



**H30-06 THREE SPAN  
PRETENSIONED PRESTRESSED  
CONCRETE BEAM BRIDGE STANDARDS**

REVISED 04-13 - THE GENERAL NOTES AND SPECIFICATIONS MOVED TO STANDARD SHEET H30-01A-06. SRL NOTATION ADDED.

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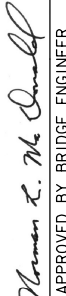

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STRUCTURAL RESISTANCE LEVEL-1 (SRL-1) REPLACES THE 50 TON STEEL PILE DESIGNATION.

STRUCTURAL RESISTANCE LEVEL-2 (SRL-2) REPLACES THE 75 TON STEEL PILE DESIGNATION.

FOR MORE INFORMATION ON STRUCTURAL RESISTANCE LEVELS (SRL-1 & SRL-2), SEE THE BRIDGE DESIGN MANUAL, LOCATED ON THE IOWA DEPARTMENT OF TRANSPORTATIONS, OFFICE OF BRIDGES AND STRUCTURES, WEBSITE.

04-13 LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	 STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006
INDEX SHEET		H30-01-06

## GENERAL NOTES:

THE H30-06 BRIDGE STANDARDS, IF PROPERLY USED, PROVIDE THE STRUCTURAL PLANS NECESSARY TO CONSTRUCT THREE SPAN 30' ROADWAY PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES WITH LENGTHS OF 138'-10, 151'-4, 163'-10, 176'-4, 188'-10, 201'-4, 213'-10, 226'-4 AND 243'-0.

THESE BRIDGES MAY BE BUILT ON A 0°, 15°, 30° OR 45° SKEW. THESE PLANS SHOW THE BRIDGES SKEWED IN ONE DIRECTION, BUT ALL DIMENSIONS AND DETAILS WOULD BE THE SAME FOR THE OPPOSITE SKEW.

FOR CLARITY, MOST SECTIONS SHOWN ON THE FOLLOWING SHEETS ARE DRAWN WITH BARRIER RAIL ONLY. THESE SECTIONS WILL BE IDENTICAL FOR OPEN RAIL DESIGN WITH ANY MODIFICATIONS SHOWN ON SHEET H30-42-06 AND H30-43-06.

THESE BRIDGES ARE DESIGNED FOR HL93 LOADING PLUS 20 LBS. PER SQ. FT. OF ROADWAY FOR FUTURE WEARING SURFACE. CONTROL OF CRACKING BY DISTRIBUTION OF REINFORCEMENT FOR SLAB DESIGN BASED ON PRE LRFD 2005 INTERIMS.

NOTE THAT WHEN APPROACH PAVEMENT IS TO BE PLACED, THE TEMPORARY PAVING BLOCKS SHALL BE REMOVED AND A PROPER JOINT FOR EXPANSION SHALL BE PROVIDED BETWEEN THE BRIDGE AND THE APPROACH PAVING.

THE FLOOR SLAB AS SHOWN INCLUDES ½" INTEGRAL WEARING SURFACE.

THE ABUTMENTS FOR THESE BRIDGES ARE BUILT INTEGRAL WITH THE SUPERSTRUCTURE. THEREFORE, IT IS IMPORTANT THAT A PROPER JOINT FOR EXPANSION BE PROVIDED BETWEEN THE BRIDGE AND APPROACH PAVING, WHEN APPROACH PAVING IS NEEDED.

THE INTEGRAL ABUTMENT DESIGN UTILIZED ON THESE BRIDGES RESTRICTS THEIR USE IN THE FOLLOWING MANNER:

- (1) THE 201'-4, 213'-10, 226'-4 AND 243'-0 BRIDGES SHALL USE STEEL PILES AT THE ABUTMENTS.
- (2) THESE BRIDGES ARE NOT TO BE USED WHEN POINT BEARING FOR THE ABUTMENT STEEL PILING WOULD BE OBTAINED ON ROCK AT A DISTANCE LESS THAN 15 FEET FROM THE BOTTOM OF FOOTING.
- (3) THE ABUTMENT PILING ARE TO BE DRIVEN THROUGH OVERSIZED HOLES PREBORED TO A MINIMUM OF 10 FEET BELOW THE BOTTOM OF FOOTING. THE PREBORED HOLES SHALL BE IN ACCORDANCE WITH SECTION 2501.03, Q OF THE STANDARD SPECIFICATIONS. THE ELEVATION OF THE BOTTOM OF THE PREBORED HOLE SHALL BE SHOWN ON THE PLANS.

THESE STANDARDS GIVE MOST OF THE INFORMATION NECESSARY TO BUILD THESE BRIDGES ON EITHER A CREST VERTICAL CURVE OR A STRAIGHT GRADE. BECAUSE OF THE INFINITE NUMBER OF GRADE POSSIBILITIES IT WILL BE NECESSARY TO SHOW ON THE PLANS THE ABUTMENT AND PIER STEP DIMENSIONS. TO HELP IN OBTAINING THIS STEP INFORMATION SEE "EXAMPLES OF BRIDGE SEAT AND STEP CALCULATIONS" ON SHEET H30-02-06 .

THE ABUTMENT FOOTING AND PIER CAP CONCRETE QUANTITIES SHOWN IN THESE PLANS ARE CALCULATED BASED ON A 0.3% GRADE. FOR HIGHER GRADES, THESE CONCRETE QUANTITIES FOR BRIDGES SKEWED AT 15°, 30°, AND 45° MAY NEED TO BE INCREASED. IN ADDITION, THE LAYOUT OF THE PIER CAP STEP REINFORCING STEEL IS GRADE DEPENDENT FOR BRIDGES SKEWED AT 15°, 30°, AND 45°. SEE SHEETS H30-17-06, H30-24-06, AND H30-31-06 TO DETERMINE THE ADDITIONAL CONCRETE QUANTITIES REQUIRED AND FOR THE LAYOUT AND QUANTITY OF THE PIER CAP STEP REINFORCING STEEL.

PROVIDE TOP OF SLAB ELEVATIONS AND WING ELEVATIONS A, B AND C AS NOTED ON THE STANDARD SHEETS (LONGITUDINAL SECTION).

VARIOUS TYPES OF PIERS MAY BE USED WITH THESE STANDARDS. IT SHOULD BE NOTED THAT THE DETAILS FOR THE PIER DIAPHRAGM ON THE SUPERSTRUCTURE DEPEND ON THE TYPE OF PIER USED.

THE PIERS AND ABUTMENTS FOR THESE STANDARDS HAVE BEEN DESIGNED FOR THE USE OF BOTH FRICTION AND POINT BEARING PILES. IT IS NECESSARY THAT THE TYPE AND LENGTH FOR BOTH THE ABUTMENT AND PIER PILES BE DESIGNATED ON THE FRONT SHEET OF THE PLANS.

THE INTEGRAL ABUTMENTS, PILE BENTS, AND TEE PIERS FOR THESE H30 STANDARDS HAVE BEEN DESIGNED FOR THE USE OF VARIOUS TYPES OF PILE FOOTINGS OR SPREAD FOOTINGS AS FOLLOWS.

- INTEGRAL ABUTMENTS: TIMBER PILES (LIMITED BY BRIDGE LENGTH) OR HP10x57 PILES AT BRIDGE DESIGN MANUAL (BDM) ARTICLE 6.2.6.1 STRUCTURAL RESISTANCE LEVEL-1 (SRL-1)
- PILE BENTS: STANDARD CONCRETE-FILLED STEEL PIPE PILES (PIOL), STANDARD PRESTRESSED CONCRETE PILES (PIOL), OR STANDARD H-PILES (PIOL AND SRL-1)
- TEE PIERS: HP10x57 PILES AT BRIDGE DESIGN MANUAL (BDM) ARTICLE 6.2.6.1 STRUCTURAL RESISTANCE LEVEL-1 OR 2 (SRL-1 OR SRL-2) OR SPREAD FOOTINGS

STRUCTURAL RESISTANCE LEVEL-1 (SRL-1) REPLACES THE 50 TON STEEL PILE DESIGNATION.

STRUCTURAL RESISTANCE LEVEL 2 (SRL-2) REPLACES THE 75 TON STEEL PILE DESIGNATION.

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

BECAUSE THESE BRIDGE STANDARDS HAVE BEEN REVISED FOR LRFD BASED ON 2012-COMPLETED IOWA STATE UNIVERSITY RESEARCH, FOR PILE FOUNDATIONS THE DESIGNER WILL NEED TO DETERMINE THE CONSTRUCTION CONTROL METHOD, CONTRACT LENGTH, AND DRIVING TARGET AND GIVE THAT INFORMATION ON THE FRONT SHEET OF THE PLANS. BRIDGE DESIGN MANUAL CADD NOTES E177, E718, E719, E818, AND E819 ARE APPROPRIATE FOR THAT PURPOSE. THE NOTES, AS WELL AS THE BRIDGE DESIGN MANUAL AND DESIGN EXAMPLES, ARE AVAILABLE ON THE OFFICE OF BRIDGES AND STRUCTURES WEB SITE: [HTTP://WWW.IOWADOT.GOV/BRIDGE/INDEX.HTM](http://www.iowadot.gov/bridge/index.htm).

THESE STANDARDS CAN BE USED FOR BRIDGES WITH OR WITHOUT EPOXY COATED REINFORCING. REINFORCING BAR LAP LENGTHS ARE BASED ON THE USE OF EPOXY COATED REINFORCING, BUT NEED NOT BE MODIFIED IF NON-COATED BARS ARE TO BE USED. THE DESIGNER SHALL SPECIFY THE APPROPRIATE BID ITEM NO. FOR THE EPOXY COATED OR NON-EPOXY COATED REINFORCING.

IT IS RECOMMENDED THAT THE EPOXY COATED REINFORCING OPTION BE USED IF IT IS ANTICIPATED THAT THE BRIDGE DECK AND/OR THE BRIDGE APPROACHES WILL BE CHEMICALLY TREATED FOR THE REMOVAL OF ICE OR SNOW.

IF EPOXY COATED BARS ARE USED IN THE DECK, THEN ALL BARS USED IN THE ABUTMENT (FOOTING AND BACKWALL), CAP, AND BARRIER RAILS SHALL BE EPOXY COATED.

FOR PIERS SUBJECT TO SCOUR THE DESIGN BEARING SHALL BE OBTAINED BELOW SCOUR ELEVATION. SCOUR ELEVATION SHALL BE SHOWN ON THE FRONT SHEET.

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

KEYWAY DIMENSIONS SHOWN ON THE PLANS ARE BASED ON NOMINAL DIMENSIONS UNLESS STATED OTHERWISE. IN ADDITION, THE BEVEL USED ON THE KEYWAY SHALL BE LIMITED TO A MAXIMUM OF 10 DEGREES FROM VERTICAL.

THESE BRIDGE PLANS LABEL ALL REINFORCING STEEL WITH ENGLISH NOTATION (501 IS 5/8 INCH DIAMETER BAR). ENGLISH REINFORCING STEEL RECEIVED IN THE FIELD MAY DISPLAY THE FOLLOWING "BAR DESIGNATION". THE "BAR DESIGNATION" IS THE STAMPED IMPRESSION ON THE REINFORCING BARS, AND IS EQUIVALENT TO THE BAR DIAMETER IN MILLIMETERS.

ENGLISH SIZE	3	4	5	6	7	8	9	10	11
BAR DESIGNATION	10	13	16	19	22	25	29	32	36

## DESIGN STRESSES:

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

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

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

FOR STANDARD PRESTRESSED CONCRETE BEAMS, SEE SHEETS H30-32-06 THRU H30-37-06

## SPECIFICATIONS:

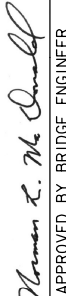

DESIGN:

AASHTO LRFD 4th Ed, SERIES OF 2007.

CONSTRUCTION:

IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2012, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.

REVISED 04-13 - THIS STANDARD RENAMED TO H30-01A-06. INDEX SHEET INFORMATION ON STANDARD H30-01-06.

04-13 LATEST REVISION DATE   APPROVED BY BRIDGE ENGINEER		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
	<table border="1" style="width: 100%;"> <tr> <td style="width: 50%; text-align: center;">GENERAL NOTES</td> <td style="width: 50%; text-align: center;">H30-01A-06</td> </tr> </table>	GENERAL NOTES
GENERAL NOTES	H30-01A-06	

## EXAMPLES OF BRIDGE SEAT AND STEP CALCULATIONS:

THE DESIGNER SHALL SHOW ON THE PLANS THE 5 ELEVATIONS AND THE 4 STEP DIMENSIONS REQUIRED FOR EACH OF THE PIER TOP AND ABUTMENT BRIDGE SEATS.

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

### EXAMPLE NO. 1

A STRAIGHT GRADE OF -3.25% WITH THE P.I. STATION OF 103+75.00 AND ELEVATION OF 653.29. THE BRIDGE LENGTH IS 213'-10"  $\phi$  TO  $\phi$  OF ABUTMENT BEARINGS WITH 30° SKEW RIGHT AHEAD.

#### STATIONS

$\phi$ BRIDGE STA.	=	105+85.00	
$\pm$ $\frac{1}{2}$ OF L2	$\pm$	38.67	
$\phi$ PIER BRGS.	=	105+46.33	106+23.67
$\pm$ LI		- 68.25	+ 68.25
$\phi$ ABUTMENT BRGS.	=	104+78.08	106+91.92

#### ELEVATIONS ALONG PROFILE GRADE LINE (P.G.L. ELEV.)

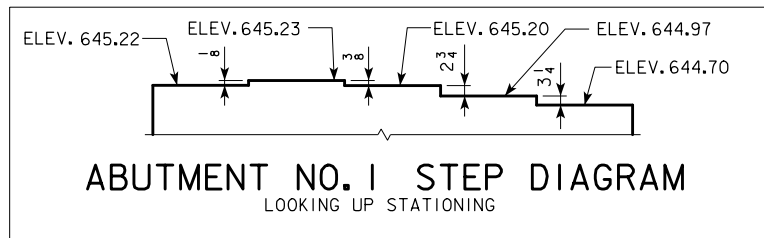
$\phi$ ABUT. BRG. =	$653.29 - [(104+78.08) - (103+75.00)](0.0325)$	=	649.94
$\phi$ PIER BRG. =	$653.29 - [(105+46.33) - (103+75.00)](0.0325)$	=	647.72
$\phi$ PIER BRG. =	$653.29 - [(106+23.67) - (103+75.00)](0.0325)$	=	645.21
$\phi$ ABUT. BRG. =	$653.29 - [(106+91.92) - (103+75.00)](0.0325)$	=	642.99

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

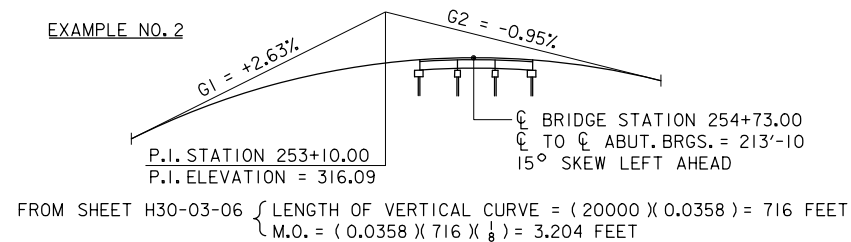
(BEAM SPACING X TAN. SK.  $\Delta$ ) X GRADE = (6.75') TAN 30° (0.0325) = 0.13'

#### ABUTMENT NO. 1

BEAMS	EXTERIOR	INTERIOR	CENTER	INTERIOR	EXTERIOR
PGL ELEV.	649.94	649.94	649.94	649.94	649.94
SK. $\Delta$ CORRECT	+0.26	0.13	0.00	-0.13	-0.26
SLAB CROWN	-0.24	-0.10	0.00	-0.10	-0.24
TOP SLAB ELEV.	649.96	649.97	649.94	649.71	649.44
"U" (4'-8 $\frac{1}{2}$ ")	-4.74	-4.74	-4.74	-4.74	-4.74
BR. SEAT ELEV.	645.22	645.23	645.20	644.97	644.70



### EXAMPLE NO. 2



#### STATIONS

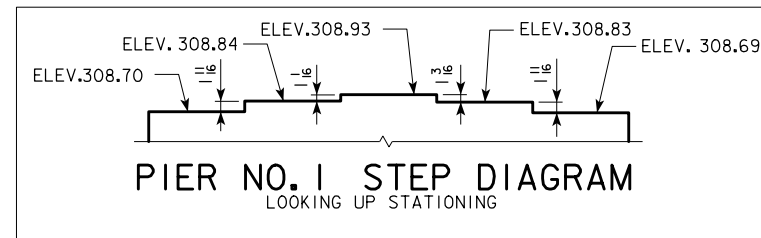
$\phi$ BRIDGE STA.	=	254+73.00	
$\pm$ $\frac{1}{2}$ OF L2	$\pm$	38.67	
$\phi$ PIER BRGS.	=	254+34.33	255+11.67
$\pm$ LI		- 68.25	+ 68.25
$\phi$ ABUTMENT BRGS.	=	253+66.08	255+79.92

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

(BEAM SPACING X TAN. SK.  $\Delta$ ) = (6.75') TAN 15° = 1.81'

#### PIER NO. 1

BEAMS	EXTERIOR	INTERIOR	CENTER	INTERIOR	EXTERIOR
STATION	254+37.95	254+36.14	254+34.33	254+32.52	254+30.71
PGL ELEV.	+313.55	+313.55	313.54	313.54	313.54
SLAB CROWN	-0.24	-0.10	0.00	-0.10	-0.24
TOP SLAB ELEV.	313.31	313.45	313.54	313.44	313.30
"U" (4'-7 $\frac{5}{8}$ ")	-4.61	-4.61	-4.61	-4.61	-4.61
BR. SEAT ELEV.	308.70	308.84	308.93	308.83	308.69



## TEE PIER NOTES:

THE TEE PIERS SHOWN IN THESE PLANS ARE DESIGNED FOR USE WITH THE H30-06 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE STANDARDS. THE PIER MAY BE USED FOR EITHER GRADE SEPARATION OR STREAM CROSSING STRUCTURES. THE PIERS WERE DESIGNED FOR THE FOLLOWING STREAM FORCE AND ICE LOADING CONDITIONS, AND SHOULD NOT BE USED WHERE THESE LOADING CONDITIONS ARE EXCEEDED.

#### ICE FORCE:

ICE FORCES WERE APPLIED AT A HEIGHT OF H/2 + 1'-6" ABOVE THE BOTTOM OF THE PIER FOOTING, WHERE H IS THE OVERALL HEIGHT OF PIER. THE EFFECTIVE ICE STRENGTH WAS 24 KSF FOR 1'-7" OF ICE DEPTH. A PRIMARY ICE FORCE (F) WAS CALCULATED ACCORDING TO THE LRFD SPECIFICATIONS AND APPLIED TO THE PIER STEM AS FOLLOWS:

- CASE 1: 100% OF F APPLIED PARALLEL TO THE PIER'S LONG AXIS AND 15% OF F APPLIED PERPENDICULAR TO THE PIER'S LONG AXIS.
- CASE 2: 50% OF F APPLIED PARALLEL TO THE PIER'S LONG AXIS AND 34% OF F APPLIED PERPENDICULAR TO THE PIER'S LONG AXIS.

#### STREAM FLOW:

THE STREAM VELOCITY USED WAS 5 FT/SEC WITH THE  $C_D$  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 6'-0" BELOW THE ADJACENT STREAMBED OR GROUND SURFACE. IT WAS ALSO ASSUMED THAT THERE ARE NO SIGNIFICANT UNBALANCED EARTH PRESSURES APPLIED TO THE PIER.

ALL BRIDGES WITH TEE PIERS DETAILED ON THESE STANDARDS ARE INTENDED TO HAVE ONE FIXED PIER AND ONE EXPANSION PIER. THE PILE LAYOUT AND REINFORCEMENT SHOWN ARE THE SAME FOR EITHER FIXED OR EXPANSION PIER. THE ONLY DISTINCTION BETWEEN FIXED PIER AND EXPANSION PIER LIES IN THE SELECTION OF BEARINGS AND PRESENCE OF THE KEYWAY IN THE TOP OF THE CAP. EACH BRIDGE SHALL HAVE ONE SET OF FIXED BEARINGS AND ONE SET OF EXPANSION BEARINGS, WHICH MAY BE USED ON EITHER PIER 1 OR PIER 2. THE KEYWAY IN THE TOP OF THE CAP SHOULD BE ELIMINATED FROM THE EXPANSION PIER.

