IOWA DOT
Highway Division

H24–06 THREE SPAN
PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE STANDARDS
GENERAL NOTES:

THE H24-06 BRIDGE STANDARDS, IF PROPERLY USED, PROVIDE THE STRUCTURAL PLANS NECESSARY TO CONSTRUCT THREE SPAN ROADWAY PRESTRESSED CONCRETE BEAM BRIDGES WITH LOADINGS OF 30k, 36k, 42k, 48k, 50k, 52k, 54k, 56k, 68k, 70k, 72k, 74k, 76k, AND 78k.

THESE BRIDGES MAY BE BUILT ON A 0°, 15°, 30°, 45°, OR 60° SKEW. THESE BRIDGES FURNISH THREE SETS OF CONSTRUCTION DETAILS FOR BOTH STANDARD PIER CAPS AND INTEGRAL ABUTMENTS DESIGNED FOR THE USE OF VARIOUS TYPES OF PILE FOOTINGS OR SPREAD FOOTINGS AS FOLLOWS:

1. INTEGRAL ABUTMENTS, PILE BENTS, AND TEE PIERS FOR THESE H24 STANDARDS HAVE BEEN DESIGNED FOR THE USE OF VARIOUS TYPES OF PILE FOOTINGS OR SPREAD FOOTINGS AS FOLLOWS.
2. THE INTEGRAL ABUTMENT DESIGN UTILIZED ON THESE BRIDGES REQUIRES THEIR USE IN THE FOLLOWING MANNER:
   (1) THE 225'-6, 235'-10, 245'-4 AND 255'-6 BRIDGES SHALL USE STEEL PILES AT THE ABUTMENT.
   (2) THESE BRIDGES ARE NOT TO BE USED WHEN POINT BEARING FOR THE ABUTMENT STEEL PILES. IT IS NECESSARY THAT THE TYPE AND LENGTH FOR BOTH THE PIERS AND ABUTMENTS FOR THESE STANDARDS HAVE BEEN DESIGNED FOR THE USE OF BOTH STEEL AND APPROACH PAVING, WHEN APPROACH PAVING IS NEEDED.
3. THE INTERNAL PIER DESIGN UTILIZED ON THE BRIDGES SHOWN ON THE PLAN MUST BE ADHERED TO WITH STEEL PILES AT THE PIER.

THESE STANDARDS GIVE MOST OF THE INFORMATION NECESSARY TO BUILD THESE BRIDGES ON EITHER A (VERTICAL LINE OR A STRAIGHT LINE). TO USE THE H24-06 BRIDGE PLAN, THE PERSON BUILDING THE BRIDGE MUST CONSIDER THE FOLLOWING:

1. THE 225'-6, 235'-10, 245'-4 AND 255'-6 BRIDGES SHALL USE STEEL PILES AT STEEL PILES FOR BOTH THE ABUTMENT AND PIER.
2. THE INTERNAL PIER DESIGN UTILIZED ON THE BRIDGES SHOWN ON THE PLAN MUST BE ADHERED TO WITH STEEL PILES AT THE PIER.
3. THE INTERNAL PIER DESIGN UTILIZED ON THE BRIDGES SHOWN ON THE PLAN MUST BE ADHERED TO WITH STEEL PILES AT THE PIER.

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (5/8 IS 10 DEGREES FROM VERTICAL). THE KEYWAY DIMENSIONS SHOWN ON THE PLANS ARE BASED ON NOMINAL DIMENSIONS UNLESS STATED OTHERWise. IN ADDITION, THE BOLTS USED FOR THE KEYWAY SHALL BE LIMITED TO A MAXIMUM OF 10 DEGREES FROM VERTICAL.

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EXAMPLES OF BRIDGE SEAT AND STEP CALCULATIONS:

The designer shall show on the plans the elevations and the 5 steps dimensions required for each of the pier top and abutment seat. The box in details in the following examples show how the information should be indicated on the plans.

**Example No. 1**

**ABUTMENT NO. 1**

`(BEAM SPACING)` `(TAN. SK.) ` `(GRADE)` = `(7.00') TAN 30° `(0.0325') = 0.13'

**ELEVTIONS**

- **BRIDGE STA.:** 103480.00
- **PIER BROS.:** 103472.67
- **ABUTMENT BROS.:** 103470.63

**ELEVATIONS ALONG PROFILE GRADE LINE (P.A.L. ELEV.)**

- **ELEV.:** 645.22
- **P.I. Li.:** 645.22
- **L1 Li.:** 645.22

**ELEVATIONS TOP OF SLAB FACING ALONG THE STATIONING**

<table>
<thead>
<tr>
<th>FROM SHEET</th>
<th>LENGTH OF CURVE</th>
<th>105+85.00</th>
<th>1+00</th>
<th>LENG. OF CURVE</th>
<th>106+23.67</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABUTMENT BRGS.</td>
<td>= 104+78.08</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIER BRGS.</td>
<td>= 105+78.08</td>
<td></td>
<td></td>
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</tbody>
</table>

**Example No. 2**

**PIER NO. 1**

- **ELEV.:** 308.89
- **L1 Li.:** 308.90

**ELEVATIONS ALONG PROFILE GRADE LINE (P.A.L. ELEV.)**

- **ELEV.:** 308.75
- **P.I. Li.:** 308.78
- **L1 Li.:** 308.90

**ELEVATIONS TOP OF SLAB FACING ALONG THE STATIONING**

<table>
<thead>
<tr>
<th>FROM SHEET</th>
<th>LENGTH OF CURVE</th>
<th>254+73.00</th>
<th>1+00</th>
<th>LENG. OF CURVE</th>
<th>255+11.67</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABUTMENT BRGS.</td>
<td>= 253+66.08</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIER BRGS.</td>
<td>= 254+34.33</td>
<td></td>
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</table>

**Tee Pier Notes:**

The tee pier shown in these plans are designed for use with the H24-06 pretensioned prestressed concrete beam standards. The piers are intended for use in bridge structures where the load conditions and the pier may be used for either slope separation or stream crossing structures. The piers were designed for the following stream force and ice loading conditions, and should be used only where these loading conditions are exceeded.

**Ice Force**

Ice forces were applied at a height of ~2' to the bottom of the pier footing. The ice to the pier footing is the overall height of the pier and the effective ice force was 24 kips for 1' of ice. When applying the ice force, it was calculated according to the LIP specifications and applied to the pier footings as follows:

- **Case 1:** 50% of F applied parallel to the pier's long axis and 34% of F applied perpendicular to the pier's long axis.
- **Case 2:** 30% of F applied parallel to the pier's long axis and 30% of F applied perpendicular to the pier's long axis.

**Stream Flow**

The stream velocity used was 5 ft/s with a C coefficient equal to 1.4. The resulting stream force was assumed to act parallel to the pier's long axis. It was assumed that superstructure elements will clear high water by approximately 3'-0.

**FOOTING GEOMETRY**

It was assumed that the pier footing will be set approximately 4'-0 below the adjacent stream bottom. It was also assumed that there are no significant unbalanced earth pressures applied to the pier.

All bridges with tee piers detailed in these standards are intended to have the fixed piers and one expansion pier. The pile layout and reinforcement between the fixed pier and expansion pier lies in the selection of footings and the design of the pier. Each bridge shall consist of two sets of fixed bearings and one set of expansion bearings, which may be used in either fixed or expansion pier. The height in the top of the cap shall be increased from the expansion pier.

**Pile Force**

When piers are used in slope separation structures, epoxy coated reinforcement may be required for high columns. Consult current policy for guidance on the use of epoxy coated reinforcement in such cases. Adjust the column bar projection into the cap and large cap distance accordingly.
HALF SECTION NEAR MID SPAN

THE CONCRETE SEALER LIMITS ARE SHOWN IN THE DETAIL AND SHALL APPLY TO THE FULL CONCRETE SEALER LIMITS FOR SIDES OF THE OPEN RAILS.

SLAB AND HAUNCH THICKNESS AT BEAMS FOR VERTICAL CURVE

CONCRETE SEALER LIMITS FOR OPEN RAILS

THE CONCRETE SEALER SHALL BE APPLIED TO BOTH SIDES OF BRIDGE SLAB ON THE TOP SIDE OF SLAB AND UNDER THE SLAB. THE CONCRETE SEALER SHALL ALSO BE APPLIED TO THE OPEN RAILS ON THE TOP TRANSVERSE FACE, RETURN OF RAIL, AND ON ALL SIDES OF THE OPEN RAIL POSTS.

SLAB AND HAUNCH THICKNESS AT BEAMS FOR STRAIGHT GRADE

THE CONCRETE SEALER LIMITS ARE SHOWN IN THE DETAIL AND SHALL APPLY TO THE FULL SURFACE OF BRIDGE CONCRETE SLAB SHALL BE HOE, 5X5, OR 5X7 FOR THE CONTRIBUTORS OF THE STANDARD SPECIFICATIONS.

6A BARS IN TOP OF SLAB

TOP TRANSVERSE REINFORCING STEEL IS TO BE PARALLEL TO AND 1" CLEAR ABOVE BOTTOM OF SLAB. TOP AND BOTTOM REINFORCING STEEL IS TO BE SUPPORTED BY INDIVIDUAL BAR CHAIRS PLACED AT NOT MORE THAN 3'-0 CENTERS LONGITUDINALLY AND TRANSVERSELY OR BY CONTINUOUS ROWS OF INDIVIDUAL BARS CHAIRS OR SLAB BOLSTERS SPACED 4'-0, 9" APART, EACH SUCH REQUIREMENT SHALL APPLY FOR BAR CHAIRS, BAR NON CHAIRS, AND SLAB BOLSTERS.

SLAB THICKNESS DETAILS

CONCRETE SEALER LIMITS FOR OPEN RAILS

THE CONCRETE SEALER SHALL BE APPLIED TO BOTH SIDES OF BRIDGE SLAB ON THE TOP SIDE OF SLAB AND UNDER THE SLAB. THE CONCRETE SEALER SHALL ALSO BE APPLIED TO THE OPEN RAILS ON THE TOP TRANSVERSE FACE, RETURN OF RAIL, AND ON ALL SIDES OF THE OPEN RAIL POSTS.

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GENERAL NOTES:
CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR SHALL BE 2" UNLESS OTHERWISE NOTED OR SHOWN.


ALL PRESTRESSED CONCRETE BEAMS ARE TO BE SET VERTICAL.
FORMS FOR THE SLAB AND RAILS ARE TO BE SUPPORTED BY THE PRESTRESSED CONCRETE BEAMS.
THE FINS AND ARMS OF THE H A N C H  C O N C R E T E I S T O B E P L A C E D MONOLITHICALLY WITH THE FLOOR SLAB.

ALL REINFORCING STEEL IS TO BE GRADE 60.

COST OF ALL PREFORMED EXPANSION JOINT FILLER MATERIAL IS TO BE INCLUDED IN THE PRICE BD FOR "STRUCTURAL CONCRETE (BRIDGE)."

INTERIOR BEAMS

EXTERIOR BEAMS @ OPEN RAIL

TYPICAL SLAB AND HAUNCH DETAIL

FOR SLAB THICKNESS OVER BEAMS SEE "SLAB THICKNESS DETAILS" ON SHEET H24-03-06

DRIP GROOVE 1/4" DOUBLE

MONOLITHICALLY WITH THE FLOOR SLAB.

THE PIER AND ABUTMENT DIAPHRAGM CONCRETE IS TO BE PLACED.

ALL PRESTRESSED CONCRETE BEAMS ARE TO BE SET VERTICAL.

I.M. 451.01 REQUIREMENTS SHALL APPLY FOR BAR CHAIRS.

ALL REINFORCING BARS ARE TO BE SECURELY WIRED IN PLACE AND ADEQUATELY SUPPORTED ON BAR CHAIRS BEFORE CONCRETE IS PLACED.

