLUDED WITH THE SUPERSTRUCTURE COST OF THE RAILING.**

6. **ALL BARRIER RAIL REINFORCING STEEL IS TO BE EPOXY COATED.**

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

8. **CONSTRUCTION JOINTS ARE TO BE PLACED BETWEEN VERTICAL BARS AT A MINIMUM SPACING OF 2 FOR 5 FEET.**

9. **THE JOINT SEALER SHALL BE LIGHT GRAY NONSAG LATEX CAULKING SEALER MARKETED FOR OUTDOOR USE. NO TESTING OR CERTIFICATION IS REQUIRED.**

10. **ALL Joints ARE TO BE PARALLEL TO THE THEORETICAL E GRADE.**

**CONCRETE BARRIER RAIL QUANTITIES**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>UNIT</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

**EPOXY REINF. STEEL-TWO BARRIER RAILS**

- **SECTION**
  - **BAR**
  - **LOCATION**
  - **SIZE**
  - **LENGTH**
  - **WEIGHT**

**CONCRETE PLACEMENT SUMMARY**

<table>
<thead>
<tr>
<th>SECTION</th>
<th>TOTAL</th>
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<tbody>
<tr>
<td>STANDARD SECTION</td>
<td>764 L.F.</td>
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<tr>
<td>BARRIER RAIL END SECTION</td>
<td>764 L.F.</td>
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</tbody>
</table>

**TOTAL (L.F.)**

- **764 L.F.**

**CONCRETE BARRIER RAIL QUANTITIES**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>UNIT</th>
<th>QUANTITY</th>
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<tbody>
<tr>
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**IOWA DOT**

Highway Division

**ROLLED STEEL BEAM BRIDGES**

- **STANDARD DESIGN**
- **40' ROADWAY, 3 SPAN BRIDGES**
- **JUNE, 2010**
**SECTION B-B**

- **VERTICAL**
  - 5 @ 6 = 2'-6

**SECTION C-C**

- **VERTICAL**
  - 99
- 8'-0

**SECTION D-D**

- **VERTICAL**
  - 4'-0
- 1'-0
- 8'-0

**PART ELEVATION VIEW**

- **LEVEL OF 6d2 IN WING FOOTING.**
- **NOTE:**
  - **NOTE:**
  - **NOTE:**
- **NOTE:**

**PART PLAN VIEW**

- **NOTE:**
  - **NOTE:**
  - **NOTE:**

**PART VIEW E-E**

- **NOTE:**
  - **NOTE:**
  - **NOTE:**

**PART VIEW F-F**

- **NOTE:**
  - **NOTE:**
  - **NOTE:**

**CONCRETE PLACEMENT SUMMARY**

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</table>

**BENT BAR DETAILS**

- **NOTE:**
  - **NOTE:**
  - **NOTE:**

**EPOXY REINFORCING STEEL - ONE END SECTION**

- **NOTE:**
  - **NOTE:**
  - **NOTE:**

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

- **NOTE:**
  - **NOTE:**
  - **NOTE:**

**ROLLING STEEL BEAM BRIDGES**

- **NOTE:**
  - **NOTE:**
  - **NOTE:**
EPOXY REINF. STEEL-TWO BARRIER RAILS - 0°, 10°, 20° AND 30° SKEW

<table>
<thead>
<tr>
<th>NO.</th>
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<tr>
<td>1832</td>
<td>474.1</td>
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<tr>
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EPOXY REINF. STEEL-TWO BARRIER RAILS - 45° SKEW

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<td>516.5</td>
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BENT BAR DETAILS

CONCRETE PLACEMENT SUMMARY

<table>
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<tr>
<th>BRIDGE LENGTH</th>
<th>180'-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>
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<tbody>
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<td>STANDARD SECTION</td>
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<td>10'-0</td>
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<td>13'-11</td>
<td>16'-0</td>
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<td>END SECTION</td>
<td>2'-4</td>
<td>4'-0</td>
<td>5'-11</td>
<td>7'-0</td>
<td>10'-0</td>
<td>11'-10</td>
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<td>16'-0</td>
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CONCRETE BARRIER RAIL QUANTITIES

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<thead>
<tr>
<th>BRIDGE LENGTH</th>
<th>0° SKEW</th>
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<td>L.F.</td>
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<td>L.F.</td>
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<td>354.0</td>
<td>414.0</td>
<td>444.0</td>
<td>444.0</td>
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</table>

NOTE: ALL DIMENSIONS ARE OUT TO OUT.
D = PIN DIAMETER.

EPOXY REINF. STEEL-TWO BARRIER RAILS - 45° SKEW
LIGHTING NOTES:

See LI-104 Standard Road Plan for additional information on Junction Boxes.

Construction shall conform to the current Iowa DOT Standard and supplemental specifications and special provisions.

Conduit installation shall be in accordance with Article 2523.9, n., of the Standard Specifications.

All "C" entrance holes in Junction Boxes shall be drilled and tapped for the specified conduit size. All other holes shall have a concrete - tight deep fit. Conduit ends shall not protrude into the Junction Box more than 0.25" from the inside surface of the box wall. Holes with inside surface of box. Grounding Buttons shall be located approximately 3" from the inside surface of the box wall and not closer than 0.25" to the edge of any hole in the box floor. Holes shall be spaced in the low corner of the box with a minimum clearance of 1" between the edge of the hole and the inside surface of the box wall. Typical details are shown on this sheet.

The rigid steel conduit, Junction Boxes, and fittings excluding lashing and any additional work to do the installation is considered incidental to the cost of the railing.

NOTE:

A. 2° threaded bolts.
B. Be blind drilled and tapped for the specified conduit size. All other holes shall have a concrete - tight deep fit. Conduit ends shall not protrude into the Junction Box more than 0.25" from the inside surface of the box wall. Holes with inside surface of box. The grounding Buttons are to be used for underdeck lighting or sign lighting only.

C. Junction Boxes shall be watertight, cast iron - flush mount.
D. Holes. To be used for underdeck lighting or sign lighting only.
E. 2° rigid steel conduit for light poles.

LI-104 JUNCTION BOX
PART PLAN AT WING

EXTERIOR ELEVATION

SECTION THRU BARRIER RAIL

SECTION THRU JUNCTION BOX

PART PLAN AT WING

VIEW A-A

SECTION B-B

SECTION C-C
LIGHTING NOTES:

See LI-04 STANDARD ROAD PLAN for additional information on junction boxes.

CONDUIT INSTALLATION SHALL BE IN ACCORDANCE WITH ARTICLE 2523.03, N, OF THE STANDARD SPECIFICATIONS.

ALL 2" ENTRANCE HOLES IN JUNCTION BOXES SHALL BE DRILLED AND TAPPED FOR THE SPECIFIED CONDUIT SIZE. ALL OTHER HOLES SHALL HAVE A CONCRETE - TIGHT SLIP FIT. CONDUIT ENDS SHALL NOT PROTRUDE INTO THE JUNCTION BOX. SHIELDED JUNCTION BOXES SHALL BE PROVIDED WITH A MINIMUM CLEARANCE OF 1" BETWEEN THE EDGE OF ANY HOLE IN THE BOX WALL AND NOT CLOSER THAN 1" TO THE INNER SURFACE OF THE BOX WALL AND NOT CLOSER THAN 1" TO THE INNER SURFACE OF THE BOX WALL. TYPICAL DETAILS ARE SHOWN ON THIS SHEET.

THE RIGID STEEL CONDUIT, JUNCTION BOXES AND FITTINGS EXCLUDING LABOR AND ANY ADDITIONAL WORK TO DO THE INSTALLATION IS CONSIDERED INCIDENTAL TO THE COST OF THE RAILING.

CONDUIT INSTALLATION SHALL BE IN ACCORDANCE WITH ARTICLE 2523.03, N, OF THE STANDARD SPECIFICATIONS.

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CONDUIT INSTALLATION SHALL BE IN ACCORDANCE WITH ARTICLE 2523.03, N, OF THE STANDARD SPECIFICATIONS.
PINTLE DETAIL

PLAN

SOLATE PLATE ELEVATION

LAMINATED NEOPRENE PADS

MATERIAL FOR NEOPRENE PADS TO BE OF 50 DUROMETER NEOPRENE.

DUROMETER NEOPRENE SHEETS AND NEOPRENE BEARING PADS.

MASONRY PLATES, KEEPER BARS AND PINTLE PLATES, WHICH ARE TO BE GALVANIZED, SHALL COMPLY WITH ASTM A709 GRADE 50.