HPI0x57 STEEL PILE SHALL BE USED IN THE PILE FOOTINGS OF THE PIERS FOR EITHER FRICTION OR POINT BEARING PILE CONDITIONS. FRICTION BEARING INCLUDES SIDE FRICTION AND END BEARING IN SOIL. POINT BEARING INCLUDES SIDE FRICTION AND POINT BEARING IN ROCK. NOMINAL STRUCTURAL RESISTANCE WAS TAKEN AS 243 KIPS FOR HPI0x57 SRL-1 FRICTION BEARING PILES AND 365 KIPS FOR HPI0x57 SRL-2 POINT BEARING PILES. A NOMINAL UPLIFT RESISTANCE OF 42 KIPS PER PILE WAS USED IN THE DESIGN OF THE PIER FOOTINGS. THE PIER SHALL NOT BE USED AT SITES WHERE THIS UPLIFT FORCE CANNOT BE ACHIEVED DUE TO SPECIFIC CONDITIONS SUCH AS SURFACE ROCK LAYERS.

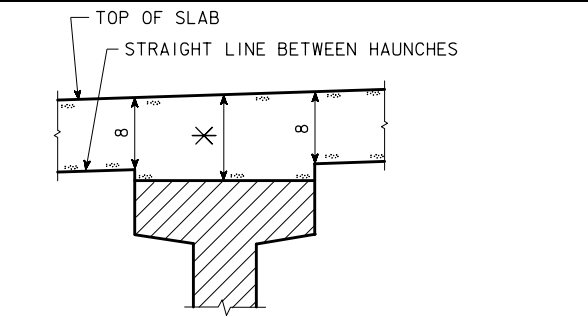
WHEN PIERS ARE USED IN GRADE SEPARATION STRUCTURES, EPOXY COATED REINFORCEMENT MAY BE REQUIRED FOR PIER COLUMNS. CONSULT CURRENT POLICY FOR GUIDANCE ON THE USE OF EPOXY COATED REINFORCEMENT IN SUCH CASES. ADJUST THE  $d_1$  COLUMN BAR PROJECTION INTO THE CAP AND  $d_1/d_2$  LAP DISTANCE ACCORDINGLY.

REVISED 04-13 - TEE PIER NOTES WERE CHANGED TO LRFD SPECS.

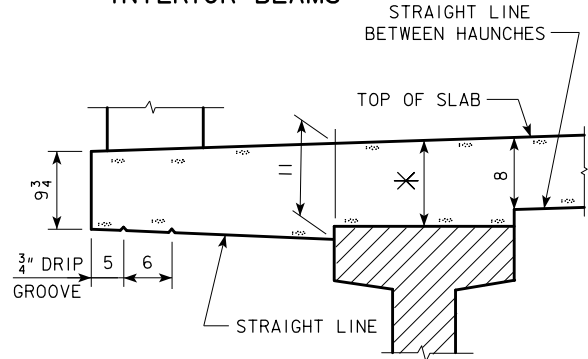
04-13 LATEST REVISION DATE	APPROVED BY BRIDGE ENGINEER	<p>STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES</p> <p><b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b></p> <p>DECEMBER, 2006</p>		
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">GENERAL INFORMATION</td> <td style="width: 50%; text-align: center;">H30-02-06</td> </tr> </table>	GENERAL INFORMATION	H30-02-06
GENERAL INFORMATION	H30-02-06			



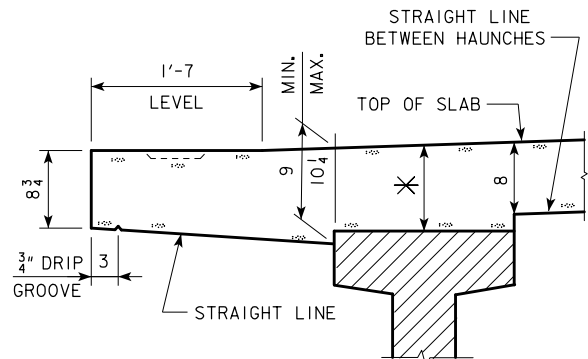




INTERIOR BEAMS

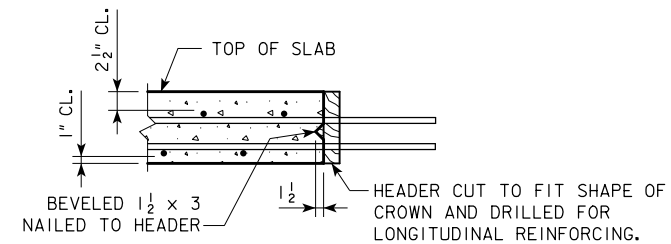


EXTERIOR BEAMS @ OPEN RAIL

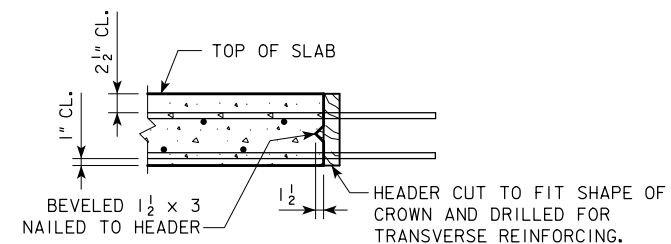


EXTERIOR BEAMS @ BARRIER RAIL  
TYPICAL SLAB AND HAUNCH DETAIL

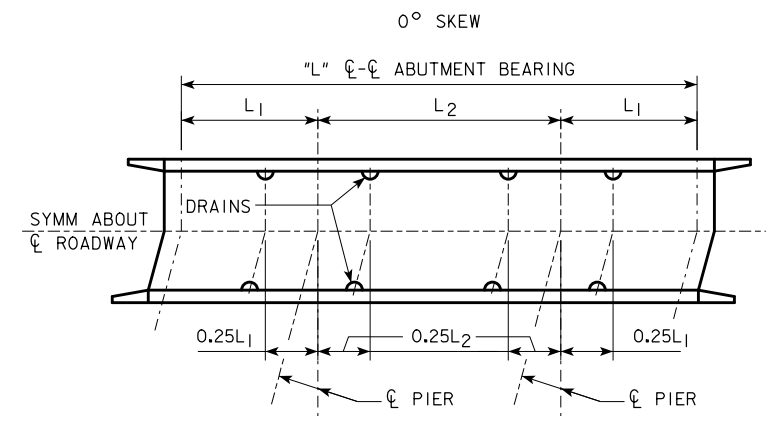
\* FOR SLAB THICKNESS OVER BEAMS SEE "SLAB THICKNESS DETAILS" ON SHEET H30-03-06.



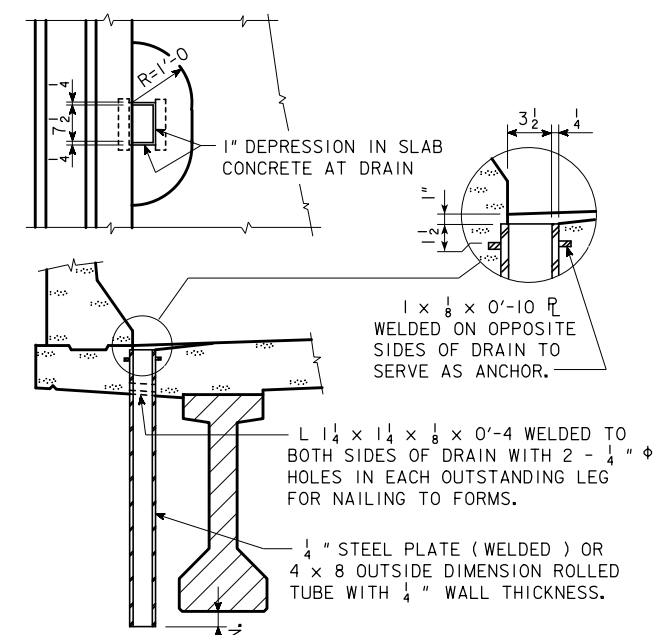
TRANSVERSE SLAB CONSTRUCTION JOINT



LONGITUDINAL SLAB CONSTRUCTION JOINT



15°, 30° AND 45° SKEW  
SITUATION SKETCH (SHOWING DRAIN LOCATIONS)



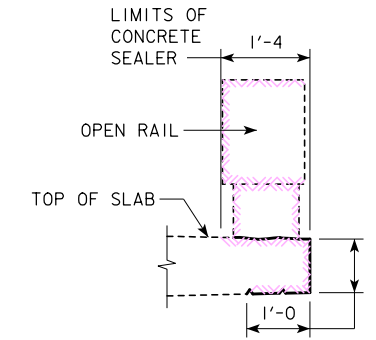
DRAIN DETAILS  
USE FOR BARRIER RAIL ONLY.  
NOT REQUIRED FOR OPEN RAIL.

NOTE :  
DRAINS ARE TO BE GALVANIZED AFTER FABRICATION. SEE "SITUATION SKETCH" FOR LOCATION OF DRAINS. WEIGHT OF DRAINS IS INCLUDED IN THE QUANTITY FOR "STRUCTURAL STEEL". WEIGHT IS BASED ON ROLLED TUBE.

DATA FOR ONE DRAIN			
BEAM SIZE	A	B	C
WT. LBS.	85	96	106
LENGTH FT.	4'-4 3/4	4'-11 3/4	5'-5 3/4

GENERAL NOTES:

- 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 WIRED IN PLACE AND ADEQUATELY SUPPORTED ON BAR CHAIRS BEFORE CONCRETE IS PLACED. I.M. 451.01 REQUIREMENTS SHALL APPLY FOR BAR CHAIRS.
- ALL PRESTRESSED CONCRETE BEAMS ARE TO BE SET VERTICAL.
- FORMS FOR THE SLAB AND RAILS ARE TO BE SUPPORTED BY THE PRESTRESSED CONCRETE BEAMS.
- WEIGHT OF DRAINS IS INCLUDED IN THE STRUCTURAL STEEL QUANTITY.
- THE PIER AND ABUTMENT DIAPHRAGM 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 BID FOR "STRUCTURAL CONCRETE (BRIDGE)".



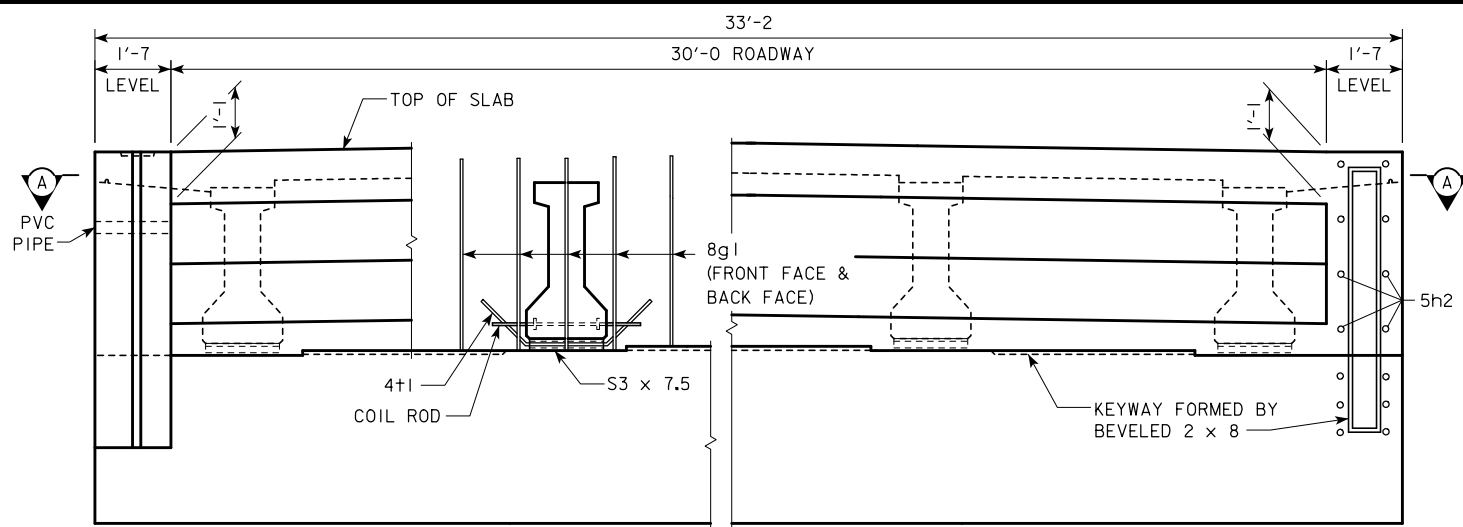
CONCRETE SEALER LIMITS FOR OPEN RAILS

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

THE CONCRETE SEALER LIMITS ARE SHOWN IN THE DETAIL AND SHALL APPLY TO THE FULL LENGTH OF BRIDGE. CONCRETE SEALER SHALL BE APPLIED IN ACCORDANCE WITH ARTICLE 2403.03, P, 3, OF THE STANDARD SPECIFICATIONS.

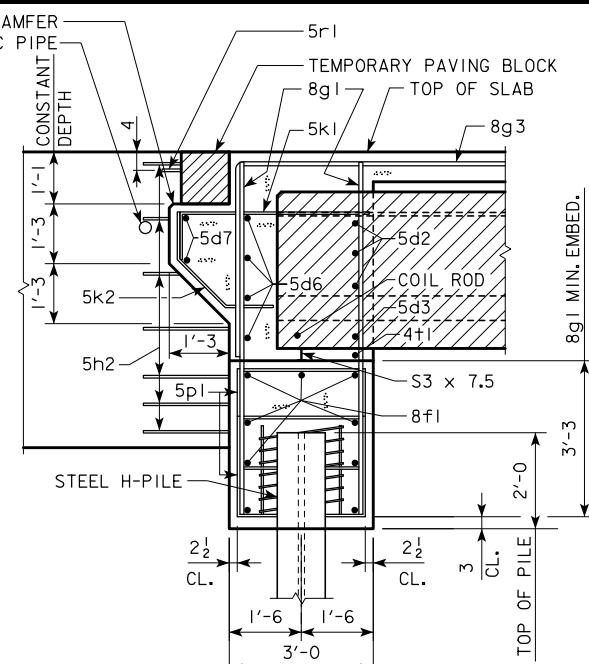
REVISED 06-12 - I.M. REQUIREMENT ADDED TO BAR CHAIR NOTE.

06-12 LATEST REVISION DATE  <i>Harmon L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
	SUPERSTRUCTURE DETAILS	H30-04-06

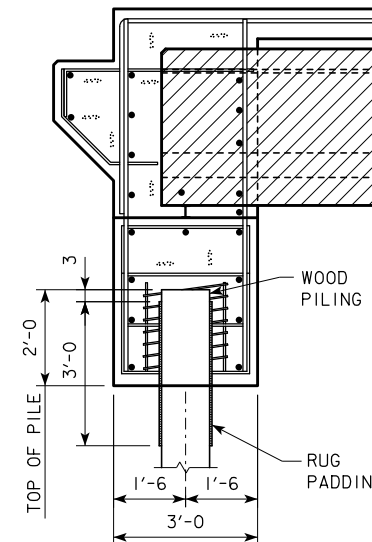


**PART REAR ELEVATION AT ABUTMENT**

NOTE: TOP OF ABUTMENT SHOWN FOR SOLID BARRIER RAIL



**PART SECTION B-B  
(FOR STEEL H-PILING)**



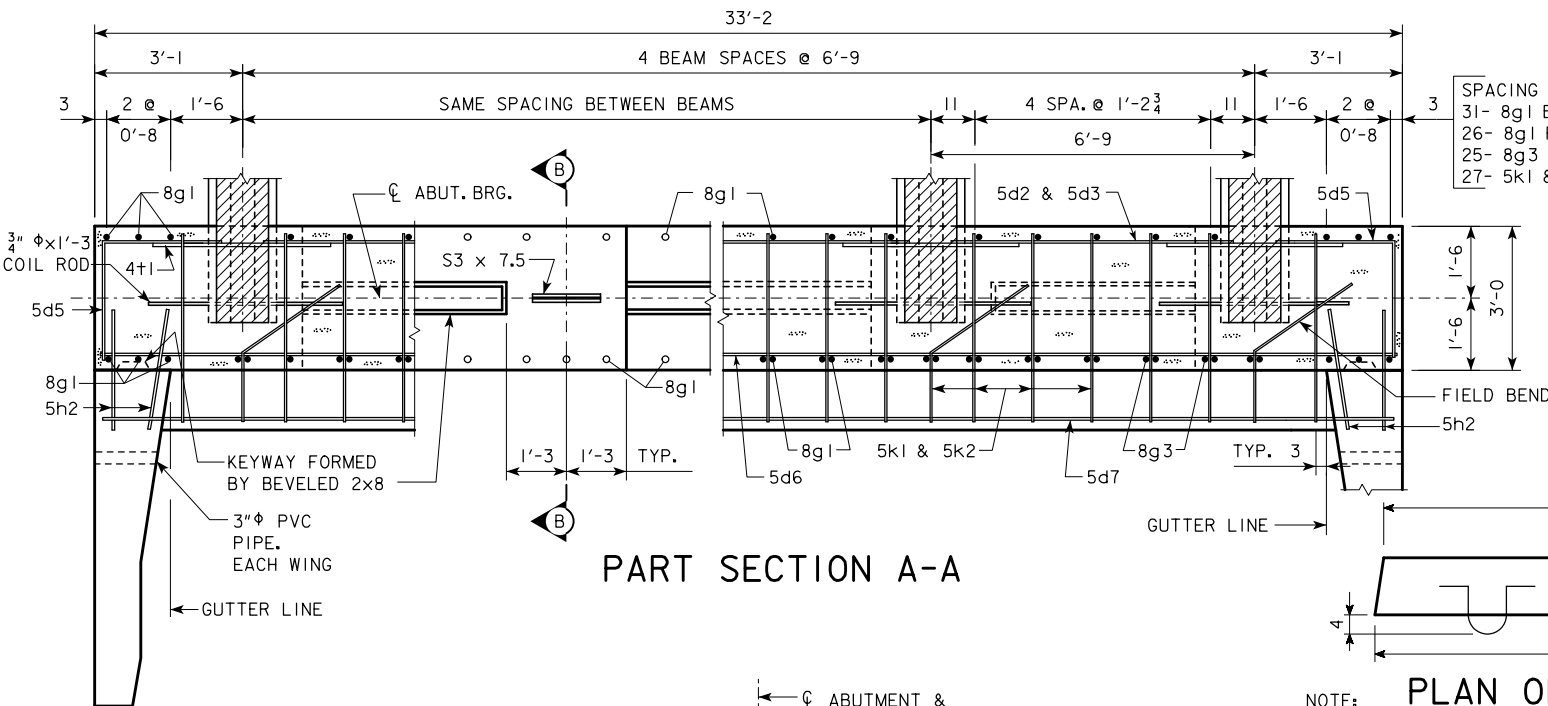
**PART SECTION B-B  
(FOR WOOD PILING)**

**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 #14 GAUGE GALVANIZED WIRE AT A 4" PITCH, CARE IS TO BE TAKEN NOT TO DAMAGE PADDING WHEN PLACING CONCRETE. RUG PADDING MAY BE EITHER OF THE FOLLOWING:

(1) HAIR AND JUTE RUG PADDING, RUBBERIZED ON BOTH SIDES, AND WEIGHING NOT LESS THAN 47 OZ. PER SQ. YD.

(2) BONDED URETHANE OR BONDED POLYFOAM WITH A MINIMUM DENSITY OF 5 LBS. PER CU. FT. AND SHALL BE AT LEAST 1/2 IN. THICK, (MATERIAL LESS THAN 1/2 IN. IN THICKNESS MAY BE USED, BUT WILL REQUIRE ADDITIONAL WRAPS FOR A TOTAL OF AT LEAST ONE INCH).