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

ALL REINFORCING BARS ARE TO BE SECURELY MAPPED IN PLACE AND ADEQUATELY SUPPORTED ON BAR CHAIRS BEFORE CONCRETE IS PLACED.

ALL PRESTRESSED CONCRETE BEAMS ARE TO BE SET VERTICAL.

FORMS FOR THE SLAB AND RAILS ARE TO BE SUPPORTED BY THE PRESTRESSED CONCRETE BEAMS.

THE FINS AND ARMS OF THE HANCH CONCRETE IS TO BE PLACED MONOLITHICALLY WITH THE FLOOR SLAB.

ALL REINFORCING STEEL IS TO BE GRADE 60.

COST OF ALL PREFORMED EXPANSION JOINT FILLER MATERIAL IS TO BE INCLUDED IN THE PRICE BD FOR "STRUCTURAL CONCRETE (BRIDGE)."
ABUTMENT BEARING TO PIERS \( \text{MIDWAY BETWEEN BEAM BEARINGS} \)

LOCATION OF BEAM COIL TIES AND STEEL DIAPHRAGM BOLT HOLES

PART PLAN

TOP OF FIXED PIERS DETAILS

SEE SHEET H24-04-06 FOR EXPANSION PIER DETAILS

PART PLAN

LONGITUDINAL SECTION OF SHORE A & B BEAMS

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

Preliminary Design

RELATIVE ELEVATIONS A AND B IN THE BRIDGE PLAN SHEETS.
DETERMINE IF A RETARDING ADMIXTURE IS REQUIRED TO MAINTAIN PLASTICITY OF THE CONCRETE DECK DURING PLACEMENT.

NECESSARY EQUIPMENT AND FACILITIES TO ACCOMPLISH THE REQUIRED RESULTS.

FOR APPROVED ALTERNATE PROCEDURES THE ENGINEER SHALL

<table>
<thead>
<tr>
<th>NO. OF SPACES FOR 6a1 BARS (BOTTOM) AND 5j1 BARS (TOP)</th>
<th>NO. OF SPACES FOR 6a1 BARS (TOP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.L. PIER REACTION (D.L. + F.W.S.) SERVICE LOADS</td>
<td></td>
</tr>
<tr>
<td>VERTICAL</td>
<td></td>
</tr>
<tr>
<td>ABUTMENT FOOTINGS (w/ STEEL H PILES)</td>
<td></td>
</tr>
<tr>
<td>ABUTMENT FOOTINGS (w/ WOOD PILES)</td>
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</tr>
<tr>
<td>SLAB INCLUDING HAUNCH &amp; PIER DIAPHRAGM, SECTIONS 4 &amp; 5</td>
<td></td>
</tr>
<tr>
<td>SLAB INCL. HAUNCH, ABUT. DIAPHR., &amp; WINGWALLS** , SECT. 1 &amp; 3</td>
<td></td>
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</tbody>
</table>

REINFORCING CONSTR.

PREBORED HOLES (w/ STEEL H-PILES)

PRETENSIONED PRESTRESSED CONCRETE BEAM, CENTER SPAN

STRUCTURAL CONCRETE SUPERSTRUCTURE (INCLUDES ABUT. WINGS)

CONCRETE PLACEMENT QUANT.

GENERAL DATA
PART REAR ELEVATION AT ABUTMENT

PART SECTION A-A

PART SECTION B-B

PLAN OF TEMPORARY PAVING BLOCK

ABUTMENT NOTES:

- MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR HEDGING RAIL IS TO BE 2 FEET UNLESS OTHERWISE NOTED OR SHOWN.
- PAVING RAILS SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.
- PLACE THE RAIL AT 38" HEDGE TO MATCH TRAFFIC SIDE OF ABUTMENT RAIL FACE (SOUTH SIDE TYPICAL)
- DARRIER RAIL NOT SHOWN IN DETAILS.
- IF ROCK IS CLOSER THAN 5 FT HOE ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.

WOOD PILING NOTES:

- H7100 SERIES ARE CUT OFF AT THE LINES 5, EXCEPT AS SHOWN, IT TO BE WRAPPED WITH ONE LAYER OF POLYFOAM WITH A MINIMUM DENSITY OF 56 OZ/SQ-YD, AND SHALL BE AT LEAST 3 IN. THICK, MATERIAL LESS THAN 3 IN. IN THICKNESS MAY BE USED, BUT WILL REQUIRE ADDITIONAL WHICH FOR A TOTAL OF AT LEAST ONE HORIZONTAL MATERNAL."
TEMPORARY PAVING BLOCK

ABUTMENT NOTES:
- Minimum clear distance from face of concrete to near reinforcing bar is to be 2" unless otherwise noted or shown.
- 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.

PART REAR ELEVATION AT ABUTMENT

PART SECTION A-A

PART SECTION B-B

Plan of Temporary Paving Block

NOTE: Line paving note with tar paper before placing the temporary paving block.
DETERMINE IF A RETARDING ADMIXTURE IS REQUIRED TO MAINTAIN PLASTICITY OF THE CONCRETE DECK DURING PLACEMENT.

NOTE: CONCRETE DECK SHALL BE PLACED IN SECTIONS AND SEQUENCES INDICATED. ALTERNATE PROCEDURES FOR PLACING DECK CONCRETE MAY BE CONSIDERED.

<table>
<thead>
<tr>
<th>CONCRETE PLACEMENT QUANT.</th>
<th>(-) ABUT. BRG.</th>
<th>0'-0&quot;</th>
<th>3'-8&quot;</th>
<th>5'-6&quot;</th>
<th>7'-1&quot;</th>
<th>9'-2&quot;</th>
<th>11'-0&quot;</th>
<th>12'-8&quot;</th>
<th>14'-6&quot;</th>
<th>16'-4&quot;</th>
<th>18'-2&quot;</th>
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</thead>
<tbody>
<tr>
<td>VERTICAL TOP OF SLAB TO ABUT. CONSTR.</td>
<td>&quot;U&quot;</td>
<td>3'-4&quot;</td>
<td>5'-2&quot;</td>
<td>6'-10&quot;</td>
<td>8'-8&quot;</td>
<td>10'-6&quot;</td>
<td>12'-4&quot;</td>
<td>14'-2&quot;</td>
<td>15'-2&quot;</td>
<td>17'-0&quot;</td>
<td>18'-8&quot;</td>
</tr>
<tr>
<td>CURVE STRAIGHT TOP OF SLAB TO C.L. ABUT. BRG.</td>
<td>&quot;U&quot;</td>
<td>3'-6&quot;</td>
<td>5'-4&quot;</td>
<td>7'-2&quot;</td>
<td>9'-0&quot;</td>
<td>10'-8&quot;</td>
<td>12'-6&quot;</td>
<td>14'-4&quot;</td>
<td>16'-2&quot;</td>
<td>18'-0&quot;</td>
<td>19'-8&quot;</td>
</tr>
<tr>
<td>SLAB DECK LEVEL HEIGHTS WITH C.S.</td>
<td>22'-5&quot;</td>
<td>24'-0&quot;</td>
<td>25'-8&quot;</td>
<td>27'-6&quot;</td>
<td>29'-4&quot;</td>
<td>31'-2&quot;</td>
<td>32'-10&quot;</td>
<td>34'-8&quot;</td>
<td>36'-6&quot;</td>
<td>38'-4&quot;</td>
<td>40'-2&quot;</td>
</tr>
<tr>
<td>L.F.</td>
<td>22'-5&quot;</td>
<td>24'-0&quot;</td>
<td>25'-8&quot;</td>
<td>27'-6&quot;</td>
<td>29'-4&quot;</td>
<td>31'-2&quot;</td>
<td>32'-10&quot;</td>
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<td>36'-6&quot;</td>
<td>38'-4&quot;</td>
<td>40'-2&quot;</td>
</tr>
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<td>B.S.</td>
<td>22'-5&quot;</td>
<td>24'-0&quot;</td>
<td>25'-8&quot;</td>
<td>27'-6&quot;</td>
<td>29'-4&quot;</td>
<td>31'-2&quot;</td>
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<td>36'-6&quot;</td>
<td>38'-4&quot;</td>
<td>40'-2&quot;</td>
</tr>
</tbody>
</table>
| L.F. REACTION | 22'-5" | 24'-0" | 25'-8" | 27'-6" | 29'-4" | 31'-2" | 32'-10" | 34'-8" | 36'-6" | 38'-4" | 40'-2"
| B.S. REACTION | 22'-5" | 24'-0" | 25'-8" | 27'-6" | 29'-4" | 31'-2" | 32'-10" | 34'-8" | 36'-6" | 38'-4" | 40'-2"
| NO. OF SPACES FOR 6" BARS | 6a1 | 6a2 | 6a3 | 6a4 | 6a5 | 6a6 | 6a7 | 6a8 | 6a9 | 6a10 | 6a11 |
| NO. OF SPACES FOR 5" BARS | 5b1 | 5b2 | 5b3 | 5b4 | 5b5 | 5b6 | 5b7 | 5b8 | 5b9 | 5b10 | 5b11 |
| NO. TO OUT OF SLAB | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" | 6" |
| REINFORCING CONTROL DISTANCE FROM C.L. | 1'-7" | 1'-7" | 1'-7" | 1'-7" | 1'-7" | 1'-7" | 1'-7" | 1'-7" | 1'-7" | 1'-7" | 1'-7" |

**CONCRETE BEAM BRIDGES**

**PREBORED HOLES (w/ STEEL H-PILES)**

**PREBORED HOLES (w/ WOOD PILES)**

**NO. OF STEEL H-PILES (HP 10 x 57) FOR TWO ABUTMENTS**

**REINFORCING STEEL (w/ STEEL H PILES)**

**REINFORCING STEEL (w/ WOOD PILES)**

**STRUCTURAL STEEL (w/ TEE PIERS)**

**STRUCTURAL STEEL (w/ PILE BENT PIERS)**

**CONCRETE RAIL**

**PRETENSIONED PRESTRESSED CONCRETE BEAM, END SPAN**

**PRETENSIONED PRESTRESSED CONCRETE BEAM, CENTER SPAN**

**STRUCTURAL CONCRETE ABUTMENTS (w/ WOOD PILES)**

**STRUCTURAL CONCRETE SUPERSTRUCTURE (INCLUDES ABUT. WINGS)**

**WINGWALLS APPLY ONLY TO BRIDGES USING "C" BEAMS.**

**3" INCHES TO "U" VALUES SHOWN.**

**BEARING PAD AT EXPANSION PIER LOCATIONS ADD FOR 1" INCH DEFLECTION OF THE 1" INCH NEOPRENE."
**REINFORCING BAR LIST**

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

**DECK & ABUTMENT REINF.**

- PRETENSIONED Prestressed Concrete Beam Bridges
- **December 2005**

**DECK & ABUTMENT REINF.**

- **DECK REINF.**
  - **893 & 895**

- **ABUTMENT REINF.**
  - **892 & 893**

**BENT BAR DETAILS**

- **5d1 & 5d5**
- **5d4 & 5d6**
- **5d3**
- **5d2**
- **5d3**
- **5d1 & 5d4**
- **5d5**
- **5d4 & 5d6**
- **5d3**

**DECK & ABUTMENT REINF.**

- **H24-16-06**

**IOWA DOT**

Highway Division

Pretensioned Prestressed Concrete Beam Bridges

**DECK & ABUTMENT REINF.**

- **H24-16-06**

**STANDARD DESIGN** & PROCEDURE GUIDE FOR HIGHWAY BRIDGES

**DECK & ABUTMENT REINF.**

- **H24-16-06**

**DECK & ABUTMENT REINF.**

- **H24-16-06**

**DECK & ABUTMENT REINF.**

- **H24-16-06**

**DECK & ABUTMENT REINF.**

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**DECK & ABUTMENT REINF.**

- **H24-16-06**

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- **H24-16-06**

**DECK & ABUTMENT REINF.**

- **H24-16-06**

**DECK & ABUTMENT REINF.**

- **H24-16-06**

**DECK & ABUTMENT REINF.**

- **H24-16-06**

**DECK & ABUTMENT REINF.**

- **H24-16-06**

**DECK & ABUTMENT REINF.**

- **H24-16-06**

**DECK & ABUTMENT REINF.**

- **H24-16-06**

**DECK & ABUTMENT REINF.**

- **H24-16-06**
STEP REINFORCING BAR LIST

ONE TEE PIERS

<table>
<thead>
<tr>
<th>LENGTH</th>
<th>BAR</th>
<th>NO.</th>
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<tbody>
<tr>
<td></td>
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</table>

