H44–07 THREE SPAN
PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE STANDARDS
### INDEX FOR H44-07 STANDARDS:

- H44-01-07 **INDEX SHEET**
- H44-02-07 **GENERAL NOTES**
- H44-03-07 **SUPERSTRUCTURE DETAILS**
- H44-04-07 **deck & abutment details for 30° skew**
- H44-05-07 **barrier rail details 1 of 3**
- H44-06-07 **barrier rail details 2 of 3**
- H44-07-07 **open rail details 1 of 2**
- H44-08-07 **open rail details 2 of 2**
- H44-09-07 **pier details**
- H44-10-07 **beam details**
- H44-11-07 **beam details**
- H44-12-07 **c beam details**
- H44-13-07 **c beam details**
- H44-14-07 **c beam details**
- H44-15-07 **c beam details**
- H44-16-07 **c beam details**
- H44-17-07 **c beam details**
- H44-18-07 **c beam details**
- H44-19-07 **c beam details**
- H44-20-07 **c beam details**
- H44-21-07 **c beam details**
- H44-22-07 **c beam details**
- H44-23-07 **c beam details**
- H44-24-07 **c beam details**
- H44-25-07 **c beam details**
- H44-26-07 **c beam details**
- H44-27-07 **c beam details**
- H44-28-07 **c beam details**
- H44-29-07 **c beam details**
- H44-30-07 **c beam details**
- H44-31-07 **c beam details**
- H44-32-07 **c beam details**
- H44-33-07 **c beam details**
- H44-34-07 **c beam details**
- H44-35-07 **c beam details**
- H44-36-07 **c beam details**
- H44-37-07 **c beam details**
- H44-38-07 **c beam details**
- H44-39-07 **c beam details**
- H44-40-07 **c beam details**
- H44-41-07 **c beam details**
- H44-42-07 **c beam details**
- H44-43-07 **c beam details**
- H44-44-07 **c beam details**
- H44-45-07 **c beam details**
- H44-46-07 **c beam details**
- H44-47-07 **c beam details**
- H44-48-07 **c beam details**
- H44-49-07 **c beam details**
- H44-50-07 **c beam details**
- H44-51-07 **c beam details**
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- H44-66-07 **c beam details**
- H44-67-07 **c beam details**
- H44-68-07 **c beam details**
- H44-69-07 **c beam details**
- H44-70-07 **c beam details**
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- H44-72-07 **c beam details**
- H44-73-07 **c beam details**
- H44-74-07 **c beam details**
- H44-75-07 **c beam details**
- H44-76-07 **c beam details**
- H44-77-07 **c beam details**
- H44-78-07 **c beam details**
- H44-79-07 **c beam details**
- H44-80-07 **c beam details**

### INDEX FOR H44-07 STANDARDS (CONT'D.):

- H44-38-07 **pier details for 0° skew**
- H44-39-07 **pier details for 0° skew**
- H44-40-07 **pier details for 0° skew**
- H44-41-07 **pier details for 0° skew**
- H44-42-07 **pier details for 0° skew**
- H44-43-07 **pier details for 0° skew**
- H44-44-07 **pier details for 0° skew**
- H44-45-07 **pier details for 0° skew**
- H44-46-07 **pier details for 0° skew**
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- H44-80-07 **pier details for 0° skew**

**Note:**
- Structural Resistance Level-1 (SRL-1) replaces the 75 ton steel pile designation.
- Structural Resistance Level-2 (SRL-2) replaces the 50 ton steel pile designation.

For more information on Structural Resistance Levels (SRL-1 & SRL-2), see the Bridge Design Manual located on the Iowa Department of Transportation's Office of Bridges and Structures website.
GENERAL NOTES:

THE H44-07 BRIDGE STANDARDS, IF PROPERLY USED, PROVIDE THE STRUCTURAL PLANS NECESSARY TO CONSTRUCT THREE SPAN 44 ROADWAY PRETENSIONED PRESTRESSED CONCRETE Beam Bridges WITH LENGTHS OF 138'-10, 151'-4, 163'-10, 176'-4, 188'-10, 201'-4, 213'-10, 226'-4 AND 243'-0.

THESE BRIDGES MAY BE BUILT ON A 0°, 15° OR 30° SKEW. THESE PLANS SHOW THE BRIDGE SHAPES IN ONE DIRECTION BUT ALL DIMENSIONS AND DETAILS WOULD BE THE SAME FOR THE OTHER DIRECTIONS.

FOR CLARITY, MOST SECTIONS SHOWN ON THE FOLLOWING SHEETS ARE DRAWN WITH BARRIER RAIL ONLY. THESE SECTIONS WILL BE REVISED FOR OPEN RAIL DESIGN WITH ANY MODIFICATIONS SHOWN ON SHEET H44-05-07 AND H44-06-07.

THESE BRIDGES ARE DESIGNED FOR HL-93 LOADING PLUS 20 LBS. PER SQ. FT. OF ROADWAY FOR FUTURE ROADWAY ENHANCEMENT AND TO PROVIDE SUFFICIENT CLEARANCE FOR SIGNAGE AND SAFETY.".

THE FLOOR SLAB AS SHOWN INCLUDES 1" INTEGRAL WEARING SURFACE.

THE INTEGRAL ABUTMENTS, PILE BENTS, AND TEE PIERS FOR THESE H44 STANDARDS HAVE BEEN DESIGNED FOR THE USE OF VARIOUS TYPES OF PILE FOOTINGS OR SPREAD FOOTINGS AS FOLLOWS.

THESE STANDARDS GIVE MOST OF THE INFORMATION NECESSARY TO BUILD THESE BRIDGES ON EITHER A STRAIGHT GRADE OR A CURVATURE GRADE. THE DESIGNER MAY ADJUST THE CONCRETE AND STEEL REINFORCEMENT QUANTITIES ACCORDINGLY.

THESE BRIDGE PLANS Label ALL REINFORCING STEEL WITH ENGLISH NOTATION (4/" = 1 INCH DIAMETER BAR). ENGLISH REINFORCING STEEL RECEIVED IN THE FIELD MAY DISPLAY THE FOLLOWING "BAR DESIGNATION," THE "BAR DESIGNATION" IS THE STAMPED IMPRESSION ON THE REINFORCING BARS, AND IS EQUIVALENT TO THE KILN DESIGNATION IN ILLINOIS.

DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH LRFD AASHTO SECTION 5, f'c = 3,500 PSI.

REINFORCING STEEL IN ACCORDANCE WITH LRFD AASHTO SECTION 5, GRADE 60.

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH AASHTO LRFD 4th Ed, SERIES OF 2007.

SPECIFICATIONS:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF Steel CONSTRUCTION SPECIFICATIONS, SERIES 860, 1999.

CONCRETE IN ACCORDANCE WITH LRFD AASHTO SECTION 5, f'c = 3,500 PSI.

REINFORCING STEEL IN ACCORDANCE WITH LRFD AASHTO SECTION 5, GRADE 60.

CONCRETE INTERMEDIATE DIAPHRAGMS SHALL BE USED FOR OVERPASS BRIDGES. THE DESIGNER SHALL ADJUST THE CONCRETE AND REINFORCING QUANTITIES ACCORDINGLY.

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EXAMPLES OF BRIDGE SEAT AND STEP CALCULATIONS:

THE DESIGNER SHALL SHOW ON THE PLANS THE ELEVATIONS AND THE STEP DIMENSIONS REQUIRED FOR EACH OF THE PIER TOP AND ABUTMENT BRIDGE SEATS.

THE BOXED IN DETAILS IN THE FOLLOWING EXAMPLES SHOW THE INFORMATION SHOULD BE INCLUDED ON THE PLANS.

EXAMPLE NO. 1

A STRAIGHT SHAPE WITH THE P.L. STATION OF 1034.00 AND ELEVATION OF 632.00. THE BRIDE LENGTH IS 32'-0 E TO E OF ABUTMENT BEARINGS WITH 30' SHOULDER HEIGHTS.

STATIONS

<table>
<thead>
<tr>
<th>PIER BRG.</th>
<th>P. I. ELEV.</th>
<th>BR. SEAT ELEV.</th>
<th>SLAB CROWN</th>
<th>SK. CORRECT BEAMS</th>
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<tr>
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ELEVATION ALONG PROFILE DRIVE LINE (P.L. ELEV.)

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ELEVATION TOP OF SLAB FACING ALONG THE STATIONING

ELEVATIONS TOP OF SLAB FACING ALONG THE STATIONING

PIER NO. 1

EXAMPLE NO. 2

A STRAIGHT SHAPE WITH THE P.L. STATION OF 1034.00 AND ELEVATION OF 632.00. THE BRIDE LENGTH IS 32'-0 E TO E OF ABUTMENT BEARINGS WITH 30' SHOULDER HEIGHTS.

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ELEVATION TOP OF SLAB FACING ALONG THE STATIONING

ELEVATIONS TOP OF SLAB FACING ALONG THE STATIONING

PIER NO. 1

TEE PIER NOTES:

THE TEE PIERS SHOWN IN THESE PLANS ARE DESIGNED FOR USE WITH THE H44-07 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE STANDARDS. THE PIER MAY BE USED FOR EITHER GRADE SEPARATION OR STREAM CROSSING STRUCTURES. THE PIER DESIGN IS BASED ON THE FOLLOWING STEAM FORCE AND ICE LOADING CONDITIONS, AND SHOULD NOT BE USED WHERE THESE LOADING CONDITIONS ARE PRESENT.

ICE FORCE:

ICE FORCES WERE APPLIED AT A HEIGHT OF 1'-1 OF THE PIER FOOTING. WHERE N IS THE OVERALL HEIGHT OF THE PIER, THE EFFECTIVE ICE STRENGTH IS 24 KIPS FOR T=1 OF ICE. THE ICE FORCES WERE ALSO APPLIED TO THE PIER TOP AS A CASE 5 OF F APPLIED ALONG THE PIER'S LONG AXES AND F AS A CASE 5 OF F APPLIED PERPENDICULAR TO THE PIER'S LONG AXES.

STREAM FLOW:

THE STREAM VELICITY WAS USED IN CASES WHERE N IS THE EFFECTIVE ICE STRENGTH IS 24 KIPS FOR T=1 OF ICE. THE ICE FORCES WERE ALSO APPLIED TO THE PIER TOP AS A CASE 5 OF F APPLIED ALONG THE PIER'S LONG AXES AND F AS A CASE 5 OF F APPLIED PERPENDICULAR TO THE PIER'S LONG AXES.

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The concrete sealer limits are shown in the detail and shall apply to the full length of bridge. Concrete sealer shall be applied in accordance with Article 240, 5, of the standard specifications.

**Concrete Sealer Limits for Open Rails**

Concrete sealers shall be applied to both sides of bridge slab on the top, edge, and under the slab. The concrete sealers shall also be applied to the drain flange on the top, traffic face side, bottom of rail, and on all sides of the open rail posts.

The concrete sealer limits are shown in the detail and shall apply to the full length of bridge. Concrete sealers shall be applied in accordance with Article 240, 5, of the standard specifications.