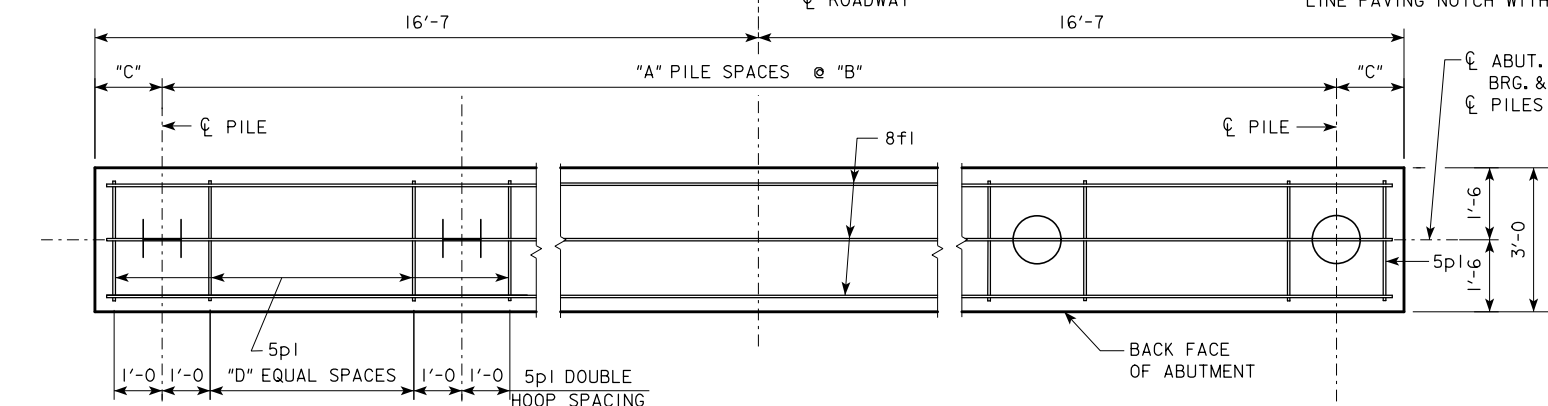
NOTE:  
THE SPIRAL AT THE TOP OF EACH PILE TO BE 7 TURNS OF NO. 2 BAR, 21" DIAMETER, 3" PITCH WITH 3 - L<sup>7</sup>/<sub>8</sub> x 7/8 x 3/8 SPACERS PUNCHED TO HOLD SPIRAL.



**PART SECTION A-A**

SPACING FOR:  
31- 8g1 BACK FACE  
26- 8g1 FRONT FACE  
25- 8g3 BACK FACE  
27- 5k1 & 5k2 BACK FACE

**PLAN OF TEMPORARY PAVING BLOCK**  
NOTE: LINE PAVING NOTCH WITH TAR PAPER BEFORE PLACING THE TEMPORARY PAVING BLOCK.



**ABUTMENT PILE PLAN**

ABUTMENT PILE SPACING		CL-CL ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10
WITH WOOD PILES	"A" PILE SPACES		10	11	11	12	12
	"B" (FT. - IN.)		3'-0	2'-8	2'-8	2'-6	2'-6
	"C" (FT. - IN.)		1'-7	1'-11	1'-11	1'-7	1'-7
	"D" EQUAL SPACES		1	1	1	1	1
	NO. OF PILES PER ABUT.		11	12	12	13	13
Pu, STRENGTH I DESIGN LOAD (KIPS)			56	54	58	55	57
WITH STEEL H-PILES	"A" PILE SPACES		4	4	5	5	5
	"B" (FT. - IN.)		7'-2	7'-2	5'-8	5'-8	5'-8
	"C" (FT. - IN.)		2'-3	2'-3	2'-5	2'-5	2'-5
	"D" EQUAL SPACES		5	5	3	3	3
	NO. OF PILES PER ABUT.		5	5	6	6	6
Pu, STRENGTH I DESIGN LOAD (KIPS)			136	141	126	131	135

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

**ABUTMENT NOTES:**

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

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

PLACE 5h2 BAR AT 1:6 SLOPE TO MATCH TRAFFIC SIDE OF ABUTMENT WING FACE. (BOTH SIDES TYPICAL)

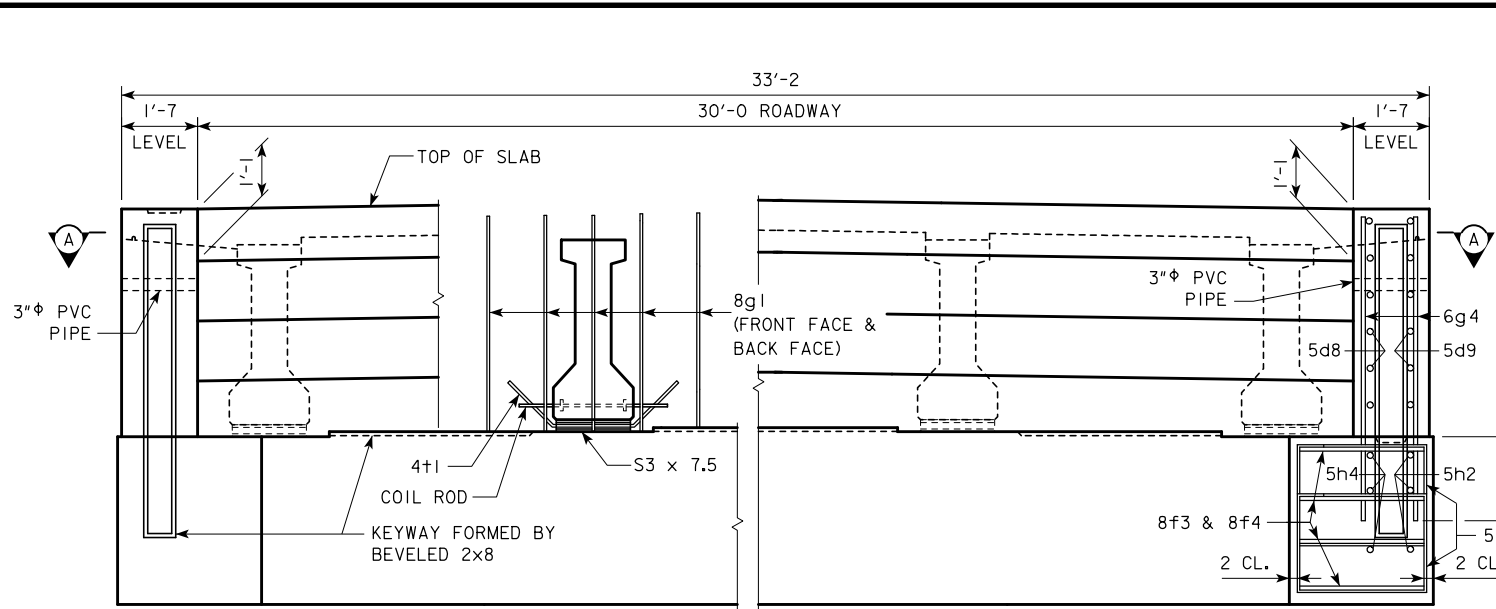
BARRIER RAIL NOT SHOWN IN DETAILS.

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

04-13 LATEST REVISION DATE  <i>Thomas L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER	
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006
	<b>ABUTMENT DETAILS</b> 0° SKEW A & B BEAMS

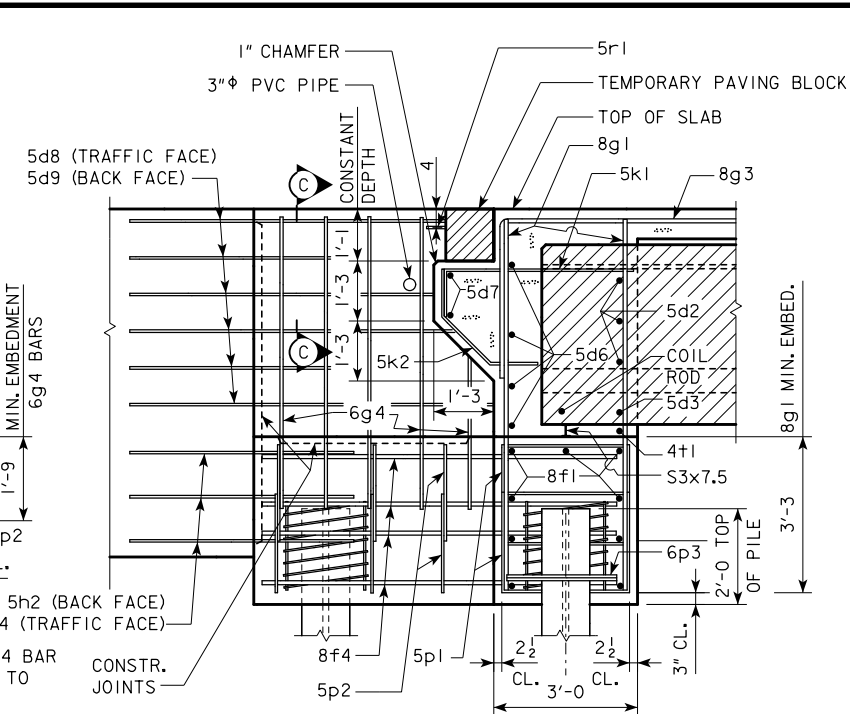
H30-05-06

REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.



**PART REAR ELEVATION AT ABUTMENT**

NOTE: TOP OF ABUTMENT SHOWN FOR SOLID BARRIER RAIL



**PART SECTION B-B**

**ABUTMENT NOTES:**

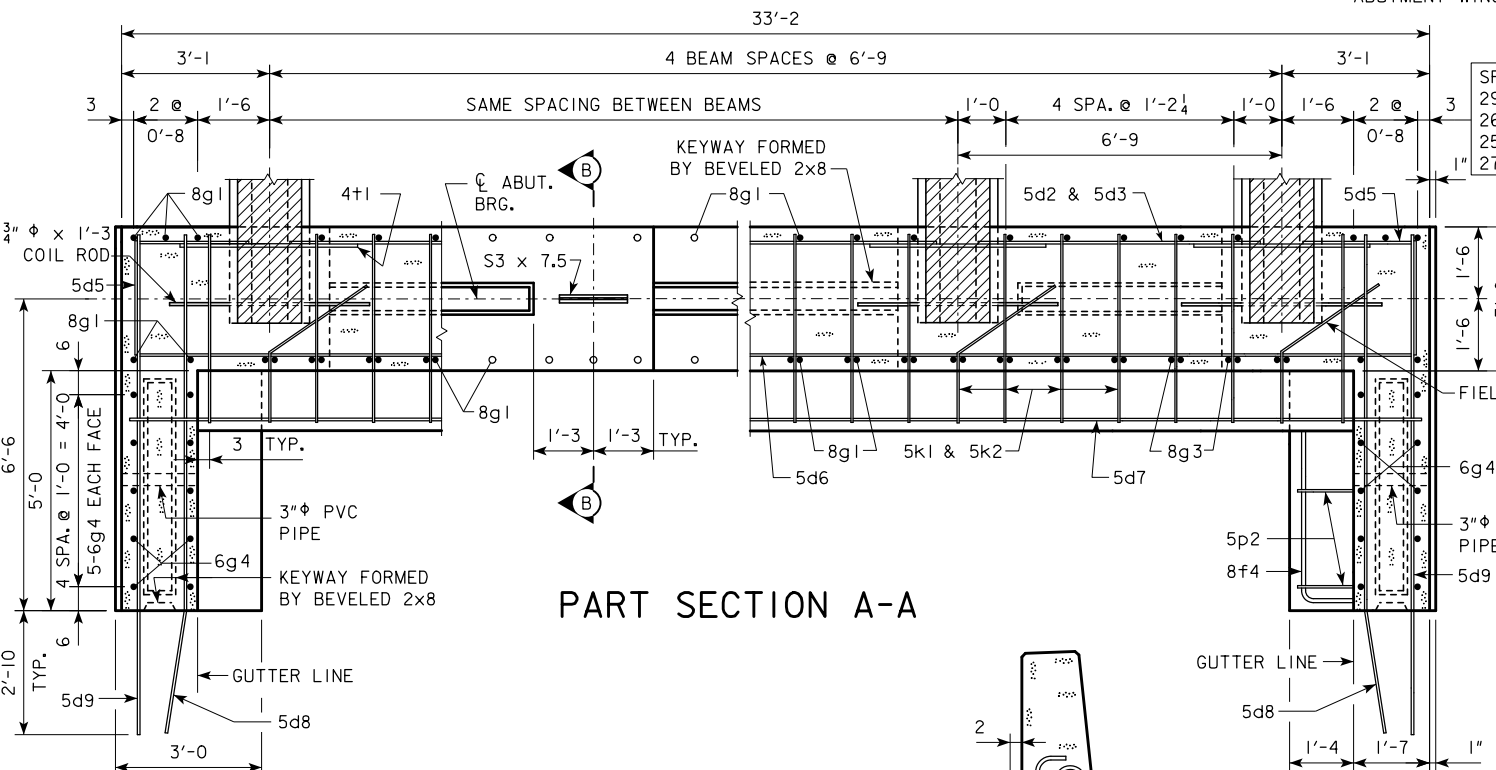
MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.

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

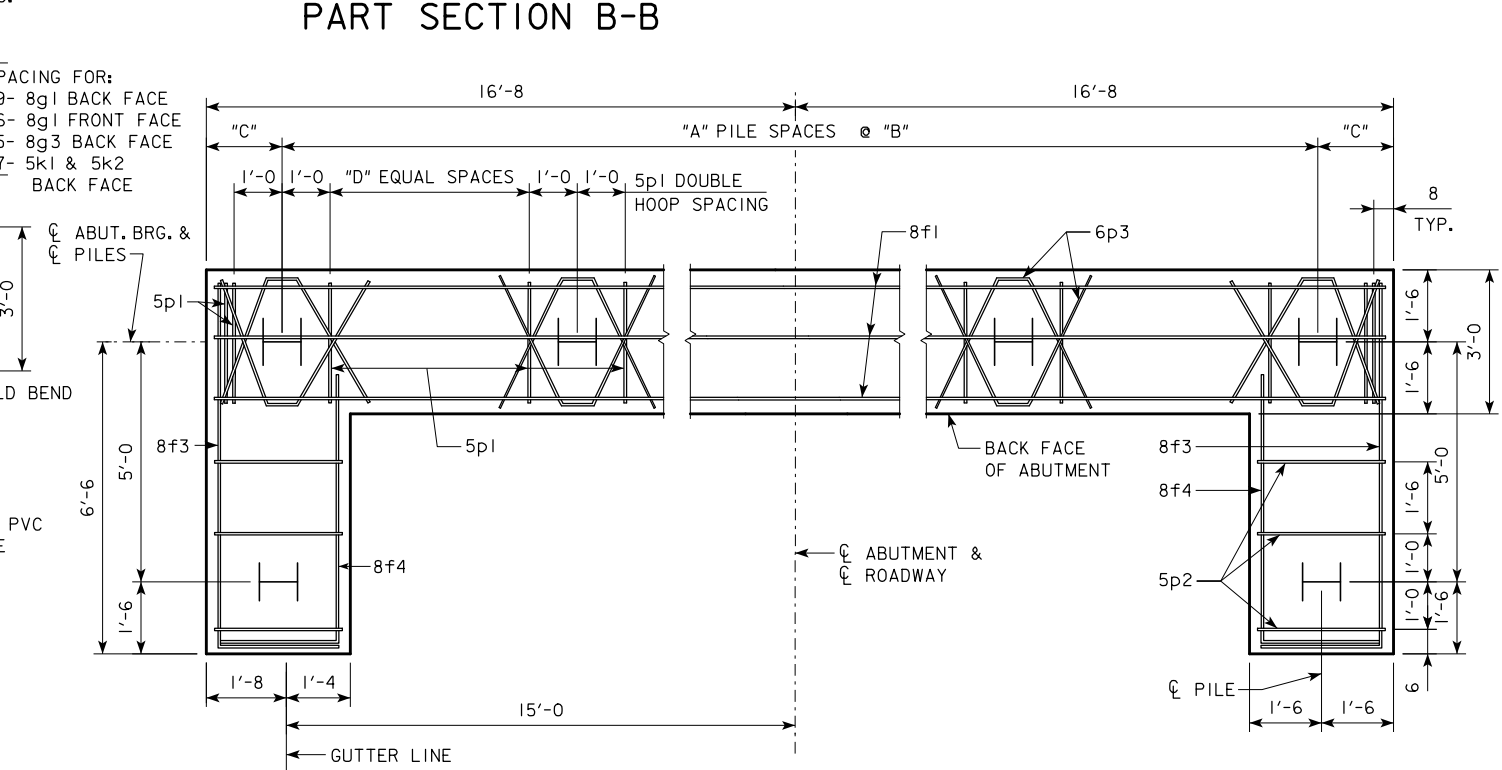
BARRIER RAIL NOT SHOWN IN DETAILS.

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

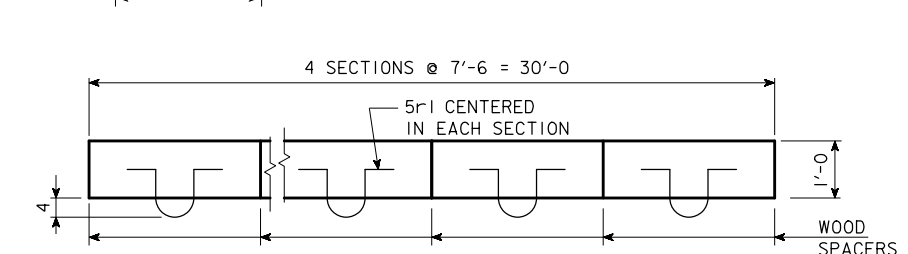
NOTE: THE SPIRAL AT THE TOP OF EACH PILE TO BE 7 TURNS OF NO. 2 BAR, 21" DIAMETER, 3" PITCH WITH 3 - L<sub>8</sub> x 7/8 x 1/8 SPACERS PUNCHED TO HOLD SPIRAL.



**PART SECTION A-A**

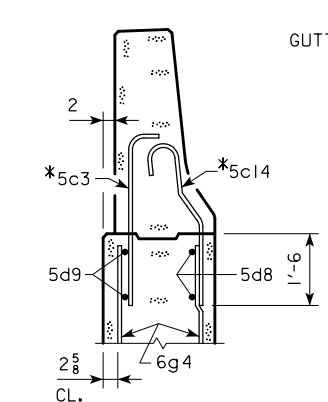


**ABUTMENT PILE PLAN**



**PLAN OF TEMPORARY PAVING BLOCK**

NOTE: LINE PAVING NOTCH WITH TAR PAPER BEFORE PLACING THE TEMPORARY PAVING BLOCK.



**PART SECTION C-C**

\* NOTE: SEE BARRIER RAIL SHEET FOR DETAILS. REINFORCING BARS 5c3 AND 5c14 ARE INCLUDED IN SUPERSTRUCTURE QUANTITIES.