ONE PILE BENT PIERS

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BENT BAR DETAILS

<table>
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ADDITIONAL CONCRETE VOLUME FOR CONSTRUCTION

<table>
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<tr>
<th>ROADWAY GRADE AT SUBSTRUCTURE UNIT</th>
<th>EACH ABUTMENT FOOTING/PIER CAP</th>
<th>EACH TEE PIER CAP</th>
<th>EACH PILE BENT PIER</th>
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<tbody>
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<tr>
<td>3%</td>
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</tr>
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<td>4%</td>
<td>26, 26, 46, 46, 10</td>
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<td>12</td>
</tr>
<tr>
<td>5%</td>
<td>26, 26, 46, 46, 10</td>
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</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>ROADWAY GRADE AT SUBSTRUCTURE UNIT</th>
<th>EACH ABUTMENT FOOTING/PIER CAP</th>
<th>EACH TEE PIER CAP</th>
<th>EACH PILE BENT PIER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1%</td>
<td>26, 26, 46, 46, 10</td>
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<tr>
<td>2%</td>
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<td>3%</td>
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<td>12</td>
</tr>
<tr>
<td>4%</td>
<td>26, 26, 46, 46, 10</td>
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<tr>
<td>5%</td>
<td>26, 26, 46, 46, 10</td>
<td>5</td>
<td>12</td>
</tr>
</tbody>
</table>

NOTES:

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

- Additional concrete should be added to the plans for each abutment footing/riper cap based on the roadway grade at each abutment footing/riper cap.
PART REAR ELEVATION AT ABUTMENT

ABUTMENT NOTES:
- Minimum clear distance from face of concrete to nearest reinforcing bar is to be 3" unless otherwise noted or shown.
- Plate 5/8" bar at 1:6 slope to match traffic side of abutment wing face, both sides.
- Abutment pile spaces shall be driven to values shown in design plans.
- Barrier rail not shown in details, if rock is closer than 15' below abutment, place 5h2 bar at 1:6 slope to match traffic.
- Minimum clear distance from face of concrete to top of abutment to be 1".
- Share spacing between beams.
- Footing to be made of a minimum of No. 2 bar, 2" diameter, 14' pitch.
- Piles are to be cut off after placing concrete. Rug padding may be used, but will require additional wraps for a total of at least one inch.

PART SECTION A-A

PART SECTION B-B

WOOD PILING NOTE:
- After piles are cut off, the upper 3', except as shown, is to be wrapped with a double thickness of rug padding held in place by tacking with galvanized roofing nails and wrapped with 4" gauge galvanized wire at a 4" pitch. Care is to be taken not to damage panels when placing panels. Rug padding may be either of the following:
- Hair and Jute rug padding, saturated on both sides, and beginning not less than 15' below abutment. (b) Bonded rubber or bonded felt with a minimum density of 1 1/2 lbs. per square foot and shall be at least 1/2 inch, and not less than 3/8" in thicknesses may be used, but will require additional wraps for a total of at least one inch.

NOTES:
- Wood piling note: Pretensioned prestressed concrete beam bridges.
- H24-18-06

ABUTMENT PILE PLAN

H24-18-06
**Plan of Temporary Paving Block**

- **Note:** Line paving notes with TAR paper before placing the temporary paving block.

**Abutment Notes:**
- Minimum clear entrance from face of concrete to rear reinforcing bars is to be 8" unless otherwise noted on drawing.
- 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 analyses may be required.

**Abutment Details:**

- Standard Design - 24' roadway, three span bridge.

Iowa DOT

Highway Division

Pretensioned Prestressed Concrete Beam Bridges

December, 2006

**Abutment Pile Plan**

**Abutment Pile Spacing**

<table>
<thead>
<tr>
<th>Location</th>
<th>3'x4'</th>
<th>4'x6'</th>
<th>5'x6'</th>
<th>6'x6'</th>
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<td>0'-0&quot;</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>3'-3&quot;</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>6'-6&quot;</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>

**Notes:**
- Minimum strength I design load to be used in the piles for driving piles.

**Temporary Paving Block A-A**

- **Part Rear Elevation at Abutment**
- **Part Section B-B**
- **Part Section A-A**

**Concrete Beam Bridges**

- **30° Skew C Beams**

**H24-19-06**
### General Data

**Concrete Deck** shall be placed in sections and sequences indicated. Alternate procedures for placing concrete may be submitted for approval together with a statement of the proposed method and evidence that the contractor possesses the necessary equipment and facilities to accomplish the required results. For approved alternate procedures the engineer shall determine in a retaining structure is required to maintain plasticity of the concrete deck during placement.

### Estimated Quantities

- **Structural Concrete SUPERSTRUCTURE** includes all reinforcing and post-tensioning.
- **Structural Concrete SUPERSTRUCTURE** includes all reinforcing and post-tensioning.
- **Structural Concrete SUPERSTRUCTURE** includes all reinforcing and post-tensioning.
- **Structural Concrete SUPERSTRUCTURE** includes all reinforcing and post-tensioning.
- **Structural Concrete SUPERSTRUCTURE** includes all reinforcing and post-tensioning.
- **Structural Concrete SUPERSTRUCTURE** includes all reinforcing and post-tensioning.

### Concreting Placement Quant.

- **Concrete Deck** shall be placed in sections and sequences indicated. Alternate procedures for placing concrete may be submitted for approval together with a statement of the proposed method and evidence that the contractor possesses the necessary equipment and facilities to accomplish the required results. For approved alternate procedures the engineer shall determine in a retaining structure is required to maintain plasticity of the concrete deck during placement.
### Reinforcing Bar List

#### Bent Bar Details

<table>
<thead>
<tr>
<th>Location</th>
<th>No.</th>
<th>Length</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pier 1</td>
<td>3</td>
<td>123'</td>
<td>92'</td>
</tr>
</tbody>
</table>

#### Open Rail Rebar Quantities

- For 201'-4, 213'-10, 213'-0, 226'-4, & 243'-0 Bridge Lengths.

#### Bent Bar Details

<table>
<thead>
<tr>
<th>Location</th>
<th>No.</th>
<th>Length</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pier 1</td>
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<td>92'</td>
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</table>

#### Deck & Abutment Reinforcement

<table>
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<tbody>
<tr>
<td>Pier 1</td>
<td>3</td>
<td>123'</td>
<td>92'</td>
</tr>
</tbody>
</table>

---

**Notes:**
- All dimensions are out to out.
- All reinforcement details are shown on the bent bar detail drawings.
Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE
CONCRETE BEAM BRIDGES
PRETENSIONED PRESTRESSED
DECEMBER, 2006

H24-24-06
30° SKEW

ADDITIONAL QUANTITIES

NOTE: ALL DIMENSIONS ARE OUT TO OUT.

BENT BAR DETAILS

3>0
TEE PIER

1'-8
PILE BENT PIER

5m1

8n2

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

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

ROADWAY GRADE AT SUBSTRUCTURE UNIT

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NOTES:

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

STEP REINFORCING BAR LIST
ONE TEE PIER

<table>
<thead>
<tr>
<th>NO.</th>
<th>SIZE</th>
<th>WEIGHT</th>
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<tbody>
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<td>126</td>
</tr>
<tr>
<td>3m1</td>
<td>8n2</td>
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<tr>
<td>1m1</td>
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STEP REINFORCING BAR LIST
ONE PILE BENT PIER

<table>
<thead>
<tr>
<th>NO.</th>
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<tbody>
<tr>
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<td>3m1</td>
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<td>313</td>
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</table>

LOW STEP

a BARS

5n1

5m1

5n1
OR 8n2

TYPICAL SECTION

PART ELEVATION VIEW OF PIER CAP
GRADE IS 1% <= G <= 4.1%

PART ELEVATION VIEW OF PIER CAP
GRADE IS 4.1% < G <= 5.0%

PART ELEVATION VIEW OF PIER CAP
GRADE IS 0 <= G <= 1.2%
REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.

9/23/2016   11:48:20 AM

COIL ROD

PARALLEL TO LONGIT. STEEL.

TO MISS BEAMS. PLACE 8g3 BARS

NOTE:

PART SECTION B-B

PART REAR ELEVATION AT ABUTMENT

PART SECTION A-A

ABUTMENT PILE SPACING

NOTE:

PLACEMENT OF NON-STEEL PILES IS TO BE IN AccordANCE WITH THE DETAIL SHOWN IN THE DESIGN PLANS.

NOTE:

PLACEMENT OF NON-STEEL PILES IS TO BE IN AccordANCE WITH THE DETAIL SHOWN IN THE DESIGN PLANS.

WOOD PILING NOTE:

AFTER PILES ARE CUT OFF, THE UPPER 2', EXCEPT AS SHOWN, IS TO BE WRAPPED WITH A DOUBLE WRAPPER OF RUG PASSING FIELD IN PLACE BY TAPPING WITH GALVANIZED HOOKING NAILS AND WRAPPED WITH RUG PASSING FIELD AT A 4" PITCH AND TAKEN NOT TO CHANGE PASSING WHEN PLACING CONCRETE. RUG PASSING MAY BE EITHER OF THE FOLLOWING:

(1) MAKING AND LIFT RUG PASSING, SUBMITTED ON BOTH SIDES, AND RENDERING NOT LESS THAN AT COUNTER VERTICAL.

(2) BONDED UPHOLSTER OR BONDED POLYFOAM WITH A MINIMUM PERCENTAGE OF UNIFORMED FABRIC. THE MINIMUM THICKNESS MAY BE REQUIRING ADDITIONAL WORKS FOR A TOTAL AT LEAST ONE INCH.

PART SECTION B-B

CONCRETE BEAM BRIDGES DECEMBER, 2006

ABUTMENT NOTES:

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

PLACE 5K2 BAR AT 16" SLOPE TO MATCH TRAFFIC FACE OF ABUTMENT WITH FACE, BOTH SIDES TYPICAL.

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

BARRIER SHALL NOT SHOWN IN DETAIL.

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

ABUTMENT DETAILS

45° SK 50 A & B BEAMS

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES DECEMBER, 2006

ABUTMENT PILE PLAN

8G1 MIN. EMBED.
### Reinforcing Bar List

| Bar | Location | No. | 30'-0 | 40'-0 | 50'-0 | 55'-0 | 60'-0 | 65'-0 | 65'-1 | 70'-0 | 75'-0 | 80'-0 | 90'-0 | 95'-0 | 100'-0 | 105'-0 | 110'-0 | 120'-0 | 125'-0 |
|-----|----------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 549 |            | 50 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 |
| 550 |            | 50 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 |
| 551 |            | 50 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 |
| 552 |            | 50 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 | 30'-0 |

### Deck & Abutment Reinforcement

- **Pretensioned Prestressed Concrete Beam Bridges**
- **December, 2006**

**Iowa DOT**

Highway Division

**Standard Design for Highway Bridge Work**

**45° Slope**

**Dimensions, Bar Sizes, and Spacing**

**138'° 10"**

**Open Rail**

**Total No. of Wood Poles**

**Total No. of Steel Poles**

**Bent Bar Details**
LIFTING LOOPS
ALTERNATE TYPES MAY BE SUBSTITUTED WITH THE APPROVAL OF THE ENGINEER. LIFTING LOOPS ARE TO BE DETAIL SHEET.