ANCHOR BOLT SETTING DIAGRAM

ANCHOR BOLT SWEDGE DETAIL

BEARING NOTES:
1. SURFACES MARKED "V" SIMPLE WEDGE AND 250 SURFACE FINISH.
2. MASONRY PLATES ARE TO BE SET ON A 1" NEOPRENE SHEET.
3. PINTLE PLATES, PINTLES, ANCHOR BOLTS, AND MASONRY PLATES, ARE A PART OF THE NEOPRENE SHEETS AND NEOPRENE BEARING PADS.
4. THE PINTLE PLATES, KEEPER BARS AND MASONRY PLATED SHALL BE GALVANIZED. ALL WELDING SHALL BE COMPLETED PRIOR TO GALVANIZING.
5. THE SURFACE OF THE PINTLE PLATE IN CONTACT WITH THE LAMINATED NEOPRENE PAD AND CURVED SOLE PLATE SHALL BE FREE OF PROJECTIONS DUE TO THE GALVANIZING.
6. CURVED SOLE PLATES SHALL COMPLY WITH ASTM A709 GRADE 50. CURVED SOLE PLATES, WHICH ARE TO BE GALVANIZED, SHALL COMPLY WITH ASTM A709 GRADE 50.
7. ANCHOR BOLTS, NUTS AND WASHERS SHALL MEET THE REQUIREMENTS OF AWA 5750.
8. BEARINGS SHOWN ON THIS DRAWING MAY BE USED FOR APPLICATIONS WITH LOCAL BEAM SLOPES BETWEEN 0% - 6%. FOR SITUATIONS OUTSIDE OF THAT SLOPE RANGE, THE ENGINEER SHALL EVALUATE THE BEARINGS APPLICABILITY IN ACCORDANCE WITH CURRENT IOWA DEPARTMENT OF TRANSPORTATION AND ASBESTOS SPECIFICATIONS ON BEARING DESIGN.
9. THE 1" ONE NEOPRENE SHEETS ARE TO BE 50, 60, OR 70 DUROMETER HARDNESS AND SHALL BE 1 INCH GREATER IN LENGTH AND WIDTH THAN THE BOTTOM SURFACES OF THE BEARING."
LAMINATED NEOPRENE PADS

SECTION A-A
FIXED PIER BEARING

SECTION B-B
EXPANSION PIER BEARING

BEARING NOTES:
1. SURFACES WASHED "V" SMALL WELT AND 250 SURFACE FINISH.
2. MASONRY PLATES ARE TO BE SET ON A 1 INCH NEOPRENE SHEET.
3. PINTLE PLATES, ANCHOR BOLTS, MASONRY PLATES, ARE A PART OF THE DESIGNER IS TO ENSURE STEEL HARDNESS AND SHALL BE 1 INCH GREATER IN THE "TYP." NEOPRENE SHEETS ARE TO BE 50, 60, OR 70 DUROMETER HARDNESS AND SHALL BE PAINTED PER STANDARD SPECIFICATIONS. KEEPER BARS, PINTLE PLATES AND WASHERS SHALL MEET ASTM A709 GRADE 50.
4. THE PINTLE PLATES, KEEPER BARS AND MASONRY PLATES SHALL BE GALVANIZED. ALL WELDING SHALL BE COMPLETED PRIOR TO GALVANIZING.
5. THE SURFACE OF THE PINTLE PLATE IN CONTACT WITH THE LAMINATED NEOPRENE PADS AND CURVED SOLE PLATE SHALL BE FREE OF PROJECTIONS DUE TO THE GALVANIZING.
6. CURVED SOLE PLATES SHALL COMPLY WITH ASTM A709 GRADE 50 AND SHALL BE FORMED PER STANDARD SPECIFICATIONS. KEEPER BARS, PINTLE PLATES AND MASONRY PLATES WHICH ARE TO BE GALVANIZED, SHALL COMPLY WITH ASTM A709 GRADE 50.
7. ANCHOR BOLTS, NUTS AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM A572.
8. BEARINGS SHOWN ON THIS DRAWING MAY BE USED FOR APPLICATIONS WITH LOCAL BEAM SLOPES BETWEEN 0- 3% FOR SITUATIONS OUTSIDE OF THIS RANGE THE DESIGNER SHALL EVALUATE THE BEARINGS APPLICABLE IN ACCORDANCE WITH CURRENT IOWA DEPARTMENT OF TRANSPORTATION AND ASST. SPECIFICATIONS ON DESIGN DECISION.
9. THE 1 INCH NEOPRENE SHEETS ARE TO BE 50, 60, OR TO CURVED SOLE PLATES SHALL COMPLY WITH ASTM A709 GRADE 50.
10. ANCHOR BOLTS, NUTS AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM A1011.
LAMINATED NEOPRENE PADS

PLAN

SECTION A-A

FIXED PIER BEARING

SOLE PLATE ELEVATION

NEOPRENE SHEET

PARTIAL ELEVATION

MASONRY P

BEARING

CURVED SOLE E

1'-0 x 2'-0 SWEDGE

ANCHOR BOLT WITH HEX NUT AND WASHER. WT = 14.5 LBS.

DETAIL C

SECTION B-B

EXPANSION PIER BEARING

SKEW BEAM

ANCHOR BOLT SETTING DIAGRAM

ANCHOR BOLT SWEDGE DETAIL

BEARING NOTES:

1. SURFACES WASHED "V" SMALL WET AND 250 SURFACE FINISH.

2. MASONRY PLATES ARE TO BE SET ON A 1 INCH NEOPRENE SHEET.

3. PINTLE PLATES, SOLE PLATES, ANCHOR BOLTS, AND MASONRY PLATES ARE A PART OF THE MASONRY PLATES, WHICH ARE TO BE GALVANIZED, CURVED SOLE PLATE SHALL BE FREE OF PROJECTIONS DUE TO THE GALVANIZING.

4. THE PINTLE PLATES, KEEPER BARS AND MASONRY PLATES SHALL BE GALVANIZED.

5. MASONRY PLATES ARE TO BE SET ON A 1 INCH NEOPRENE SHEET AND NEOPRENE BEARING PADS.

6. NEOPRENE SHEET SHALL COMPLY WITH ASTM A1011 GRADE 50, WASHED "V" SMALL WET, AND AASHTO SPECIFICATIONS ON BEARING DESIGN.

7. SUPERSTRUCTURE STRUCTURAL STEEL, MASONRY PLATES, ARE A PART OF THE PINTLE PLATES, SOLE PLATES, ANCHOR BOLTS, MASONRY PLATES AND NEOPRENE SHEETS.

8. BEARINGS SHOWN ON THIS DRAWING MAY BE USED FOR APPLICATIONS WITH LOCAL BEAM SLIGHTLY BETWEEN 0% - 6%. FOR SITUATIONS OUTSIDE OF THIS SLOPE RANGE, THE DESIGNER SHALL EVALUATE THE REQUIREMENTS APPLYING IT IN ACCORDANCE WITH CURRENT IOWA DEPARTMENT OF TRANSPORTATION STANDARDS, PINTLE PLATES, KEEPER BARS AND MASONRY PLATES, WHICH ARE TO BE GALVANIZED.

9. THE 1 INCH NEOPRENE SHEETS ARE TO BE 50, 60, OR 70 DUROMETER HARDNESS AND SHALL BE 1 INCH GREATER IN LENGTH AND WIDTH THAN THE BOTTOM SURFACES OF THE BEARING'S APPLICABILITY IN ACCORDANCE WITH THE REQUIREMENTS OF I.M. 453.08.

BEARING NOTES:

1. SURFACES WASHED "V" SMALL WET AND 250 SURFACE FINISH.

2. MASONRY PLATES ARE TO BE SET ON A 1 INCH NEOPRENE SHEET.

3. PINTLE PLATES, SOLE PLATES, ANCHOR BOLTS, AND MASONRY PLATES ARE A PART OF THE MASONRY PLATES, WHICH ARE TO BE GALVANIZED, CURVED SOLE PLATE SHALL BE FREE OF PROJECTIONS DUE TO THE GALVANIZING.

4. THE PINTLE PLATES, KEEPER BARS AND MASONRY PLATES SHALL BE GALVANIZED.

5. MASONRY PLATES ARE TO BE SET ON A 1 INCH NEOPRENE SHEET AND NEOPRENE BEARING PADS.

6. NEOPRENE SHEET SHALL COMPLY WITH ASTM A1011 GRADE 50, WASHED "V" SMALL WET, AND AASHTO SPECIFICATIONS ON BEARING DESIGN.

7. SUPERSTRUCTURE STRUCTURAL STEEL, MASONRY PLATES, ARE A PART OF THE PINTLE PLATES, SOLE PLATES, ANCHOR BOLTS, MASONRY PLATES AND NEOPRENE SHEETS.