ABUTMENT PILE SPACING		201'-4	213'-10	226'-4	243'-0
WITH STEEL H-PILES	"A" PILE SPACES	5	6	6	6
	"B" (FT. - IN.)	5'-9	4'-9	4'-9	4'-9
	"C" (FT. - IN.)	2'-3 1/2	2'-5	2'-5	2'-5
	"D" EQUAL SPACES	3	3	3	3
	NO. OF PILES PER ABUT.	8	9	9	9
P <sub>u</sub> , STRENGTH I DESIGN LOAD (KIPS)		143	126	130	138

NOTE: P<sub>u</sub>, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

04-13  
LATEST REVISION DATE

*Thomas L. Mc Donald*  
APPROVED BY BRIDGE ENGINEER

STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES

**PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES**

DECEMBER, 2006

**ABUTMENT DETAILS**  
0° SKEW C BEAMS

**H30-06-06**

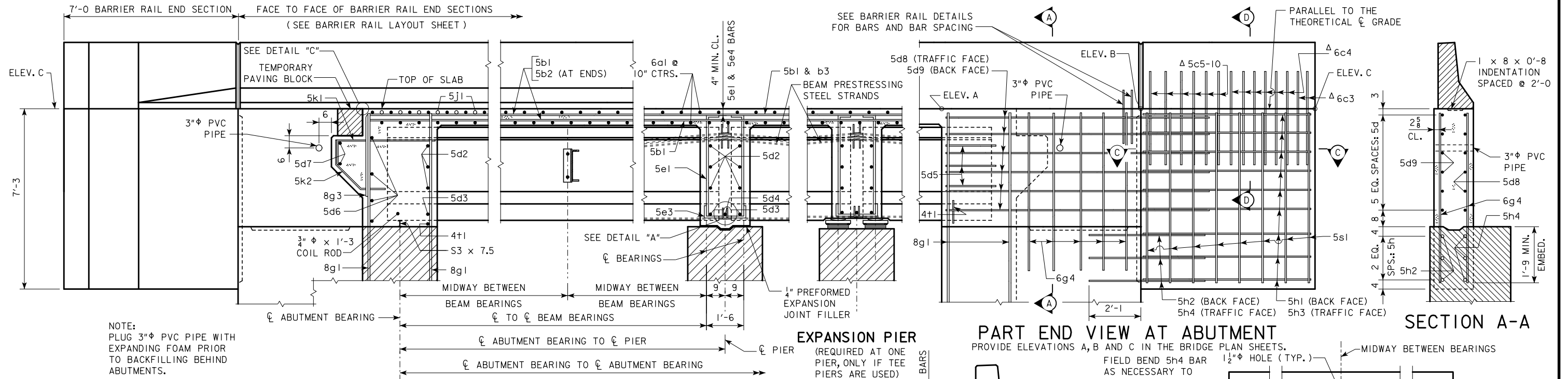
REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.



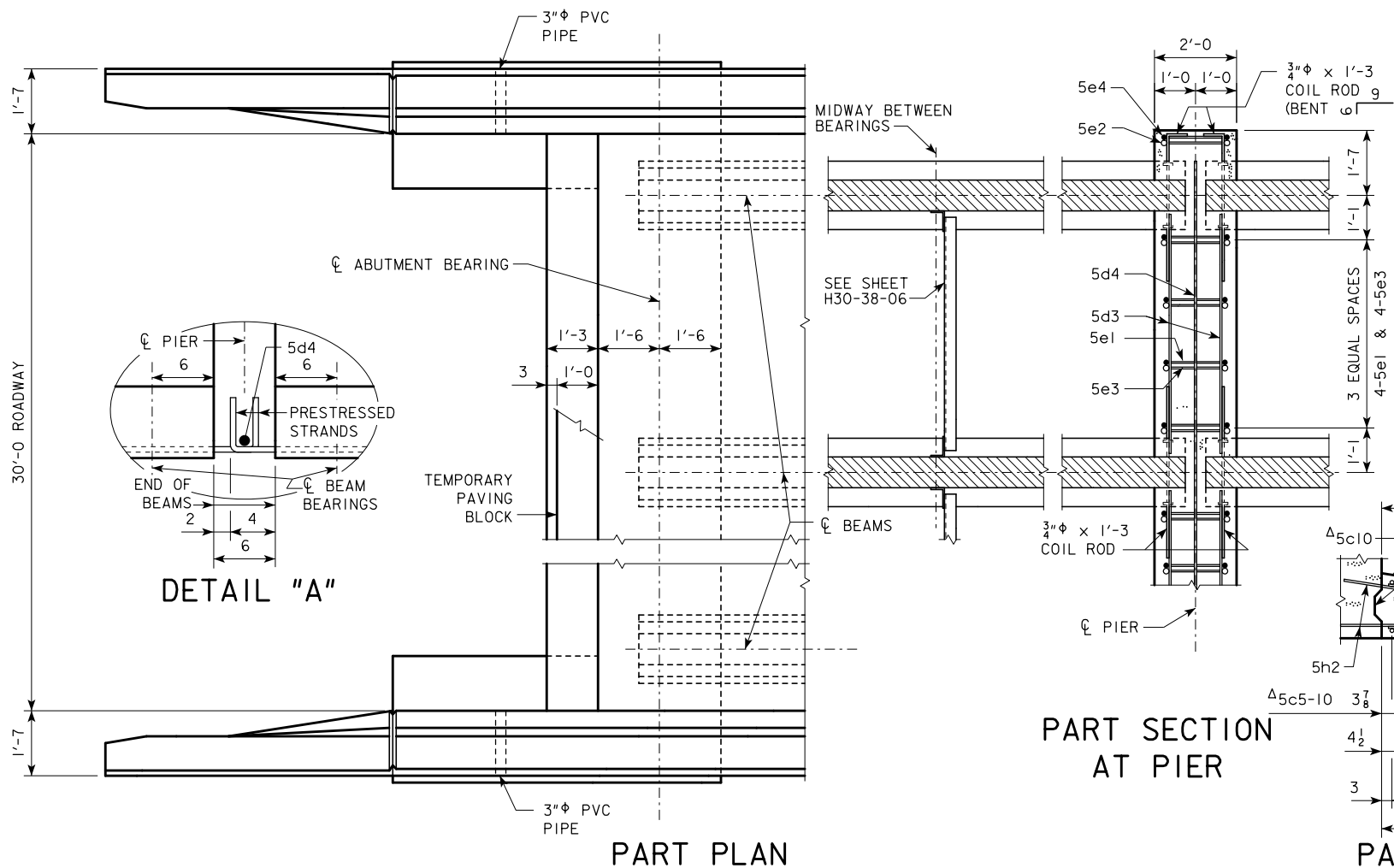




NOTE: BRIDGE IS SYMMETRICAL ABOUT  $\bar{C}$



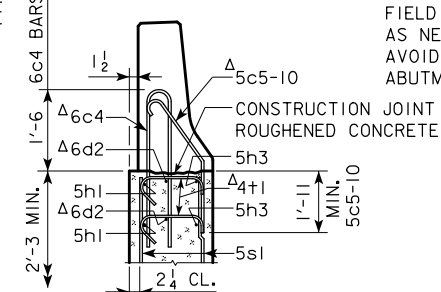
**ABUTMENT PART LONGITUDINAL SECTION NEAR GUTTER**  
(FOR DETAILS OF INTERMEDIATE DIAPHRAGM SEE SHEET H30-38-06)



**PART PLAN**

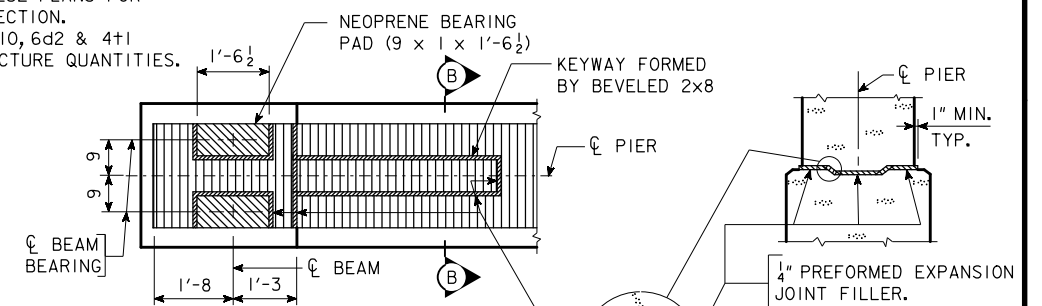
**EXPANSION PIER**  
(REQUIRED AT ONE PIER, ONLY IF TEE PIERS ARE USED)

**PART END VIEW AT ABUTMENT**  
PROVIDE ELEVATIONS A, B AND C IN THE BRIDGE PLAN SHEETS.

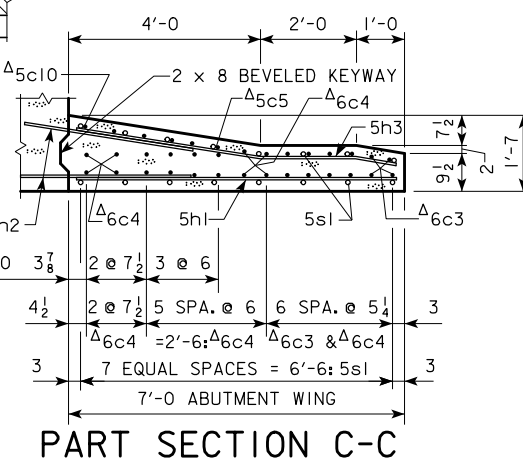


**SECTION D-D**

**LOCATION OF BEAM COIL TIES AND STEEL DIAPHRAGM BOLT HOLES**



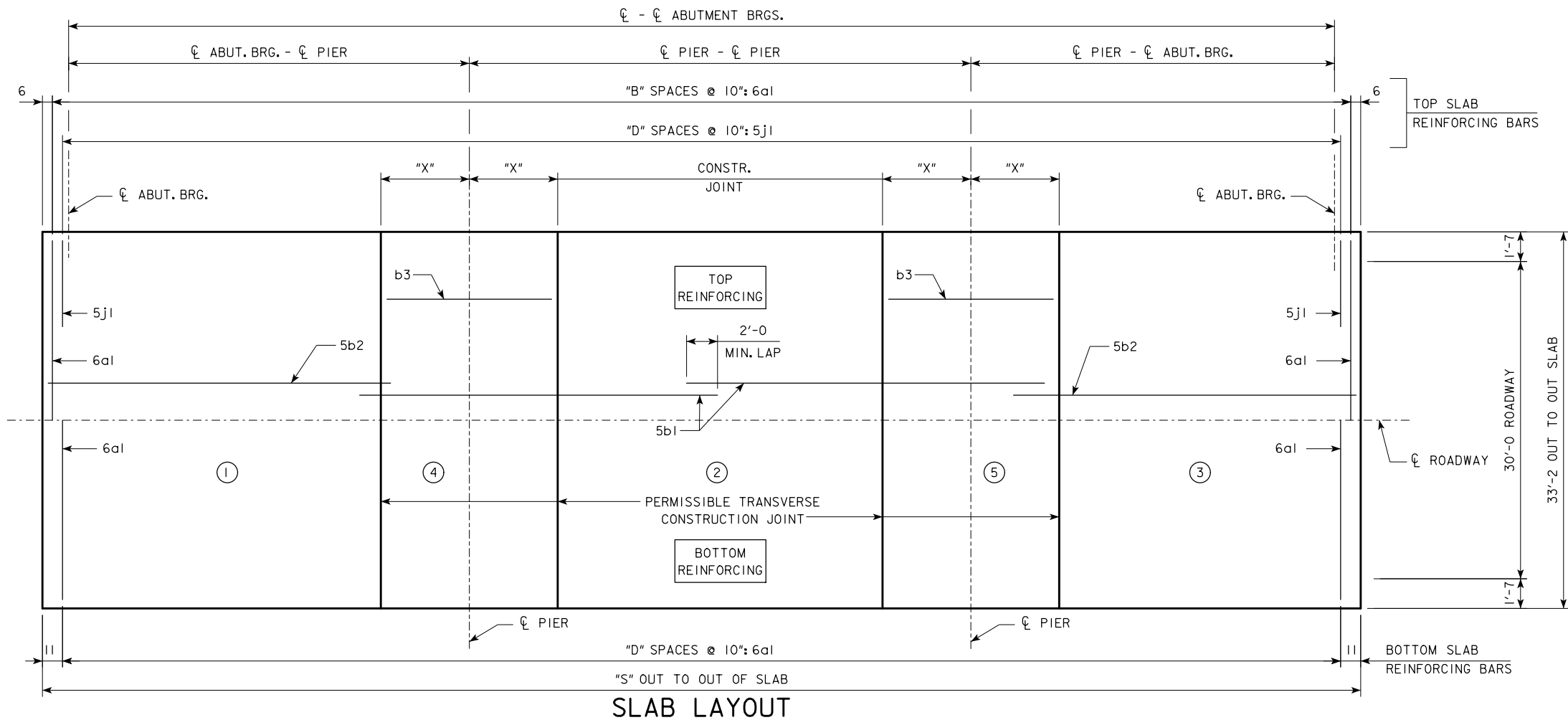
**SECTION B-B**  
NOTE: SEE SHEET H30-44-06 FOR EXPANSION PIER BEARING DETAILS



**PART SECTION C-C**

LATEST REVISION DATE 01-12 APPROVED BY BRIDGE ENGINEER <i>Harmon L. Mc Donald</i>		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
	<b>LONGITUDINAL SECTION</b> 0° SKEW C BEAMS	<b>H30-08-06</b>

REVISED 07-2015 - CHANGED CONCRETE PLACEMENT NOTE TO ACCOUNT FOR THE POSSIBLE ADDITION OF A RETARDING ADMIXTURE TO THE CONCRETE.



ESTIMATED QUANTITIES (SUPERSTRUCTURE PLUS INTEGRAL ABUTMENTS)		CL-CL ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
STRUCTURAL CONCRETE SUPERSTRUCTURE (INCLUDES ABUTMENT WINGS, PAV. BLOCKS)	WITH BARRIER RAIL	C.Y.	168.1	178.8	196.1	206.8	217.5	239.0	249.7	261.0	275.8
	WITH OPEN RAIL	C.Y.	170.6	181.5	199.1	210.0	221.0	242.5	253.4	265.0	280.0
STRUCTURAL CONCRETE ABUTMENTS (w/ WOOD PILES)		C.Y.	25.3	25.2	25.2	25.1	25.1	-----	-----	-----	-----
STRUCTURAL CONCRETE ABUTMENTS (w/ STEEL H PILES)		C.Y.	26.6	26.6	26.6	26.6	26.6	34.4	34.4	34.4	34.4
PRETENSIONED PRESTRESSED CONCRETE BEAM, CENTER SPAN		NO.	5-A50	5-A55	5-B59	5-B63	5-B67	5-C71	5-C75	5-C80	5-C80
PRETENSIONED PRESTRESSED CONCRETE BEAM, END SPAN		NO.	10-A42	10-A46	10-B50	10-B55	10-B59	10-C63	10-C67	10-C71	10-C80
CONCRETE RAIL (BARRIER OR OPEN)		L.F.	311.7	336.7	361.7	386.7	411.7	456.7	481.7	506.7	540.0
STRUCTURAL STEEL (w/ PILE BENT PIERS & DRAINS)		LB.	3829	3829	3917	3917	3917	3912	3912	3912	3912
STRUCTURAL STEEL (w/ PILE BENT PIERS & NO DRAINS)		LB.	3149	3149	3149	3149	3149	3064	3064	3064	3064
STRUCTURAL STEEL (w/ TEE PIERS & DRAINS)		LB.	4725	4725	4813	4813	4813	4970	4970	4970	4970
STRUCTURAL STEEL (w/ TEE PIERS & NO DRAINS)		LB.	4045	4045	4045	4045	4045	4122	4122	4122	4122
REINFORCING STEEL (w/ WOOD PILES & BARRIER RAIL)		LB.	50,098	53,542	57,274	61,247	64,670	-----	-----	-----	-----
REINFORCING STEEL (w/ WOOD PILES & OPEN RAIL)		LB.	50,763	54,163	58,042	62,191	65,544	-----	-----	-----	-----
REINFORCING STEEL (w/ STEEL H PILES & BARRIER RAIL)		LB.	50,150	53,487	57,064	60,928	64,351	70,789	75,170	78,589	83,064
REINFORCING STEEL (w/ STEEL H PILES & OPEN RAIL)		LB.	50,815	54,108	57,832	61,872	65,225	72,420	76,710	80,326	84,847
NO. OF WOOD PILES, TREATED FOR TWO ABUTMENTS		NO.	22	24	24	26	26	-----	-----	-----	-----
NO. OF STEEL H-PILES FOR TWO ABUTMENTS (HP 10 x 57)		NO.	10	10	12	12	12	16	18	18	18
PREBORED HOLES (w/ WOOD PILES)		L.F.	220	240	240	260	260	-----	-----	-----	-----
PREBORED HOLES (w/ STEEL H-PILES)		L.F.	100	100	120	120	120	160	180	180	180

CONCRETE PLACEMENT QUANT.		CL-CL ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
SLAB INCLUDING HAUNCH, ABUT. DIAPHRAGM, & WINGWALLS**, SECTIONS 1 & 3	WITH BARRIER RAIL	C.Y.	90.8	97.0	107.2	113.4	119.6	134.2	140.6	147.2	162.0
	WITH OPEN RAIL	C.Y.	92.1	98.4	108.8	115.1	121.5	136.1	142.6	149.4	164.4
SLAB INCLUDING HAUNCH, SECTION 2	WITH BARRIER RAIL	C.Y.	33.5	36.2	38.9	41.6	44.1	47.0	49.7	52.4	52.4
	WITH OPEN RAIL	C.Y.	34.2	37.0	39.7	42.5	45.1	48.0	50.7	53.5	53.5
SLAB INCLUDING HAUNCH & PIER DIAPHRAGM, SECTIONS 4 & 5	WITH BARRIER RAIL	C.Y.	34.2	36.0	40.0	41.8	43.8	47.0	48.6	50.6	50.6
	WITH OPEN RAIL	C.Y.	34.7	36.5	40.6	42.4	44.4	47.6	49.3	51.3	51.3
PAVING BLOCKS		C.Y.	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
ABUTMENT WINGS		C.Y.	7.2	7.2	7.6	7.6	7.6	8.4	8.4	8.4	8.4
ABUTMENT FOOTINGS (w/ WOOD PILES)		C.Y.	25.3	25.2	25.2	25.1	25.1	-----	-----	-----	-----
ABUTMENT FOOTINGS (w/ STEEL H PILES)		C.Y.	26.6	26.6	26.6	26.6	26.6	34.4	34.4	34.4	34.4

GENERAL DATA		CL-CL ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
VERTICAL CURVE	TOP OF SLAB TO ABUT. CONSTR. JT. AT C.L. ABUT. BRG.	"U"	3'-7 <sup>15</sup> / <sub>16</sub>	3'-7 <sup>3</sup> / <sub>4</sub>	4'-2 <sup>13</sup> / <sub>16</sub>	4'-2 <sup>13</sup> / <sub>16</sub>	4'-3	4'-8 <sup>1</sup> / <sub>2</sub>	4'-8 <sup>11</sup> / <sub>16</sub>	4'-9	4'-9 <sup>7</sup> / <sub>16</sub>
	TOP OF SLAB TO PIER TOP AT C.L. PIER*	"U"	3'-6 <sup>7</sup> / <sub>16</sub>	3'-6 <sup>5</sup> / <sub>8</sub>	4'-1 <sup>3</sup> / <sub>8</sub>	4'-1 <sup>5</sup> / <sub>8</sub>	4'-1 <sup>15</sup> / <sub>16</sub>	4'-7 <sup>5</sup> / <sub>16</sub>	4'-7 <sup>5</sup> / <sub>16</sub>	4'-7 <sup>9</sup> / <sub>16</sub>	4'-7 <sup>9</sup> / <sub>16</sub>
STRAIGHT GRADE	TOP OF SLAB TO ABUT. CONSTR. JT. AT C.L. ABUT. BRG.	"U"	3'-8 <sup>1</sup> / <sub>16</sub>	3'-7 <sup>7</sup> / <sub>8</sub>	4'-2 <sup>15</sup> / <sub>16</sub>	4'-2 <sup>15</sup> / <sub>16</sub>	4'-3 <sup>1</sup> / <sub>16</sub>	4'-8 <sup>11</sup> / <sub>16</sub>	4'-8 <sup>15</sup> / <sub>16</sub>	4'-9 <sup>3</sup> / <sub>8</sub>	4'-10
	TOP OF SLAB TO PIER TOP AT C.L. PIER*	"U"	3'-6 <sup>5</sup> / <sub>8</sub>	3'-6 <sup>7</sup> / <sub>8</sub>	4'-1 <sup>11</sup> / <sub>16</sub>	4'-1 <sup>15</sup> / <sub>16</sub>	4'-2 <sup>5</sup> / <sub>16</sub>	4'-7 <sup>15</sup> / <sub>16</sub>	4'-7 <sup>3</sup> / <sub>4</sub>	4'-8 <sup>1</sup> / <sub>16</sub>	4'-8 <sup>1</sup> / <sub>16</sub>
D.L. PIER REACTION (D.L. + F.W.S.) SERVICE LOADS	KIPS		345.7	373.7	426.8	456.3	485.9	583.8	617.0	650.6	683.4
L.L. PIER REACTION (HL93) NO IMPACT SERVICE LOADS	KIPS		207.6	215.3	222.7	229.9	237.0	244.0	253.2	268.2	284.4
NO. OF SPACES FOR 6a1 BARS (TOP)	"B"		169	184	199	214	229	244	259	274	294
NO. OF SPACES FOR 6a1 BARS (BOTTOM) AND 5j1 BARS (TOP)	"D"		168	183	198	213	228	243	258	273	293
OUT TO OUT OF SLAB	"S"		141'-10	154'-4	166'-10	179'-4	191'-10	204'-4	216'-10	229'-4	246'-0
SLAB TRANSVERSE CONSTR. JT. DISTANCE FROM C.L. PIER	"X"		6'-7	7'-1	7'-7	8'-1	8'-8	9'-2	9'-8	10'-2	10'-2

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

\* VALUES SHOWN ARE FOR FIXED PIERS ONLY AND ALLOW FOR 1/16 INCH DEFLECTION OF THE 1 INCH NEOPRENE BEARING PAD. AT EXPANSION PIER LOCATIONS ADD 3/16 INCHES TO "U" VALUES SHOWN.