**Situations Sketch (Showing Drain Locations)**

1. **Drain Details**
   - Use for barrier rail only, not required for open rail.
   - Drain details shown in the detail.
   - See "Situation Sketch" for location of drains.
   - Drain details as included in the quantity for "Structural Steel".

**Data for One Drain**

<table>
<thead>
<tr>
<th>Drain Size</th>
<th>Amount</th>
<th>Length of Drain</th>
<th>Weight</th>
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<tbody>
<tr>
<td>4'-11&quot;</td>
<td>0.25</td>
<td>1</td>
<td>2.05</td>
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<tr>
<td>4'-4&quot;</td>
<td>0.25</td>
<td>1</td>
<td>1.75</td>
</tr>
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</table>

**Concrete Sealer Limits**

Concrete slabs shall be applied to both sides of bridge slab on the top, edge, and under the slab. The concrete sealers shall also be applied to the drain flange on the top, traffic face side, bottom of rail, and on all sides of the open rail posts.

**Concrete Sealer Limit for Slab at Beams**

Concrete sealers shall be applied to both sides of bridge slab on the top, edge, and under the slab. The concrete sealers shall also be applied to the drain flange on the top, traffic face side, bottom of rail, and on all sides of the open rail posts.

**Concrete Sealer Limit for Slab at Barrier Rail**

Concrete sealers shall be applied to both sides of bridge slab on the top, edge, and under the slab. The concrete sealers shall also be applied to the drain flange on the top, traffic face side, bottom of rail, and on all sides of the open rail posts.

**Concrete Sealer Limit for Drain Details**

Concrete sealers shall be applied to both sides of bridge slab on the top, edge, and under the slab. The concrete sealers shall also be applied to the drain flange on the top, traffic face side, bottom of rail, and on all sides of the open rail posts.

**Concrete Sealer Limit for Slab Thickness Details**

Concrete sealers shall be applied to both sides of bridge slab on the top, edge, and under the slab. The concrete sealers shall also be applied to the drain flange on the top, traffic face side, bottom of rail, and on all sides of the open rail posts.

**Concrete Sealer Limit for Typical Slab and Haunch Detail**

Concrete sealers shall be applied to both sides of bridge slab on the top, edge, and under the slab. The concrete sealers shall also be applied to the drain flange on the top, traffic face side, bottom of rail, and on all sides of the open rail posts.

**Concrete Sealer Limit for Superstructure Details**

Concrete sealers shall be applied to both sides of bridge slab on the top, edge, and under the slab. The concrete sealers shall also be applied to the drain flange on the top, traffic face side, bottom of rail, and on all sides of the open rail posts.
### Reinforcing Bar List

**One Superstructure and Two Abutments**

- **Rail Reinforcing Not Included**

#### Sub Total W/ Steel H-Piles

#### Sub Total W/ Wood Piles

#### Spiral Spacers, L 7/8 x 7/8 x 1/8 x 0.70 (Wood/Steel)*

- **Pile Spiral (Wood/Steel)*

#### Pavement Notch

- **Top of Slab Transverse at Rail**

- **Abut. Diaphragm Wing Ext. Longit.**

- **Slab Longitudinal, Top & Bottom, Ends**

- **Slab Transverse, Top & Bottom**

#### Bent Bar Details

- **Bent Bar Details**

---

**Iowa DOT**

**Highway Division**

**Standard Design - 49 Roads - Three Span Bridge**

**Pretensioned Prestressed Concrete Beam Bridges**

**Marc Dott**

**Deck & Abutment Reinf.**

**H44-10-07**
NOTES:

1. **ABUTMENT NOTES:**

   - **MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR-ENDING SLAB IS TO BE 2' UNLESS OTHERWISE NOTED OR SHOWN.**
   - **IF NECESSARY TO PREVENT DAMAGE TO THE END OF THE BRIDGE SEE SHEET H3002 FOR CONSTRUCTION EQUIPMENT, AN APPROPRIATE METHOD OF PROTECTION APPROVED BY THE ENGINEER SHALL BE PROVIDED BY THE BRIDGE CONTRACTOR AT NO EXTRA COST TO THE COUNTY OR STATE.**
   - **ABUTMENT PILE PLAN.**
   - **ABUTMENT PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.**
   - **BARRIER RAIL NOT SHOWN IN DETAILS.**
   - **IF ROCK IS CLOSER THAN 15' BELOW ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.**

   - **ABUTMENT DETAILS:**

     - **Minimum clear distance from face of concrete to near-ending slab is to be 2' unless otherwise noted or shown.**
     - **If necessary to prevent damage to the end of the bridge see Sheet H3002 for construction equipment, an appropriate method of protection approved by the engineer shall be provided by the bridge contractor at no extra cost to the county or state.**
     - **Abutment piles shall be driven to values shown in design plans.**
     - **Barrier rail not shown in details.**
     - **If rock is closer than 15' below abutment footing, special analysis may be required.**

2. **NOTES:**

   - **PART REAR ELEVATION AT ABUTMENT**
   - **Note: Top of abutment drawn for solid barrier rail.**

   - **PART SECTION A-A**
   - **Note: Shift bars in P.S. as necessary to move beam, plane, etc. bars parallel to longitude of steel.**

   - **PART SECTION B-B**
   - **Note: Shift bars in P.S. as necessary to move beam, plane, etc. bars parallel to longitude of steel.**

   - **PART SECTION C-C**
   - **Note: Shift bars in P.S. as necessary to move beam, plane, etc. bars parallel to longitude of steel.**

3. **ABUTMENT NOTES:**

   - **MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR-ENDING SLAB IS TO BE 2' UNLESS OTHERWISE NOTED OR SHOWN.**
   - **IF NECESSARY TO PREVENT DAMAGE TO THE END OF THE BRIDGE SEE SHEET H3002 FOR CONSTRUCTION EQUIPMENT, AN APPROPRIATE METHOD OF PROTECTION APPROVED BY THE ENGINEER SHALL BE PROVIDED BY THE BRIDGE CONTRACTOR AT NO EXTRA COST TO THE COUNTY OR STATE.**
   - **ABUTMENT PILE PLAN.**
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   - **BARRIER RAIL NOT SHOWN IN DETAILS.**
   - **IF ROCK IS CLOSER THAN 15' BELOW ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.**

   - **ABUTMENT DETAILS:**

     - **Minimum clear distance from face of concrete to near-ending slab is to be 2' unless otherwise noted or shown.**
     - **If necessary to prevent damage to the end of the bridge see Sheet H3002 for construction equipment, an appropriate method of protection approved by the engineer shall be provided by the bridge contractor at no extra cost to the county or state.**
     - **Abutment piles shall be driven to values shown in design plans.**
     - **Barrier rail not shown in details.**
     - **If rock is closer than 15' below abutment footing, special analysis may be required.**

4. **NOTES:**

   - **PART REAR ELEVATION AT ABUTMENT**
   - **Note: Top of abutment drawn for solid barrier rail.**

   - **PART SECTION A-A**
   - **Note: Shift bars in P.S. as necessary to move beam, plane, etc. bars parallel to longitude of steel.**

   - **PART SECTION B-B**
   - **Note: Shift bars in P.S. as necessary to move beam, plane, etc. bars parallel to longitude of steel.**

   - **PART SECTION C-C**
   - **Note: Shift bars in P.S. as necessary to move beam, plane, etc. bars parallel to longitude of steel.**

5. **ABUTMENT NOTES:**

   - **MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR-ENDING SLAB IS TO BE 2' UNLESS OTHERWISE NOTED OR SHOWN.**
   - **IF NECESSARY TO PREVENT DAMAGE TO THE END OF THE BRIDGE SEE SHEET H3002 FOR CONSTRUCTION EQUIPMENT, AN APPROPRIATE METHOD OF PROTECTION APPROVED BY THE ENGINEER SHALL BE PROVIDED BY THE BRIDGE CONTRACTOR AT NO EXTRA COST TO THE COUNTY OR STATE.**
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   - **ABUTMENT PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.**
   - **BARRIER RAIL NOT SHOWN IN DETAILS.**
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   - **ABUTMENT DETAILS:**

     - **Minimum clear distance from face of concrete to near-ending slab is to be 2' unless otherwise noted or shown.**
     - **If necessary to prevent damage to the end of the bridge see Sheet H3002 for construction equipment, an appropriate method of protection approved by the engineer shall be provided by the bridge contractor at no extra cost to the county or state.**
     - **Abutment piles shall be driven to values shown in design plans.**
     - **Barrier rail not shown in details.**
     - **If rock is closer than 15' below abutment footing, special analysis may be required.**

6. **NOTES:**

   - **PART REAR ELEVATION AT ABUTMENT**
   - **Note: Top of abutment drawn for solid barrier rail.**

   - **PART SECTION A-A**
   - **Note: Shift bars in P.S. as necessary to move beam, plane, etc. bars parallel to longitude of steel.**

   - **PART SECTION B-B**
   - **Note: Shift bars in P.S. as necessary to move beam, plane, etc. bars parallel to longitude of steel.**

   - **PART SECTION C-C**
   - **Note: Shift bars in P.S. as necessary to move beam, plane, etc. bars parallel to longitude of steel.**

7. **ABUTMENT NOTES:**

   - **MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR-ENDING SLAB IS TO BE 2' UNLESS OTHERWISE NOTED OR SHOWN.**
   - **IF NECESSARY TO PREVENT DAMAGE TO THE END OF THE BRIDGE SEE SHEET H3002 FOR CONSTRUCTION EQUIPMENT, AN APPROPRIATE METHOD OF PROTECTION APPROVED BY THE ENGINEER SHALL BE PROVIDED BY THE BRIDGE CONTRACTOR AT NO EXTRA COST TO THE COUNTY OR STATE.**
   - **ABUTMENT PILE PLAN.**
   - **ABUTMENT PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.**
   - **BARRIER RAIL NOT SHOWN IN DETAILS.**
   - **IF ROCK IS CLOSER THAN 15' BELOW ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.**

   - **ABUTMENT DETAILS:**

     - **Minimum clear distance from face of concrete to near-ending slab is to be 2' unless otherwise noted or shown.**
     - **If necessary to prevent damage to the end of the bridge see Sheet H3002 for construction equipment, an appropriate method of protection approved by the engineer shall be provided by the bridge contractor at no extra cost to the county or state.**
     - **Abutment piles shall be driven to values shown in design plans.**
     - **Barrier rail not shown in details.**
     - **If rock is closer than 15' below abutment footing, special analysis may be required.**

8. **NOTES:**

   - **PART REAR ELEVATION AT ABUTMENT**
   - **Note: Top of abutment drawn for solid barrier rail.**

   - **PART SECTION A-A**
   - **Note: Shift bars in P.S. as necessary to move beam, plane, etc. bars parallel to longitude of steel.**

   - **PART SECTION B-B**
   - **Note: Shift bars in P.S. as necessary to move beam, plane, etc. bars parallel to longitude of steel.**