8. BEARINGS SHOWN ON THIS DRAWING MAY BE USED FOR APPLICATIONS WITH LOCAL BEAM SLIGHTLY BETWEEN 0% - 6%. FOR SITUATIONS OUTSIDE OF THIS SLOPE RANGE, THE DESIGNER SHALL EVALUATE THE REQUIREMENTS APPLYING IT IN ACCORDANCE WITH CURRENT IOWA DEPARTMENT OF TRANSPORTATION STANDARDS, PINTLE PLATES, KEEPER BARS AND MASONRY PLATES, WHICH ARE TO BE GALVANIZED.

9. THE 1 INCH NEOPRENE SHEETS ARE TO BE 50, 60, OR 70 DUROMETER HARDNESS AND SHALL BE 1 INCH GREATER IN LENGTH AND WIDTH THAN THE BOTTOM SURFACES OF THE BEARING'S APPLICABILITY IN ACCORDANCE WITH THE REQUIREMENTS OF I.M. 453.08.
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 Figure P10L.

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

Pier piles 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

BENT BAR DETAILS

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES
PILE BENT NOTES:

These pile groups 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 3 inches unless otherwise noted or shown.

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

BENT BAR DETAILS

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

Pier Cap & E. Piles

NOTE: | FRICTION OR POINT BEARING PILING |

PILE BENT PIERS

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

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, see standard pile.

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

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

PILE BENT PIERS

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

PILE BENT PIERS

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

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PILE BENT PIERS

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

PILE BENT PIERS

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

SYMMETRICAL ABOUT THIS POINT THROUGH 180° ROTATION EXCEPT STEPS

STEP ELEVATIONS

THROUGH 180° ROTATION EXCEPT SYMMETRICAL ABOUT | PIER EXCEPT STEPS

NOTE:

THE HEIGHT OF THE STEPS ON THE BRIDGE IS TO BE EQUAL TO THE DIFFERENCE IN ELEVATIONS OF THE TOP OF SLAB AT

ADJACENT BEAMS ALONG | PIER.

ANCHOR BOLTS REQUIRED FOR FIXED PIER BEARINGS. BOLTS FOR BOLT AND BEARING

SIZES, SEE RS40-093-10, RS40-094-10 OR RS40-095-10.

FOR 9 PILE BENT

FOR 10, 11, 12, 13, 14, 15 & 16 PILE BENTS

FOR 15 PILE BENT
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 Pile. Minimum clear distance from face of concrete to near reinforcing bar shall be 2 inches unless otherwise noted on drawing. Pile piles 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

PILE BAR DETAILS

FRICITION BEARING PILING

<table>
<thead>
<tr>
<th>PRE TYPE 1 OR 2</th>
<th>NUMBER OF TRESTLE PILES</th>
<th>$\frac{d}{16}$ INCHES</th>
<th>UOPL P.A. DEG LOAD (KIPS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>160^2&gt;</td>
<td>11</td>
<td>16</td>
<td>125</td>
</tr>
<tr>
<td>160^2&gt;</td>
<td>11</td>
<td>16</td>
<td>130</td>
</tr>
<tr>
<td>200^2&gt;</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>220^2&gt;</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>240^2&gt;</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>300^2&gt;</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>340^2&gt;</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

FRICITION OR POINT BEARING PILING

<table>
<thead>
<tr>
<th>PRE TYPE 3</th>
<th>NUMBER OF TRESTLE PILES</th>
<th>$\frac{d}{16}$ INCHES</th>
<th>UOPL P.A. DEG LOAD (KIPS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>160^2&gt;</td>
<td>9</td>
<td>16</td>
<td>125</td>
</tr>
<tr>
<td>200^2&gt;</td>
<td>10</td>
<td>16</td>
<td>130</td>
</tr>
<tr>
<td>220^2&gt;</td>
<td>10</td>
<td>16</td>
<td>135</td>
</tr>
<tr>
<td>240^2&gt;</td>
<td>10</td>
<td>16</td>
<td>140</td>
</tr>
<tr>
<td>300^2&gt;</td>
<td>12</td>
<td>16</td>
<td>150</td>
</tr>
<tr>
<td>340^2&gt;</td>
<td>12</td>
<td>16</td>
<td>155</td>
</tr>
</tbody>
</table>

1. See sheet RS40-166-10 for steel reinforcing steel quantities and details.
2. Concrete quantities shown have been the volume of embeded piles deducted for types 1 and 2 piles on MP FT^2 per foot of engaged. Concrete quantities for type 3 piles do not require deduction for pile engagement.
3. See standard Pile for ‘N’ dimension.
4. Notaral, strength 1 design load KIPS is not the value used in the field for driving piles.
Standard Design - 40' Roadway, 3 Span Bridges

Notation:
10° Skew
HP14 Piles

Pile Bent Piers

RS40-102-10

Highway Division

June, 2010
PILE BENT NOTES:

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

PILE SHAPES

FLAT STEEL BEAM BRIDGES

JUNE, 2010

Highway Division

IOWA DOT

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

ROLLED STEEL BEAM BRIDGES

JUNE, 2010

PILE BENT PIERS

HP14 PILES

RS40-103-10
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 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.

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES
STEP ELEVATIONS THROUGH 180° ROTATION EXCEPT SYMMETRICAL ABOUT | PIER EXCEPT STEPS

<table>
<thead>
<tr>
<th>PIER &amp; BRG.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIER CAP</td>
</tr>
<tr>
<td>3'-0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PIER</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 REM SPACES @ 4'-6&quot; = 40'-10&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 6'-0</td>
</tr>
<tr>
<td>5 EQ. SPA.</td>
</tr>
<tr>
<td>TYP.</td>
</tr>
<tr>
<td>1'-0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 7'-3</td>
</tr>
<tr>
<td>6 EQ. SPA.</td>
</tr>
<tr>
<td>TYP.</td>
</tr>
<tr>
<td>1'-0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 5'-6</td>
</tr>
<tr>
<td>5 EQ. SPA.</td>
</tr>
<tr>
<td>TYP.</td>
</tr>
<tr>
<td>1'-0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 4'-9</td>
</tr>
<tr>
<td>5 EQ. SPA.</td>
</tr>
<tr>
<td>TYP.</td>
</tr>
<tr>
<td>1'-0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 5'-3</td>
</tr>
<tr>
<td>6 EQ. SPA.</td>
</tr>
<tr>
<td>TYP.</td>
</tr>
<tr>
<td>1'-0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 4'-6</td>
</tr>
<tr>
<td>6 EQ. SPA.</td>
</tr>
<tr>
<td>TYP.</td>
</tr>
<tr>
<td>1'-0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 3'-5</td>
</tr>
<tr>
<td>12 PILE SPACES @ 3'-5 = 41'-0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 3'-8</td>
</tr>
<tr>
<td>11 PILE SPACES @ 3'-8 = 40'-9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 2'-3</td>
</tr>
<tr>
<td>5 BEAM SPACES @ 7'-10&quot; = 39'-4&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 2'-0</td>
</tr>
<tr>
<td>2'-3 TYP.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>PILE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 1'-0</td>
</tr>
<tr>
<td>4 EQ. SPA.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 1'-0</td>
</tr>
<tr>
<td>3'-0</td>
</tr>
<tr>
<td>2&quot; C L.</td>
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<tr>
<td>2&quot; C L.</td>
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<td>2&quot; C L.</td>
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<table>
<thead>
<tr>
<th>PILE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 1'-6</td>
</tr>
<tr>
<td>3'-6</td>
</tr>
<tr>
<td>1'-0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 1'-7</td>
</tr>
<tr>
<td>10 PILE SPACES @ 4'-1 = 40'-10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 1'-0</td>
</tr>
<tr>
<td>6 EQ. SPA.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 1'-0</td>
</tr>
<tr>
<td>1'-6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 1'-0</td>
</tr>
<tr>
<td>1'-0</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>PILE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 1'-0</td>
</tr>
<tr>
<td>1'-0</td>
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</tbody>
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<table>
<thead>
<tr>
<th>PILE SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 1'-0</td>
</tr>
<tr>
<td>1'-0</td>
</tr>
</tbody>
</table>

Note: The height of the steps on the bridge bent is equal to the difference in elevations of the top of slab at adjacent bents along | PIER.

Anchor bolts required for fixed pier bearings only. See RS40-093-10, RS40-094-10 or RS40-095-10.
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.

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES
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 p10l.

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 in design plans.

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES
TYPICAL PLAN

NOTE:
The height of the steps on the bridge seat is equal to the difference in elevations of the top of slab at adjacent beams above & below.
Anchor bolts required for fixed pier bearings only. For bent and bearing sizes, see RS40-093-10, RS40-094-10 or RS40-095-10.