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

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

STRAIGHT FORCE -KIP
DEFL. AT RELEASE
DEFL. AFTER LOADING
MAXIMUM PRESTRESS FORCE
MAXIMUM STRESS IN STEEL

NOTES:

THESE BEAMS ARE DESIGNED FOR A MAXIMUM LOAD AS INDICATED IN ABOVE TABLE WITH AN ALLOWANCE OF 5% FRICTION AND A MAXIMUM LOAD AT PRODUCER'S OPTION.

ALL PERMISSIBLE SPACINGS ARE TO EXCLUDE CONCRETE AS DETAILED ON THE BEARING SHEET.

NOTE:


DESIGN STRESSES:

THE FOLLOWING MATERIALS ARE TO BE DESIGNED IN ACCORDANCE WITH THE PORTION OF THE PARTITION.

PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 5, c = 270,000 psi

REINFORCING STEEL IN ACCORDANCE WITH SECTION 5, c = 60,000 psi

MEASUREMENTS:

STRAIGHT FORCE -KIP
DEFL. AT RELEASE
DEFL. AFTER LOADING
MAXIMUM PRESTRESS FORCE
MAXIMUM STRESS IN STEEL

DECREASES:

MAXIMUM LOAD
MAXIMUM STRESS IN STEEL

DESIGN STRESSES:

THE FOLLOWING MATERIALS ARE TO BE DESIGNED IN ACCORDANCE WITH THE PORTION OF THE PARTITION.

PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 5, c = 270,000 psi

REINFORCING STEEL IN ACCORDANCE WITH SECTION 5, c = 60,000 psi

REINFORCING BAR LIST

BEAM SPAN
CUT LENGTH
MIN. LENGTH
MAX. LENGTH
A
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
B
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
C
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
D
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
E
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
F
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
G
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
H
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
I
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
J
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
K
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
L
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
M
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
N
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
O
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
P
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
Q
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
R
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
S
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
T
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
U
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
V
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
W
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
X
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
Y
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
Z
42'-6" 40'-6" 40'-6" 40'-6" 40'-6"
NOTE: BARS 3d ARE TO BE PLACED IN PAIRS.

~ EPOXY COATED BARS
~ DIMENSIONS AT END OF BEAM
* KEEP DEFLECTED STRANDS

1'-1 3
4'-3 6 5
1'-5 6

34,082 in. 14.05 in. 311.5 in. 42'-6

"A" BEAM CROSS SECTION

| BRG. 6 1 3 8 5 2 BARS 5a1
4b2, 3d 3e

SYMMETRICAL ABOUT | BRG. 6 1 3e

4b1, 3c1, 3d

2 BARS 5a1

2 BARS 5a1

SYMMETRICAL ABOUT |

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

REVISED 01-10 - THE BEAM DETAILS WERE UPDATED TO THE CURRENT BEAMS.
**Notes:**

These beams are designed for applying live loads as indicated in an above table with an allowance of 20 lb. per square foot of roadway for exterior bearing surface. Held down points for selected strands may be moved toward ends of beam a distance of 2.5 ft. Maximum at proctor option.

All prestressing strands shall conform to ASTM Grade 70 low relaxation strand.

**Specifications:**

Construction standards shall be in accordance with the Iowa Department of Transportation, current series, with current applicable special provisions and supplemental specifications.

Design stresses are based on AASHTO live loads provided by the Iowa Highway Commission, 2000, with minor modifications.

**Design stresses:**

Design stresses for the following materials are to be in accordance with quality control specifications for highway bridges. These shall be indicated on the detail sheet. The following reinforcing steel shall be in accordance with Section 9, Grade 40, concrete in accordance with Section 5, f'c = 5000 psi (except as noted).

**Prestressing steel in accordance with Section 9, f'p = 170,000 psi.**

**Standard design** - 24' highway, three span bridge.

**Pretensioned prestressed concrete beam bridges.**

**December 2006.**

---

**Table: B Beam Data**

<table>
<thead>
<tr>
<th>Material</th>
<th>Weight (lbs)</th>
<th>Length (ft)</th>
<th>Total Initial Prestress (kips)</th>
<th>Hold Down (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
<td>778</td>
<td>13.6</td>
<td>11.2</td>
<td>5.92</td>
</tr>
<tr>
<td>Steel</td>
<td>680</td>
<td>6.0</td>
<td>5.9</td>
<td>6.39</td>
</tr>
<tr>
<td>Diaphragm</td>
<td>607</td>
<td>4.2</td>
<td>3.5</td>
<td>3.32</td>
</tr>
<tr>
<td>Total</td>
<td>1435</td>
<td>25.8</td>
<td>20.6</td>
<td>15.57</td>
</tr>
</tbody>
</table>

---

**Diaphragm Diaphragm Attachments as detailed on the Steel Diaphragm**

**NOTES:**

- These beams are designed for applying live loads as indicated in above table with an allowance of 20 lb. per square foot of roadway for exterior bearing surface. Held down points for selected strands may be moved toward ends of beam a distance of 2.5 ft. Maximum at proctor option.
- All prestressing strands shall conform to ASTM Grade 70 low relaxation strand.
- Tops of beams are to be struck off level and finishes as per materials finish. Beams shall be as detailed on other design sheets.
- The steel diaphragm option is allowed and used.

**Reinforcing Bar List**

<table>
<thead>
<tr>
<th>Material</th>
<th>Grade</th>
<th>Section</th>
<th>Size</th>
<th>No.</th>
<th>Length (ft)</th>
<th>Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
<td>Grade 40</td>
<td>6</td>
<td>1</td>
<td>24</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Steel</td>
<td>Grade 70</td>
<td>5</td>
<td>4</td>
<td>24</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Steel</td>
<td>Grade 70</td>
<td>6</td>
<td>4</td>
<td>24</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Steel</td>
<td>Grade 70</td>
<td>7</td>
<td>4</td>
<td>24</td>
<td>24</td>
<td>24</td>
</tr>
</tbody>
</table>

**ALL DIMENSIONS ARE CUT TO 1/4" X 1/4".**

**ALL DIMENSIONS ARE CUT TO 1/4" X 1/4".**

---

**奏章**

- 位于图中，图中示意图
- 坚持使用图中示意图
REVISED 01-10 - THE BEAM DETAILS WERE UPDATED TO THE CURRENT BEAMS.

9/23/2016 11:48:44 AM

B50

50-10-4-6 BEARINGS
SYMMETRICAL ABOUT ξ

B55

55-10-4-6 BEARINGS
SYMMETRICAL ABOUT ξ

B59

59-10-4-6 BEARINGS
SYMMETRICAL ABOUT ξ

B63

63-10-4-6 BEARINGS
SYMMETRICAL ABOUT ξ

B67

67-10-4-6 BEARINGS
SYMMETRICAL ABOUT ξ

NOTE: BARS 3d ARE TO BE PLACED IN PAIRS.

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

HIGHWAY DIVISION

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

“B” BEAM CROSS SECTION

<table>
<thead>
<tr>
<th>b</th>
</tr>
</thead>
<tbody>
<tr>
<td>62,000 in.²</td>
</tr>
<tr>
<td>382.5 in. ¢</td>
</tr>
</tbody>
</table>

DEFLECTED STRANDS

NOTE: DIMENSIONS AT END OF BEAM

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

HIGHWAY DIVISION
The top straight strands of beams C62 and C64 are to be cut with F-3 projections, and the top and bottom of each strand are to be cut with F-1 projections. The top and bottom strands are to be cut with F-3 projections. The top and bottom strands are to be cut with F-3 projections, and the top and bottom strands are to be cut with F-3 projections.

NOTES:

- These beams are designed for highway live loads as indicated in Table 2.3.2, with an allowance of 20 in. square root of roadway for future loading.
- All points of reflected strands may be moved toward ends of beam a distance of 0.05 L maximum at producer's option. The top and bottom strands shall be cut off reasonably flush with the concrete.
- The top and bottom strands shall be cut off reasonably flush with the concrete.
- The top and bottom strands shall be cut off reasonably flush with the concrete.

### CONCRETE DATA

<table>
<thead>
<tr>
<th>Beam</th>
<th>Grade</th>
<th>Weight</th>
<th>End Deflection</th>
</tr>
</thead>
<tbody>
<tr>
<td>C61</td>
<td>63</td>
<td>5,340</td>
<td>0.70</td>
</tr>
<tr>
<td>C62</td>
<td>63</td>
<td>5,480</td>
<td>0.72</td>
</tr>
<tr>
<td>C63</td>
<td>63</td>
<td>5,620</td>
<td>0.74</td>
</tr>
<tr>
<td>C64</td>
<td>63</td>
<td>5,760</td>
<td>0.76</td>
</tr>
</tbody>
</table>

### DESIGN STRESSES:

- Design stresses for the following materials are to be used:
  - For Highway Bridges, Series 2004
  - For Highway Bridges, Series 2004
- Reinforcing steel in accordance with Section 5, Grade 60, concrete in accordance with Section 9, f'c = 5,000 psi, except as noted.

### C BEAM DETAILS

- C61 is based on 72.664% f'c, immediate deflections at mid-span due to weight of slab and diaphragm.
- Total beam deflections at mid-span due to weight of slab and diaphragm are not to exceed 0.03L, for construction and other loads.
- Total beam deflections at mid-span due to weight of slab and diaphragm are not to exceed 0.03L, for construction and other loads.
- Total beam deflections at mid-span due to weight of slab and diaphragm are not to exceed 0.03L, for construction and other loads.

### REINFORCING BAR LIST

<table>
<thead>
<tr>
<th>Beam</th>
<th>Grade</th>
<th>Weight</th>
<th>End Deflection</th>
</tr>
</thead>
<tbody>
<tr>
<td>C61</td>
<td>63</td>
<td>5,340</td>
<td>0.70</td>
</tr>
<tr>
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<td>63</td>
<td>5,480</td>
<td>0.72</td>
</tr>
<tr>
<td>C63</td>
<td>63</td>
<td>5,620</td>
<td>0.74</td>
</tr>
<tr>
<td>C64</td>
<td>63</td>
<td>5,760</td>
<td>0.76</td>
</tr>
</tbody>
</table>

### C BEAM DATA

- C61 is based on 72.664% f'c, immediate deflections at mid-span due to weight of slab and diaphragm.
- Total beam deflections at mid-span due to weight of slab and diaphragm are not to exceed 0.03L, for construction and other loads.
- Total beam deflections at mid-span due to weight of slab and diaphragm are not to exceed 0.03L, for construction and other loads.
- Total beam deflections at mid-span due to weight of slab and diaphragm are not to exceed 0.03L, for construction and other loads.
**C63**

- 605 @ 1' - 2"
- 404, 303, 30.

**C67**

- 605 @ 1' - 0"

**C71**

- 605 @ 1' - 0"

**C75**

- 605 @ 1' - 0"

**C80**

- 605 @ 1' - 0"

---

**NOTE:**
- Dimensions for the location of the deflected strands are at E beam and end of beam.
- Bars #4 are to be placed in pairs.
- 4" epoxy coated bars.