   - **PART SECTION C-C**
   - **Note: Shift bars in P.S. as necessary to move beam, plane, etc. bars parallel to longitude of steel.**
### Step Reinforcing Bar List

#### One Pile Bent Pier

<table>
<thead>
<tr>
<th>Type</th>
<th>No.</th>
<th>Beams</th>
<th>Dia.</th>
<th>3in. spacing</th>
<th>4in. spacing</th>
<th>5in. spacing</th>
<th>6in. spacing</th>
<th>8in. spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar</td>
<td>75</td>
<td>5</td>
<td>3/4</td>
<td>2 3/4</td>
<td>2 1/4</td>
<td>3 1/4</td>
<td>4 1/4</td>
<td>5 1/4</td>
</tr>
</tbody>
</table>

*Bars vary from 28'-7 to 29'-3*

#### One Tee Pier

<table>
<thead>
<tr>
<th>Type</th>
<th>No.</th>
<th>Beams</th>
<th>Dia.</th>
<th>3in. spacing</th>
<th>4in. spacing</th>
<th>5in. spacing</th>
<th>6in. spacing</th>
<th>8in. spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar</td>
<td>75</td>
<td>5</td>
<td>3/4</td>
<td>2 3/4</td>
<td>2 1/4</td>
<td>3 1/4</td>
<td>4 1/4</td>
<td>5 1/4</td>
</tr>
</tbody>
</table>

*Bars vary from 28'-7 to 29'-3*

### Bent Bar Details

- **TYPICAL SECTION**

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

#### Additional Concrete Volume

<table>
<thead>
<tr>
<th>Roadway Grade at Substructure Unit</th>
<th>1%</th>
<th>2%</th>
<th>3%</th>
<th>4%</th>
<th>5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Beam Footing</td>
<td>**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Beam Footing</td>
<td></td>
<td>**</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*# of pile bent pier - all beams*

### Additional Quantities

<table>
<thead>
<tr>
<th>Type</th>
<th>Additional Quantities</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYP.</td>
<td></td>
<td>20</td>
</tr>
</tbody>
</table>

### Standard Design - 4/13 Roadways Three Span Bridge

**Pretensioned Prestressed Concrete Beam Bridges**

*Iowa DOT*

**Highway Division**

**ADDITIONAL QUANTITIES BY SHEET**

H44-17-07
SLAB LAYOUT

CONCRETE PLACEMENT QUANT.

GENERAL DATA

ESTIMATED QUANTITIES

CONCRETE PLACEMENT QUANT.

SUPERSTRUCTURE PLUS INTERNAL SUPPORT

SLAB LAYOUT

(LEFT HAND SIDE SHOWN, RIGHT HAND SIDE SIMILAR)
The specification references were changed. The beam data has been updated to the current beam.

1. The Lift Loop detail shows the structural layout for lifting beams.
2. The Lifting Loop detail indicates the placement of lifting loops.
3. The Strand Projection at Beam Ends When Embedded in Concrete End Diaphragm specifies the projection lengths.
4. The Strand Specifications table lists strand sizes and their properties.
5. The Beam Design Stress details the prestressing stresses for different beam sections.
6. The Beam Details table provides a summary of beam specifications.
7. The AASHTO Specifications for Highway Bridges cover the required design stresses for various materials.
8. The AASHTO Specifications for Highway Bridges also include the design stresses for reinforcing steel.
9. The Specifications for Highway Bridges include additional requirements for concrete and prestressing.
10. The overall beam length and specific loadings are outlined in the applicable design sheets.

NOTES:
- The specifications are subject to change.
- All dimensions and specifications are in accordance with the current Structural Specifications.

MARCH, 2007

H-24
PRETENSIONED CONCRETE BEAM BRIDGES
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
H4-25-07
IOWA DOT
Highway Division

APPROVED BY SHANE ENGEL
MARCH, 2007

REINFORCING BAR LIST
A BEAM DETAILS
H4-25-07
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
H-33

Approved by Shane Engel

COMMENTS:
- The design specifications are subject to change.
- All dimensions and specifications are in accordance with the current Structural Specifications.

MARCH, 2007

H-24
PRETENSIONED CONCRETE BEAM BRIDGES
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
H4-25-07
IOWA DOT
Highway Division

APPROVED BY SHANE ENGEL
MARCH, 2007

REINFORCING BAR LIST
A BEAM DETAILS
H4-25-07
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
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MARCH, 2007

H-24
PRETENSIONED CONCRETE BEAM BRIDGES
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
H4-25-07
IOWA DOT
Highway Division

APPROVED BY SHANE ENGEL
MARCH, 2007

REINFORCING BAR LIST
A BEAM DETAILS
H4-25-07
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
H-33

Approved by Shane Engel

COMMENTS:
- The design specifications are subject to change.
- All dimensions and specifications are in accordance with the current Structural Specifications.
NOTE: BARS 3d ARE TO BE PLACED IN PAIRS.

EPOXY COATED BARS

DIMENSIONS AT END OF BEAM

KEEP DEFLECTED STRANDS

1'-1  
3"  6
5"  1'-5
6 1 "
4 2 '-8 1 '-4
5 "
5" 5 @ 1'-2 = 5'-10
4'-8 2

"A" BEAM CROSS SECTION

SYMMETRICAL ABOUT |

BEARS

SYMMETRICAL ABOUT |

NOTE: DIMENSIONS FOR THE LOCATION OF THE DEFLECTED STRANDS ARE AT END OF BEAM.

STRAINS DEFLECTED

STRAINS STRAIGHT

A42

A46

A50

A55

NOTE: REVISED 11-09 - THE BEAM DETAILS WERE UPDATED TO THE CURRENT BEAM DETAILS.

REVIEWED 11-09 - THE BEAM DETAILS WERE UPDATED TO THE CURRENT BEAM DETAILS.
TABLE OF STIRRUPS NEAR END OF BEAM

<table>
<thead>
<tr>
<th>NO. OF STIRRUPS</th>
<th>LENGTH</th>
<th>SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>1'-5</td>
<td>2'-1 0</td>
</tr>
<tr>
<td>9</td>
<td>1'-8</td>
<td>3'</td>
</tr>
<tr>
<td>12</td>
<td>6'-2</td>
<td>4'-2</td>
</tr>
<tr>
<td>11</td>
<td>6'-2</td>
<td>4'-2</td>
</tr>
<tr>
<td>18</td>
<td>9'-0</td>
<td>10'-0</td>
</tr>
</tbody>
</table>

**NOTES:**
These beams are designed for acute live loads as indicated in the above table with an allowance of 0.0415 square foot of roadway for future wearing surface. All beams are to be prestressed Grade 270 low-relaxation steel strands.

**REINFORCEMENT:**

- All prestressing strands shall conform to ASTM A416 Grade 270 low-relaxation steel.
- All prestressing strands shall be at least 6,000 psi in tension.
- The portions of the prestressed beams that are to be removed in the alignment and pipe dam shall be reinforced with 0.03 of 101 from the beam top, 0.21 from the beam top, and 0.19 from the beam top, or such other means as may be determined in accordance with Article 2403.03, I., of the Standard Specifications.
- The portions of the prestressed beams that are to be removed in the alignment and pipe dam shall be reinforced with 0.03 of 101 from the beam top, 0.21 from the beam top, and 0.19 from the beam top, or such other means as may be determined in accordance with Article 2403.03, I., of the Standard Specifications.

**DESIGN STRESSES:**

- Design stresses for the following materials are to be in accordance with Iowa DOT Specifications for Highway Bridges, Series No. 267.
- Reinforcing steel in accordance with Section 9, Grade 60, concrete in accordance with Section 5, f'c = 5,000 psi (except as noted).
- Prestressing steel in accordance with Section 5, f'p = 30,000 psi.
REVIEWED 11-09 - THE BEAM DETAILS WERE UPDATED TO THE CURRENT BEAM DETAILS.
TYPICAL AT BOTH BEAM ENDS

COIL TIE DETAIL
NUMBER AND EXACT LOCATION OF COIL TIES TO BE AS DETAILLED ON SPECIFIC BRIDGE DETAIL.

SECTION A-A SHOWING PLACEMENT OF STIRRUPS NEAR END OF BEAM

LIFTING LOOP DETAIL
ALTERNATE TYPES MAY BE SUBSTITUTED WITH THE APPROVAL OF THE ENGINEER. LIFTING LOOPS ARE TO BE STRUCTURAL GRADE.

COIL TIE DETAIL
NUMBER AND EXACT LOCATION OF COIL TIES TO BE AS DETAILLED ON SPECIFIC BRIDGE DETAIL.

STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS

THE TOP STRAIGHT STRANDS OF BEAMS C62 AND C67 ARE TO BE CUT WITH F-3 PROJECTIONS AND DO NOT REVEAL THE TOP STRAIGHT STRANDS AT BOTH ENDS. THE REMAINING TOP AND BOTTOM DEFLECTED STRANDS ARE TO BE CUT WITH F-3 PROJECTIONS

COIL TIE DETAIL
NUMBER AND EXACT LOCATION OF COIL TIES TO BE AS DETAILLED ON SPECIFIC BRIDGE DETAIL.

REINFORCING BAR LIST

NOTES:

CONCRETE BEAM BRIDGES
PRESTRESSED CONCRETE BEAM BRIDGES
MARCH 2007

IOWA DOT
Highway Division

STANDARD DESIGN - 44' ROADWAY, THREE SPAN BRIDGE

H44-29-07

THE TOP STRAIGHT STRANDS OF BEAMS C62 AND C67 ARE TO BE CUT WITH F-3 PROJECTIONS AND DO NOT REVEAL THE TOP STRAIGHT STRANDS AT BOTH ENDS. THE REMAINING TOP AND BOTTOM DEFLECTED STRANDS ARE TO BE CUT WITH F-3 PROJECTIONS

COIL TIE DETAIL
NUMBER AND EXACT LOCATION OF COIL TIES TO BE AS DETAILLED ON SPECIFIC BRIDGE DETAIL.
**Concrete Placement Summary - C.Y.**

<table>
<thead>
<tr>
<th>Standard Section</th>
<th>28'-3&quot;</th>
<th>3X30'</th>
<th>312.6</th>
<th>311.9</th>
<th>311.7</th>
<th>32.5</th>
<th>32.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bend Bar Details</td>
<td>28'-3&quot;</td>
<td>3X30'</td>
<td>312.6</td>
<td>311.9</td>
<td>311.7</td>
<td>32.5</td>
<td>32.6</td>
</tr>
</tbody>
</table>

**Concrete Barrier Rail Quantities - L.F.**

<table>
<thead>
<tr>
<th>Standard Section</th>
<th>28'-3&quot;</th>
<th>3X30'</th>
<th>312.6</th>
<th>311.9</th>
<th>311.7</th>
<th>32.5</th>
<th>32.6</th>
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<tbody>
<tr>
<td>Bend Bar Details</td>
<td>28'-3&quot;</td>
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<td>312.6</td>
<td>311.9</td>
<td>311.7</td>
<td>32.5</td>
<td>32.6</td>
</tr>
</tbody>
</table>
### TABLE OF OPEN RAIL DIMENSIONS AND NUMBERS