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

LATEST REVISION DATE

07-15  
Approved by BRIDGE ENGINEER  
*Thomas L. Mc Donald*

STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES

## PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

DECEMBER, 2006

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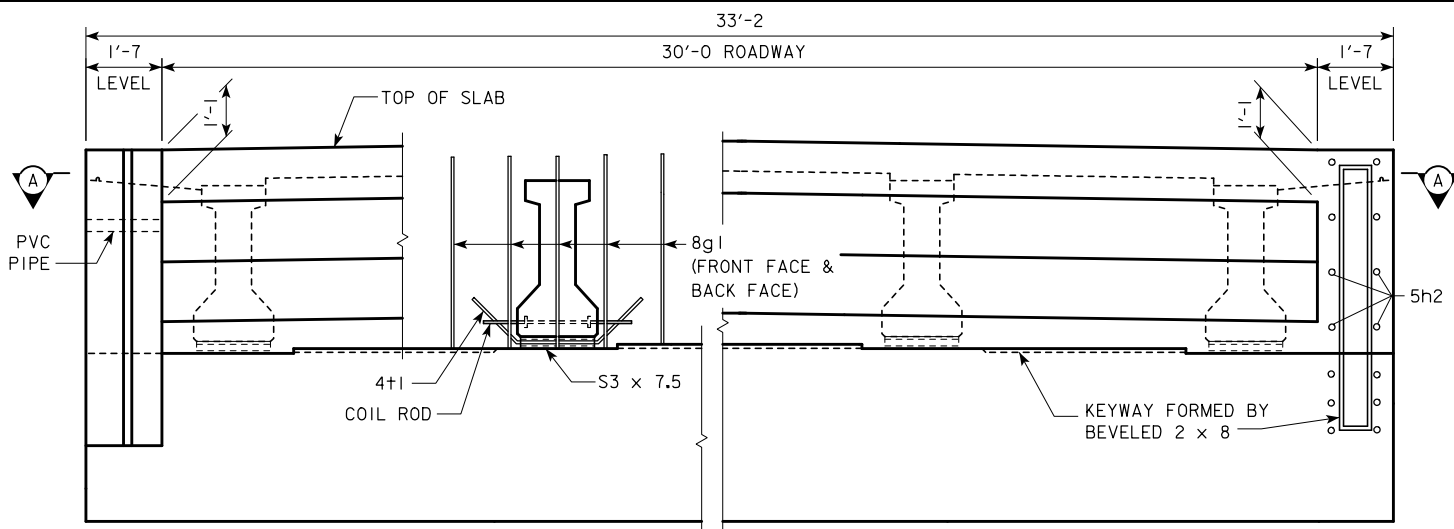
**SUPERSTRUCTURE DETAILS**      **H30-09-06**

0° SKEW

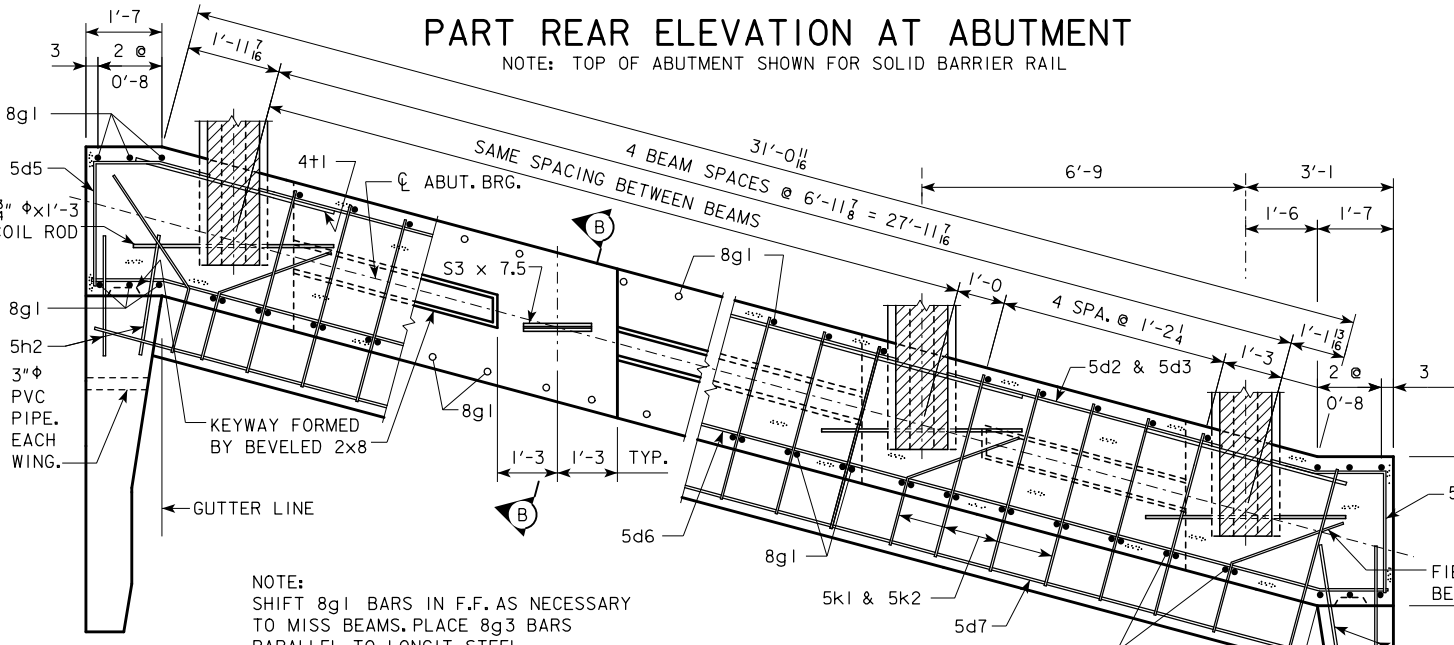
REVISED 05-11 - CORRECTED THE OPEN RAIL REBAR QUANTITIES FOR THE 201'-4, 231'-10, 226'-4, & 243'-0 BRIDGE LENGTHS.

REINFORCING BAR LIST			138'-10			151'-4			163'-10			176'-4			188'-10			201'-4			213'-10			226'-4			243'-0		
ONE SUPERSTRUCTURE AND TWO ABUTMENTS			42'-6			46'-8			50'-10			55'-0			59'-2			63'-4			67'-6			71'-8			80'-0		
			A BEAM			A BEAM			B BEAM			B BEAM			B BEAM			C BEAM			C BEAM			C BEAM			C BEAM		
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT
6a1	SLAB TRANSV. TOP & BOTT.	—	339	32'-10	16,718	369	32'-10	18,197	399	32'-10	19,677	429	32'-10	21,156	459	32'-10	22,636	489	32'-10	24,115	519	32'-10	25,595	549	32'-10	27,074	589	32'-10	29,047
5b1	SLAB LONGITUDINAL, TOP & BOTT.	—	152	40'-0	6,341	152	40'-0	6,341	228	40'-0	9,512	228	40'-0	9,512	228	40'-0	9,512	304	40'-0	12,683	304	40'-0	12,683	304	40'-0	12,683	380	40'-0	15,854
5b2	SLAB LONGITUDINAL, TOP & BOTT., ENDS	—	152	33'-9	5,351	152	40'-0	6,341	152	27'-3	4,320	152	33'-6	5,311	152	39'-9	6,302	152	27'-0	4,280	152	33'-3	5,271	152	39'-6	6,262	152	28'-10	4,571
6b3	SLAB LONGITUDINAL, TOP @ PIERS	—	66	12'-10	1,272	66	13'-10	1,371	66	14'-10	1,470	66	15'-10	2,136	66	17'-0	2,293	66	18'-0	2,428	66	19'-0	3,348	66	20'-0	3,524	66	20'-0	3,524
7b3	SLAB LONGITUDINAL, TOP @ PIERS	—	66	12'-10	1,272	66	13'-10	1,371	66	14'-10	1,470	66	15'-10	2,136	66	17'-0	2,293	66	18'-0	2,428	66	19'-0	3,348	66	20'-0	3,524	66	20'-0	3,524
8b3	SLAB LONGITUDINAL, TOP @ PIERS	—	66	12'-10	1,272	66	13'-10	1,371	66	14'-10	1,470	66	15'-10	2,136	66	17'-0	2,293	66	18'-0	2,428	66	19'-0	3,348	66	20'-0	3,524	66	20'-0	3,524
5d1	PIER DIAPH. ENDS	—	12	3'-6	44	12	3'-6	44	12	3'-6	44	12	3'-6	44	12	3'-6	44	12	3'-6	44	12	3'-6	44	12	3'-6	44	12	3'-6	44
5d2	PIER & ABUT. DIAPH. LONGIT.	—	72	6'-1	457	72	6'-1	457	72	6'-1	457	72	6'-1	457	72	6'-1	457	72	5'-10	438	72	5'-10	438	72	5'-10	438	72	5'-10	438
5d3	PIER & ABUT. DIAPH. LONGIT.	—	24	5'-2	129	24	5'-2	129	24	5'-2	129	24	5'-2	129	24	5'-2	129	24	4'-11	123	24	4'-11	123	24	4'-11	123	24	4'-11	123
5d4	PIER DIAPH. LONGIT.	—	2	29'-9	62	2	29'-9	62	2	29'-9	62	2	29'-9	62	2	29'-9	62	2	29'-9	62	2	29'-9	62	2	29'-9	62	2	29'-9	62
5d5	ABUT. DIAPH. ENDS	—	12	5'-0	63	12	5'-0	63	12	5'-0	63	12	5'-0	63	12	5'-0	63	12	5'-0	63	12	5'-0	63	12	5'-0	63	12	5'-0	63
5d6	ABUT. DIAPH. LONGIT. B.F.	—	8	32'-9	273	8	32'-9	273	8	32'-9	273	8	32'-9	273	8	32'-9	273	8	32'-9	273	8	32'-9	273	8	32'-9	273	8	32'-9	273
5d7	PAVING NOTCH LONGIT.	—	4	32'-9	137	4	32'-9	137	4	32'-9	137	4	32'-9	137	4	32'-9	137	4	32'-9	137	4	32'-9	137	4	32'-9	137	4	32'-9	137
5d8	ABUT. DIAPH. WING EXT. LONGIT.	—	24	10'-9	269	24	10'-9	269	24	10'-9	269	24	10'-9	269	24	10'-9	269	24	10'-9	269	24	10'-9	269	24	10'-9	269	24	10'-9	269
5d9	ABUT. DIAPH. WING EXT. LONGIT.	—	24	10'-8	267	24	10'-8	267	24	10'-8	267	24	10'-8	267	24	10'-8	267	24	10'-8	267	24	10'-8	267	24	10'-8	267	24	10'-8	267
5e1	PIER DIAPH. HOOPS	—	32	8'-5	281	32	8'-5	281	32	9'-8	323	32	9'-8	323	32	9'-8	323	32	10'-8	356	32	10'-8	356	32	10'-8	356	32	10'-8	356
5e2	PIER DIAPH. TIES ENDS	—	4	2'-7	11	4	2'-7	11	4	2'-7	11	4	2'-7	11	4	2'-7	11	4	2'-7	11	4	2'-7	11	4	2'-7	11	4	2'-7	11
5e3	PIER DIAPH. TIES	—	32	2'-9	92	32	2'-9	92	32	2'-9	92	32	2'-9	92	32	2'-9	92	32	2'-9	92	32	2'-9	92	32	2'-9	92	32	2'-9	92
5e4	PIER DIAPH. HOOPS ENDS	—	4	8'-3	34	4	8'-3	34	4	9'-6	40	4	9'-6	40	4	9'-6	40	4	10'-6	44	4	10'-6	44	4	10'-6	44	4	10'-6	44
8f1	ABUT. FOOTING LONGIT.	—	18	32'-10	1,578	18	32'-10	1,578	18	32'-10	1,578	18	32'-10	1,578	18	32'-10	1,578	18	33'-0	1,586	18	33'-0	1,586	18	33'-0	1,586	18	33'-0	1,586
8f3	ABUT. EXTENSION LONGIT.	—	16	10'-1	431	16	10'-1	431	16	10'-1	431	16	10'-1	431	16	10'-1	431	16	10'-1	431	16	10'-1	431	16	10'-1	431	16	10'-1	431
8f4	ABUT. EXTENSION LONGIT.	—	16	8'-6	363	16	8'-6	363	16	8'-6	363	16	8'-6	363	16	8'-6	363	16	8'-6	363	16	8'-6	363	16	8'-6	363	16	8'-6	363
8g1	ABUT. VERT.	—	114	6'-8	2,029	114	6'-8	2,029	114	7'-3	2,207	114	7'-3	2,207	114	7'-3	2,207	110	7'-9	2,276	110	7'-9	2,276	110	7'-9	2,276	110	7'-10	2,301
8g3	ABUT. DIAPH. VERT. B.F.	—	50	15'-3	2,036	50	15'-3	2,036	50	15'-3	2,036	50	15'-3	2,036	50	15'-3	2,036	50	15'-9	2,103	50	15'-9	2,103	50	15'-9	2,103	50	15'-9	2,103
6g4	ABUT. DIAPH. WING EXT. VERT.	—	40	6'-6	391	40	6'-6	391	40	6'-7	396	40	6'-7	396	40	6'-7	396	40	6'-6	391	40	6'-6	391	40	6'-6	391	40	6'-7	396
5h1	ABUT. WING HORIZ. B.F.	—	28	6'-8	195	28	6'-8	195	28	6'-8	195	28	6'-8	195	28	6'-8	195	36	6'-8	250	36	6'-8	250	36	6'-8	250	36	6'-8	250
5h2	ABUT. TO WING ANCHOR	—	56	4'-11	287	56	4'-11	287	56	4'-11	287	56	4'-11	287	56	4'-11	287	12	4'-11	62	12	4'-11	62	12	4'-11	62	12	4'-11	62
5h3	ABUT. WING HORIZ. TRAFFIC FACE	—	28	6'-9	197	28	6'-9	197	28	6'-9	197	28	6'-9	197	28	6'-9	197	36	6'-9	253	36	6'-9	253	36	6'-9	253	36	6'-9	253
5h4	ABUT. TO WING ANCHOR	—	12	4'-11	62	12	4'-11	62	12	4'-11	62	12	4'-11	62	12	4'-11	62	12	4'-11	62	12	4'-11	62	12	4'-11	62	12	4'-11	62
5j1	TOP OF SLAB TRANSV. (AT RAIL)	—	338	6'-3	2,203	368	6'-3	2,399	398	6'-3	2,594	428	6'-3	2,790	458	6'-3	2,986	488	6'-3	3,181	518	6'-3	3,377	548	6'-3	3,572	588	6'-3	3,833
5k1	PAVING NOTCH	—	54	4'-9	268	54	4'-9	268	54	4'-9	268	54	4'-9	268	54	4'-9	268	54	4'-9	268	54	4'-9	268	54	4'-9	268	54	4'-9	268
5k2	PAVING NOTCH	—	54	3'-5	192	54	3'-5	192	54	3'-5	192	54	3'-5	192	54	3'-5	192	54	3'-5	192	54	3'-5	192	54	3'-5	192	54	3'-5	192
5p1	ABUTMENT HOOPS (WOOD/STEEL)	—	88/104	10'-6	964/1139	96/104	10'-6	1051/1139	96/88	10'-6	1051/964	104/88	10'-6	1139/964	104/88	10'-6	1139/964	96	10'-6	1,051	112	10'-6	1,227	112	10'-6	1,227	112	10'-6	1,227
5p2	ABUTMENT HOOPS	—	24	10'-8	267	24	10'-8	267	24	10'-8	267	24	10'-8	267	24	10'-8	267	24	10'-8	267	24	10'-8	267	24	10'-8	267	24	10'-8	267
6p3	ABUT. BOTT. AT PILES	—	24	6'-8	240	28	6'-8	280	28	6'-8	280	28	6'-8	280	28	6'-8	280	28	6'-8	280	28	6'-8	280	28	6'-8	280	28	6'-8	280
5r1	PAVING BLOCK LIFTING LOOPS	—	8	2'-10	24	8	2'-10	24	8	2'-10	24	8	2'-10	24	8	2'-10	24	8	2'-10	24	8	2'-10	24	8	2'-10	24	8	2'-10	24
5s1	WING VERT.	—	64	5'-10	389	64	5'-10	389	64	6'-2	412	64	6'-2	412	64	6'-2	412	64	6'-11	462	64	6'-11	462	64	6'-11	462	64	6'-11	462
4+1	UNDER BEAMS AT ABUTMENTS	—	10	4'-6	30	10	4'-6	30	10	4'-6	30	10	4'-6	30	10	4'-6	30	10	4'-9	32	10	4'-9	32	10	4'-9	32	10	4'-9	32
#2	PILE SPIRAL (WOOD/STEEL)*	—	22/10	38'-6	141/64	24/10	38'-6	154/64	24/12	38'-6	154/77	26/12	38'-6	167/77	26/12	38'-6	167/77	16	38'-6	103	18	38'-6	116	18	38'-6	116	18	38'-6	116
	SPIRAL SPACERS, L 7/8 x 7/8 x 1/8 x 0.70 (WOOD/STL)*	—	66/30	1'-10	85/39	72/30	1'-10	92/39	72/36	1'-10	92/46	78/36	1'-10	100/46	78/36	1'-10	100/46	48	1'-10	62	54	1'-10	69	54	1'-10	69	54	1'-10	69
	*EPOXY COATING NOT REQUIRED																												
	SUB TOTAL W/ WOOD PILES**				41,883			44,																					