STEP ELEVATIONS THROUGH 180° ROTATION EXCEPT SYMMETRICAL ABOUT | PIER EXCEPT STEPS

PILE SPACING

FOR 6'-1 5 EQ. SPA.

FOR 8'-1 PILE SPACING 7 EQ. SPA.

FOR 5'-7 5 EQ. SPA.

FOR 6'-8 PILE SPACING 7 EQ. SPA.

FOR 4'-5 5 EQ. SPA.

FOR 3'-11 5 EQ. SPA.

FOR 5'-1 7 EQ. SPA.

FOR 4'-7 7 EQ. SPA.

FOR 3'-8 5 EQ. SPA.

FOR 2'-6 5 EQ. SPA.

FOR 1'-6 5 EQ. SPA.

FOR 1'-0 5 EQ. SPA.

FOR 1'-0 5 EQ. SPA.

FOR 2'-0 5 EQ. SPA.

FOR 1'-6 5 EQ. SPA.

FOR 1'-0 6 EQ. SPA.

FOR 1'-0 6 EQ. SPA.

FOR 4'-5 5 EQ. SPA.

FOR 3'-11 5 EQ. SPA.

FOR 5'-1 5 EQ. SPA.

FOR 4'-7 7 EQ. SPA.

FOR 3'-8 7 EQ. SPA.

FOR 2'-6 7 EQ. SPA.

FOR 1'-6 5 EQ. SPA.

FOR 1'-0 5 EQ. SPA.

FOR 1'-0 5 EQ. SPA.

FOR 2'-0 5 EQ. SPA.

FOR 1'-6 5 EQ. SPA.

FOR 1'-0 5 EQ. SPA.

FOR 1'-0 5 EQ. SPA.

FOR 2'-0 5 EQ. SPA.

FOR 1'-6 5 EQ. SPA.

FOR 1'-0 5 EQ. SPA.

FOR 1'-0 5 EQ. SPA.

FOR 2'-0 5 EQ. SPA.

FOR 1'-6 5 EQ. SPA.

FOR 1'-0 5 EQ. SPA.

FOR 1'-0 5 EQ. SPA.

FOR 2'-0 5 EQ. SPA.

FOR 1'-6 5 EQ. SPA.

FOR 1'-0 5 EQ. SPA.

FOR 1'-0 5 EQ. SPA.

FOR 2'-0 5 EQ. SPA.

FOR 1'-6 5 EQ. SPA.

FOR 1'-0 5 EQ. SPA.

FOR 1'-0 5 EQ. SPA.

FOR 2'-0 5 EQ. SPA.

FOR 1'-6 5 EQ. SPA.

FOR 1'-0 5 EQ. SPA.

FOR 1'-0 5 EQ. SPA.

FOR 2'-0 5 EQ. SPA.

FOR 1'-6 5 EQ. SPA.

FOR 1'-0 5 EQ. SPA.

FOR 1'-0 5 EQ. SPA.

FOR 2'-0 5 EQ. SPA.

FOR 1'-6 5 EQ. SPA.

FOR 1'-0 5 EQ. SPA.
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 RODS SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.

PILE BENTS SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

PILE BENT PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

<table>
<thead>
<tr>
<th>PILE PLOT</th>
<th>PILE detail</th>
<th>PILE ORIENTATION</th>
<th>BENT bar details</th>
<th>PILE BENT PILES</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP14</td>
<td>TYPE 3 TRESTLE BENT PILES</td>
<td>PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES</td>
<td>BENT bar details</td>
<td>PILE BENT PILES</td>
</tr>
</tbody>
</table>
1'-0
6 EQ. SPA.
TYP.
1'-0
6 EQ. SPA.
TYP.
1'-7
1'-0
5 EQ. SPA.
TYP.
1'-6
18 PILE SPACES @ 3'-0 = 54'-9
1'-0
4 EQ. SPA.
TYP.
20 PILE SPACES @ 2'-9 = 55'-0
717x233
3 EQ. SPA.
TYP.
1'-6
22 PILE SPACES @ 2'-6 = 55'-0
166x102
2 EQ. SPA.
TYP.
12 PILE SPACES @ 4'-7 = 55'-0
178x232
STEP ELEVATIONS
THROUGH 180° ROTATION EXCEPT
SYMMETRICAL ABOUT THIS POINT
1'-0
1'-6
14 PILE SPACES @ 3'-11 = 54'-10
16 PILE SPACES @ 3'-5' = 55'-0
7
FOR 160'-0, 180'-0 & 200'-0 SPANS
300'-0, 320'-0 & 340'-0 SPANS
FOR 220'-0, 240'-0, 260'-0, 280'-0,
300'-0, 320'-0 & 340'-0 SPANS
FOR 160'-0, 180'-0 & 200'-0 SPANS
3 EQ.
SPA.
5 EQ.
SPA.
NOTE:
THE HEIGHT OF THE STEPS ON THE BRIDGE SEAT IS EQUAL TO THE
DIFFERENCE IN ELEVATIONS OF THE TOP OF SLAB AT ADJACENT BEAMS
ALONG THE PIER.
ANCHOR BOLTS REQUIRED FOR FIXED PIER BEARINGS ONLY.
FOR BOLT AND BEARING SIZES, SEE RS40-093-10, RS40-094-10 OR RS40-095-10.
ANCHOR BOLTS REQUIRED FOR FIXED PIER BEARINGS ONLY.
FOR BOLT AND BEARING SIZES, SEE RS40-093-10, RS40-094-10 OR RS40-095-10.
FOR BOLT AND BEARING SIZES, SEE RS40-093-10, RS40-094-10 OR RS40-095-10.
FOR BOLT AND BEARING SIZES, SEE RS40-093-10, RS40-094-10 OR RS40-095-10.
FOR BOLT AND BEARING SIZES, SEE RS40-093-10, RS40-094-10 OR RS40-095-10.
FOR BOLT AND BEARING SIZES, SEE RS40-093-10, RS40-094-10 OR RS40-095-10.
FOR BOLT AND BEARING SIZES, SEE RS40-093-10, RS40-094-10 OR RS40-095-10.
FOR BOLT AND BEARING SIZES, SEE RS40-093-10, RS40-094-10 OR RS40-095-10.
FOR BOLT AND BEARING SIZES, SEE RS40-093-10, RS40-094-10 OR RS40-095-10.
FOR BOLT AND BEARING SIZES, SEE RS40-093-10, RS40-094-10 OR RS40-095-10.
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.

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES
STEP ELEVATIONS THROUGH 180° ROTATION EXCEPT SYMMETRICAL ABOUT THIS POINT & BRG.

PIER CAP

PILE SPACING

FOR 6'-0, 6 EQ. SPA.

8'-7 PILE SPACING

10 EQ. SPA. FOR

FOR 5'-3

6 EQ. SPA.

SPACING

FOR 7'-5 PILE

10 EQ. SPA.

11 PILE SPACES @ 5'-0 = 55'-0

13 PILE SPACES @ 4'-2" = 54'-11"

12 PILE SPACES @ 4'-7 = 55'-0

TYP.

6 EQ. SPA.

TYP.

FOR 4'-6

5 EQ.

FOR 160'-0, 180'-0 & 200'-0 SPANS

5 EQ.

FOR 220'-0, 240'-0, 260'-0, 280'-0, 300'-0, 320'-0 & 340'-0 SPANS

ANCHOR BOLTS REQUIRED FOR FIXED PIER BEARINGS ONLY.

FOR BOLT AND BEARING SIZES, SEE RS40-093-10, RS40-094-10 OR RS40-095-10.

NOTE: THE HEIGHT OF THE STEPS ON THE BRIDGE SEAT IS EQUAL TO THE DIFFERENCE IN ELEVATIONS OF THE TOP OF SLAB AT 55'-0 (+6") ACCORDING TO PIER & PIALS.

THE HEIGHT OF THE STEPS ON THE BRIDGE SEAT IS EQUAL TO THE DIFFERENCE IN ELEVATIONS OF THE TOP OF SLAB AT 55'-0 (+6") ACCORDING TO PIER & PIALS.

ANCHOR BOLTS REQUIRED FOR FIXED PIER BEARINGS ONLY.

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NOTE: THE HEIGHT OF THE STEPS ON THE BRIDGE SEAT IS EQUAL TO THE DIFFERENCE IN ELEVATIONS OF THE TOP OF SLAB AT 55'-0 (+6") ACCORDING TO PIER & PIALS.

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ANCHOR BOLTS REQUIRED FOR FIXED PIER BEARINGS ONLY.