<table>
<thead>
<tr>
<th>Dim. or Number</th>
<th>(L, A) Brg</th>
<th>20±4</th>
<th>21±4</th>
<th>22±4</th>
<th>23±0</th>
<th>(L, A) Brg</th>
</tr>
</thead>
<tbody>
<tr>
<td>0°</td>
<td>0°</td>
<td>0°</td>
<td>0°</td>
<td>0°</td>
<td>0°</td>
<td>0°</td>
</tr>
<tr>
<td>30°</td>
<td>30°</td>
<td>30°</td>
<td>30°</td>
<td>30°</td>
<td>30°</td>
<td>30°</td>
</tr>
<tr>
<td>OPEN</td>
<td>OPEN</td>
<td>OPEN</td>
<td>OPEN</td>
<td>OPEN</td>
<td>OPEN</td>
<td>OPEN</td>
</tr>
</tbody>
</table>

### OPEN RAIL NOTES:
- Construction joint between top of wing and rail is roughened concrete.
- Minimum clear distance from face of concrete to nearest reinforcing bar is to be 2" unless otherwise noted or shown.
- Cost of the joint sealer and bond breaker shall be considered incidental to other construction.
- The concrete open rail is to be bid on a linear foot basis measured from end to end of rail. The number of linear feet of open rail installed will be as per the contract scale. For linear posts, back-up posts, for concrete open rail, the top of the rail is to be parallel to the top of the rail.
- The cast-in-place open rail shall use Class C mix. Class D concrete is not permitted.
- The cost of the joint sealer and bond breaker shall be considered incidental to other construction.

---

### ELEVATION OF OPEN RAIL LAYOUT

#### OPEN RAIL DETAILS
- PROVIDE 5 HOLES FORMED WITH 1½ PLASTIC CONDUCIT, COST TO BE INCLUDED IN PRICE BID FOR CONCRETE OPEN RAILING.
HI-ROMTER NEOPRENE. PADS TO BE OF 70 MATERIAL FOR NEOPRENE PADS TO BE OF 50 DURAMETER NEOPRENE.

FLANGE WIDTH

BEAM BOTTOM

A

B

C

E

F

0'-5

1'-3

1'-6

0'-1

0'-4

1'-8

1'-6

VARIABLE DIMENSIONS

SLOPE CALCULATION FORMULA

SLOPE =

SPAN 1 LENGTH

SPAN 2 LENGTH

SPAN 3 LENGTH

SLOPE =

SLOPE =

SLOPE =

P/G ELEV. @ NEAR ABUT. - P/G ELEV. @ PIER 1

P/G ELEV. @ PIER 1 - P/G ELEV. @ PIER 2

P/G ELEV. @ PIER 2 - P/G ELEV. @ FAR ABUT.

SLOPE

D

0"

"`

"`

"`

"`

1.4%

SLOPE

1.4%

4.2%

SLOPE

5.0%

4.2%

TYP.

1" - "D"

1" + "D"

EXPANSION PIER BEARING NOTES:

SURFACES MARKED "V" SHALL BE THICKENED AND D5S.

PINTLE PLATES ARE A PART OF THE SUPERSTRUCTURE "STRUCTURAL STEEL QUANTITY". COSTS OF MACHINED DIAMOND SURFACES ARE INCLUDED IN THE PRICE BID FOR "PRESTRESSED CONCRETE BEAMS".

THE SOLE PLATES AND PINTLE PLATES SHALL BE GALVANIZED. ALL WELDING SHALL BE COMPLETED PRIOR TO GALVANIZING. THE SURFACE OF THE PINTLE PLATE IN CONTACT WITH THE DIAMOND SURFACES SHALL BE FREE OF PROJECTIONS DUE TO THE GALVANIZING.

SOLE PLATES SHALL COMPLY WITH ONE OF THE FOLLOWING:

ASTM A514 GRADE B

ASTM A1011 TYP.

LAMINATED NEOPRENE. PADS TO BE OF 50 DURAMETER NEOPRENE.

FLANGE WIDTH

BEAM BOTTOM

A

B

C

E

F

0'-5

1'-3

1'-6

0'-1

0'-4

1'-8

1'-6

VARIABLE DIMENSIONS

SLOPE CALCULATION FORMULA

SLOPE =

SPAN 1 LENGTH

SPAN 2 LENGTH

SPAN 3 LENGTH

P/G ELEV. @ NEAR ABUT. - P/G ELEV. @ PIER 1

P/G ELEV. @ PIER 1 - P/G ELEV. @ PIER 2

P/G ELEV. @ PIER 2 - P/G ELEV. @ FAR ABUT.

SLOPE

D

0"

"`

"`

"`

"`

1.4%

SLOPE

1.4%

4.2%

SLOPE

5.0%

4.2%

TYP.

1" - "D"

1" + "D"

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THE SOLE PLATES AND PINTLE PLATES SHALL BE GALVANIZED. ALL WELDING SHALL BE COMPLETED PRIOR TO GALVANIZING. THE SURFACE OF THE PINTLE PLATE IN CONTACT WITH THE DIAMOND SURFACES SHALL BE FREE OF PROJECTIONS DUE TO THE GALVANIZING.

SOLE PLATES SHALL COMPLY WITH ONE OF THE FOLLOWING:

ASTM A514 GRADE B

ASTM A1011 TYP.

LAMINATED NEOPRENE. PADS TO BE OF 50 DURAMETER NEOPRENE.

FLANGE WIDTH

BEAM BOTTOM

A

B

C

E

F

0'-5

1'-3

1'-6

0'-1

0'-4

1'-8

1'-6

VARIABLE DIMENSIONS

SLOPE CALCULATION FORMULA

SLOPE =

SPAN 1 LENGTH

SPAN 2 LENGTH

SPAN 3 LENGTH

P/G ELEV. @ NEAR ABUT. - P/G ELEV. @ PIER 1

P/G ELEV. @ PIER 1 - P/G ELEV. @ PIER 2

P/G ELEV. @ PIER 2 - P/G ELEV. @ FAR ABUT.

SLOPE

D

0"

"`

"`

"`

"`

1.4%

SLOPE

1.4%

4.2%

SLOPE

5.0%

4.2%

TYP.

1" - "D"

1" + "D"

EXPANSION PIER BEARING NOTES:

SURFACES MARKED "V" SHALL BE THICKENED AND D5S.

PINTLE PLATES ARE A PART OF THE SUPERSTRUCTURE "STRUCTURAL STEEL QUANTITY". COSTS OF MACHINED DIAMOND SURFACES ARE INCLUDED IN THE PRICE BID FOR "PRESTRESSED CONCRETE BEAMS".

THE SOLE PLATES AND PINTLE PLATES SHALL BE GALVANIZED. ALL WELDING SHALL BE COMPLETED PRIOR TO GALVANIZING. THE SURFACE OF THE PINTLE PLATE IN CONTACT WITH THE DIAMOND SURFACES SHALL BE FREE OF PROJECTIONS DUE TO THE GALVANIZING.

SOLE PLATES SHALL COMPLY WITH ONE OF THE FOLLOWING:

ASTM A514 GRADE B

ASTM A1011 TYP.

LAMINATED NEOPRENE. PADS TO BE OF 50 DURAMETER NEOPRENE.
PILE BENT NOTES:
These pier bends are designed for use in locations where ice and
draft conditions are not severe.
For details of trestle piles, types 1, 2, and 3, see standard PIB.
Minimum clear distance from face of concrete to near reinforcing
bar shall be 2 inches unless otherwise noted on plans.
Pier piles shall be driven to values shown in design plans.

<table>
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PILE ORIENTATION DETAIL FOR
TYPE 3 TRESTLE BENT PILES

FRUCTION BEARING PILING

PILE BEAR TYPE 1 OR 2

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PILE BEAR TYPE 3

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NOTES:
1. Concrete quantities shown include the volume of driven piles deducted for types 1 and 2 based on 0.01 ft³ per foot of embedment. The concrete quantities for type 3 piles do not require reduction for pile embedment.
2. See standard PIB for "M" dimensions.
3. Note: pile strength 1 design load is not the value used in the field for driving piles.

PILE BENT PILES

H44-39-07

Highway Division

PRETENSIONED Prestressed Concrete Beam Bridges

MARCH 2017
### TYPICAL PLAN

**Pile Bents Configuration**

- **7 Pile Bent**
- **8 Pile Bent**
- **9 Pile Bent**
- **10 Pile Bent**
- **11 Pile Bent**
- **12 Pile Bent**

**Keyed Notch Detail**

**Bar Layout**

**View A-A**

**FOR 7, 8, 9 & 10 PILE BENTS**

**FOR 11 & 12 PILE BENTS**

---

**Revision Details**

- **Latest Revision Date:**
- **Approved by Bridge Engineer:**
- **Highway Division:**
- **Standard Design - 44' Roadway, Three Span Bridge:**
- **Concrete Beam Bridges:**
- **Pretensioned Prestressed:**

**MARCH, 2007**

**CAPE OPTION & CAP DEPTH IS 3'-6'.**

---

**NOTE:**

- See Sheet H44-09-07 for "U" dimension.
- See Sheet H44-40-07 for "Y" dimension.

**Copyright:**

- Iowa DOT
- Highway Division
- Pile Bent Piers
- HP14 Piles
- 0° Skew

---

**LATEST REV. DATE**

- **APPROVED BY BRIDGE ENGINEER**

---

**Dimensions and Notations**

- **5m1 & 5m1**
- **TO BE TOP OF PILES**
- **VIEW A-A**

---

**Joint Material**

- **Expansion Joint Material**
- **1" PREFORMED JOINT MATERIAL**

---

**View of Pile Bent Piers**

- **8e1**
- **a1**
- **a2**
- **b1**
- **5c1**

---

**Grade Elev. @ Pier:**

- **5n1**
- **5m1**
- **5c1**

---

**Pile Bent Piers**

- **8e1**
- **a1**
- **a2**
- **b1**
- **5c1**

---

**Typical Plan**

- **Keyed Notch**
- **(SEE DETAIL)**

---

**NOTE:**

- See Sheet H44-09-07 for "U" dimension.
- See Sheet H44-40-07 for "Y" dimension.

---

**Copyright:**

- Iowa DOT
- Highway Division
- Pile Bent Piers
- HP14 Piles
- 0° Skew

---

**LATEST REV. DATE**

- **APPROVED BY BRIDGE ENGINEER**

---

**Dimensions and Notations**

- **5m1 & 5m1**
- **TO BE TOP OF PILES**
- **VIEW A-A**

---

**Joint Material**

- **Expansion Joint Material**
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**View of Pile Bent Piers**

- **8e1**
- **a1**
- **a2**
- **b1**
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**Grade Elev. @ Pier:**

- **5n1**
- **5m1**
- **5c1**

---

**Pile Bent Piers**

- **8e1**
- **a1**
- **a2**
- **b1**
- **5c1**

---

**Typical Plan**

- **Keyed Notch**
- **(SEE DETAIL)**

---

**NOTE:**

- See Sheet H44-09-07 for "U" dimension.
- See Sheet H44-40-07 for "Y" dimension.
PILE BENT NOTES:
These pier bends are designed for use in locations where ice and drift conditions are not severe.