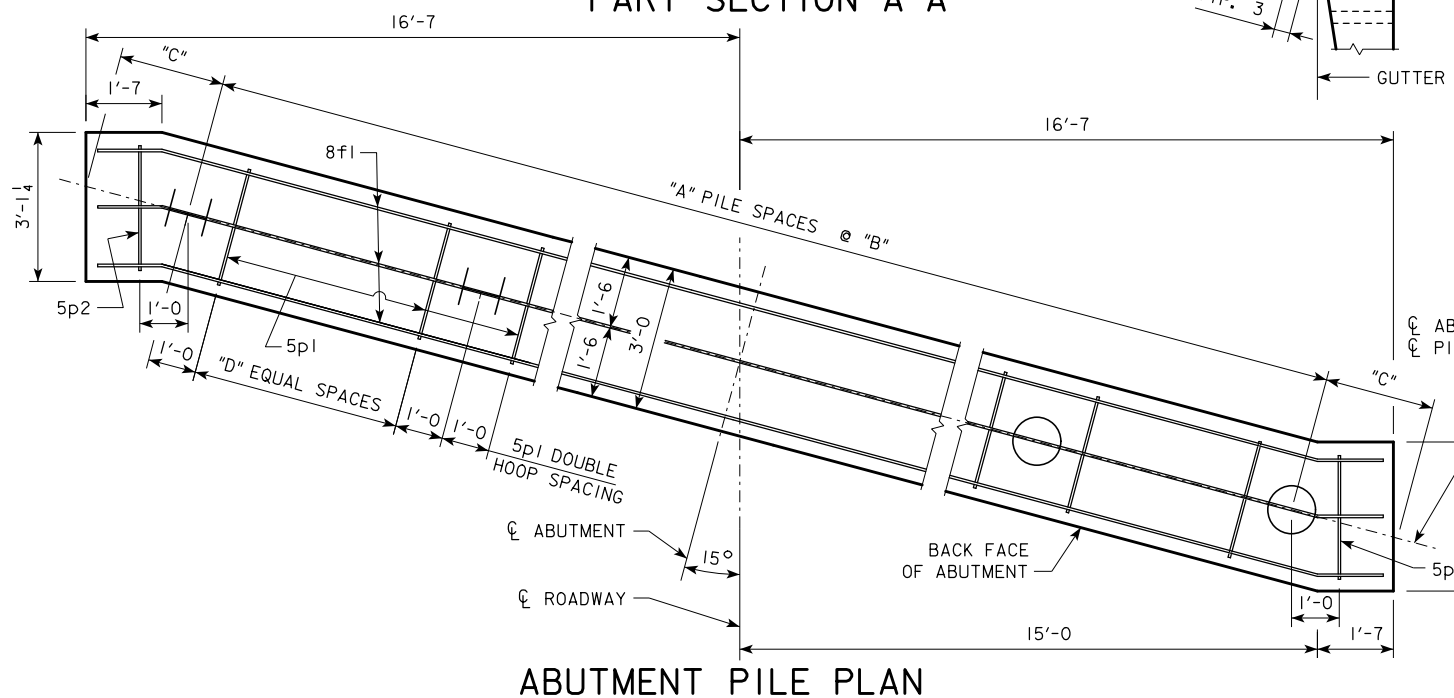




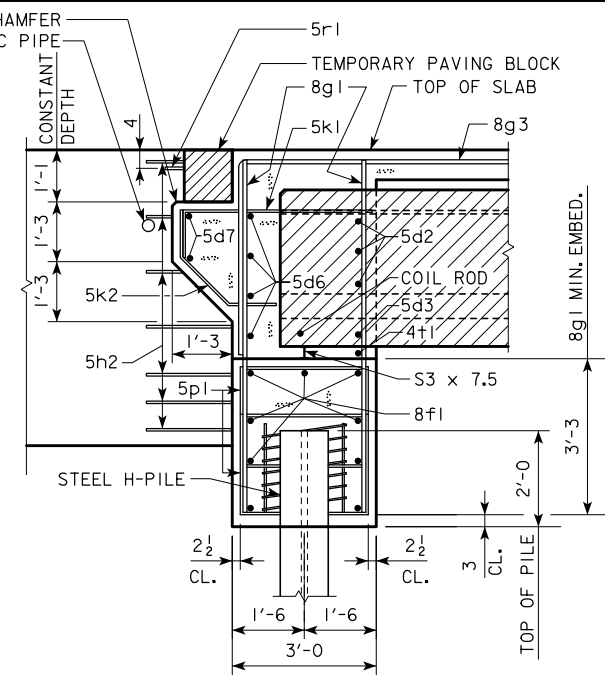
**PART REAR ELEVATION AT ABUTMENT**  
NOTE: TOP OF ABUTMENT SHOWN FOR SOLID BARRIER RAIL



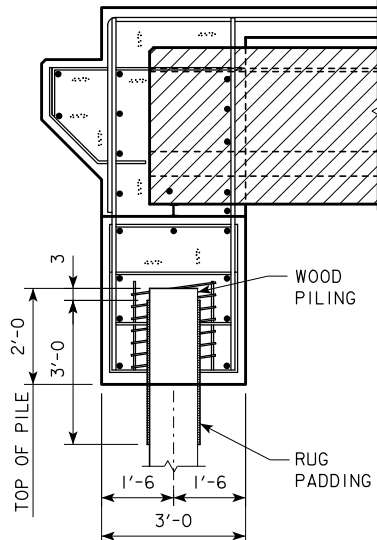
**PART SECTION A-A**



**ABUTMENT PILE PLAN**



**PART SECTION B-B (FOR STEEL H-PILING)**



**PART SECTION B-B (FOR WOOD PILING)**

**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 #14 GAUGE GALVANIZED WIRE AT A 4\"/>

(1) HAIR AND JUTE RUG PADDING, RUBBERIZED ON BOTH SIDES, AND WEIGHING NOT LESS THAN 47 OZ. PER SQ. YD.

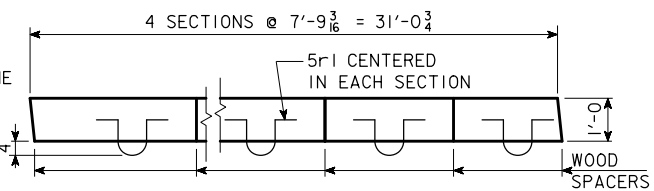
(2) BONDED URETHANE OR BONDED POLYFOAM WITH A MINIMUM DENSITY OF 5 LBS. PER CU. FT. AND SHALL BE AT LEAST 1/2 IN. THICK, (MATERIAL LESS THAN 1/2 IN. IN THICKNESS MAY BE USED, BUT WILL REQUIRE ADDITIONAL WRAPS FOR A TOTAL OF AT LEAST ONE INCH).

**NOTE:**  
THE SPIRAL AT THE TOP OF EACH PILE TO BE 7 TURNS OF NO. 2 BAR, 21\"/>

**SPACING FOR:**  
31- 8g1 BACK FACE  
26- 8g1 FRONT FACE  
25- 8g3 BACK FACE  
27- 5k1 & 5k2 BACK FACE

ABUTMENT PILE SPACING		CL-CL ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10
WITH WOOD PILES	"A" PILE SPACES		10	11	12	12	12
	"B" (FT. - IN.)		3'-1	2'-10	2'-7	2'-7	2'-7
	"C" (FT. - IN.)		1'-9	1'-7	1'-8	1'-8	1'-8
	"D" EQUAL SPACES		1	1	1	1	1
	NO. OF PILES PER ABUT.		11	12	13	13	13
Pu, STRENGTH I DESIGN LOAD (KIPS)			57	54	54	56	58
WITH STEEL H-PILES	"A" PILE SPACES		4	4	5	5	5
	"B" (FT. - IN.)		7'-5	7'-5	5'-11	5'-11	5'-11
	"C" (FT. - IN.)		2'-4	2'-4	2'-4 1/2	2'-4 1/2	2'-4 1/2
	"D" EQUAL SPACES		5	5	4	4	4
	NO. OF PILES PER ABUT.		5	5	6	6	6
Pu, STRENGTH I DESIGN LOAD (KIPS)			137	142	127	132	136

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



**PLAN OF TEMPORARY PAVING BLOCK**

**NOTE:**  
LINE PAVING NOTCH WITH TAR PAPER BEFORE PLACING THE TEMPORARY PAVING BLOCK.

**ABUTMENT NOTES:**

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2\"/>

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

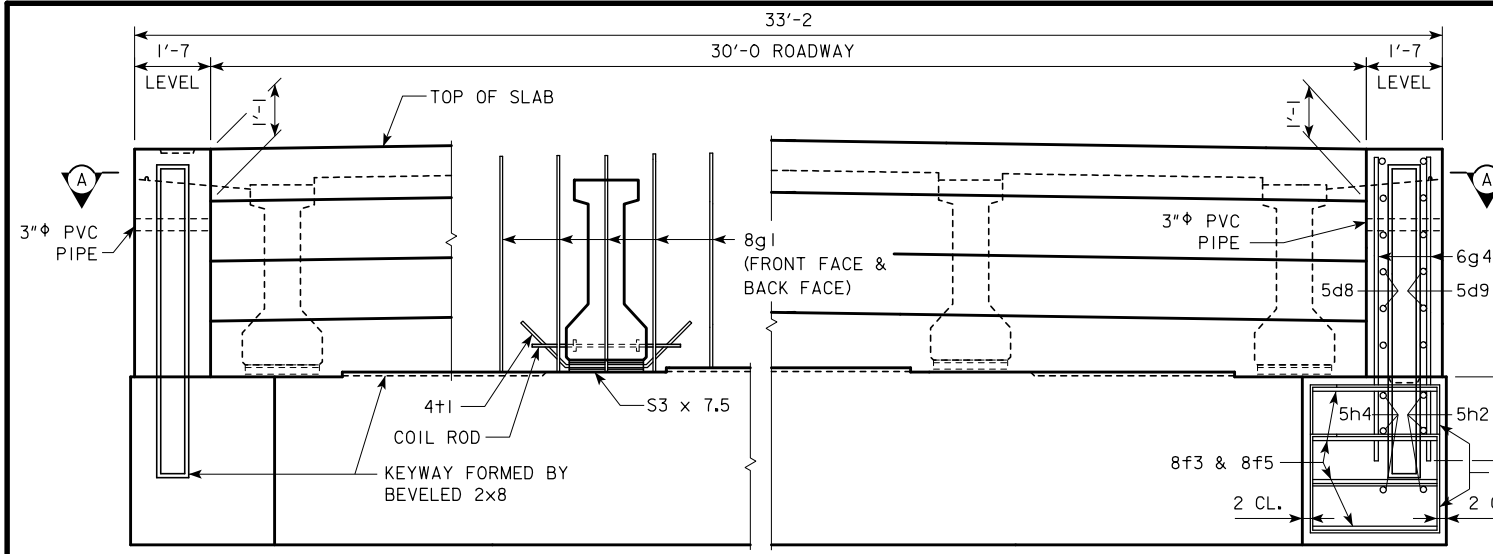
PLACE 5h2 BAR AT 1:6 SLOPE TO MATCH TRAFFIC SIDE OF ABUTMENT WING FACE. (BOTH SIDES TYPICAL)

BARRIER RAIL NOT SHOWN IN DETAILS.

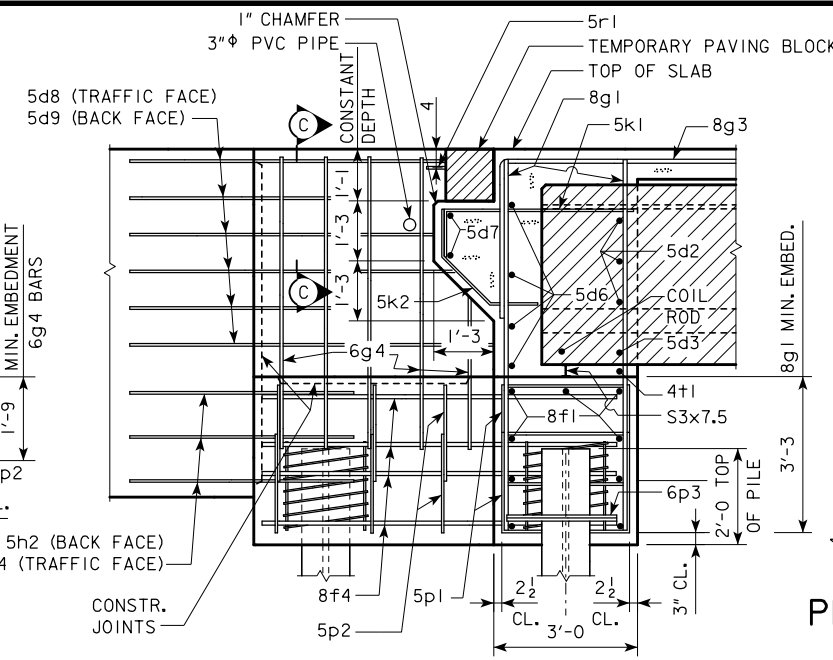
IF ROCK IS CLOSER THAN 15' BELOW ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.

REVISED 04-13 - REVISION FOR LRED PILE DESIGN.

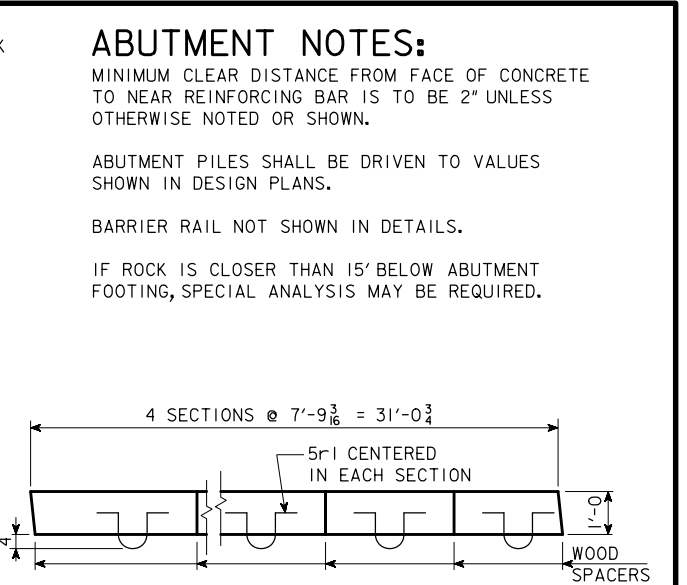
LATEST REVISION DATE 04-13  APPROVED BY BRIDGE ENGINEER <i>Norman L. Mc Donald</i>	
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006
	<div style="text-align: center;"> <b>ABUTMENT DETAILS</b> 15° SKEW A &amp; B BEAMS         </div> <div style="text-align: center;"> <b>H30-11-06</b> </div>



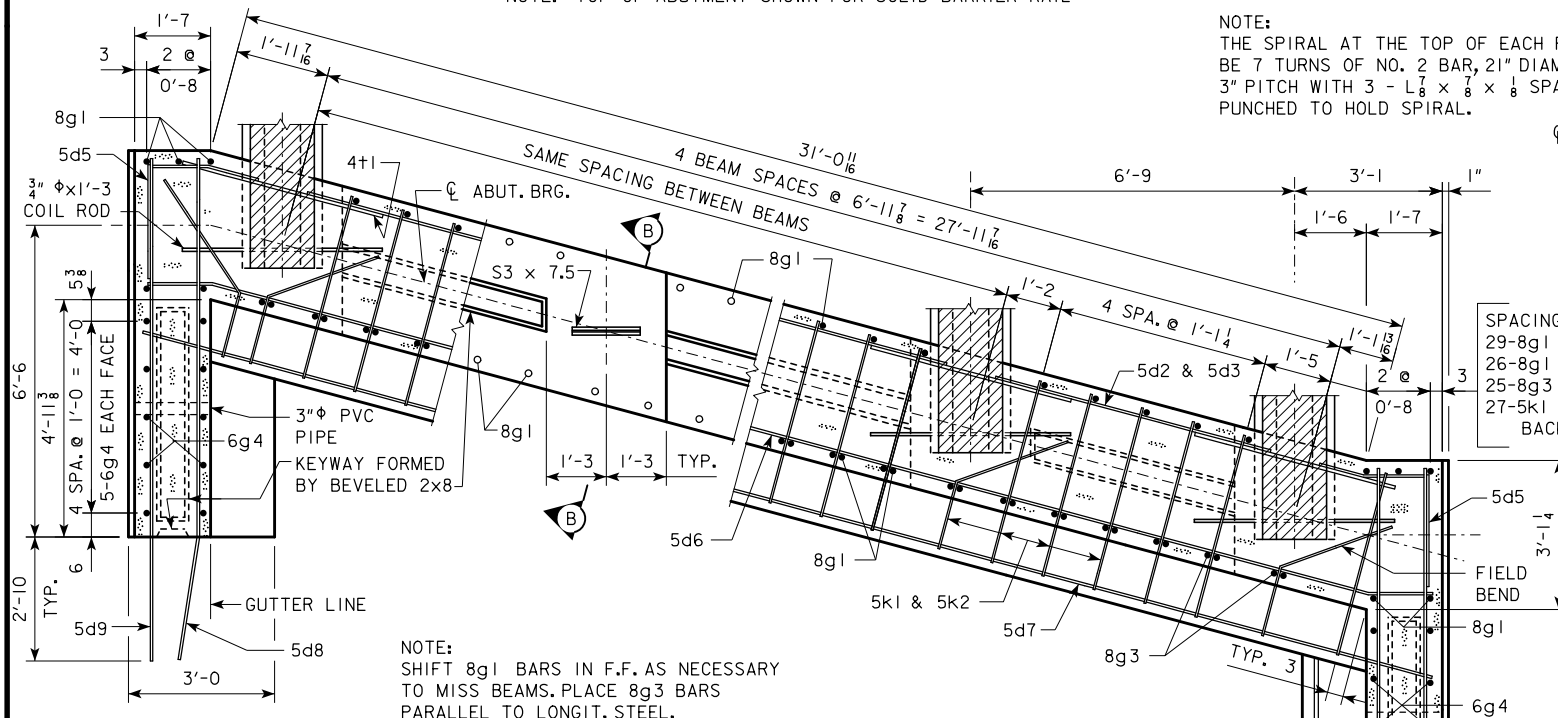
**PART REAR ELEVATION AT ABUTMENT**  
NOTE: TOP OF ABUTMENT SHOWN FOR SOLID BARRIER RAIL



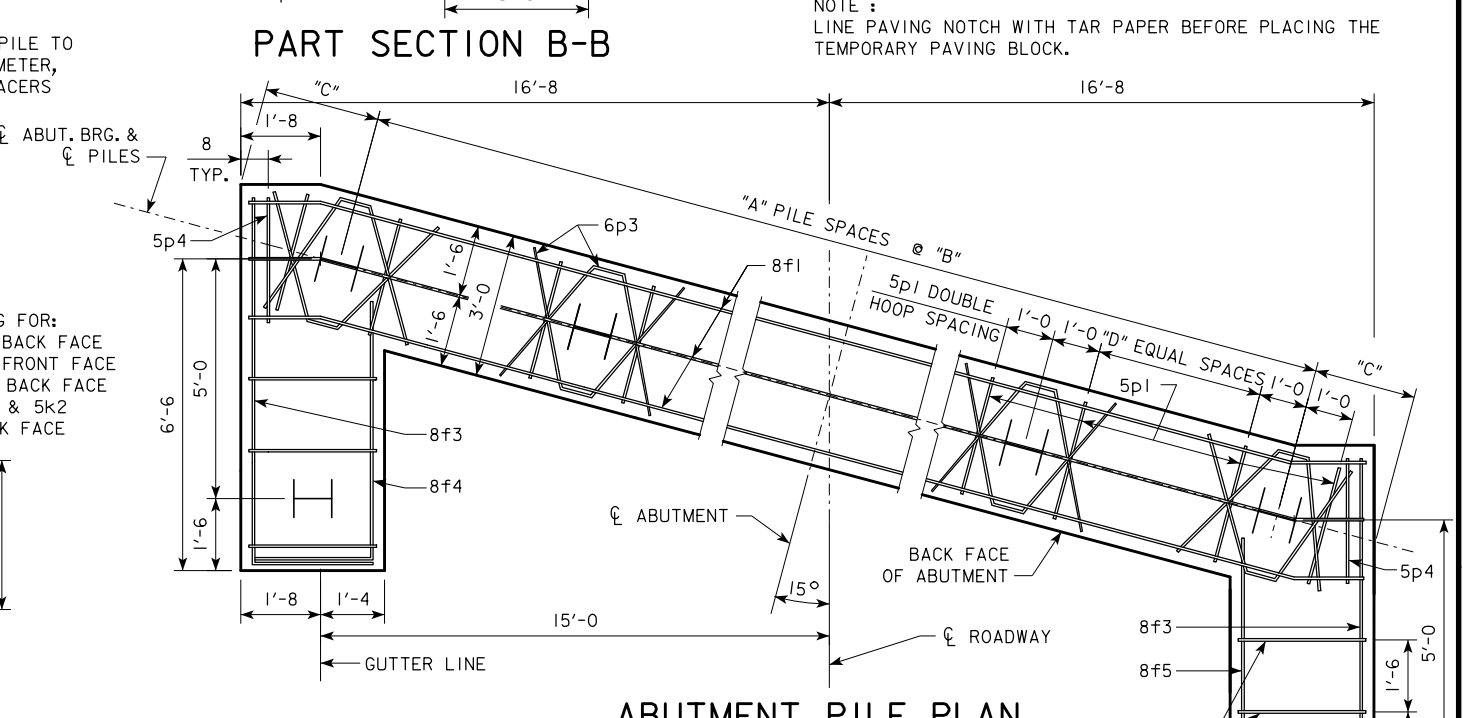
**PART SECTION B-B**



**PLAN OF TEMPORARY PAVING BLOCK**  
NOTE: LINE PAVING NOTCH WITH TAR PAPER BEFORE PLACING THE TEMPORARY PAVING BLOCK.



**PART SECTION A-A**



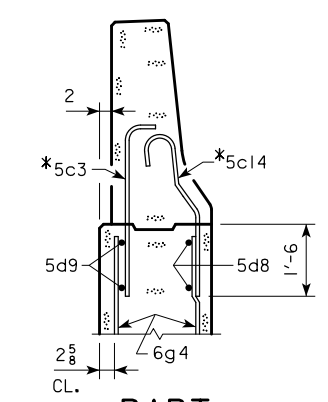
**ABUTMENT PILE PLAN**

ABUTMENT PILE SPACING		201'-4	213'-10	226'-4	243'-0
WITH STEEL H-PILES	"A" PILE SPACES	5	6	6	6
	"B" (FT. - IN.)	5'-11	4'-11	4'-11	4'-11
	"C" (FT. - IN.)	2'-5 9/16	2'-6 1/16	2'-6 1/16	2'-6 1/16
	"D" EQUAL SPACES	4	3	3	3
	NO. OF PILES PER ABUT.	8	9	9	9
Pu, STRENGTH I DESIGN LOAD (KIPS)		144	127	131	139