FOR BOLT AND BEARING SIZES, SEE RS40-093-10, RS40-094-10 OR RS40-095-10.

NOTE: THE HEIGHT OF THE STEPS ON THE BRIDGE SEAT IS EQUAL TO THE DIFFERENCE IN ELEVATIONS OF THE TOP OF SLAB AT 55'-0 (+6") ACCORDING TO PIER & PIALS.

ANCHOR BOLTS REQUIRED FOR FIXED PIER BEARINGS ONLY.

FOR BOLT AND BEARING SIZES, SEE RS40-093-10, RS40-094-10 OR RS40-095-10.
### STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

JUNE, 2010

Highway Division

---

### BAR SHAPE

<table>
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### PILE TYPE

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<td></td>
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</tbody>
</table>

### BAR OF POINT BEARING PILING OUT TO OUT. D=PIN DIAMETER.

NOTE: ALL DIMENSIONS ARE

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

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<tbody>
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<td>2</td>
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</table>

### PILE LONG INSTALLATION DETAILS

- **PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES**

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

### FRICITION OR POINT BEARING PILING

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<td>2</td>
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<td>3</td>
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</table>

### FOR DETAILS OF TRESTLE PILES, SEE STANDARD P10L.

### ICE AND DRIFT CONDITIONS ARE NOT SEVERE.

### THESE PIER BENTS ARE DESIGNED FOR USE IN LOCATIONS WHERE

---

### TRESTLE BEARINGS

<table>
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### BEARINGS OR ABUTMENT

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</tbody>
</table>

---

### APPROVED BY BRIDGE ENGINEER

ROLLED STEEL BEAM BRIDGES

<table>
<thead>
<tr>
<th>RS40-15-10</th>
</tr>
</thead>
</table>
NOTE: ALL DIMENSIONS ARE OUT TO OUT.
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 RS40-116-10. Battery 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 9'-8".

Pier piles shall be driven to values shown in design plans.
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 26'-0 FOR 17C & 18D

4'-0 x 11'-0 x 28'-0 FOR 17D, 18E, 19A, 20A & 21A

NOTE:
SEE SHEET RS40-118-10 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 RS40-118-10 FOR FOOTING NOTES.
4'-0 x 9'-0 x 25'-0 FOR 10B, 11B & 12B

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

SEE SHEET RS40-121-10 FOR FOOTING NOTES.
### Footing Notes

The spread footings are designed and detailed to be used with the REINFORCING STEEL (ONE FOOTING) as shown on Sheet RS40-124-10.

**Approved by:**

- Bridge Engineer
- Latest Revision Date: 08-2012

**Typical Details:**

- **d1 & d2 Bars**
- **f2 Bars**: Symmetrical about Pier
- **g1**
- **g2**
- **f1**
- **d2**

**Dimensions**: Out to Out

**Bearings Value**: Of At Least 10 Kips Per Square Foot.

**PIER**

<table>
<thead>
<tr>
<th>36 TO 36</th>
<th>34 TO 33</th>
<th>32 TO 31</th>
<th>30 TO 29</th>
<th>28 TO 27</th>
<th>26 TO 25</th>
<th>24 TO 23</th>
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</table>

**REINFORCING STEEL (ONE FOOTING)**

- **d2 Bars EA. FACE**
- **d2 Bar Layout**
- **g1**, **g2**, **f1**, **d2**

**Notes**: The spread footings are designed and detailed to be used with the ROLLED STEEL BEAM BRIDGES as shown on Sheet RS40-124-10.
7/30/2018   8:20:22 AM
bkloss
W:\Highway\Bridge\Standards\Bridges\RS40-10.dgn   RS40-125-10   11x17_pdf.pltcfg

SEE SHEET RS40-124-10 FOR FOOTING NOTES.

NOTE:

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES
LATEST REVISION DATE
APPROVED BY BRIDGE ENGINEER

ROLLING STEEL BEAM BRIDGES
JUNE, 2010
Highway Division

REINFORCING

TOP FOOTING
SYMMETRICAL ABOUT | PIER

REINFORCING
BOTT. FOOTING

4'-0 x 8'-0 x 26'-0
25 SPA, E = 27'-0, 28' - 6g1
28'-0

4'-0 x 8'-0 x 28'-0
27 SPA, E = 27'-0, 28' - 6g1
28'-0

4'-0 x 9'-0 x 28'-0
33 SPA, E = 27'-0, 28' - 6g1
28'-0

4'-0 x 9'-0 x 30'-0
36 SPA, E = 26'-0, 31' - 6g1
30'-0

4'-0 x 10'-0 x 30'-0
47 SPA, E = 38'-0, 39' - 6g1
30'-0

4'-0 x 10'-0 x 32'-0
49 SPA, E = 38'-0, 39' - 6g1
32'-0

4'-0 x 11'-0 x 32'-0
52 SPA, E = 40'-0, 41' - 6g1
32'-0

36 SPA. @ 9° = 28'-6; 37 - 6g1
12 SPA. @ 8° = 29'-4; 45 - 6g1
9 SPA. @ 10 = 29'-0; 30 - 5f1
47 SPA. @ 8 = 31'-4; 48 - 6g1
25 SPA. @ 1'-0 = 25'-0; 26 - 6g1
27 SPA. @ 1'-0 = 27'-0; 28 - 6g1
33 SPA. @ 10 = 27'-6; 34 - 6g1
16 SPA. @ 7 = 27'-0; 28 - 5f1
9 SPA. @ 1'-0 = 29'-0; 30 - 5f1
14 SPA. @ 9 = 31'-0; 32 - 5f1
10 SPA. @ 1'-0 = 31'-0; 32 - 5f1
8 SPA. @ 1'-0 = 31'-0; 32 - 5f1
BENT BAR DETAILS

NOTES:
1. All dimensions are out to out of bar diameter.
2. All reinforcing is deformed.

PIER NOTES:
SEE TEE PIER NOTES ON RS40-016-10 FOR NOTES REGARDING APPLICATION OF THESE PIER STANDARDS.
MASONRY CLEAR DISTANCE FROM FACE OF CONCRETE TO REINFORCING BAR SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.
SEE SHEET RS40-166-10 FOR STEP REINFORCING STEEL QUANTITIES AND DETAILS.
4'-0 x 9'-0 x 24'-0 FOR 16A & 17A

4'-0 x 10'-0 x 24'-0 FOR 16B, 17B & 18A

4'-0 x 11'-0 x 26'-0 FOR 16D, 17D & 18C

4'-0 x 11'-0 x 28'-0 FOR 17E, 18J, 19A, 20A & 21A

NOTE: SEE SHEET RS40-128-10 FOR FOOTING NOTES.

4'-0 x 9'-0 x 24'-0 FOR 16C, 17C & 18B

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

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

ROLLED STEEL BEAM BRIDGES

STEEL PILE FOOTINGS

TEE PIER-HP10x57 SRL-1

RS40-129-10

NOTES:
- 8 SPA. @ 1'-0 = 8'-0
- 23 SPA. @ 1'-0 = 23'-0
- 25 SPA. @ 1'-0 = 25'-0
- 27 SPA. @ 1'-0 = 27'-0
- 28 SPA. @ 10'-0 = 28'-0
- 10° SKEW - SHEET 2

REVISED 05-2013 - REVISION FOR LRFD PILE DESIGN.

REVISED 08-2018 - UPDATED BRIDGE ENGINEER SIGNATURE.

08-2018
4'-0 x 11'-0 x 30'-0 FOR 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 25B, 26B, 27A & 28A

NOTE: SEE SHEET RS40-128-10 FOR FOOTING NOTES.
TYP. 45°

SEE SHEET RS40-131-10 FOR FOOTING NOTES.

NOTE:

8' 5 6 6 25'-0 1'-6 3'-0 3'-0 1'-6 9'-0 1'-6 3'-8 3'-8 3'-8

8' 4 6 6 25'-0 1'-6 4'-0 4'-0 1'-6 10'-0 1'-6 3'-8 3'-8 3'-8

7 5 6 6 25'-0 1'-6 4'-0 4'-0 1'-6 10'-0 1'-6 2'-9 2'-9 5'-6

SYMM. ABOUT | PIER
REINF.
TOP FTG.
REINF.
BOTT. FTG.