---

**BEAM C63**

- SYMMETRICAL ABOUT
- 2 bars 6b1

**BEAM C67**

- SYMMETRICAL ABOUT
- 2 bars 6a1

**BEAM C71**

- SYMMETRICAL ABOUT
- 2 bars 6a1

**BEAM C75**

- SYMMETRICAL ABOUT
- 2 bars 6a1

**BEAM C80**

- SYMMETRICAL ABOUT
- 2 bars 6a1

---

**Standard Design:** 24' roadway, three span bridge.

**Concrete Beam Bridges:**

December, 2006

---

**IOWA DOT**

Highway Division

PRETENSIONED PRESTRESSED CEMENT BEAM BRIDGES

C BEAM DETAILS

H24-37-06

---

**Dimensions:**

- a = 1.202 ft
- Y = 20.23 in
- A = 564.5 in²
TABLE OF OPEN RAIL DIMENSIONS AND NUMBERS

<table>
<thead>
<tr>
<th>L</th>
<th>A/B, B/RG</th>
<th>201-4</th>
<th>202-4</th>
<th>203-4</th>
<th>204-4</th>
<th>205-6</th>
<th>206-6</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>A/B, B/RG</td>
<td>201-4</td>
<td>202-4</td>
<td>203-4</td>
<td>204-4</td>
<td>205-6</td>
<td>206-6</td>
</tr>
</tbody>
</table>

OPEN RAIL NOTES:
- Construction joint between top of wing and rail is reinforced concrete.
- Minimum clear distance from face of concrete to nearest reinforcing bar is 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 shall be used on a bridge with a clear span length.
PIER BEARING DETAILS
H24-41-06

DUROMETER NEOPRENE.
PADS TO BE OF 70 MATERIAL FOR NEOPRENE
9 FLANGE WIDTH
BEAM BOTTOM
"A"
"B"
"C"
"E"
"F"

VARIABLE DIMENSIONS

FIXED PIER BEARING NOTES:
If calculated slope for a given span exceeds or the neoprene bearing pads at the fixed pier for that span shall be tapered. Refer to Table for dimensions of tapered pads. Cost of neoprene pads shall be included in the price bid for "pretensioned prestressed concrete beams.

PART ELEVATION

PLAN OF NEOPRENE PAD

SLOPE CALCULATION FORMULA

EXPANSION PIER BEARING NOTES:
Expansion pier ends to sole & thickness maximum 1".

SECTION B-B FOR A & B BEAMS

SECTION B-B FOR C BEAMS

EXPANSION PIER

VARIABLE DIMENSIONS

PART ELEVATION

PLAN OF NEOPRENE PAD

SLOPE CALCULATION FORMULA

EXPANSION PIER

VARIABLE DIMENSIONS
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 pile.

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

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

VIEW A-A

KEYED NOTCH DETAIL

1" PREFORMED EXPANSION JOINT MATERIAL

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 6 pier.

See Sheet HP-10-06 for 6P design.

5 PILE BENT

6 PILE BENT

7 PILE BENT

8 PILE BENT

TYPICAL PLAN

REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

<table>
<thead>
<tr>
<th>Number of Thistle Piles</th>
<th>Pile Size</th>
<th>DES. LOAD (KIPS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>HP14x73</td>
<td>170</td>
</tr>
<tr>
<td>10</td>
<td>HP14x73</td>
<td>176</td>
</tr>
<tr>
<td>20</td>
<td>HP14x73</td>
<td>181</td>
</tr>
<tr>
<td>8</td>
<td>HP14x73</td>
<td>195</td>
</tr>
<tr>
<td>6</td>
<td>HP14x73</td>
<td>204</td>
</tr>
<tr>
<td>4</td>
<td>HP14x73</td>
<td>206</td>
</tr>
<tr>
<td>6</td>
<td>HP14x73</td>
<td>212</td>
</tr>
<tr>
<td>8</td>
<td>HP14x73</td>
<td>243</td>
</tr>
</tbody>
</table>

NOTE:

Friction or point bearing piling includes side friction and end bearing in soil. Point bearing includes side friction and point bearing in rock.

HP14x73 PIPES

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

H24-45-06

IOWA DOT

Highway Division

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

H24-45-06

IOWA DOT

Highway Division

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

H24-45-06

IOWA DOT

Highway Division
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 piles.

Minimum clear distance from face of concrete to bearing.

Pile bents shall be 2 in. unless otherwise noted or shown.

Pile bents shall be driven to values shown in design plans.

REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

PILE BAR DETAILS

PILE OR POINT BEARING PILING

PILE TYP. 1 OR 2

PILE TYP. 3

FRICITION BEARING PILING

PILE TYP. 1 OR 2

PILE TYP. 3

NOTES:

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

H24-46-06

IOWA DOT

Highway Division

NOTE: PRETENSION BEARING INCLUDES SIDE FRICITION AND END BEARING IN SQUEEZE POINT BEARING INCLUDES SIDE FRICITION AND POINT BEARING IN ROCK.

NOTE: SEE SHEET H24-24-06 FOR STEP REINFORCING STEEL QUANTITIES AND DETAILS.

NOTE: USE STANDARD P10L FOR "K" DIMENSION.

NOTE: PILES WITH TRESTLE PILES, TYPES 1, 2 AND 3, SEE STANDARD P10L.

NOTE: DES. LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

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

CONCRETE QUANTITIES SHOWN HAVE HAD THE VOLUME OF EMBEDDED PILES DEDUCTED FOR TYPES 1 AND 2 BASED ON 0.8 FT³ PER FOOT OF EMBEDMENT.

FOR DETAILS OF TRESTLE PILES, TYPES 1, 2 AND 3, SEE STANDARD P10L.

NOTE: BEARINGS FOR THE TOP OF SLAB AT SEAT IS EQUAL TO THE DIFFERENCE IN THE HEIGHT OF THE STEPS ON THE BRIDGE.

ABUTMENT LENGTH

LENGTH

NUMBER OF PILES

DES. LOAD (KIPS)

NUMBER OF TRESTLE PILES

PILE LENGTH

PILE LENGTH

PILE LENGTH

PILE LENGTH

PILE LENGTH

PILE LENGTH

PILE LENGTH

PILE LENGTH

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PILE LENGTH
PILE BENT NOTES:

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

For details of trestle piles see standard pile.

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

<table>
<thead>
<tr>
<th>BENT BAR DETAILS</th>
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<tbody>
<tr>
<td><strong>PILE TYPE</strong></td>
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<tr>
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<td><strong>LENGTH</strong></td>
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<tr>
<td><strong>DES. LOAD (KIPS)</strong></td>
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<tr>
<td><strong>LRFD Pu, STRENGTH 1, DESIGN LOAD (KIPS)</strong></td>
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<td><strong>FRICITION OR POINT BEARING PILING</strong></td>
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<tr>
<td><strong>PILE SIZE</strong></td>
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REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

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</table>

BENT BAR DETAILS

1. See Sheet H24-24-06 for pile reinforcing steel quantities and details.
2. Note: Pile length is design load (kips) is not the value used in the field for driving piles.
3. Note: Pile diameter includes side friction and point bearing in soil. Point bearing excludes side friction and point bearing in rock.

*H24-47-06*  
December, 2006  
Pretensioned Prestressed Concrete Beam Bridges  
Iowa DOT Highway Division  
Standard Design - 24 Roadway, Three Span Bridge  
Trestle Piles

**PILE BENT PIER**

**HP14 PILES**

---

**TYPICAL PLAN**

Symmetrical about this point through hot rotation except step elevations.

---

**TYPICAL PLAN**

Symmetrical about each pier except steps.
PILE BENT NOTES:

These piers 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.

NOTES: Unless otherwise noted, all dimensions are to outer, driven diameters.

PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

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

SEE STANDARD P10L FOR "K" DIMENSION.

STRUCTURAL REINFORCING STEEL (LB.)

BAR SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.

BEARING

DRIFT CONDITIONS ARE NOT SEVERE.

FRICTION BEARING PILING

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

NOTE: KEYED NOTCH DETAIL

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

PRETENSIONING

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

KEYED NOTCH DETAIL

SIDE FRICTION AND END BEARING IN ROCK.
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 H24-50-06.

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

3'-6" x 8'-0" x 21'-0" FOR 12A, 13A & 14A
3'-6" x 9'-0" x 22'-0" FOR 13B & 14B

REINFORCING STEEL

<table>
<thead>
<tr>
<th>FOOTING SIZE</th>
<th>BAR NO. &amp; SIZE &amp; SPACING</th>
<th>LENGTH</th>
<th>WEIGHT</th>
<th>TOTAL</th>
<th>STRUCTURAL CONCRETE</th>
</tr>
</thead>
<tbody>
<tr>
<td>3'-6&quot; x 8' x 21'</td>
<td>#5 @ 1'-0</td>
<td>8</td>
<td>7'-8&quot;</td>
<td>8'-8&quot;</td>
<td>21'-8&quot;</td>
</tr>
<tr>
<td>3'-6&quot; x 8' x 21'</td>
<td>#5 @ 1'-0</td>
<td>9</td>
<td>8'-8&quot;</td>
<td>9'-8&quot;</td>
<td>22'-8&quot;</td>
</tr>
<tr>
<td>3'-6&quot; x 9' x 22'</td>
<td>#6 @ 0'-11&quot;</td>
<td>11</td>
<td>7'-0&quot;</td>
<td>8'-0&quot;</td>
<td>20'-0&quot;</td>
</tr>
<tr>
<td>3'-6&quot; x 9' x 22'</td>
<td>#5 @ 1'-0</td>
<td>12</td>
<td>7'-0&quot;</td>
<td>8'-0&quot;</td>
<td>20'-0&quot;</td>
</tr>
</tbody>
</table>

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

1'-7" D = 7'-0"
2'-6" D = 6'-0"
3'-0" D = 5'-0"
4'-0" D = 4'-0"
5'-0" D = 3'-0"
6'-0" D = 2'-0"
7'-0" D = 1'-0"
8'-0" D = 0'-0"

1'-6" E = 6'-0"
2'-6" E = 5'-0"
3'-0" E = 4'-0"
4'-0" E = 3'-0"
5'-0" E = 2'-0"
6'-0" E = 1'-0"
7'-0" E = 0'-0"
8'-0" E = -1'-0"

<table>
<thead>
<tr>
<th>FOOTING SIZE</th>
<th>BAR NO. &amp; SIZE &amp; SPACING</th>
<th>LENGTH</th>
<th>WEIGHT</th>
</tr>
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<tbody>
<tr>
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<td>#5 @ 1'-0</td>
<td>8</td>
<td>7'-8&quot;</td>
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<td>9</td>
<td>8'-8&quot;</td>
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<tr>
<td>2'-6&quot; x 9'-0&quot;</td>
<td>#6 @ 0'-11&quot;</td>
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<td>7'-0&quot;</td>
</tr>
<tr>
<td>2'-6&quot; x 9'-0&quot;</td>
<td>#5 @ 1'-0</td>
<td>12</td>
<td>7'-0&quot;</td>
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</tbody>
</table>

3'-6" x 9'-0" x 22'-0" FOR 13B & 14B
3'-6" x 8'-0" x 21'-0" FOR 12A, 13A & 14A

NOTE: Pu, STRENGTH 1 DESIGN LOAD (KIPS) IS NOT THE VALUE SHEET IN THE FIELD FOR DRIVING PILES.
**Standard Design - 24' Roadway, Three Span Bridge**

**Concrete Beam Bridges**

**Pretensioned Prestressed**

**December, 2006**

---

**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 H24-50-06.

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 centered to center of adjacent piles shall not exceed 10 feet.

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

---

**Bar Length**

**Weight**

**Total Weight**

**Reinforcing Steel**

**Footing Size**

**No., Size & Spacing**

**d2**

**f1**

**f2**

**g1**

**g2**

---

**TYPICAL SECTION**

---

**d2**

Note: A 4-fin diameter, dimensions are cut to suit.
FOOTING SIZE

4' x 10' x 23'
4' x 12' x 25'
4' x 12' x 23'
4' x 9' x 23'

TYPICAL SECTION

4' x 9' x 23' FOR 10B
4' x 12' x 23' FOR 10C
4' x 12' x 25' FOR 10D
4' x 12' x 25' FOR 10E

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 H24-50-06.

Batter 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 plans.

REINFORCING STEEL (ONE FOOTING)

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<td>4' x 12' x 25'</td>
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<tr>
<td>4' x 12' x 25'</td>
<td>12 - #5 @ 1'-0</td>
<td>23'-0</td>
<td>280</td>
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TYPICAL SECTION

4' x 9' x 23' FOR 10B
4' x 12' x 23' FOR 10C
4' x 12' x 25' FOR 10D
4' x 12' x 25' FOR 10E

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 H24-50-06.