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

NOTE: THE SPIRAL AT THE TOP OF EACH PILE TO BE 7 TURNS OF NO. 2 BAR, 21\"/>

SPACING FOR:  
29-8g1 BACK FACE  
26-8g1 FRONT FACE  
25-8g3 BACK FACE  
27-5k1 & 5k2 BACK FACE



**PART SECTION C-C**

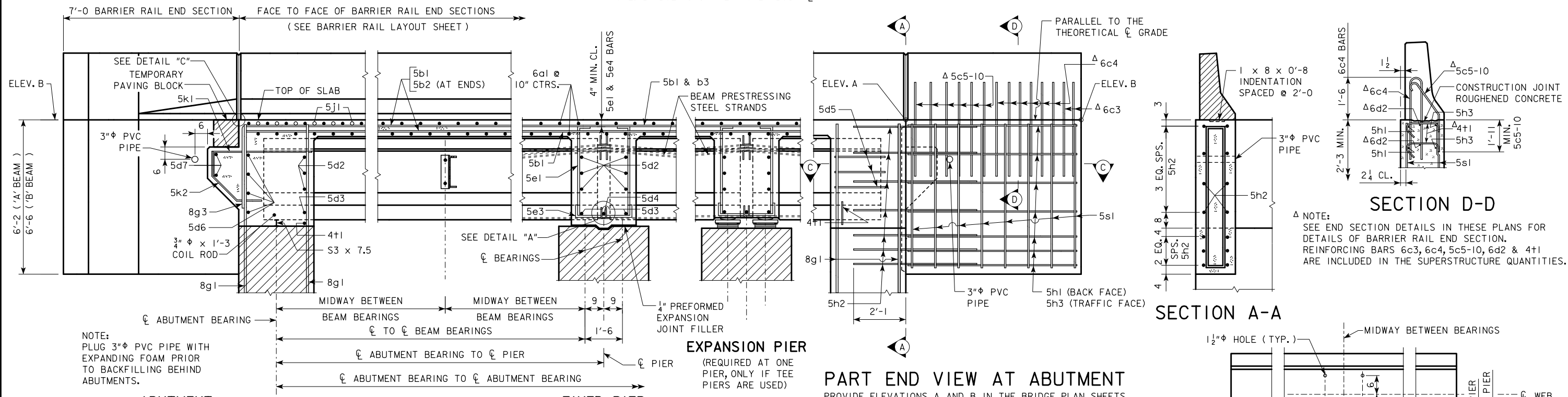
\* NOTE: SEE BARRIER RAIL SHEET FOR DETAILS. REINFORCING BARS 5c3 AND 5c14 ARE INCLUDED IN SUPERSTRUCTURE QUANTITIES.

REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.

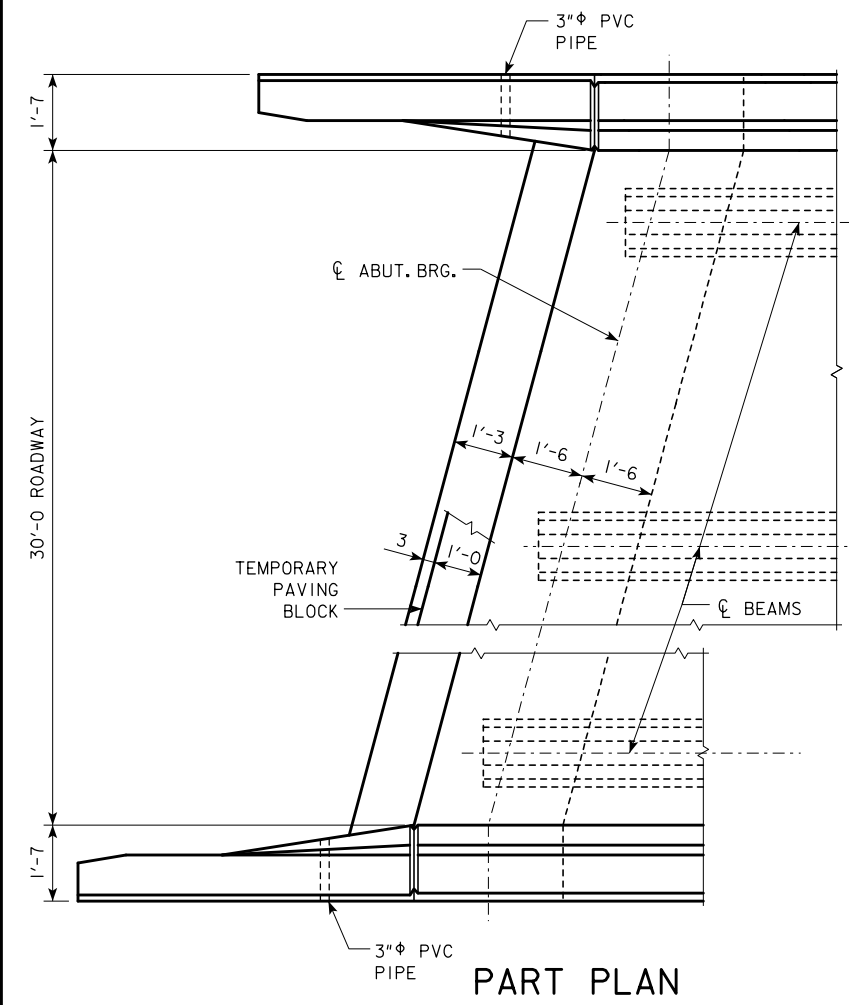
04-13 LATEST REVISION DATE  <i>Norman L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER	
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006
	<div style="text-align: center;"> <b>ABUTMENT DETAILS</b> 15° SKEW C BEAMS         </div> <div style="text-align: center;"> <b>H30-12-06</b> </div>



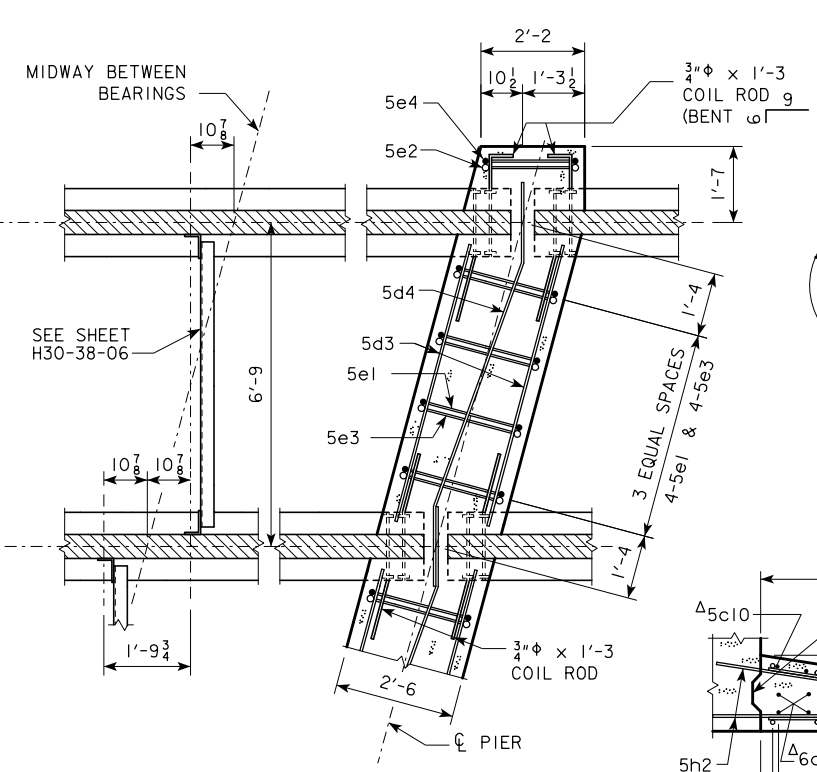
NOTE: BRIDGE IS SYMMETRICAL ABOUT  $\bar{C}$



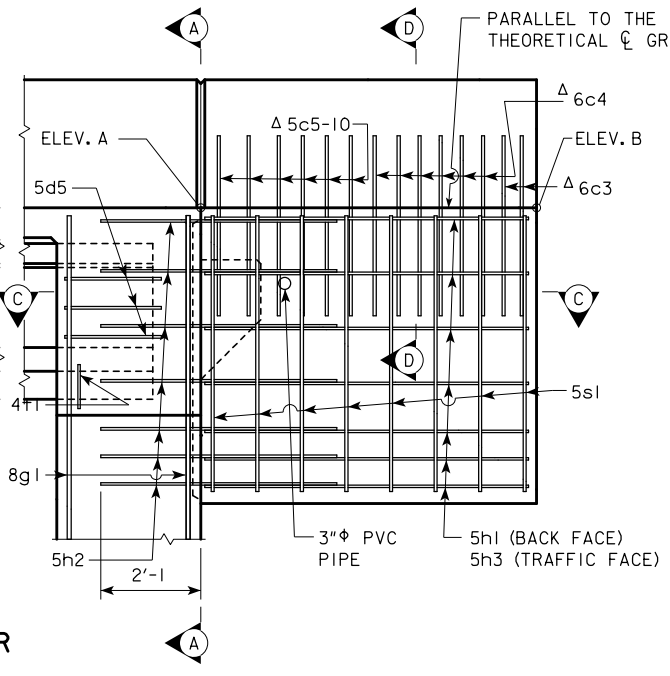
**ABUTMENT**  
**PART LONGITUDINAL SECTION NEAR GUTTER**  
 (FOR DETAILS OF INTERMEDIATE DIAPHRAGM SEE SHEET H30-38-06)



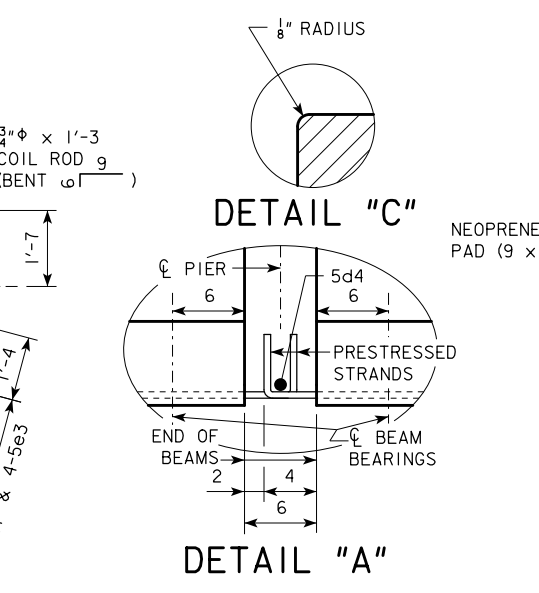
**PART PLAN**



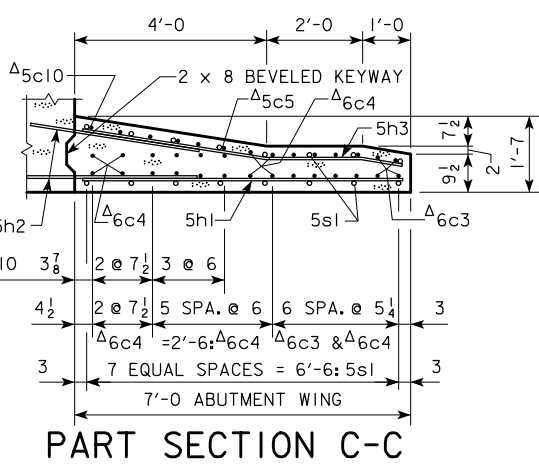
**PART SECTION AT PIER**



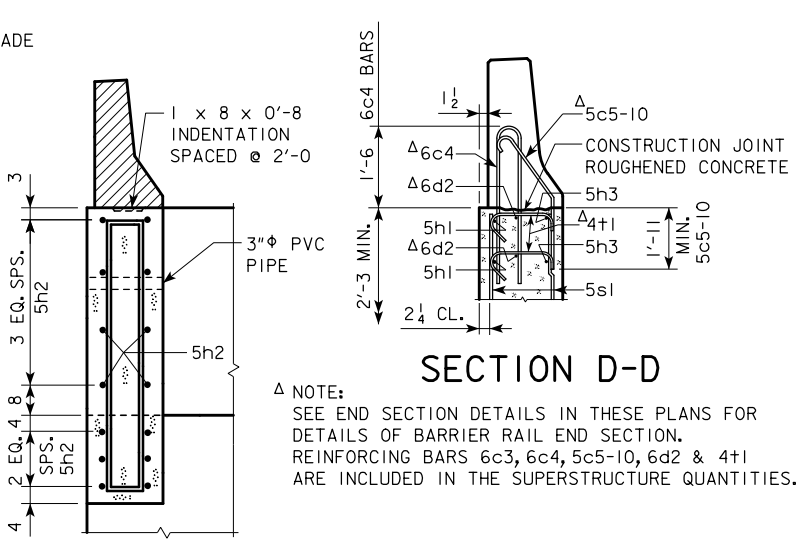
**PART END VIEW AT ABUTMENT**  
 PROVIDE ELEVATIONS A AND B IN THE BRIDGE PLAN SHEETS.



**DETAIL "A"**



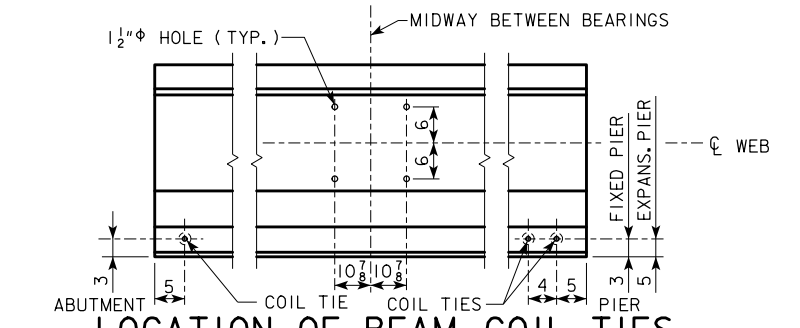
**PART SECTION C-C**



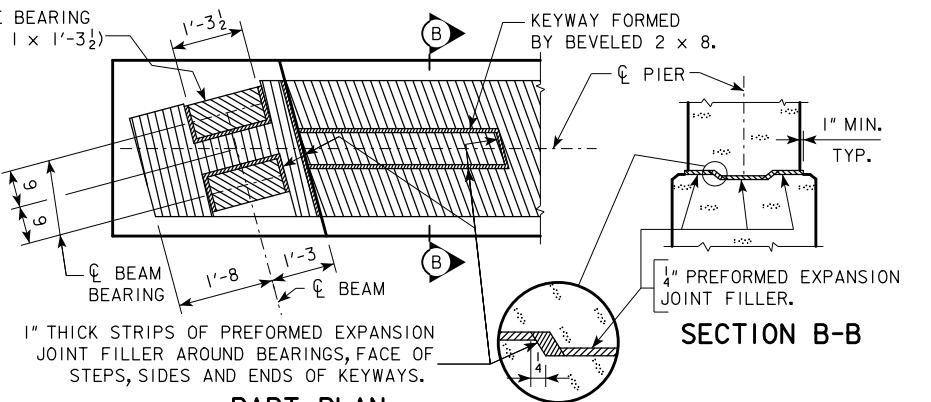
**SECTION A-A**

**SECTION D-D**

NOTE:  
 SEE END SECTION DETAILS IN THESE PLANS FOR  
 DETAILS OF BARRIER RAIL END SECTION.  
 REINFORCING BARS 6c3, 6c4, 5c5-10, 6d2 & 4+1  
 ARE INCLUDED IN THE SUPERSTRUCTURE QUANTITIES.



**LOCATION OF BEAM COIL TIES  
 AND STEEL DIAPHRAGM BOLT HOLES**

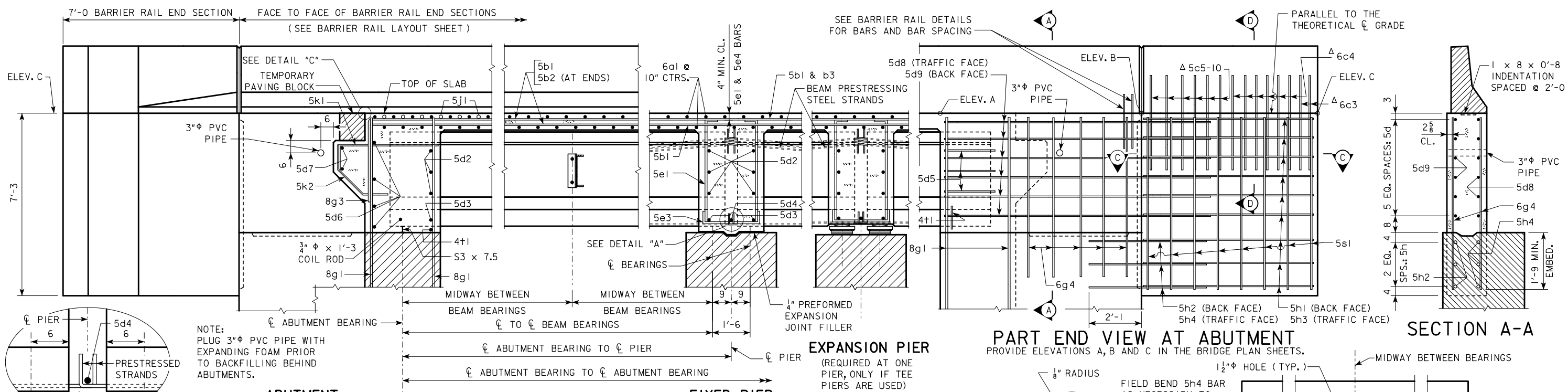


**PART PLAN  
 TOP OF FIXED PIER DETAILS**  
 (SEE SHEET H30-44-06 FOR EXPANSION  
 PIER BEARING DETAILS)

CORRECTION 09-10 - MINOR MODIFICATIONS TO PART SECTION C-C.  
 REVISED 07-10 - ABUT. WING SHAPE CHANGED.