For details of thistle piles, see Standard P10L.

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

REINFORCING BAR LIST AND ESTIMATED QUANTITIES

<table>
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<th>PILE BENT</th>
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</table>

BENT BAR DETAILS

### FRICITON OR POINT BEARING PILING

- **NOTE:** FRICITON BEARING INCLUDES SIDE FRICITON AND END BEARING IN SOIL.
- **NOTE:** POINT BEARING INCLUDES SIDE FRICITON AND POINT BEARING IN ROCK.

**PILE BENT PIERS**

- **OCT. 31, 2006**
- **REVISED:** 05-13 - REVISED FOR LRFD PILE DESIGN.

**PILE BENT NOTES:**
These pier bends are designed for use in locations where ice and drift conditions are not severe.

For details of thistle piles, see Standard P10L.

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

**REINFORCING BAR LIST AND ESTIMATED QUANTITIES PER PILE BENT**

| NO. | LENGTH | STRENGTH | PENETRATION | PENETRATION | PENETRATION | PENETRATION | PENETRATION | PENETRATION | PENETRATION | PENETRATION |
|-----|--------|----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 1   | 8'     | 3        | 9           | 10          | 11          | 12          | 13          | 14          | 15          | 16          |
| 2   | 7'     | 3        | 9           | 10          | 11          | 12          | 13          | 14          | 15          | 16          |
| 3   | 6'     | 3        | 9           | 10          | 11          | 12          | 13          | 14          | 15          | 16          |
| 4   | 5'     | 3        | 9           | 10          | 11          | 12          | 13          | 14          | 15          | 16          |

**NOTICE:** FRICITON BEARING INCLUDES SIDE FRICITON AND END BEARING IN SOIL.
POINT BEARING INCLUDES SIDE FRICITON AND POINT BEARING IN ROCK.
TOP OF PILES

1" PREFORMED EXPANSION JOINT MATERIAL

"U " TYP.

3'-0  3'-1  4'-4

2'-6

5 PILE SPACES @ 4'-10" = 43'-10"

10 PILE BENTS

SYMMETRICAL ABOUT E PIER EXCEPT STEPS

ELEVATIONS

11 PILE BENTS

12 PILE BENTS

13 PILE BENTS

14 PILE BENTS

15 PILE BENTS

16 PILE BENTS

17 PILE BENTS

VIEW A-A

FOR 10 PILE BENT

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

FOR 17 PILE BENT

KEYED NOTCH DETAIL

NOTE: THE DESIGN OF THE STEPS ON THE BRIDGE

SEAT IS EQUAL TO THE DIFFERENCE IN

ELEVATIONS OF THE TOP OF SLAB AT

ADJACENT BEAMS ALONG E PIER.

SEE SHEET H44-15-07 FOR "U " DIMENSION.

VIEW A-A

FOR 10 PILE BENT

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

FOR 17 PILE BENT

TOP OF PILES

1" PREFORMED EXPANSION JOINT MATERIAL

"U " TYP.

3'-0  3'-1  4'-4

2'-6

5 PILE SPACES @ 4'-10" = 43'-10"

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

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SEE SHEET H44-15-07 FOR "U " DIMENSION.

VIEW A-A

FOR 10 PILE BENT

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

FOR 17 PILE BENT

TOP OF PILES

1" PREFORMED EXPANSION JOINT MATERIAL

"U " TYP.

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5 PILE SPACES @ 4'-10" = 43'-10"

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SYMMETRICAL ABOUT E PIER EXCEPT STEPS

ELEVATIONS

11 PILE BENTS

12 PILE BENTS

13 PILE BENTS

14 PILE BENTS

15 PILE BENTS

16 PILE BENTS

17 PILE BENTS

VIEW A-A

FOR 10 PILE BENT

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

FOR 17 PILE BENT

KEYED NOTCH DETAIL

NOTE: THE DESIGN OF THE STEPS ON THE BRIDGE

SEAT IS EQUAL TO THE DIFFERENCE IN

ELEVATIONS OF THE TOP OF SLAB AT

ADJACENT BEAMS ALONG E PIER.

SEE SHEET H44-15-07 FOR "U " DIMENSION.

VIEW A-A

FOR 10 PILE BENT

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

FOR 17 PILE BENT

TOP OF PILES

1" PREFORMED EXPANSION JOINT MATERIAL

"U " TYP.
PILE BENT NOTES:

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

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

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

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

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

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

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

PILE BENT PIERS

REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

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<td>46'-8</td>
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NOTE: PU, STRENGTH 1 DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES. SEE STANDARD P10L FOR "K" DIMENSION.

CONSULTING ENGINEER

APPROVED BY BRIDGE ENGINEER

Highway Division

STANDARD DESIGN - 44' ROADWAY, THREE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

MARCH 2007
PILE BENT NOTES:

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

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

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

REINFORCING BAR LIST AND ESTIMATED QUANTITIES PER PILE BENT

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BENT BAR DETAILS

NOTES:

- All dimensions are in feet and inches.
- Dimensions are subject to change based on design.

PILE BENT NOTES:

- Pile bent piers shall be driven to values shown in design plans.
- See sheet H44-45-07 for thistle reinforcing steel quantities and details.
- For determining actual pile length in field, see sheet H44-45-07 for thistle reinforcing steel quantities and details.
- Use of pile length in field for field driving is not the value used in the field for driving piles.

NOTES:

- Pile bent piers shall be driven to values shown in design plans.
- See sheet H44-45-07 for thistle reinforcing steel quantities and details.
- For determining actual pile length in field, see sheet H44-45-07 for thistle reinforcing steel quantities and details.
- Use of pile length in field for field driving is not the value used in the field for driving piles.

NOTE: FRICITION BEARING INCLUDES SIDE FRICTION AND END BEARING IN SOIL, POINT BEARING INCLUDES SIDE FRICTION AND POINT BEARING IN ROCK.
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 or shown. Pile piles shall be driven to values shown in design plans.

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

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

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<td>244-40</td>
<td>244</td>
<td>244</td>
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<td>244</td>
<td>HP10x57</td>
<td>244</td>
<td>HP10x57</td>
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<td>276-40</td>
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<td>276</td>
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<td>276</td>
<td>HP12x53</td>
<td>276</td>
<td>HP12x53</td>
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<td>318-40</td>
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<td>318</td>
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<td>318</td>
<td>HP12x53</td>
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<td>HP12x53</td>
<td>318</td>
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</tr>
</tbody>
</table>

PILE BENT PIERS

H44-47-07
TOPOLOGY

TOP OF PILES

7’3…

1’-6

3’-3

4’

3…

2 EQ. SPA.

2” CL.

5c1

3’-6

3…

1’-0

3…

1’-7 †

1’-0

1’-0

5’-6

6’-4

6’-4

6’-10

6’-10

6’-10

6’-10

6’-10

6’-10

6’-10

6’-10

6’-10

6’-10

6’-10

6’-10

6’-10

6’-10

4’

3…

1’-6”

7’-4ƒ

SPACING

7’-4ƒ PILE

6 EQ. SPA. FOR PILE SPACING

FOR 6’-0

4 EQ. SPA.

7’-4ƒ

3’-8…

1’-6”

6’-0

1’-0

1’-0

5’-6

6’-4

6’-4

6’-10

6’-10

6’-10

6’-10

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6’-10
PILE BENT NOTES:

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

For details of thistle 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.

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

<table>
<thead>
<tr>
<th>PILE BENT</th>
<th>LENGTH</th>
<th>BENT</th>
<th>NUMBER</th>
<th>SIZE</th>
<th>DESIGN LOAD (KIP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>23.5</td>
<td>1</td>
<td>8</td>
<td>HP14</td>
<td>163</td>
</tr>
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<td>2</td>
<td>23.5</td>
<td>2</td>
<td>4</td>
<td>HP12</td>
<td>111</td>
</tr>
<tr>
<td>3</td>
<td>23.5</td>
<td>1</td>
<td>8</td>
<td>HP14</td>
<td>111</td>
</tr>
<tr>
<td>4</td>
<td>23.5</td>
<td>1</td>
<td>8</td>
<td>HP14</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>8.5</td>
<td>1</td>
<td>8</td>
<td>HP10</td>
<td>200</td>
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<tr>
<td>6</td>
<td>8.5</td>
<td>1</td>
<td>8</td>
<td>HP10</td>
<td>150</td>
</tr>
<tr>
<td>7</td>
<td>6.5</td>
<td>1</td>
<td>8</td>
<td>HP10</td>
<td>100</td>
</tr>
<tr>
<td>8</td>
<td>6.5</td>
<td>1</td>
<td>8</td>
<td>HP10</td>
<td>100</td>
</tr>
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<td>9</td>
<td>6.5</td>
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<td>8</td>
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<td>150</td>
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<td>10</td>
<td>6.5</td>
<td>1</td>
<td>8</td>
<td>HP10</td>
<td>200</td>
</tr>
<tr>
<td>11</td>
<td>6.5</td>
<td>1</td>
<td>8</td>
<td>HP10</td>
<td>150</td>
</tr>
<tr>
<td>12</td>
<td>6.5</td>
<td>1</td>
<td>8</td>
<td>HP10</td>
<td>200</td>
</tr>
</tbody>
</table>

### BENT BAR DETAILS

**Pile Type:** HP14 Piles

**Note:** All dimensions are subject to engineering changes.

**Friction or Point Bearing Piling:**

- **Number of Thistle Piles:**
  - 1
  - 2
  - 3
  - 4
  - 5
  - 6
  - 7
  - 8
  - 9
  - 10
  - 11
  - 12

**Bar Size:**

- HP14
- HP10

**Design Load (Kips):**

- 163
- 111
- 111
- 100
- 200
- 150
- 100
- 100
- 150
- 200
- 150
- 100

### PILE BENT PIERS

- HP14 PILES

**NOTES:**

- See Sheet H44-24-07 for step reinforcing steel quantities and details.
- For determining actual pile lengths in field.
- **Note:** The design load (Kips) is not the value used in the field for driving piles.
- **Note:** Friction bearing includes side friction and end bearing in soil.
- **Note:** Point bearing includes side friction and point bearing in rock.
**Pier Notes:**

- See "Tee Pier Notes" on H44-42-07 for notes regarding application of these pier standards.
- Minimum clear distance from face of concrete to near reinforcing bar shall be 2 inches unless otherwise noted or shown.
- Eliminate 2x8 bevelled keyway on top of cap for expansion piers.
- For size of bearing pads, see H44-31-07.

See sheet H44-09-07 for "U" dimension.