Batter 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 plans.

REINFORCING STEEL (ONE FOOTING)

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<tr>
<th>FOOTING SIZE</th>
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<tr>
<td>4' x 10' x 23'</td>
<td>12 - #5 @ 1'-0</td>
<td>23'-0</td>
<td>280</td>
</tr>
<tr>
<td>4' x 12' x 23'</td>
<td>12 - #5 @ 1'-0</td>
<td>23'-0</td>
<td>280</td>
</tr>
<tr>
<td>4' x 12' x 25'</td>
<td>12 - #5 @ 1'-0</td>
<td>23'-0</td>
<td>280</td>
</tr>
<tr>
<td>4' x 12' x 25'</td>
<td>12 - #5 @ 1'-0</td>
<td>23'-0</td>
<td>280</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 H24-50-06.

These spread footings shall extend at least 18 inches into suitable foundation rock and the last 12 inches of the foundation rock shall be to neat lines of masonry. The foundation rock shall have a minimum load bearing resistance of 30 kips per square foot.

The foundation rock and the last 12 inches of rock excavation shall be to neat lines of masonry. 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 resistance of 30 kips per square foot.

**Typical Section**

<table>
<thead>
<tr>
<th>Footing Size</th>
<th>Reinforcing Steel</th>
<th>Concrete</th>
<th>Structural Concrete (CY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3'-6 x 7'-0 x 22'</td>
<td>21 SPA @ 1'-0 = 21'-0</td>
<td>3'-0; 7 @ 6'</td>
<td>11.5</td>
</tr>
<tr>
<td>3'-6 x 8'-0 x 22'</td>
<td>22 SPA @ 1'-0 = 22'-0</td>
<td>3'-0; 8 @ 6'</td>
<td>11.5</td>
</tr>
<tr>
<td>3'-6 x 9'-0 x 22'</td>
<td>23 SPA @ 1'-0 = 23'-0</td>
<td>3'-0; 9 @ 6'</td>
<td>11.5</td>
</tr>
<tr>
<td>3'-6 x 7'-0 x 22'</td>
<td>22 SPA @ 1'-0 = 22'-0</td>
<td>3'-0; 7 @ 6'</td>
<td>11.5</td>
</tr>
<tr>
<td>3'-6 x 8'-0 x 22'</td>
<td>23 SPA @ 1'-0 = 23'-0</td>
<td>3'-0; 8 @ 6'</td>
<td>11.5</td>
</tr>
<tr>
<td>3'-6 x 9'-0 x 22'</td>
<td>24 SPA @ 1'-0 = 24'-0</td>
<td>3'-0; 9 @ 6'</td>
<td>11.5</td>
</tr>
</tbody>
</table>

Note: All dimensions are shown out to out.
**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 H24-50-06.

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 lines of masonry. The foundation rock shall have a minimum LRFD bearing value of 30 kips per square foot. The foundation rock and the last 12 inches of rock excavation shall be to next lines of masonry. The foundation rock shall have a minimum LRFD bearing value of at least 12 kips per square foot.

**REINFORCING STEEL (ONE FOOTING):**

<table>
<thead>
<tr>
<th>FOOTING SIZE</th>
<th>NO.</th>
<th>SIZE &amp; SPACING</th>
<th>D2</th>
<th>F1</th>
<th>F2</th>
<th>G1</th>
<th>G2</th>
<th>TOTAL WEIGHT (LB.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4' x 8' x 23'</td>
<td>44</td>
<td>#9 AS SHOWN</td>
<td>253</td>
<td>265</td>
<td>189</td>
<td>184</td>
<td>1484</td>
<td>593</td>
</tr>
<tr>
<td>4' x 8' x 25'</td>
<td>25</td>
<td>#9 AS SHOWN</td>
<td>236</td>
<td>206</td>
<td>200</td>
<td>1484</td>
<td>1484</td>
<td>365</td>
</tr>
<tr>
<td>4' x 9' x 25'</td>
<td>28</td>
<td>#6 @ 1'-0&quot;</td>
<td>227</td>
<td>226</td>
<td>226</td>
<td>226</td>
<td>226</td>
<td>552</td>
</tr>
<tr>
<td>4' x 9' x 23'</td>
<td>23</td>
<td>#5 @ 1'-0&quot;</td>
<td>227</td>
<td>226</td>
<td>226</td>
<td>226</td>
<td>226</td>
<td>552</td>
</tr>
<tr>
<td>4' x 9' x 25'</td>
<td>10</td>
<td>#6 @ 0'-10&quot;</td>
<td>227</td>
<td>226</td>
<td>226</td>
<td>226</td>
<td>226</td>
<td>552</td>
</tr>
</tbody>
</table>

**NOTE:** D = PIN DIAMETER.

DIMENSIONS ARE OUT TO OUT.

8' - 4" MIN. INTO ROCK

3'-0" MIN.abetic at end,
STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE
CONCRETE BEAM BRIDGES
PRETENSIONED PRESTRESSED
DECEMBER, 2006

REINFORCING STEEL (ONE FOOTING)

<table>
<thead>
<tr>
<th>FOOTING SIZE</th>
<th>NO., SIZE &amp; SPACING</th>
<th>d2</th>
<th>f1</th>
<th>f2</th>
<th>g1</th>
<th>g2</th>
</tr>
</thead>
<tbody>
<tr>
<td>3'-6 x 8' x 21'</td>
<td>3'-6 x 8' x 21'</td>
<td>70</td>
<td>60</td>
<td>56</td>
<td>54</td>
<td>52</td>
</tr>
<tr>
<td>3'-6 x 9' x 22'</td>
<td>3'-6 x 9' x 22'</td>
<td>100</td>
<td>90</td>
<td>86</td>
<td>84</td>
<td>82</td>
</tr>
</tbody>
</table>

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

FOOTING NOTES:
8 - #5 @ 1'-0
22 - #6 @ 0'-11
11 - #6 @ 0'-9
22 - #5 @ 1'-0
9 - #5 @ 1'-0
23 - #7 @ 0'-11
12 - #7 @ 0'-9
44 - #9 AS SHOWN

THREE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-57-06.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE CENTER TO CENTER 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.

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

DES. LOAD (KIPS)

STRENGTH 1,
LRFD Pu,
1

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

STEEL PILE FOOTINGS

TEE PIER-HP10x57 SRL-1

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
DECEMBER, 2006

IOWA DOT
Highway Division

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
DECEMBER, 2006

TEE PIER-HP10x57 SRL-1

STEEL PILE FOOTINGS

H24-58-06
TYPICAL SECTION

4'-0 x 10'-0 x 22'-0 FOR 13C, 14C & 15A

4'-0 x 10'-6 x 23'-0 FOR 14D, 15B & 16A

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 H24-57-06.

Steel piles used as point bearing shall have a minimum distance of approximately 40 feet from bottom of footings to top of driving roll. The pile layout and design are such that the distance center to center of adjacent piles shall not exceed 10 feet. Pier piles shall be driven to values shown in design plans.

REINFORCING STEEL (FOOTING)

| FOOTING SIZE | BAR NO. | SIZE & SPACING | LENGTH | TOTAL REIN. | TRA.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4' x 10' x 22'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4' x 10'-6 x 23'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4' x 11' x 24'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4' x 12' x 25'</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

d2 BAR LAYOUT

1. Note: Full strength and design load input is not the value used in the field for driving piles.

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

TYP. 45° SKEW - H=25' TO 40'

H409 Structural Design Specifications

H24-06.dgn   H24-59-06   11x17_pdf.pltcfg
### 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 H24-57-06. Battie piles in exterior rows to be in the direction shown.

Steel piles used as point bearing shall have a minimum distance of approximately 10 feet from center of footing to top of bearing rock. The pile layouts are such that the distance center to center of adjacent piles shall not exceed 1/4.

Pier piles shall be driven to values shown in Design Plans.

---

### Typical Section:

- **Bar Length**
- **Weight**
- **Total Weight**

### Reinforcing Steel One Footing:

<table>
<thead>
<tr>
<th>Footing Size</th>
<th>Bar No., Size &amp; Spacing</th>
<th>Length</th>
<th>Referred to</th>
<th>Structural Concrete Cubes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3'-6 x 8'-0</td>
<td>6 @ 1'-0, 2-5 @ 0'-9</td>
<td>20'-8</td>
<td>44 - #9 AS SHOWN</td>
<td>2650</td>
</tr>
</tbody>
</table>

---

**NOTE:** The strength design load in kips is not the value used in the field for driving piles.

---

**3'-6 x 8'-0 x 21'-0 for 8A, 9A & 10A**

---

**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 H24-57-06. Battie piles in exterior rows to be in the direction shown.

Steel piles used as point bearing shall have a minimum distance of approximately 10 feet from center of footing to top of bearing rock. The pile layouts are such that the distance center to center of adjacent piles shall not exceed 1/4.

Pier piles shall be driven to values shown in Design Plans.
4'-0 x 9'-0 x 23'-0 FOR 10B

4'-0 x 10'-0 x 23'-0 FOR 10C

4'-0 x 12'-0 x 23'-0 FOR 10D

4'-0 x 12'-0 x 25'-0 FOR 10E & 11A

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 H24-57-06. Batter piles in exterior rows W1 in the direction shown.

Steel piling used as point bearing shall have a minimum distance of approximately 10 feet from bottom of footings to top of bearing rock. The pile layouts are such that the distance center to center of adjacent piles shall not exceed 5'-0.

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

Highway Division

Standard Design: 25 Roadway, Three Span Bridge

Pretensioned Prestressed Concrete Beam Bridges

December, 2006

Tee Pier-Hp10x57 Srl-2

Steel Pile Footings

H24-61-06
NOTE: 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 tee piers as shown on Sheet H24-57-06. 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 rock-bearing value of at least 10 kips per square foot.

FOOTING SIZE

<table>
<thead>
<tr>
<th>FOOTING SIZE</th>
<th>FOOTING SIZE</th>
<th>FOOTING SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4' x 8' x 23'</td>
<td>4' x 8' x 23'</td>
<td>4' x 8' x 23'</td>
</tr>
<tr>
<td>4' x 8' x 25'</td>
<td>4' x 8' x 25'</td>
<td>4' x 8' x 25'</td>
</tr>
<tr>
<td>4' x 9' x 25'</td>
<td>4' x 9' x 25'</td>
<td>4' x 9' x 25'</td>
</tr>
</tbody>
</table>

BARLENGTH

<table>
<thead>
<tr>
<th>BARLENGTH</th>
<th>BARLENGTH</th>
<th>BARLENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>3' - 5'</td>
<td>3' - 5'</td>
<td>3' - 5'</td>
</tr>
<tr>
<td>3' - 7'</td>
<td>3' - 7'</td>
<td>3' - 7'</td>
</tr>
<tr>
<td>3' - 9'</td>
<td>3' - 9'</td>
<td>3' - 9'</td>
</tr>
</tbody>
</table>

FOR THE TOP FOOTING SYMMETRICAL ABOUT PIER

TYPICAL SECTION

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

TYPICAL SECTION

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

REINFORCING STEEL (ONE FOOTING)

<table>
<thead>
<tr>
<th>FOOTING SIZE</th>
<th>FOOTING SIZE</th>
<th>FOOTING SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4' x 8' x 23'</td>
<td>4' x 8' x 23'</td>
<td>4' x 8' x 23'</td>
</tr>
<tr>
<td>4' x 8' x 25'</td>
<td>4' x 8' x 25'</td>
<td>4' x 8' x 25'</td>
</tr>
<tr>
<td>4' x 9' x 25'</td>
<td>4' x 9' x 25'</td>
<td>4' x 9' x 25'</td>
</tr>
</tbody>
</table>

REINFORCING STEEL (ONE FOOTING)