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

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

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

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

NOTE:

14 SPA. @ 7 = 8'-2
8 SPA. @ 1'-0 = 8'-0
14 SPA. @ 8 = 9'-4
9 SPA. @ 1'-0 = 9'-0
24 SPA. @ 1'-0 = 24'-0

14 SPA. @ 7 = 8'-2
8 SPA. @ 1'-0 = 8'-0
11 SPA. @ 11 = 10'-1
10 SPA. @ 1'-0 = 10'-0
24 SPA. @ 1'-0 = 24'-0

14 SPA. @ 8 = 9'-4
9 SPA. @ 1'-0 = 9'-0
24 SPA. @ 1'-0 = 24'-0

14 SPA. @ 8 = 9'-4
9 SPA. @ 1'-0 = 9'-0
24 SPA. @ 1'-0 = 24'-0

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

TEE PIER-HP10x57 SRL-2

ROLLING SHEET RS40-133-10 FOR FOOTING NOTES.

NOTE:

14 SPA. @ 7 = 8'-2
8 SPA. @ 1'-0 = 8'-0
14 SPA. @ 8 = 9'-4
9 SPA. @ 1'-0 = 9'-0
24 SPA. @ 1'-0 = 24'-0

11 SPA. @ 11 = 10'-1
10 SPA. @ 1'-0 = 10'-0
24 SPA. @ 1'-0 = 24'-0

OMIT ON 10B, 11B

OMIT ON 10B, 12B

OMIT ON 11C

OMIT ON 12C
TYP. 45°

SEE SHEET RS40-131-10 FOR FOOTING NOTES.

NOTE:

4'-0 x 11'-0 x 25'-0 FOR 13D, 14D & 16C

4'-0 x 12'-0 x 27'-0 FOR 12F, 13F & 14F

4'-0 x 12'-0 x 27'-0 FOR 13E, 14E, 15C & 16D

4'-0 x 12'-0 x 27'-0 FOR 15D, 16E, 17B, 18A & 19A

NOTE:
SEE SHEET RS40-131-10 FOR FOOTING NOTES.

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

ROLLATED STEEL BEAM BRIDGES

JUNE, 2010

Highway Division
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 RS40-126-10.
These spread footings shall extend at least 12 inches into suitable foundation rock and the last 36 inches of rock excavation shall be no later than the lines of masonry. The foundation rock shall have a minimum LRFD bearing value of at least 10 kips per square foot.

WEIGHT:
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<th>Weight (LB.)</th>
<th>Weight (LB.)</th>
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CONCRETE:
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REINFORCING STEEL (ONE FOOTING):
- f2: 23 - d1 & d2 bars ea. face
  
- d2 BAR LAYOUT
  - 4e1: 22 spa. @ 9 = 17'-5
  - 4e2: 22 spa. @ 9 = 17'-5
  - 4e3: 22 spa. @ 9 = 17'-5

NOTE: All dimensions are cut to cut.
SEE SHEET RS40-134-10 FOR FOOTING NOTES.

- SYMMETRICAL ABOUT PIER

25 SPA, e = 7'-0 / 25'-0 - 6g1

6g1

5f1

7g2

5f2

4'-0 x 8'-0 x 26'-0

4'-0 x 9'-0 x 26'-0

4'-0 x 9'-0 x 28'-0

4'-0 x 10'-0 x 28'-0

4'-0 x 10'-0 x 30'-0

4'-0 x 11'-0 x 30'-0

4'-0 x 11'-0 x 32'-0

13 SPA @ 1'-0 = 9'-2'-0 / 14 - 9g2

10° SKEW - SHEET 2
SEE SHEET RS40-138-10 FOR FOOTING NOTES.
FOOTING SIZE

<table>
<thead>
<tr>
<th>FOOTING SIZE</th>
<th>BAR NO., SIZE &amp; SPACING</th>
<th>REINFORCING STEEL USE</th>
<th>BAR LENGTH</th>
<th>PLACING METHOD</th>
<th>TOTAL REINFORCING STEEL</th>
<th>STRUCTURAL CONCRETE (CY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 x 8 x 26&quot;</td>
<td>49 BAR, 1&quot; AS SHOWN</td>
<td>49 BAR, 1&quot; AS SHOWN</td>
<td>49 BAR, 1&quot;</td>
<td>49 BAR, 1&quot;</td>
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</tr>
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<td>4 x 9 x 26&quot;</td>
<td>49 BAR, 1&quot; AS SHOWN</td>
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<td>49 BAR, 1&quot;</td>
<td>49 BAR, 1&quot;</td>
</tr>
<tr>
<td>4 x 10 x 26&quot;</td>
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</tr>
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<td>4 x 11 x 26&quot;</td>
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<td>49 BAR, 1&quot;</td>
<td>49 BAR, 1&quot;</td>
<td>49 BAR, 1&quot;</td>
</tr>
<tr>
<td>4 x 12 x 26&quot;</td>
<td>49 BAR, 1&quot; AS SHOWN</td>
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<td>49 BAR, 1&quot;</td>
<td>49 BAR, 1&quot;</td>
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<td>49 BAR, 1&quot;</td>
<td>49 BAR, 1&quot;</td>
<td>49 BAR, 1&quot;</td>
</tr>
</tbody>
</table>

FOOTING NOTES:

1. NOTA: PLACEMENT OF DESIGN LOAD IMPOSES NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

2. NOTE: D = PIN DIAMETER.

3. SYMMETRICAL ABOUT | PIER |

4. STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK.

5. BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

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

<table>
<thead>
<tr>
<th>FOOTING SIZE</th>
<th>REINFORCING STEEL USE</th>
<th>BAR LENGTH</th>
<th>PLACING METHOD</th>
<th>TOTAL REINFORCING STEEL</th>
<th>STRUCTURAL CONCRETE (CY)</th>
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SEE SHEET RS40-141-10 FOR FOOTING NOTES.
4'-0 x 12'-0 x 28'-0 FOR 16B, 17A, 18A & 19A

4'-0 x 13'-0 x 28'-0 FOR 19B & 20A

SEE SHEET RS40-141-10 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 RS40-116-02.

These spread footings extend at least 10 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 LRFD bearing resistance of 30 kips per square foot. The foundation rock shall have a minimum bearing value of at least 10 kips per square foot.

### Footing Size

<table>
<thead>
<tr>
<th>Footing Size</th>
<th>Dimensions</th>
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<tbody>
<tr>
<td>4' x 10' x 29'</td>
<td>300'-0</td>
</tr>
<tr>
<td>4' x 10' x 31'</td>
<td>200'-0</td>
</tr>
<tr>
<td>4' x 11' x 33'</td>
<td>300'-0</td>
</tr>
<tr>
<td>4' x 11' x 31'</td>
<td>200'-0</td>
</tr>
<tr>
<td>4' x 9' x 29'</td>
<td>300'-0</td>
</tr>
<tr>
<td>4' x 9' x 27'</td>
<td>200'-0</td>
</tr>
</tbody>
</table>

### Typical Section

D2 Bar Layout

Symmetrical About Pier

TYPICAL SECTION

- Footing Notes:
  - Pin Diameter.
  - Dimensions are out to out.

- Structural Concrete:
  - 36.0
  - 43.0
  - 50.0

TOP OF PILES

SYMMETRICAL ABOUT THIS POINT THROUGH 90° ROTATION EXCEPT STEP ELEVATIONS

LOW STEP

NOTE:
SHIFT 5c4 BARS TO CLEAR IN COLUMN ALL SPANS.

SHEAR WALL輝 DETAIL

END ELEVATION

SECTION A-A

SECTION B-B

RS40-146-10

ROLLD STEEL BEAM BRIDGES

JUNE, 2010

HIGHWAY DIVISION

WASHINGTON, IOWA 

STATE OF IOWA 

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

LATEST REVISION DATE
APPROVED BY BRIDGE ENGINEER

REVISED 10-2016 - CHANGED BEVELED KEY WAY ON PIER COLUMN CAP AND POSITIONING TO 7'-9".-0". SEE RS40-094-10 OR RS40-095-10. KEY WAY LENGTH CHANGED TO BE LESS THAN WIDTH OF COLUMN.

REVISED 08-2018 - UPDATED BRIDGE ENGINEER SIGNATURE.
STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

Highway Division

ROLL ED STEEL BEAM BRIDGES
JUNE, 2010

4'-0 x 14'-0 x 30'-0 FOR 26A & 27A

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

4'-0 x 14'-0 x 34'-0 FOR 28B, 29A & 30A

NOTE: SEE SHEET RS40-148-10 FOR FOOTING NOTES.
TYP. 45°

SEE SHEET RS40-151-10 FOR FOOTING NOTES.

NOTE:

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

LATEST REVISION DATE
APPROVED BY BRIDGE ENGINEER

JUNE, 2010

Highway Division

ROLLED STEEL BEAM BRIDGES

REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.

05-2018 - UPDATED BRIDGE ENGINEER SIGNATURE.