- **Front Elevation**
- **End Elevation**
- **Section A-A**
- **Section B-B**
TYPICAL SECTION

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

<table>
<thead>
<tr>
<th>FOOTING SIZE</th>
<th>REINFORCING STEEL</th>
<th>CONCRETE</th>
<th>TOTAL WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>3'-6 x 10' x 24'</td>
<td>#9 @ 1'-0</td>
<td>3389 lb</td>
<td>31.1 lb</td>
</tr>
<tr>
<td>3'-6 x 10' x 24'</td>
<td>#5 @ 1'-0</td>
<td>144 lb</td>
<td>140 lb</td>
</tr>
<tr>
<td>24'-0 x 9'-0 x 24'-0</td>
<td>#8 @ 0'-10</td>
<td>1147 lb</td>
<td>1100 lb</td>
</tr>
<tr>
<td>23'-8 x 9'-0 x 24'-0</td>
<td>#5 @ 1'-0</td>
<td>144 lb</td>
<td>140 lb</td>
</tr>
</tbody>
</table>

FOOTING NOTES:
- 5 EQUAL SPACES
- 4 - d1 & d2 BARS
- 19 - d1 & d2 BARS EA. FACE
- SYMMETRICAL ABOUT | ROADWAY
- d2 BAR LAYOUT

THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H44-50-07.

BATTER PILES IN EXTERIOR ROWS 1:4 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 8'-0.

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

NOTE: PU, STRENGTH 1 DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.
FOOTING SIZE
3'-7" T O 4'-0"
3'-4" T O 3'-6"
3'-1" T O 3'-3"
2'-8" T O 3'-0"
2'-5" T O 2'-7"

FOOTING SIZE
2'-10" T O 2'-3"
2'-9" T O 2'-2"
2'-8" T O 2'-1"
2'-7" T O 2'-6"
2'-6" T O 2'-5"
2'-5" T O 2'-4"
2'-4" T O 2'-3"
2'-3" T O 2'-2"
2'-2" T O 2'-1"
2'-1" T O 2'-0"
1'-10" T O 1'-8"
1'-9" T O 1'-7"
1'-8" T O 1'-6"
1'-7" T O 1'-6"
1'-6" T O 1'-5"
1'-5" T O 1'-4"
1'-4" T O 1'-3"
1'-3" T O 1'-2"
1'-2" T O 1'-1"
1'-1" T O 1'-0"
0'-10" T O 0'-8"
0'-9" T O 0'-7"
0'-8" T O 0'-6"
0'-7" T O 0'-6"
0'-6" T O 0'-5"
0'-5" T O 0'-4"
0'-4" T O 0'-3"
0'-3" T O 0'-2"
0'-2" T O 0'-1"
0'-1" T O 0'-0"

FOOTING NOTES:
1. These footings are designed and detailed to be used with the cap and column details of the tee piers as shown on Sheet H44-50-07.
2. Pile layout in exterior rows is in the direction shown.
3. Batter piles in exterior rows are in the direction shown.
4. Steel pile footings 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 piles shall not exceed 8'-0.
5. Pier piles shall be driven to values shown in design plans.

STEEL PILE FOOTINGS
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
STANDARD DESIGN • 44' ROADWAY, THREE SPAN BRIDGE
O'MELIA DOT

TYP. 0° SKEW - H=25' TO 40'

NOTE: D = PIN DIAMETER.
6

TYPICAL SECTION

4'-0 x 10'-0 x 25'-0 FOR 22B, 23B, 24B, 25B & 26A

4'-0 x 10'-0 x 26'-0 FOR 22C, 23C, 24C & 26B

4'-0 x 11'-0 x 26'-0 FOR 22D & 23D

4'-0 x 11'-0 x 26'-0 FOR 24D, 25C & 26C

NOTE: D = PIN DIAMETER.
6
3'-6 x 9'-0 x 25'-0

3'-6 x 9'-0 x 29'-0

3'-6 x 9'-0 x 27'-0

3'-6 x 10'-0 x 29'-0

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 4K-4507.
These spread footings shall extend at least 12 inches into suitable foundation rock and the last 18 inches of rock excavation shall be to the level of the foundation. The foundation rock shall have a minimum LRFD nominal bearing resistance of 30 kips per square foot if allowable service load bearing value of at least 10 kips per square foot.

NOTE: D = PIN DIAMETER.

TYPICAL SECTION

REINFORCING STEEL USE FOR FOOTING

<table>
<thead>
<tr>
<th>FOOTING SIZE</th>
<th>BARS</th>
<th>NO.</th>
<th>SIZE</th>
<th>SPACING</th>
<th>LENGTH</th>
<th>TOTAL</th>
<th>STRUCTURAL CONCRETE</th>
<th>WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3'-6 x 9' x 25'</td>
<td>46</td>
<td>8 - #8</td>
<td>10&quot;</td>
<td>6 - 8</td>
<td>238</td>
<td>10'</td>
<td>1473 (LB.)</td>
<td>35.8</td>
</tr>
<tr>
<td>3'-6 x 9' x 27'</td>
<td>46</td>
<td>8 - #8</td>
<td>10&quot;</td>
<td>6 - 8</td>
<td>238</td>
<td>10'</td>
<td>1473 (LB.)</td>
<td>35.8</td>
</tr>
<tr>
<td>3'-6 x 9' x 29'</td>
<td>46</td>
<td>8 - #8</td>
<td>10&quot;</td>
<td>6 - 8</td>
<td>238</td>
<td>10'</td>
<td>1473 (LB.)</td>
<td>35.8</td>
</tr>
<tr>
<td>3'-6 x 10' x 25'</td>
<td>46</td>
<td>8 - #8</td>
<td>10&quot;</td>
<td>6 - 8</td>
<td>238</td>
<td>10'</td>
<td>1473 (LB.)</td>
<td>35.8</td>
</tr>
<tr>
<td>3'-6 x 10' x 27'</td>
<td>46</td>
<td>8 - #8</td>
<td>10&quot;</td>
<td>6 - 8</td>
<td>238</td>
<td>10'</td>
<td>1473 (LB.)</td>
<td>35.8</td>
</tr>
<tr>
<td>3'-6 x 10' x 29'</td>
<td>46</td>
<td>8 - #8</td>
<td>10&quot;</td>
<td>6 - 8</td>
<td>238</td>
<td>10'</td>
<td>1473 (LB.)</td>
<td>35.8</td>
</tr>
</tbody>
</table>
**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 H44-57-07.

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 or masonry. The foundation rock shall have a minimum LRFD Foundation Rock and the last 12 inches of rock excavation shall be to 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 or masonry.

**FOOTING SIZE**

<table>
<thead>
<tr>
<th>Size</th>
<th>Top Footing</th>
<th>Bottom Footing</th>
<th>Total Footing</th>
<th>Structural Concrete</th>
</tr>
</thead>
<tbody>
<tr>
<td>4' x 9' x 25'-0</td>
<td>30 SP. @ 1'-0 = 30'-0; 31 - 5f1</td>
<td>29'-0</td>
<td>30'-0</td>
<td>33.3</td>
</tr>
<tr>
<td>4' x 9' x 29'-0</td>
<td>30 SP. @ 1'-0 = 30'-0; 31 - 5f1</td>
<td>29'-0</td>
<td>30'-0</td>
<td>36.0</td>
</tr>
<tr>
<td>4' x 9' x 27'-0</td>
<td>33 SP. @ 10 ; 33 - 10g2</td>
<td>27'-6; 34 - 6g1</td>
<td>28'-6</td>
<td>40.3</td>
</tr>
<tr>
<td>4' x 9' x 31'-0</td>
<td>32 SP. @ 11 ; 32 - 8g2</td>
<td>24'-0; 33 - 8g2</td>
<td>25'-0</td>
<td>45.3</td>
</tr>
<tr>
<td>4' x 10' x 31'-0</td>
<td>33 SP. @ 10 ; 33 - 10g2</td>
<td>27'-6; 34 - 6g1</td>
<td>28'-6</td>
<td>45.3</td>
</tr>
</tbody>
</table>

**SYMMETRICAL ABOUT & PIER**

**REINFORCING STEEL**

<table>
<thead>
<tr>
<th>NO. &amp; SIZE &amp; SPACING</th>
<th>10g2</th>
<th>9g2</th>
<th>8g2</th>
<th>7g2</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'-6 &amp; d2 Bar Layout</td>
<td>6g1</td>
<td>5f2</td>
<td>4f2</td>
<td>3f2</td>
</tr>
</tbody>
</table>

**TOTAL WEIGHT (LB.)**

<table>
<thead>
<tr>
<th>Size</th>
<th>4'-0 x 9'-0 x 25'-0</th>
<th>4'-0 x 9'-0 x 29'-0</th>
<th>4'-0 x 9'-0 x 27'-0</th>
<th>4'-0 x 10'-0 x 31'-0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Footing</td>
<td>2929</td>
<td>320</td>
<td>269</td>
<td>364</td>
</tr>
<tr>
<td>Pier</td>
<td>45.9</td>
<td>41.3</td>
<td>42.5</td>
<td>1551</td>
</tr>
<tr>
<td>Total</td>
<td>4963</td>
<td>45.9</td>
<td>4963</td>
<td>4963</td>
</tr>
</tbody>
</table>
NOTE: ALL DIMENSIONS ARE OUT TO OUT, D = PIN DIAMETER.
PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

REINFORCING STEEL

<table>
<thead>
<tr>
<th>FOOTING SIZE</th>
<th>BAR NO. &amp; SIZE &amp; SPACING</th>
<th>LENGTH</th>
<th>WEIGHT</th>
<th>FLOOR REINFORCEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>3'-6 x 9' x 25'</td>
<td>#9 @ 0'-11</td>
<td>3'-6 x 9' x 25'</td>
<td>25.2</td>
<td>3.2</td>
</tr>
<tr>
<td>3'-6 x 10' x 26'</td>
<td>#9 @ 0'-11</td>
<td>3'-6 x 10' x 26'</td>
<td>25.2</td>
<td>3.2</td>
</tr>
</tbody>
</table>

FOOTING NOTES:

1. FOOTING DIMENSIONS ARE OUT TO OUT.

2. FOOTING SIZE:
   - #9 BAR
   - MIN.
   - 4'-8"

3. WEIGHT:
   - 960 LB.

4. LABOR COST:
   - 45°

5. CONCRETE PLACEMENT:
   - 4 BAR LAYOUT

6. SYMMETRICAL ABOUT | PIER

7. REINFORCING STEEL (ONE FOOTING)
   - 25'-0
   - 268 (LB.)

8. DESIGN LOAD (KIPS):
   - 15° SKEW - H=16' TO 24'

9. STRUCTURAL CONCRETE:
   - 33.7 CY

10. TYPICAL SECTION:
    - 24 SP. @ 1'-0 = 24'-0
    - 8 SP. @ 1'-0 = 8'-0

11. TYP. CONCRETE BEAM BRIDGES
    - PRETENSIONED PRESTRESSED

12. HIGHWAY DIVISION
    - 11x17_pdf.pltcfg

13. LATEST REVIEW DATE
    - 6/26/2015

14. APPROVED BY BRIDGE ENGINEER

15. MARCH, 2007
**TYPICAL SECTION**

**FOOTING NOTES:**

These footings are designed and detailed to be used with the cap and column details of the tee piers as shown on sheet H44-58-07. Batter 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 8 feet.