<table>
<thead>
<tr>
<th>FOOTING SIZE</th>
<th>FOOTING SIZE</th>
<th>FOOTING SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4' x 8' x 23'</td>
<td>4' x 8' x 23'</td>
<td>4' x 8' x 23'</td>
</tr>
<tr>
<td>4' x 8' x 25'</td>
<td>4' x 8' x 25'</td>
<td>4' x 8' x 25'</td>
</tr>
<tr>
<td>4' x 9' x 25'</td>
<td>4' x 9' x 25'</td>
<td>4' x 9' x 25'</td>
</tr>
</tbody>
</table>

FOOTINGS

TEE PIER - SPREAD FOOTINGS

PRETENSIONED, PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE

CONCRETE BEAM BRIDGES
PRETENSIONED, PRESTRESSED

DECEMBER, 2006

REINFORCING STEEL (ONE FOOTING)

<table>
<thead>
<tr>
<th>FOOTING SIZE</th>
<th>FOOTING SIZE</th>
<th>FOOTING SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4' x 8' x 23'</td>
<td>4' x 8' x 23'</td>
<td>4' x 8' x 23'</td>
</tr>
<tr>
<td>4' x 8' x 25'</td>
<td>4' x 8' x 25'</td>
<td>4' x 8' x 25'</td>
</tr>
<tr>
<td>4' x 9' x 25'</td>
<td>4' x 9' x 25'</td>
<td>4' x 9' x 25'</td>
</tr>
</tbody>
</table>

6TYPICAL SECTION

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

6TYPICAL SECTION

NOTE: D = PIN DIAMETER.
DIMENSIONS ARE OUT TO OUT.
**STEEL PILE FOOTINGS**

**FOOTING SIZE**

3'-6 x 8'-0 x 23'-0 FOR 13A, 14A & 15A

3'-6 x 9'-0 x 23'-0 FOR 13B, 14B & 15B

3'-6 x 10'-0 x 23'-0 FOR 13C, 14C & 15C

**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 H24-64-06. 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. Pile piles shall be driven to values shown in Design Plans.

---

**TYPICAL SECTION**
HIGHWAY/Bridge Methods Section
STANDARD DESIGN - 24' ROADWAY, THREE SPAN BRIDGE
CONCRETE BEAM BRIDGES
PRETENSIONED PRESTRESSED
DECEMBER, 2006

FOOTING LAYOUT

- Pin Diameter
- Dimensions are from footing to top of bearing

<table>
<thead>
<tr>
<th>FOOTING</th>
<th>NO. &amp; SIZE</th>
<th>LENGTH</th>
<th>REINFORCING STEEL (ONE FOOTING)</th>
<th>TOTAL</th>
<th>STRUCTURAL CONCRETE CUBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3'-6 x 8'-0 x 23'-0</td>
<td>9A &amp; 10A</td>
<td>30° SKEW - H=16' TO 24'</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FOOTING NOTES:

- Steel pile footings are designed and detailed to be used with the cap and column details of the tee pier as shown on sheet H24-64-06.
- Battered piles in exterior rows are in the direction shown.
- Steel piles used as joint bearing shall have a minimum distance of 10 feet from footing to top of bearing.
- Footing layout is such that the distance from center to center of adjacent piles shall not exceed 8'-0.

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

DES. LOAD (KIPS) USED IN THE FIELD FOR DRIVING PILES.

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

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 H24-64-06.

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 line of masonry. The foundation rock shall have a minimum LRFD bearing resistance of 30 kips per square foot (allowable bearing value of at least 10 kips per square foot).

FOOTINGS

CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H24-64-06.

THESE SPREAD FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE

REINFORCING

TYPICAL SECTION

 BEARING VALUE OF AT LEAST 10 KIPS PER SQUARE FOOT).

NOMINAL BEARING RESISTANCE OF 30 KIPS PER SQUARE FOOT (ALLOWABLE
**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 H24-64-06. These spread footings shall extend at least 18 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 Value of at least 10 kips per square foot.  

**REINFORCING STEEL ONE FOOTING:**

<table>
<thead>
<tr>
<th>FOOTING SIZE</th>
<th>BAR NO.</th>
<th>BAR DIAMETER</th>
<th>BAR SPACING</th>
<th>LENGTH</th>
<th>TOTAL WEIGHT</th>
<th>STRUCTURAL CONCRETE</th>
<th>LRFD BEARING VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4' x 9' x 25'</td>
<td>#10</td>
<td>0.39</td>
<td>3.0</td>
<td>500 ft</td>
<td>870</td>
<td>37.3</td>
<td>10.0</td>
</tr>
<tr>
<td>4' x 9' x 28'</td>
<td>#10</td>
<td>0.39</td>
<td>3.0</td>
<td>500 ft</td>
<td>1100</td>
<td>37.3</td>
<td>12.0</td>
</tr>
</tbody>
</table>

**TYPICAL SECTION:**

- d2 BAR LAYOUT
- TYPICAL SECTION

- SEE SECTION A-A ON SHEET H24-64-06.

- SYMMETRICAL ABOUT PIER
**TYPICAL SECTION**

- **NOTES**: D = PIN DIAMETER.
- DIMENSIONS ARE OUT TO OUT.

**FOOTING SIZE**

<table>
<thead>
<tr>
<th>FOOTING SIZE</th>
<th>NO. &amp; SIZE &amp; SPACING</th>
<th>3'-6 x 8'-0 x 24'-0 FOR 13A, 14A, 15A &amp; 16A</th>
<th>3'-6 x 9'-0 x 24'-0 FOR 14B, 15B &amp; 16B</th>
</tr>
</thead>
</table>

**REINFORCING STEEL (ONE FOOTING)**

<table>
<thead>
<tr>
<th>BEARING STEEL SIDE</th>
<th>POCKET SIDE</th>
<th>3'-6 x 8'-0 x 24'-0</th>
<th>3'-6 x 9'-0 x 24'-0</th>
</tr>
</thead>
</table>

**FOOTING NOTES**

- **PIER PILES** SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.
- **STEEL PILE FOOTINGS**
  - **TEE PIER-HP10x57 SRL-1**
  - **NOTE**: PU, STRENGTH 1 DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.
  - **REVISION 09-2016 - CHANGED VERTICAL CLEARANCE OF REBAR "f2" TO TOP OF PIER FOOTING TO 3" (WAS 2").**

**DES. LOAD (KIPS)**

<table>
<thead>
<tr>
<th>LOAD</th>
<th>STRENGTH 1, LRFD Pu, 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>577</td>
<td>577</td>
</tr>
<tr>
<td>592</td>
<td>592</td>
</tr>
<tr>
<td>592</td>
<td>592</td>
</tr>
<tr>
<td>577</td>
<td>577</td>
</tr>
</tbody>
</table>

**PIER NO. & SIZE & SPACING**

<table>
<thead>
<tr>
<th>PIER NO. &amp; SIZE &amp; SPACING</th>
<th>3'-6 x 8'-0 x 24'-0</th>
<th>3'-6 x 9'-0 x 24'-0</th>
</tr>
</thead>
</table>

**FOOTING WEIGHT (LB.)**

<table>
<thead>
<tr>
<th>FOOTING SIZE</th>
<th>TOTAL WEIGHT (LB.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3'-6 x 8'-0 x 24'-0</td>
<td>24.9</td>
</tr>
<tr>
<td>3'-6 x 9'-0 x 24'-0</td>
<td>28.0</td>
</tr>
</tbody>
</table>

**TYPICAL SECTION**

- **NOTE**: W = WIDTH OF REBAR SHEET.
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 H24-71-06. Batter piles in exterior rows 1:4 in the direction shown.

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.

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

NOTES:

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

REINFORCING STEEL ONE FOOTING

<table>
<thead>
<tr>
<th>FOOTING SIZE</th>
<th>BAR NO. SIDE &amp; SPACING</th>
<th>LENGTH</th>
<th>WEIGHT</th>
<th>TYPICAL CONCRETE (CY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3'-6 x 9' x 24'</td>
<td>5f1</td>
<td>3'-0</td>
<td>23'0</td>
<td>10'-0</td>
</tr>
<tr>
<td>3'-6 x 9' x 24'</td>
<td>5f2</td>
<td>3'-0</td>
<td>23'0</td>
<td>10'-0</td>
</tr>
<tr>
<td>3'-6 x 9' x 24'</td>
<td>7g1</td>
<td>3'-0</td>
<td>23'0</td>
<td>10'-0</td>
</tr>
<tr>
<td>3'-6 x 9' x 24'</td>
<td>7g2</td>
<td>3'-0</td>
<td>23'0</td>
<td>10'-0</td>
</tr>
</tbody>
</table>

TYPICAL SECTION

NOTE: D = PIN DIAMETER.

DIMENSIONS ARE OUT TO OUT.

REINFORCING STEEL (ONE FOOTING)

<table>
<thead>
<tr>
<th>FOOTING SIZE</th>
<th>NO., SIZE &amp; SPACING</th>
<th>LENGTH</th>
<th>WEIGHT</th>
<th>TYPICAL CONCRETE (CY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3'-6 x 9' x 24'</td>
<td>5f1</td>
<td>3'-0</td>
<td>23'0</td>
<td>10'-0</td>
</tr>
<tr>
<td>3'-6 x 9' x 24'</td>
<td>5f2</td>
<td>3'-0</td>
<td>23'0</td>
<td>10'-0</td>
</tr>
<tr>
<td>3'-6 x 9' x 24'</td>
<td>7g1</td>
<td>3'-0</td>
<td>23'0</td>
<td>10'-0</td>
</tr>
<tr>
<td>3'-6 x 9' x 24'</td>
<td>7g2</td>
<td>3'-0</td>
<td>23'0</td>
<td>10'-0</td>
</tr>
</tbody>
</table>

FOOTING DESIGN LOAD (KIPS)

<table>
<thead>
<tr>
<th>DES. LOAD (KIPS)</th>
<th>STRENGTH 1, LRFD Pu, 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

STEELE PILE FOOTINGS

TEE PIER-HP10x57 SRL-2

STEEL PILE FOOTINGS

NOTE: 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 tee piers as shown on Sheet H24-71-06.

These spread footings shall 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 load-bearing resistance of 30 kips per square foot downhill, bearing value of at least 10 kips per square foot.

---

### Footing Sizes

<table>
<thead>
<tr>
<th>Footing Size</th>
<th>Bar Size &amp; Spacing</th>
<th>Length</th>
<th>Structural Concrete (ft³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4' x 8' x 24'</td>
<td>10 - #7 @ 1'-0</td>
<td>25 SPA</td>
<td>217</td>
</tr>
<tr>
<td>4' x 9' x 24'</td>
<td>10 - #5 @ 1'-0</td>
<td>24 SPA</td>
<td>222</td>
</tr>
<tr>
<td>4' x 9' x 26'</td>
<td>46 - #10 as shown</td>
<td>23 SPA</td>
<td>3812</td>
</tr>
<tr>
<td>4' x 8' x 24'</td>
<td>10 - #7 @ 1'-0</td>
<td>23 SPA</td>
<td>235</td>
</tr>
<tr>
<td>4' x 9' x 24'</td>
<td>10 - #5 @ 1'-0</td>
<td>26 SPA</td>
<td>320</td>
</tr>
<tr>
<td>4' x 9' x 24'</td>
<td>10 - #6 @ 0'-11</td>
<td>27 SPA</td>
<td>338</td>
</tr>
<tr>
<td>4' x 8' x 24'</td>
<td>10 - #7 @ 1'-0</td>
<td>24 SPA</td>
<td>3192</td>
</tr>
<tr>
<td>4' x 9' x 24'</td>
<td>10 - #5 @ 1'-0</td>
<td>24 SPA</td>
<td>294</td>
</tr>
<tr>
<td>4' x 9' x 24'</td>
<td>46 - #10 as shown</td>
<td>26 SPA</td>
<td>335</td>
</tr>
<tr>
<td>4' x 9' x 24'</td>
<td>10 - #7 @ 1'-0</td>
<td>25 SPA</td>
<td>284</td>
</tr>
<tr>
<td>4' x 9' x 24'</td>
<td>10 - #5 @ 1'-0</td>
<td>26 SPA</td>
<td>276</td>
</tr>
<tr>
<td>4' x 9' x 24'</td>
<td>46 - #10 as shown</td>
<td>26 SPA</td>
<td>222</td>
</tr>
</tbody>
</table>

---

### Typical Section

- Rebars are laid out symmetrically about the pier.
- Footings are designed for load-bearing resistance.
- Note the dimensions and reinforcement details for each footing size.
OUTLET DETAILS

SITUATION PLAN

PROTECTION LAYOUT 0° SKewed

PROTECTION LAYOUT SKewed

OUTLET DETAILS

SITUATION PLAN

REFER TO SITUATION PLAN FOR NORTH ARROW.