REVISED 08-2018 - PJT PIER-HP10x57 SRL-2

STEEL PILE FOOTINGS

RS40-152-10
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 RS40-151-10 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 RS40-146-10. 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 LRFD bearing resistance of 20 kips per square foot and while bearing value of at least 10 kips per square foot.

IN JUNE, 2010

Highway Division

STANDARD DESIGN - 40' ROADWAY 3 SPAN BRIDGES

ROLLED STEEL BEAM BRIDGES

JUNE, 2010

TYPICAL SECTION

d2 LAYOUT

SEE SECTION 6-A ON SHEET RS40-146-10

Copyright © 2004 Iowa DOT

RS40-154-10

TEE PIER - SPREAD FOOTINGS

30 FT SHEET - SHEET 1

IOWA DOT
### Structural Concrete (CY)

<table>
<thead>
<tr>
<th>NO.</th>
<th>5c1</th>
<th>5c2</th>
<th>5c4</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>6'8&quot; TO 6'11&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>6'11&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Minimum Clear Distance from Face of Concrete to Near:**

See Sheet RS40-169-10 for Step Reinforcing Steel Quantities and Details.

### See "Tee Pier Notes" on RS40-003-10 for Notes Regarding Application.
4'-0 x 14'-0 x 34'-0 FOR 32A

4'-0 x 14'-0 x 36'-0 FOR 32B

4'-0 x 15'-0 x 38'-0 FOR 32C
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
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

SEE SHEET RS40-161-10 FOR FOOTING NOTES.

NOTE: SEE SHEET RS40-161-10 FOR FOOTING NOTES.
SEE SHEET RS40-164-10 FOR FOOTING NOTES.

NOTE:

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

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

NOTE:

45° SKEW - SHEET 2

RS40-165-10
STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

NOTE: ALL DIMENSIONS ARE OUT TO OUT.

BENT BAR DETAILS

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. YD. OR MORE OF ADDITIONAL CONCRETE. VALUES SHOULD BE EXCLUDED FOR SCENARIOS THAT HAVE LESS THAN 0.5 CU. YD. OF ADDITIONAL CONCRETE. ADDITIONAL CONCRETE SHOULD BE ADDED TO THE PLANS FOR SUBSTRUCTURE UNIT BASED ON THE ROADWAY GRADE AT EACH ABUTMENT.

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

ROADWAY GRADE AT SUBSTRUCTURE UNIT
<table>
<thead>
<tr>
<th>G &lt;= 2.2%</th>
<th>2.2% &lt; G &lt;= 5.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>10% SKEW</td>
<td>10% SKEW</td>
</tr>
<tr>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td>0.9</td>
<td>0.9</td>
</tr>
</tbody>
</table>

PART ELEVATION VIEW OF PIER CAP

PART ELEVATION VIEW OF PIER CAP

TYPICAL SECTION
NOTE: ALL DIMENSIONS ARE OUT TO OUT.
### Standard Design - 40' Roadway, 3 Span Bridges

#### Latest Revision Date

**Appointed by Bridge Engineer**

### Rolled Steel Beam Bridges

**June, 2010**

#### Highway Division

---

### Bent Bar Details

- **Note:** All dimensions are cut to cut.
- **D = Pin Diameter.**

---

### BARS

- **Length:** Total (LB.)
- **No.:**
- **Size:**
- **Weight:**

<table>
<thead>
<tr>
<th>G &lt;= 0.6%</th>
<th>No.</th>
<th>Size</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>5%</td>
<td>5m1</td>
<td>5</td>
<td>47</td>
</tr>
<tr>
<td>20%</td>
<td>20</td>
<td>20</td>
<td>--</td>
</tr>
<tr>
<td>5%</td>
<td>5</td>
<td>5</td>
<td>59</td>
</tr>
<tr>
<td>4%</td>
<td>4</td>
<td>4</td>
<td>--</td>
</tr>
<tr>
<td>5%</td>
<td>5</td>
<td>5</td>
<td>35</td>
</tr>
</tbody>
</table>

**Notes:**

- **Grade (G):**
  - **0.6% < G <= 1.5%**
  - **1.5% < G <= 2.3%**
  - **2.3% < G <= 3.4%**
  - **3.4% < G <= 5.0%**

---

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

<table>
<thead>
<tr>
<th>Roadway Grade at Substructure Unit</th>
<th>0%</th>
<th>2%</th>
<th>5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beam Abutment Footing</td>
<td>--</td>
<td>0.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Beam Pier Footing</td>
<td>--</td>
<td>0.5</td>
<td>--</td>
</tr>
<tr>
<td>Beam Pier Cap</td>
<td>--</td>
<td>0.5</td>
<td>--</td>
</tr>
</tbody>
</table>

**Notes:**

- Additional concrete 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 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.

---

### Typical Section

#### ONE PIER

---

### Additional Quantities

**RS40-168-10**
TOE OF SLOPE

SUBDRAIN OUTLET

SUBDRAIN OUTLET

SUBDRAIN OUTLET

4"½ PERFORATED SUBDRAIN (MULTIPLE HOLES CORRODED TUBING)

4"½ PERFORATED SUBDRAIN (MULTIPLE HOLES CORRODED TUBING)

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% MIN.

DRILLED HOLES FOR ATTACHMENT

ONE OF THE TWO FOLLOWING WAYS.

METAL CORRUGATED DOUBLE-WALLED PE OR PVC PIPE 6"½ CORRUGATED METAL PIPE OUTLET, OR 4"½ SEAL THE ENTIRE OPENING WITH GROUT.

THE 6"½ METAL OUTLET PIPE, THEN FULLY INSERT 1'-0 OF THE 4"½ SUBDRAIN INTO THE METAL OUTLET PIPE, THEN FULLY SEAL THE ENTIRE OPENING WITH GROUT.

USE AN INSIDE FIT REDUCER COUPLER MATERIALS I.M. 443.01 GUARD. SEE REMOVABLE RODENT TUBING)

SUBDRAIN OUTLET

SUBDRAIN OUTLET

SUBDRAIN OUTLET

SUBDRAIN OUTLET

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%.

PROTECTION LAYOUT 0° SKEW

PROTECTION LAYOUT SKewed

SUBDRAIN OUTLET

SUBDRAIN OUTLET

SUBDRAIN OUTLET

SITUATION PLAN

REFER TO SITUATION PLAN FOR NORTH ARROW.
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:

1. 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 corner of the bridge unless otherwise noted in the plans. The macadam stone at these locations shall be underdrain with engineering fabric in accordance with pertinent articles of the standard specifications.

2. Macadam stone shall be in accordance with Section 4122 of the standard specifications, coarse material, and engine stone is allowable.

3. Wood preservative treatment for the timber edging shall be applied in accordance with Section 4122 of the standard specifications, and shall be underlain with engineering fabric in accordance with pertinent articles of the standard specifications.

4. The macadam stone shall be placed, spread, consolidated, and shaped by mechanical or hand methods that will provide uniform depth and density and provide uniform surface appearance.

5. Payment for the bridge wing armoring shall be incidental to the bid item "structural concrete subdrain" and shall include costs of all material and labor to construct the wing armoring as shown on these plans.

6. These details to be used for 160'-0 to 320'-0 bridge lengths.
DETAILS

WING ARMORING

WING ARMORING AS SHOWN ON THESE PLANS.
INCLUDE COSTS OF ALL MATERIAL AND LABOR TO CONSTRUCT THE TO THE BID ITEM "STRUCTURAL CONCRETE (BRIDGE)" AND SHALL PAYMENT FOR THE BRIDGE WING ARMORING SHALL BE INCIDENTAL APPEARANCE.

UNIFORM 6" DEPTH AND DENSITY AND PROVIDE UNIFORM SURFACE AND SHAPED BY MECHANICAL OR HAND METHODS THAT WILL PROVIDE THE MACADAM STONE SHALL BE DEPOSITED, SPREAD, CONSOLIDATED IN ACCORDANCE WITH SECTION 4161, OF THE STANDARD SPECIFICATIONS.

MEET THE REQUIREMENTS FOR GUARDRAIL POSTS, SAWED FOUR SIDES, WOOD PRESERVATIVE TREATMENT FOR THE TIMBER EDGING SHALL CHoke STONE IS ALLOWED`.

ARTICLE 4196.01, B, 3, OF THE STANDARD SPECIFICATIONS.

IN THE PLANS. THE MACADAM STONE AT THESE LOCATIONS SHALL BE TYPICAL AT EACH CORNER OF THE BRIDGE UNLESS OTHERWISE NOTED WING AND ABUTMENT FOOTING AS SHOWN IN SECTION A-A. THIS IS MACADAM STONE SHALL BE PLACED ALONG THE SIDE OF THE BRIDGE ENGINERING FABRIC UNDERLAYED WITH ENGINEERING FABRIC IN ACCORDANCE WITH SECTION 4161, OF THE STANDARD SPECIFICATIONS.