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

**HIGHWAY DOT**

**STANDARD DESIGN - 44’ ROADWAY, THREE SPAN BRIDGE**

**PRETENSIONED Prestressed CONCRETE BEAM BRIDGES**

**MARCH, 2007**

**TABLE OF CONTENTS**

- Footing Size
- Footing Notes
- Reinforcing Steel Footing
- Structural Concrete

---

**FOOTING SIZE**

<table>
<thead>
<tr>
<th>No.</th>
<th>Size &amp; Spacing</th>
<th>Footing Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>207</td>
<td></td>
</tr>
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<td>2</td>
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<tr>
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<tr>
<td>7</td>
<td>207</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>207</td>
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**REINFORCING STEEL FOOTING**

<table>
<thead>
<tr>
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**STRUCTURAL CONCRETE**

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**NOTE:** The design load (HIPS) is not the value used in the field for driving piles.
FOOTING SIZE

4' x 10' x 26' FOR 15C, 16C, 17B & 18C

4' x 9' x 24' FOR 15B, 16B & 18B

4' x 9' x 26' FOR 15D, 16D, 17C & 18D

FOOTING NOTES:

These footings are detailed and designed to be used with the cap and column details of the TEE piers as shown on Sheet H44-58-07.

Batter piles in exterior rows as in the direction shown.

Steel piles used as point bearing shall have a minimum distance of approximately 10 feet from top of bearing rock. The pile layouts are such that the distance center to center of adjacent piles shall not exceed 8 feet.

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

TYPICAL SECTION

4'-0 x 9'-0 x 24'-0 FOR 15B, 16B & 18B

4'-0 x 9'-0 x 26'-0 FOR 15C, 16C, 17B & 18C

4'-0 x 10'-0 x 26'-0 FOR 15D, 16D, 17C & 18D

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

OF ADJACENT PILING SHALL NOT EXCEED 8'-0.


BATTER PILES IN EXTERIOR ROWS AS IN THE DIRECTION SHOWN.

STEEL PILES USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILES SHALL NOT EXCEED 8 FEET.

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

TYPICAL SECTION

4'-0 x 9'-0 x 24'-0 FOR 15B, 16B & 18B

4'-0 x 9'-0 x 26'-0 FOR 15C, 16C, 17B & 18C

4'-0 x 10'-0 x 26'-0 FOR 15D, 16D, 17C & 18D

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

OF ADJACENT PILING SHALL NOT EXCEED 8'-0.


BATTER PILES IN EXTERIOR ROWS AS IN THE DIRECTION SHOWN.

STEEL PILES USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILES SHALL NOT EXCEED 8 FEET.

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

TYPICAL SECTION

4'-0 x 9'-0 x 24'-0 FOR 15B, 16B & 18B

4'-0 x 9'-0 x 26'-0 FOR 15C, 16C, 17B & 18C

4'-0 x 10'-0 x 26'-0 FOR 15D, 16D, 17C & 18D

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

OF ADJACENT PILING SHALL NOT EXCEED 8'-0.


BATTER PILES IN EXTERIOR ROWS AS IN THE DIRECTION SHOWN.

STEEL PILES USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILES SHALL NOT EXCEED 8 FEET.

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

TYPICAL SECTION

4'-0 x 9'-0 x 24'-0 FOR 15B, 16B & 18B

4'-0 x 9'-0 x 26'-0 FOR 15C, 16C, 17B & 18C

4'-0 x 10'-0 x 26'-0 FOR 15D, 16D, 17C & 18D

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

OF ADJACENT PILING SHALL NOT EXCEED 8'-0.


BATTER PILES IN EXTERIOR ROWS AS IN THE DIRECTION SHOWN.

STEEL PILES USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILES SHALL NOT EXCEED 8 FEET.

PIER PIRES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.
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 H44-58-07. 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 nominal bearing resistance of 30 kips per square foot allowable service level bearing value of at least 10 kips per square foot.

Standard Design - 44' Roadway, Three Span Bridge
Pretensioned Prestressed Concrete Beam Bridges
March, 2007

FOOTINGS:

| FOOTING SIZE | BAR NO. | BAR SIZE | SPACE | LENGTH | TOTAL WEIGHT | STRUCTURAL CONCRETE
|--------------|---------|----------|-------|---------|--------------|---------------------|
| 3'-6 x 9' x 26 | 6 | #8 @ 0'-9 | 24 | 6 | 912 | 30.3
| 3'-6 x 9' x 26 | 6 | #8 @ 0'-9 | 24 | 6 | 912 | 30.3
| 3'-6 x 9' x 26 | 6 | #8 @ 0'-9 | 24 | 6 | 912 | 30.3
| 3'-6 x 9' x 26 | 6 | #8 @ 0'-9 | 24 | 6 | 912 | 30.3

NOTES:
- F4 = 2" CL.
- WEIGHT

TYPICAL SECTION

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

REVISED 04 - EXCAVATION LIMIT WAS CHANGED TO 3'-0.

6/26/2015 2:38:41 PM
6/26/2015 2:38:41 PM
### BENT BAR DETAILS

**5c1, 5c2 & 5c3**

- **D = PIN DIAMETER.**

### STRUCTURAL CONCRETE (CY)

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### REINFORCING STEEL

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### CAP AND COLUMN

- **350**
- **493**
- **586**
- **496**

**CAP AND COLUMN**

- 1405
- 20
- 26
- 32

### STANDARD DESIGN - 44' ROADWAY, THREE SPAN BRIDGE

- **30**
- **20**
- **28**
- **23**
- **22**

**7250**

**CAP AND COLUMN**

- **350**
- **493**
- **149**
- **124**
- **106**

**CAP AND COLUMN**

- **350**
- **493**
- **149**
- **124**
- **106**

**CAP AND COLUMN**

- **350**
- **493**
- **149**
- **124**
- **106**

**CAP AND COLUMN**

- **350**
- **493**
- **149**
- **124**
- **106**

**CAP AND COLUMN**

- **350**
- **493**
- **149**
- **124**
- **106**
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 H44-66-07.

Battered piles in exterior rows 1/4 in the direction shown.

Steel piles used as point bearing shall have a minimum distance of approximately 10 feet from bottom of footing to top of bearing rock. The pile layouts are such that the distance center to center of adjacent piles shall not exceed 8'-0.

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

NOTE: D = PIN DIAMETER.

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 H44-66-07.

Steel piles used as point bearing shall have a minimum spacing of 10 feet from bottom of footing to top of bearing rock. The pile layouts are such that the distance center to center of adjacent piles shall not exceed 8 feet.

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

Small *D = pin diameter.*

Dimensions are out to out.

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

The pile layouts are such that the distance center to center of adjacent piles shall not exceed 8 feet.

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

Small *D = pin diameter.*

Dimensions are out to out.

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

The pile layouts are such that the distance center to center of adjacent piles shall not exceed 8 feet.

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

Small *D = pin diameter.*

Dimensions are out to out.
FOOTING NOTES:

These spread footings are designed and detailed to be used with the cap and column details of the bridge as shown on Sheet H44-66-07.

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 load-bearing value of 10 kips per square foot.

The foundation rock and the last 12 inches of rock excavation shall be to neat lines of masonry. The foundation rock shall have a minimum load-bearing value of at least 10 kips per square foot.

Service load bearing value of at least 10 kips per square foot.

Note: Pin diameters, dimensions are cut to.

See Section A-A on Sheet H44-66-07 for bar layout.
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 H44-66-07.

These spread footings shall extend at least 12 inches into suitable foundation rock and the last 12 inches of rock excavation shall be to next level of hardrock. The foundation rock shall have a minimum UCS normal bearing resistance of 30 kips per square foot allowable service load bearing value of at least 10 kips per square foot.

Dimensions are out to out.

NOTE: D = PIN DIAMETER.
SUBDRAIN DETAILS

OUTLET DETAILS

MIN. DRILLED HOLES FOR ATTACHMENT

REMOVABLE RODENT GUARD DETAILS

TYPICAL SECTION OF SUBDRAIN OUTLET

OUTLET DETAILS

MATERIALS I.M. 443.01

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

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

SUBDRAIN OUTLET

SITUATION PLAN

REFER TO SITUATION PLAN FOR NORTH ARROW.

PROTECTION LAYOUT 0° SKEW

PROTECTION LAYOUT SKewed

STANDARD DESIGN - 44' ROADWAY, THREE SPAN BRIDGE
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
MARCH, 2007

REVISED 11-09 - REMOVED THE GRANULAR BACKFILL DETAIL.

LATEST REVISON DATE
APPROVED BY BRIDGE ENGINEER

IOWA DOT
Highway Division

SHEET H44-76-07
SHEET H44-75-07 OR SEE DETAILS ON H44-74-07
SUBDRAIN NOTES:

See H44-74-07 and GENERAL ELEVATION DATA SHEETS for details of placing all subdrains and subdrain outlets required for this structure.

The bridge contractor is to install subdrains behind the abutment. The subdrains shall be 6" in diameter and be in accordance with Article 4196.01, B, of the standard specifications. The subdrain outlet shall consist of a 6"-0 length of pipe with a removable rodent guard.

The dimensions shown for the proposed subdrains are based on the proposed grading layout of bridge beams. The subdrains shown are for estimating only. Required length and general locations of subdrains are subject to change due to field adjustments of the grading layout.

The cost of furnishing and placing subdrain (including excavations, granular backfill, porous backfill, and subdrain outlet) is to be included in the price bid for "Structural Concrete (Bridge)" no extra payment will be made.

MACADAM STONE WING ARMORING NOTES:

Macadam stone shall be placed along the face of the wing and abutment footing. This is typical at each corner of the bridge unless otherwise noted in the plans. The macadam stone at these locations shall be underlaid with engineering fabric and be in accordance with Article 4122.02, B, of the standard specifications.

The bridge beam forefoot shall be compacted and shaped as shown on these plans. The situation plan and as directed by the engineer, the beam forefoot shall be firm when the engineering fabric and macadam stone are placed.

The engineering fabric shall be in accordance with Article 4196.01, B, 3, of the standard specifications for coarse material and coarse stone is allowed.

Wood preservative treatment for the timber edging shall meet the requirements for structural wood, same for subdrains, and be in accordance with Section 4161 of the standard specifications.

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

Payment for the bridge wing armor shall be incidental to the bid for "Structural Concrete (Bridge)" and will include costs of all materials and labor to construct the wing armor as shown on these plans.
**EDGING DETAILS**

4" x 6" TREATED TIMBER

**ENGINEERING FABRIC**

ENGINEERING FABRIC ENDS ARE TO BE UNDERLAPPIED TO PREVENT UNDERMINING.