OUTLET DETAILS

MIN. DRILLED HOLES FOR ATTACHMENT

TOP VIEW

FRONT VIEW

GUARD DETAILS

REMOVABLE RODENT TUBING

Piper is used, the pipes should be coiled in one of the two following ways:
1. Insert an inside fit reducer coupler and an inside fit reducer coupler with a minimum 6 inch into CMP.
2. Insert the 4.5" subdrain into the 6.5" metal outlet pipe, then fully seal the entire opening with grout.

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

STANDARD DESIGN – 24' ROADWAY, THREE SPAN BRIDGE
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
DECEMBER, 2006
**WING ARMORING NOTES:**

The bridge berm foreslope shall be compacted and shaped as shown on the plans. The macadam stone at these locations shall be underlaid with engineering fabric meeting the requirements of 4196.01C.

The dimensions shown for the proposed subdrains are based on the proposed grading layout of bridge berming. 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 (including excavation, granular backfill, porous gasket, and subdrain outlet) is to be included in the price bid for structural concrete bridges; no extra payment shall be made.

**MACADAM STONE WING ARMORING NOTES:**

- Macadam stone shall be placed along the line of the wing and armor 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 meeting the requirements of 4143.01B of the current I.D.O.T. Standard Specification. The subdrain outlet shall consist of a 6'-0 length of pipe with a removable rodent guard.
- Subdrains shall be 4" in diameter and meet the requirements of Section 4143.01B of the current I.D.O.T. Standard Specification. The subdrain outlet shall consist of a 6'-0 length of pipe with a removable rodent guard.

**EDGING DETAILS**

- Timber edging is lapped. The laps shall be a minimum of one foot in the engineering fabric. The engineering fabric shall meet the requirements of Section 4196.01C. If the requirements for guardrail posts, sawed four sides, as specified in 4161.
- Wood preservative treatment for the timber edging shall meet the requirements for guadarail posts, sawed four sides, as specified in 4161.
- All subdrains and subdrain outlets required for this structure.

**SUBDRAIN NOTES:**

- See H24-78-06 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 meet the requirements of Section 4143.01B of the current I.D.O.T. Standard Specification. 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 berming. 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 (including excavation, granular backfill, porous gasket, and subdrain outlet) is to be included in the price bid for structural concrete bridges; no extra payment shall be made.
SUBDRAIN NOTES:

The bridge contractor is to install subdrains behind the abutment. The subdrains shall be 6" in diameter and meet the requirements of Section 4143.01b of the current I.D.O.T. standard specification. The subdrain outlet shall consist of a 3'-0 length of pipe with a removable rodent guard.

The subdrains shown for the proposed subdrains 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 (including 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 armor protection. This is typical at each corner of the bridge unless otherwise noted in the plans. The macadam stone at these locations shall be overlaid with engineering fabric meeting the requirements of 4146.01b.

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

The engineering fabric shall meet the requirements of 4196.01c if the engineering fabric is placed. The ends shall be a minimum of 1 foot in length, single fabric with no slope lay flat on top and stapled for continuity.

The macadam stone shall meet the requirements of 4143.01b above. If the macadam stone is placed, the ends are to be underdrain (shown for integral abutment with wing extensions).

Wood preservative treatment for the timber edging shall meet the requirements for guardrail posts, sawed four sides, as specified in 4161.

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 item "structural concrete bridges" and shall include costs of all materials and labor to construct the wing armor as shown on these plans.
ABUTMENT BACKFILL PROCESS:

The base of the excavation surface 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 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. A trench is placed at the toe of the 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 shall overlap approximately 1 foot and shall be pinned in place. The fabric will be attached to the abutment by using lathe 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 placed 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.

The subdrain is then placed and leveled, no compaction is required. The subdrain will be placed backfilling with floodable backfill, surface flooding, and vibratory compaction. The floodable backfill material shall be in accordance with the standard specifications. The floodable backfill shall be placed in individual lifts, surface flooded and compacted with vibratory compaction. The required lift thickness for 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 procedure to the low point where the subdrain exits the fabric. To ensure uniform surface flooding, water running full in a 2-inch targeted hole should be spaced 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 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 floodable backfill furnished at the bridge abutments shall be included in the contract unit price set for structural concrete.

NOTE:

Subdrain shall slope downward 2% from & approach roadway when outlying both sides of the abutment, subdrain shall slope downward 2% from one end when outlying at one end of the abutment.

The geotextile fabric shall be in accordance with Article 1.028, 3.046 of the Standard Specifications. If the engineering design is altered, the lifts shall be made of one foot in length, single pass fabric of slope lap place on top and stacked for continuity.
ABUTMENT BACKFILL PROCESS:

The base of the excavation surface 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 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, where it will serve as a filter 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 shall overlap approximately 1 foot and shall be pinned in place. The fabric shall be attached to the abutment by using lay placed in the fabric and secured to the concrete with shallow concrete nails. The fabric placed against the excavation face shall be pinned.

ABUTMENT BACKFILL PROCESS:

When the fabric is in place, the subdrain shall be installed directly on the fabric. Any of the subdrain outlet, alignment, or direction where the subdrain exits the fabric near the end of the abutment wing wall.

PERIOD BACKFILL IS THEN PLACED AND LEVELLED NO COMPACTION IS REQUIRED.

The remaining work involves backfilling with porous backfill. Surface leveling and compaction. The porous backfill material shall be in accordance with the standard specifications. The porous backfill shall be placed in individual lifts. Surface leveling, 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 POROUS BACKFILL LIFT AT THE HIGH POINT OF THE ABUTMENT. AT ONE END OF THE ABUTMENT.

STOP FLOODING, AND VIBRATORY COMPACTION. THE POROUS BACKFILL MATERIAL SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID FOR STRUCTURAL CONCRETE.

THE REMAINING WORK INVOLVES BACKFILLING WITH FLOODABLE BACKFILL, SURFACE LEVELING, FLOODING, AND VIBRATORY COMPACTION. THE FLOODABLE BACKFILL MATERIAL SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 6 OF THE STANDARD SPECIFICATIONS. IF THE ENGINEERING PILE LIFTED THE LAPS SHALL BE A MINIMUM OF ONE FOOT IN LENGTH SHOWN FABRIC OF SLOPE LAY FLAT ON TOP AND STAPLED FOR CONTINUITY.

GEOTEXTILE FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 6 OF THE STANDARD SPECIFICATIONS. IF THE ENGINEERING PILE LIFTED THE LAPS SHALL BE A MINIMUM OF ONE FOOT IN LENGTH SHOWN FABRIC OF SLOPE LAY FLAT ON TOP AND STAPLED FOR CONTINUITY.

NOTE:

SUBDRAIN SHALL SLOPE DOWNWARD 2\% FROM E APPROACH ROADWAY WHEN OUTLETTING BOTH SIDES OF THE ABUTMENT.

SUBDRAIN SHALL SLOPE DOWNWARD 2\% FROM HIGH END WHEN OUTLETTING AT ONE END OF THE ABUTMENT.

THE GEOTEXTILE FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 6 OF THE STANDARD SPECIFICATIONS. IF THE ENGINEERING PILE LIFTED THE LAPS SHALL BE A MINIMUM OF ONE FOOT IN LENGTH SHOWN FABRIC OF SLOPE LAY FLAT ON TOP AND STAPLED FOR CONTINUITY.
ABUTMENT BACKFILL PROCESS:

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

After the subdrain has been placed, 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 at the abutment backfill, abutment wing walls, and excavation face to a height that will be approximately 1 to 2 feet higher than the height of the finished subdrain placement. The subdrain placement is to be shown on this sheet. The ends 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 lath 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 base 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 in accordance with the standard specifications. The floodable backfill shall be placed in individual lifts. Surface flooding and compaction with vibratory rollers shall be performed to achieve the required full thickness. 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. The subdrain outlet shall be located at the 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. Do not overlap the increments.

Floodable backfill lift placement, compaction, 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 placed in the bridge abutments will not be assessed separately for payment.

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

NOTE: Subdrain shall slope downward 2% from & approach roadway when outfilling both sides of the abutment. Subdrain shall slope downward 2% from end of subdrain at one end of the abutment.

The geotextile fabric shall be in accordance with Article 20 of the standard specifications. If the engineering firm approved the cuts or any portion of one foot in length. Floodable backfill will be identified at one face on top and styled for continuity.
ABUTMENT BACKFILL PROCESS:

THE BASE OF THE EXCAVATION SUBSURFACE (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 SUBURBAN OUTLET. THIS EXCAVATION SHOULD BE COMPLETED PRIOR TO BEGINNING INSTALLATION OF THE GEOTEXTILE AND SUBDRAIN MATERIAL.

AFTER THE SUBDRAIN HAS BEEN Laid, 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 UP THE ABUTMENT BACKFILL, ABUTMENT WING WALLS, AND EXCAVATION FACE TO A HEIGHT THAT WILL BE APPROXIMATELY 1 TO 2 FEET HIGHER THAN THE HEIGHT OF THE FABRIC SHOWN IN THE BACKFILL DETAILS. THE STRIPS OF FABRIC SHOWN OVERLAP APPROXIMATELY 1 FOOT AND SHALL BE PINNED IN PLACE.

THE FABRIC SHALL BE ATTACHED TO THE ABUTMENT FOOTINGS USING LATH PINNED IN THE FABRIC AND SECURED TO THE CONCRETE WITH SMALLER CONCRETE NAILS. THE FABRIC PLACED AGAINST THE EXCAVATION FACE SHALL BE PINNED.


POROUS BACKFILL IS THEN PLACED AND LEVELLED NO COMPACTION IS REQUIRED.

THE REMAINING WORK INVOLVES BACKFILLING WITH FLOODABLE BACKFILL. SURFACE FLOODING AND VIBRATORY COMPACTING, THE FLOODABLE BACKFILL MATERIAL WILL BE PLACED IN SUCCESSIVE 6-FOOT TO 8-FOOT INCREMENTS. THE FABRIC IS INTENDED TO BE INSTALLED AGAINST THE EXCAVATION FACE TO A HEIGHT OF 2 FEET.

START SURFACE FLOODING FOR EACH FLOODABLE BACKFILL LIFT AT THE HIGH POINT OF THE SUBURBAN AND PROGRESS TO THE LOW POINT WHERE THE SUBURBAN EXITS THE FABRIC. TO ENSURE UNIFORM 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 PROCEED UNTIL THE REQUIRED FULL THICKNESS OF THE ABUTMENT BACKFILL HAS BEEN COMPLETED.

WATER REQUIRED FOR FLOODING, SUBURBAN, POROUS BACKFILL, FLOODABLE BACKFILL, AND GEOTEXTILE FABRIC PLACED AT THE BRIDGE ABUTMENTS WILL NOT BE MEASURED SEPARATELY FOR PAYMENT.

THE COST OF WATER REQUIRED FOR FLOODING SUBURBAN, POROUS BACKFILL, FLOODABLE BACKFILL, AND GEOTEXTILE FABRIC PLACED AT THE BRIDGE ABUTMENTS WILL BE INCLUDED IN THE CONTRACT UNIT PRICE BID FOR STRUCTURAL CONCRETE.