5'-0 MIN.

UNDERMINING BURIED 6" TO PREVENT ENDS ARE TO BE ENGINEERING FABRIC END OF SUBDRAIN OUTLET

REBAR. DRIVE PIN OR REBAR | †"½ HOLES FOR †"½ x 1'-6 STEEL PIN OR REBAR VERTICALLY TO †"½ OVERTOP SURFACE OF TREATED TIMBER.

08-2018

REPORT DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

ROLMED STEEL BEAM BRIDGES

JUNE, 2010

HIGHWAY DIVISION

IOWA DOT

STANDARD DESIGN - 40' ROADWAY, 3 SPAN BRIDGES

ROLLED STEEL BEAM BRIDGES

JUNE, 2010

WING ARMORING DETAILS

RS40-172-10

GENERAL NOTES:

MACADAM STONE SHALL BE PLACED ALONG THE SIDE OF 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.

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.

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

FACE OF ABUTMENT FOOTING

SUBDRAIN OUTLET

SUBDRAIN

MACADAM STONE (6" THICKNESS)

WINGWALL

ENGINEERING FABRIC (6" THICKNESS)

MACADAM STONE (6" THICKNESS)

ABUTMENT FOOTING

SLOPE PROTECTION

GRADING SURFACE

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

TOP VIEW OF WING ARMORING WITH WING EXTENSION

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.

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

PROFILE VIEW OF WING ARMORING WITH WING EXTENSION

(Shorn for integral Abutment wing with extension)
ABUTMENT BACKFILL PROCESS:

THE BASE OF THE EXCAVATION SUBGRADE BEHIND THE ABUTMENT IS TO BE GRADED WITH A 6% SLOPE AWAY FROM THE ABUTMENT FOOTING AND A 2% CROSS SLOPE IN THE DIRECTION OF THE SUBGRADE OUTLET. THIS EXCAVATION SHADING IS TO BE DONE PRIOR TO BEGINNING INSTALLATION OF THE GEOTEXTILE AND BACKFILL MATERIAL.


THE FABRIC WILL BE ATTACHED TO THE ABUTMENT BY USING LONG FOLED IN THE FABRIC AND SECURED TO THE CONCRETE WITH SHALLOW CONCRETE NAILS. THE FABRIC PLACED SHALL OVERLAP APPROXIMATELY 1 FOOT AND SHALL BE PINNED IN PLACE.

ABUTMENT PLAN WITHOUT WING EXTENSIONS

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

NOTE: SUBBASE IMPORTANCE 2% FROM APPROACH ROADWAY WHERE OUTLETTING BOTH SIDES OF THE ABUTMENT.

NOTE: GEOTEXTILE FABRIC WILL BE ATTACHED TO FACE OF ABUTMENT FOOTING AND WINGS. EXPANSION JOINTS THEREFOR CHALLENGED TO 2% SUBDRAIN SLOPE.
**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 material.

After the subdrains have been installed, the geotextile fabric shall be installed in accordance with the details shown. The fabric is intended to be installed in the slope of the excavation and extend beyond the limits of the abutment, subdrain, and subgrade. The excavated face shall be left free of all loose debris, and the geotextile fabric shall be installed properly to ensure full consolidation. Limit the loose lifts to no more than 2 feet of thickness.

Floodable backfill shall be placed in individual lifts, surface flooded, and compacted with vibratory compactor. Full compaction is required within 2 feet of thickness. Further compaction shall be done within 3 minutes of each lift placement.

The cost of water required for flooding, subdrains, and floodable backfill and geotextile fabric placed at the bridge abutments shall be included in the contract and measured for structural concrete.

**NOTE:** These details to be used for 340'-0 bridge length.

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**Standard Design - 40 Highway, 3 Span Bridges**

**Rolled Steel Beam Bridges**

**June, 2010**

**ABUTMENT BACKFILL DETAILS, 0° SKEW**

**RS40-174-10**

**Iowa DOT**

**Highway Division**
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 abutment. This excavation shaping is to be done prior to beginning
installation of the geotextile and backfill material.

After the subgrade has been graded, the geotextile fabric shall be installed in
accordance with the details shown. The subdrain is intended to be installed in
the base of the excavation and extended vertically along the backwall, abutment
footing, and wall. 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 overlapped approximately 1 foot and shall be pinned in place.
The fabric shall be attached to the abutment using latex-fused 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 wall. This space will be filled with porous concrete.

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

The remaining work involves backfilling with floodable backfill, surface
floodings, 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, 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-inch
sprinkler nozzle should be applied by successive lifts of up to 6 inches
until the required lift thickness is reached. The floodable backfill material
shall be soaked 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
incurred in the contract with more and for structural concrete.

NOTE: SUBDRAIN SLOPE DOWNWARD 2% FROM HIGH END WHEN OUTLETTING BOTH SIDES OF THE ABUTMENT,
SUBDRAIN SLOPE DOWNWARD 2% FROM HIGH END WHEN OUTLETTING AT ONE END OF THE ABUTMENT.

THE GEOTEXTILE FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE
ARTICLE 3 OF THE STANDARD SPECIFICATIONS. THE EXCAVATING
FABRIC IS LIFTED THE LAPS SHALL BE A MINIMUM OF ONE FOOT IN
LENGTH, SINGLE FABRIC WITH TOP LAPS ELECTRIC TO TOP AND
STAPLED FOR CONTINUITY.
NOTE: THESE DETAILS TO BE USED FOR 34°-0 BRIDGE LENGTH.

ABUTMENT BACKFILL PROCESS:

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

After the subdrain has been sized, the geotextile fabric shall be installed in accordance with the details shown. The fabric is intended to be installed in the base of the excavations and extended vertically along the abutment backwall, abutment footings, and abutment, and perpendicular to the toe of the excavation. The geotextile is extended to a height that will be approximately 5 to 6 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 latex folded in the fabric and secured to the concrete with shallow concrete nails. The fabric placed shall overlap approximately 1 foot and shall be pinned in place.

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 compaction to ensure full compaction. 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 2:1 size subdrain may be supplied by successive lifts to improve consistency for 3 minutes within each lift.

Floodable backfill lift placement, compaction, and backfilling shall progress until the required full thickness of the abutment backfill is backfilled. Water required for flooding, subdrains, porous backfill, floodable backfill, and geotextile fabric furnished at the bridge abutments shall 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 and shall not be paid separately for payment.

NOTE:

SUBDRAIN SMALL SLOPE DOWNSTREAM FROM APPROACH ROADWAY WHEN OUTLETTING BOTH SIDES OF THE ABUTMENT.

SUBDRAIN SMALL SLOPE DOWNSTREAM FROM HIGH END WHEN OUTLETTING AT ONE END OF THE ABUTMENT.

The geotextile fabric shall be in accordance with Article 9.3 of the Standard Specifications. If the embankment fabric is lifted the lift shall be a minimum of 1 foot in length, embankment fabric with peel slope lap placed on top and sealed for continuity.

NOTE:

The geotextile fabric shall be installed in accordance with the details shown. The fabric is intended to be installed in the base of the excavations and extended vertically along the abutment backwall, abutment footings, and abutment, and perpendicular to the toe of the excavation. The fabric placed shall overlap approximately 1 foot and shall be pinned in place. The fabric shall be attached to the abutment by using latex folded in the fabric and secured to the concrete with shallow concrete nails. The fabric placed shall overlap approximately 1 foot and shall be pinned in place.

NOTE:

See subdrain details sheet for details not shown on this sheet which are pertinent to this structure.

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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 may be added at certain locations to provide stability to the structure during construction. These may be used to supplement permanent bracing, stabilize beams, and reduce the deck thickness loss during the deck placements. The spacing between adjacent tie bars between tie bars and permanent diaphragm shall be a minimum of 15 feet. The overhang bracket shall be located within the plane perpendicular to the beam web.

- The temporary bracing system shall consist of a compression strut pipe, a tie bar, and hangers or clips. The connection to the beam flanges shall be a minimum of 10,000 lbs. The yield strength of the tie and strut shall be a minimum of 36,000 psi.
- The ultimate capacity of the tie bar and connection to the beam flanges shall be a minimum of 50,000 lbs. The net deck concrete load is assumed to extend 15 feet in front of the finisher machine rail.
- The temporary bracing system shall be placed at the top junction of the interior beam and the bottom junction of the exterior beam, located at the diaphragm for the 160' bridge only.
- Temporary bracing shall be considered incidental to the cost of structural steel.