**SUBDRAIN NOTES:**

See MACADAM TRENCH FABRIC NOTES FOR DETAILS OF PLACING ALL SUBDRAINS AND SUBDRAIN OUTLETS REQUIRED FOR THIS STRUCTURE.

The bridge contractor is to install subdrains behind the abutment. The subdrains shall be 4" in diameter and be in accordance with Article 4143.01 of the Standard Specifications. The subdrain outlet shall consist of a 6" diameter length of pipe with a removable rodent guard.

The subdrains shown for the proposed subdrain are based on the proposed grading layout of bridge berms. The subdrains shown are for estimating only. Required lengths and general locations of subdrains are subject to change due to field adjustments of the grading layout.

The cost of furnishing and placing subdrain (excluding excavation) granular backfill, porous backfill, and subdrain outlet is to be included in the price bid for structural concrete bridges. No extra payment will be made.

**MACADAM STONE WING ARMORING NOTES:**

Macadam stone shall be placed along the side of the wing and abutment footing. This is typical at each corner of the bridge unless otherwise noted in the plans. The macadam stone at these locations shall be underlapped with engineering fabric and be in accordance with Article 4143.01 of the Standard Specifications.

The macadam stone top edge shall be formed and shaped as shown on these plans. The situation plan and as directed by the engineer, the mowed foreedge shall be flat and the engineering fabric and macadam stone are placed.

The engineering fabric shall be in accordance with Article 4143.01, 3, of the Standard Specifications for coarse material and choke stone is allowed. Wood preservative treatment for the timber edging shall meet the requirements for structural posts. Sawed four sides, and be in accordance with Section 4161 of the Standard Specifications.

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

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

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**SUBDRAIN NOTES:**

See MACADAM TRENCH FABRIC NOTES FOR DETAILS OF PLACING ALL SUBDRAINS AND SUBDRAIN OUTLETS REQUIRED FOR THIS STRUCTURE.

The bridge contractor is to install subdrains behind the abutment. The subdrains shall be 4" in diameter and be in accordance with Article 4143.01 of the Standard Specifications. The subdrain outlet shall consist of a 6" diameter length of pipe with a removable rodent guard.

The subdrains shown for the proposed subdrain are based on the proposed grading layout of bridge berms. The subdrains shown are for estimating only. Required lengths and general locations of subdrains are subject to change due to field adjustments of the grading layout.

The cost of furnishing and placing subdrain (excluding excavation) granular backfill, porous backfill, and subdrain outlet is to be included in the price bid for structural concrete bridges. No extra payment will be made.

**MACADAM STONE WING ARMORING NOTES:**

Macadam stone shall be placed along the side of the wing and abutment footing. This is typical at each corner of the bridge unless otherwise noted in the plans. The macadam stone at these locations shall be underlapped with engineering fabric and be in accordance with Article 4143.01 of the Standard Specifications.

The macadam stone top edge shall be formed and shaped as shown on these plans. The situation plan and as directed by the engineer, the mowed foreedge shall be flat and the engineering fabric and macadam stone are placed.

The engineering fabric shall be in accordance with Article 4143.01, 3, of the Standard Specifications for coarse material and choke stone is allowed. Wood preservative treatment for the timber edging shall meet the requirements for structural posts. Sawed four sides, and be in accordance with Section 4161 of the Standard Specifications.

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

Payment for the bridge wing armoring shall be incidental to the bid item "structural concrete (bridge) and shall include costs of all material and labor to construct the wing armoring as shown on these plans.
ABUTMENT BACKFILL PROCESS:

The base of the excavation surface behind the abutment is to be covered with a 3% slope away from the abutment footing and a 2% cross slope in the direction of the subdrain outlets. This excavation shaping is to be done prior to beginning installation of the geotextile and backfill material.

After the subdrain has been installed, the geotextile fabric shall be installed in accordance with the details shown. The fabric is intended to be installed in the base of the excavation and extended vertically of the abutment backfill. The fabric will be installed with such concrete ties to a height that will be approximately 1 to 2 feet higher than the height of the forces backfill placed as shown in the backfill details on this sheet. The edges of 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 placed in the fabric and secured to the concrete with shallow concrete nails. The fabric placed against the excavation face shall be pinned.

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

Periodic backfill is then placed and leveled. No compaction is required. The remaining work involves backfilling with floodable backfill. Surface flooding, and vibratory compaction, the floodable backfill material shall be placed in individual lifts. Surface flooding and compacted within 30 minutes after full consideration, limit the loose lifts to no more than 2 feet of thickness.

Start surface flooding for each floodable backfill lift at the mid-point of the subdrain and proceed to the low point where the subdrain exits the fabric. To ensure uniform surface flooding, water running full in a 2-inch diameter hose should be sprayed in successive 6-foot to 8-foot increments for 5 minutes within each increment.

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

Water required for flooding subdrains, porous backfill, floodable backfill, and geotextile fabric furnished at the bridge abutments shall not be specified separately for payments. 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 see for structural concrete.

NOTE:

Subdrain shall slope downward 2% from the approach roadway when outlittle both sides of the abutment. Subdrain shall slope downward 2% from high end when outlittle at one end of the abutment.

The geotextile fabric shall be in accordance with Article 3196.01, B, 6 of the Standard Specifications. If the engineered fabric is lifted, the lifts shall be a minimum of 1 foot in length, single layer, furnished with a slope lap piece on top and stapled for continuity.

NOTE:

See subdrain details sheet for details not shown on this sheet which are pertinent to this structure.
**ABUTMENT BACKFILL PROCESS:**

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

After the subgrade has been shaped, the geotextile fabric shall be installed in accordance with the details shown. The fabric is intended to be installed in the base of the excavation and extended vertically of the abutment backfill arches and excavation face to a height that will be approximately 1 to 2 feet higher than the height of the porous backfill placed as shown in the backfill details on this sheet. The edges of the fabric placed shall overlap approximately 1 foot and shall be pinned in place. The fabric shall be attached to the abutment by using lap placed 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. The 2% slope of the rear excavation slope is shown on this sheet, where the subdrain exits the fabric near the end of the abutment wing wall. Perforated pipe shall then be placed and leveled. No compaction is required.

The subdrain work involves backfilling with flexible backfill. Surface flooding and vibratory compaction. The flexible backfill material shall be installed in accordance with the Standard Specifications. The flexible backfill shall be placed in individual lifts, surface flooded and compacted within 30 minutes following installation. For the full compaction, limit the loose lifts to no more than 2 feet of thickness.

Start surface flooding for each flexible backfill lift at the mid-point of the subdrain and proceed to the low point where the subdrain exits the fabric. To ensure uniform surface flooding, water running off a 2-inch diameter toenail must be spread in successive 6-foot to 8-foot increments for 5 minutes within each increment.

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

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

The geotextile fabric is intended to be installed in accordance with the Standard Specifications. The geotextile fabric shall be in accordance with Article 10.2 of the Standard Specifications. The geotextile fabric furnished at the bridge abutments shall be included in the contract unit price used for structural concrete.

**NOTE:**

Subdrain subsoil slope downward 2% from each end when outflanking both sides of the abutment, from high end when outflanking at one end of the abutment. The geotextile fabric shall be in accordance with Article 10.2 of the Standard Specifications. The geotextile fabric is lifted the lips shall be a minimum of the top in length, single pieces width of slope lap placed on top and staples for continuity.

**SECTION A-A**

**BACKFILL DETAILS**

NOTE: GEOTEXTILE FABRIC WILL BE ATTACHED AT ONE END OF THE ABUTMENT.

**NOTE:** GEOTEXTILE FABRIC WILL BE ATTACHED AT ONE END OF THE ABUTMENT.
ABUTMENT BACKFILL PROCESS:

The base of the excavation surface being 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 shaping is to be done prior to installing the geotextile and backfill material.

After the subdrain has been installed, the geotextile fabric shall be installed in accordance with the details shown. The fabric is intended to be installed in the base of the excavation and extends vertically around the abutment backfill, and excavation face to a height that will be approximately 1 to 2 feet higher than the height of the porous backfill. Placement as shown in the backfill details on this sheet. The limits of 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 pipe in the fabric and secured to the concrete by shallow concrete nails.

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

Porous backfill is then placed and levied; no compaction is required. The remaining work involves backfilling with flexible backfill surface flooding and vibration compaction. The flexible backfill material shall be installed in successive lifts, surface flooded and compacted with vibratory rollers. During full compaction, limit the loose lifts to no more than 2 feet of thickness.

Start surface flooding for each flexible backfill lift at the high point of the subdrain. Proceed to the low point where the subdrain exits the fabric. To ensure uniform surface flooding, water running full in a 2-inch shower must be spaced in successive 6-foot to 8-foot increments for 5 minutes within each increment.

Flexible backfill lift placement, flooding, and compaction shall progress until the required thickness of the backfill has been completed. Water required for floating subdrains. Flexible backfill is preferred and geotextile fabric placed at the bridge abutments shall be included in the contact unit price bid for structural concrete.

The cost of water required for floating subdrains, porous backfill flexible backfill, and geotextile fabric placed at the bridge abutments shall be included in the contact unit price bid for structural concrete.
ABUTMENT BACKFILL PROCESS:

The base of the excavation surface along 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 grading is to be done prior to installing the geotextile and backfill material.

After the surface has been shaped, the geotextile fabric shall be installed in accordance with the details shown. The fabric is to be installed in the base of the excavation and extended vertically along the abutment backwall, arch wall, and excavation face to a height that will be approximately 1 to 2 feet higher than the height of the porous backfill placement as shown in the geotextile details on this sheet. The strips of the fabric placed shall overlap approximately 1 foot and shall be pinned in place. The fabric shall be attached to the abutment by using stapled fabric and secured to the concrete with small concrete nails. The fabric placed against the excavation face shall be pinned.

When the fabric is in place, the subbase shall be installed directly on the fabric. At the top of the lower excavation slope, a slop will need to be cut in the fabric at the point where the subbase exits the fabric near the end of the abutment wing. Porous backfill is then placed and leveled, no compaction is required.

The remaining work involved backfilling with flexible backfill. Surface grading and compaction, the flexible backfill material shall be placed in accordance with the grading specifications. The flexible backfill shall be placed in such lifts, so as to be completed with vibration compaction. Limit the loose lifts to no more than 3 feet of thickness.

Start surface grading for each flexible backfill lift at the high point of the subbase. Proceed to the low point where the subbase exits the fabric. Do not perform surface grading, water running full in a 2-inch diameter pipe should be sprayed in successive 3-foot to 4-foot increments for 5 minutes within each increment.

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

Water required for leveling, subbase, porous backfill, flexible backfill, and geotextile fabric furnished by the bridge will not be measured separately for payment.

The cost of water required for leveling, subbase, porous backfill, flexible backfill, and geotextile fabric furnished at the bridge shall be included in the contract unit price bid for structural concrete.

NOTE: Subbase in slope and crown drain as shown on approach road. When grading both sides of the abutment, subbase in slope and crown shall be a minimum of one on top and pinning for continuity.