LATEST REVISION DATE 07-10 APPROVED BY BRIDGE ENGINEER <i>Harmon L. Mc Donald</i>		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED                  CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
	LONGITUDINAL SECTION 15° SKEW A & B BEAMS	<b>H30-13-06</b>

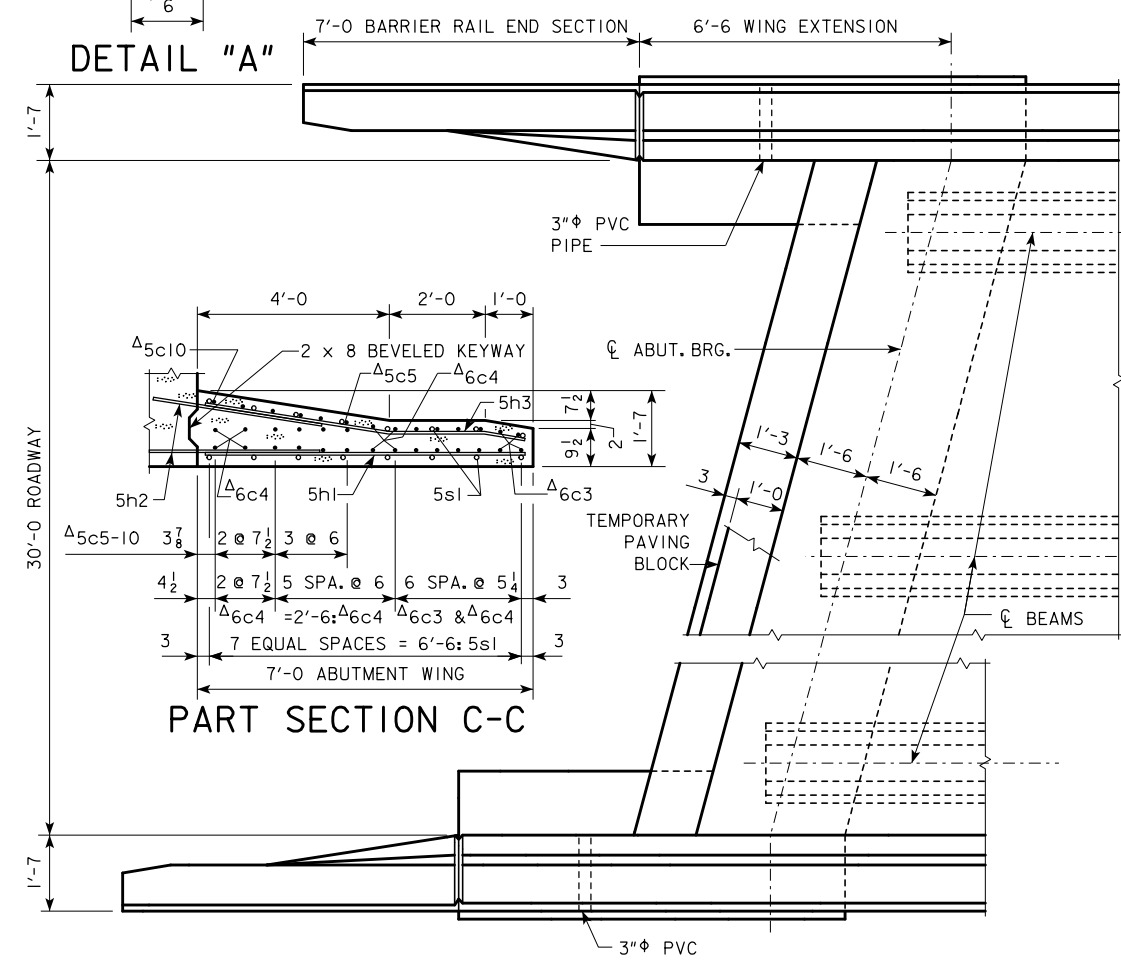
NOTE: BRIDGE IS SYMMETRICAL ABOUT  $\bar{C}$



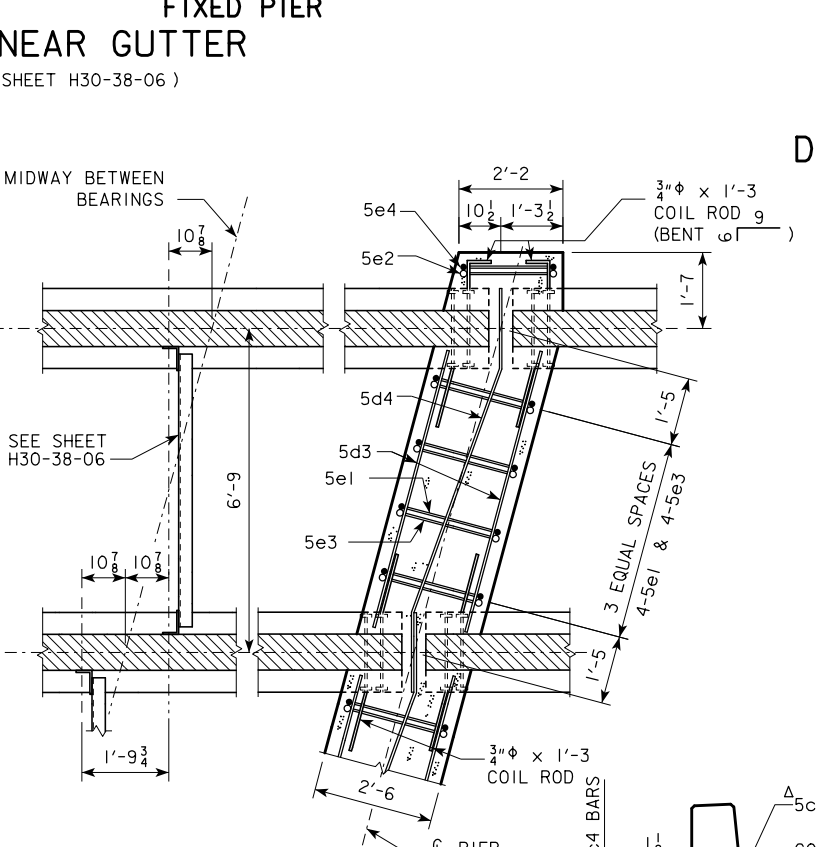
NOTE: PLUG 3"  $\phi$  PVC PIPE WITH EXPANDING FOAM PRIOR TO BACKFILLING BEHIND ABUTMENTS.

**PART END VIEW AT ABUTMENT**  
PROVIDE ELEVATIONS A, B AND C IN THE BRIDGE PLAN SHEETS.

**ABUTMENT PART LONGITUDINAL SECTION NEAR GUTTER**  
(FOR DETAILS OF INTERMEDIATE DIAPHRAGM SEE SHEET H30-38-06)

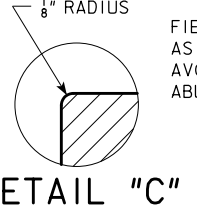


**PART PLAN**

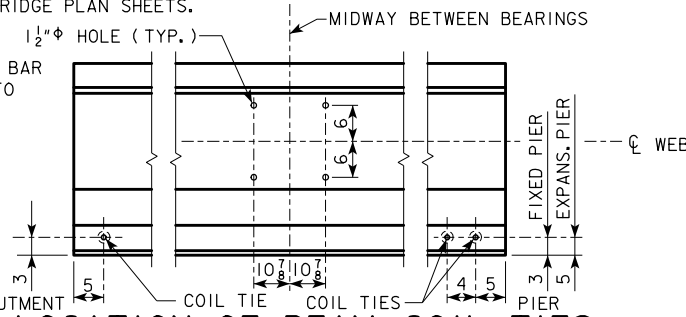


**PART SECTION AT PIER**

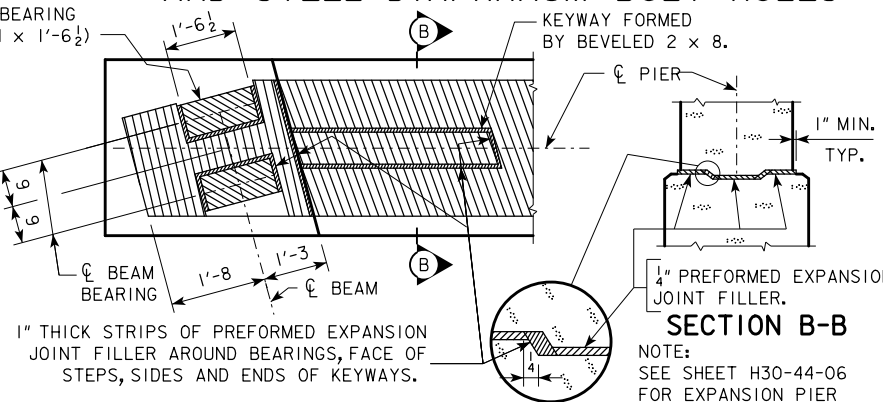
NOTE: SEE END SECTION DETAILS IN THESE PLANS FOR DETAILS OF BARRIER RAIL END SECTION. REINFORCING BARS 6c3, 6c4, 5c5-10, 6d2 & 4t1 ARE INCLUDED IN THE SUPERSTRUCTURE QUANTITIES.



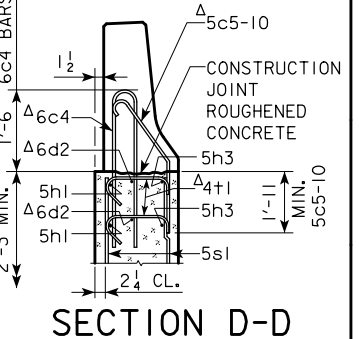
**DETAIL "C"**



**LOCATION OF BEAM COIL TIES AND STEEL DIAPHRAGM BOLT HOLES**



**PART PLAN TOP OF FIXED PIER DETAILS**



**SECTION D-D**

01-12  
LATEST REVISION DATE

*Harmon L. Mc Donald*  
APPROVED BY BRIDGE ENGINEER



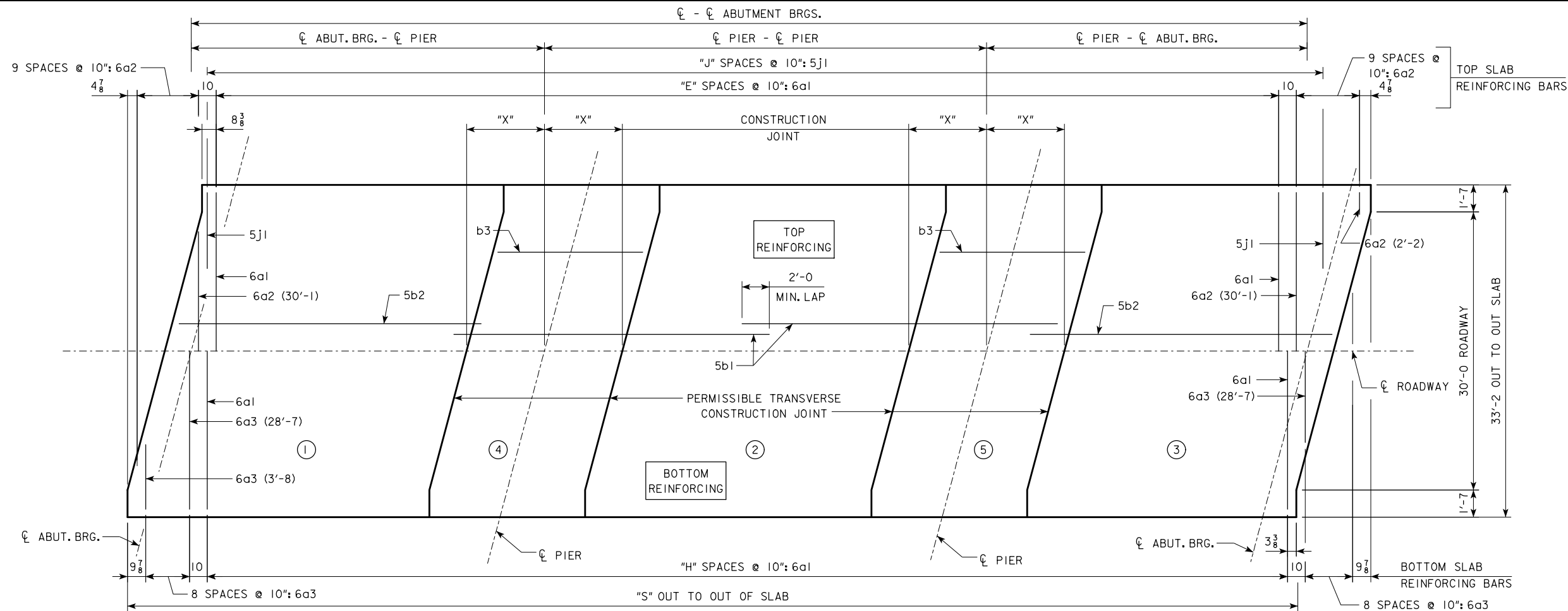
STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES  
**PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES**  
DECEMBER, 2006

**LONGITUDINAL SECTION**  
15° SKEW C BEAMS

**H30-14-06**

REVISED 01-12 - ADDED FIELD BEND 5h4 BAR TO AVOID PILE IN ABUTMENT WING NOTE.

REVISED 07-2015 - CHANGED CONCRETE PLACEMENT NOTE TO ACCOUNT FOR THE POSSIBLE ADDITION OF A RETARDING ADMIXTURE TO THE CONCRETE.



### SLAB LAYOUT

(LEFT AHEAD SKEW SHOWN, RIGHT AHEAD SKEW SIMILAR)

ESTIMATED QUANTITIES (SUPERSTRUCTURE PLUS INTEGRAL ABUTMENTS)		CL-CL ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
STRUCTURAL CONCRETE SUPERSTRUCTURE	WITH BARRIER RAIL	C.Y.	172.3	183.0	200.9	211.8	222.7	244.4	255.1	266.4	281.2
(INCLUDES ABUTMENT WINGS, PAV. BLOCKS)	WITH OPEN RAIL	C.Y.	174.8	185.7	203.9	215.0	226.2	247.9	258.8	270.4	285.4
STRUCTURAL CONCRETE ABUTMENTS (w/ WOOD PILES) ***		C.Y.	26.3	26.2	26.1	26.1	-----	-----	-----	-----	-----
STRUCTURAL CONCRETE ABUTMENTS (w/ STEEL H PILES) ***		C.Y.	27.6	27.6	27.6	27.6	27.6	35.4	35.4	35.4	35.4
PRETENSIONED PRESTRESSED CONCRETE BEAM, CENTER SPAN		NO.	5-A50	5-A55	5-B59	5-B63	5-B67	5-C71	5-C75	5-C80	5-C80
PRETENSIONED PRESTRESSED CONCRETE BEAM, END SPAN		NO.	10-A42	10-A46	10-B50	10-B55	10-B59	10-C63	10-C67	10-C71	10-C80
CONCRETE RAIL (BARRIER OR OPEN)		L.F.	311.9	336.9	361.9	386.9	411.9	456.7	481.7	506.7	540.0
STRUCTURAL STEEL (w/ PILE BENT PIERS & DRAINS)		LB.	3985	3985	4073	4073	4073	4077	4077	4077	4077
STRUCTURAL STEEL (w/ PILE BENT PIERS & NO DRAINS)		LB.	3305	3305	3305	3305	3305	3229	3229	3229	3229
STRUCTURAL STEEL (w/ TEE PIERS & DRAINS)		LB.	4881	4881	4969	4969	4969	5135	5135	5135	5135
STRUCTURAL STEEL (w/ TEE PIERS & NO DRAINS)		LB.	4201	4201	4201	4201	4201	4287	4287	4287	4287
REINFORCING STEEL (w/ WOOD PILES & BARRIER RAIL)		LB.	50,260	53,865	57,543	61,408	64,830	-----	-----	-----	-----
REINFORCING STEEL (w/ WOOD PILES & OPEN RAIL)		LB.	50,925	54,486	58,311	62,352	65,704	-----	-----	-----	-----
REINFORCING STEEL (w/ STEEL H PILES & BARRIER RAIL)		LB.	50,312	53,809	57,443	61,308	64,730	71,176	75,336	78,755	83,229
REINFORCING STEEL (w/ STEEL H PILES & OPEN RAIL)		LB.	50,977	54,430	58,211	62,252	65,604	72,807	76,876	80,492	85,012
NO. OF WOOD PILES, TREATED FOR TWO ABUTMENTS		NO.	22	24	26	26	26	-----	-----	-----	-----
NO. OF STEEL H-PILES FOR TWO ABUTMENTS (HP 10 x 57)		NO.	10	10	12	12	12	16	18	18	18
PREBORED HOLES (w/ WOOD PILES)		L.F.	220	240	260	260	260	-----	-----	-----	-----
PREBORED HOLES (w/ STEEL H-PILES)		L.F.	100	100	120	120	120	160	180	180	180

CONCRETE PLACEMENT QUANT. (SUPERSTRUCTURE PLUS INTEGRAL ABUTMENTS)		CL-CL ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
SLAB INCLUDING HAUNCH, ABUT. DIAPHRAGM, & WINGWALLS** , SECTIONS 1 & 3	WITH BARRIER RAIL	C.Y.	91.8	98.0	108.2	114.6	120.8	135.4	141.8	148.4	163.2
	WITH OPEN RAIL	C.Y.	93.1	99.4	109.8	116.3	122.7	137.3	143.8	150.6	165.6
SLAB INCLUDING HAUNCH, SECTION 2	WITH BARRIER RAIL	C.Y.	33.5	36.2	38.9	41.6	44.1	47.0	49.7	52.4	52.4
	WITH OPEN RAIL	C.Y.	34.2	37.0	39.7	42.5	45.1	48.0	50.7	53.5	53.5
SLAB INCLUDING HAUNCH & PIER DIAPHRAGM, SECTIONS 4 & 5	WITH BARRIER RAIL	C.Y.	37.4	39.2	43.8	45.6	47.8	51.2	52.8	54.8	54.8
	WITH OPEN RAIL	C.Y.	37.9	39.7	44.4	46.2	48.4	51.8	53.5	55.5	55.5
PAVING BLOCKS		C.Y.	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
ABUTMENT WINGS		C.Y.	7.2	7.2	7.6	7.6	7.6	8.4	8.4	8.4	8.4
ABUTMENT FOOTINGS (w/ WOOD PILES) ***		C.Y.	26.3	26.2	26.1	26.1	26.1	-----	-----	-----	-----
ABUTMENT FOOTINGS (w/ STEEL H PILES) ***		C.Y.	27.6	27.6	27.6	27.6	27.6	35.4	35.4	35.4	35.4

GENERAL DATA		CL-CL ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
VERTICAL CURVE	TOP OF SLAB TO ABUT. CONSTR. JT. AT C.L. ABUT. BRG.	"U"	3'-7 <sup>15</sup> / <sub>16</sub>	3'-7 <sup>3</sup> / <sub>4</sub>	4'-2 <sup>13</sup> / <sub>16</sub>	4'-2 <sup>13</sup> / <sub>16</sub>	4'-3	4'-8 <sup>1</sup> / <sub>2</sub>	4'-8 <sup>11</sup> / <sub>16</sub>	4'-9	4'-9 <sup>7</sup> / <sub>16</sub>
	TOP OF SLAB TO PIER TOP AT C.L. PIER*	"U"	3'-6 <sup>7</sup> / <sub>16</sub>	3'-6 <sup>5</sup> / <sub>8</sub>	4'-1 <sup>3</sup> / <sub>8</sub>	4'-1 <sup>5</sup> / <sub>8</sub>	4'-1 <sup>15</sup> / <sub>16</sub>	4'-7 <sup>5</sup> / <sub>16</sub>	4'-7 <sup>5</sup> / <sub>16</sub>	4'-7 <sup>9</sup> / <sub>16</sub>	4'-7 <sup>9</sup> / <sub>16</sub>
STRAIGHT GRADE	TOP OF SLAB TO ABUT. CONSTR. JT. AT C.L. ABUT. BRG.	"U"	3'-8 <sup>1</sup> / <sub>16</sub>	3'-7 <sup>7</sup> / <sub>8</sub>	4'-2 <sup>15</sup> / <sub>16</sub>	4'-2 <sup>15</sup> / <sub>16</sub>	4'-3 <sup>1</sup> / <sub>16</sub>	4'-8 <sup>11</sup> / <sub>16</sub>	4'-8 <sup>15</sup> / <sub>16</sub>	4'-9 <sup>3</sup> / <sub>8</sub>	4'-10
	TOP OF SLAB TO PIER TOP AT C.L. PIER*	"U"	3'-6 <sup>5</sup> / <sub>16</sub>	3'-6 <sup>7</sup> / <sub>8</sub>	4'-1 <sup>11</sup> / <sub>16</sub>	4'-1 <sup>15</sup> / <sub>16</sub>	4'-2 <sup>5</sup> / <sub>16</sub>	4'-7 <sup>15</sup> / <sub>16</sub>	4'-7 <sup>3</sup> / <sub>4</sub>	4'-8 <sup>1</sup> / <sub>16</sub>	4'-8 <sup>1</sup> / <sub>16</sub>
D.L. PIER REACTION (D.L. + F.W.S.) SERVICE LOADS		KIPS	352.1	380.1	434.5	464.0	493.8	592.3	625.5	659.1	691.9
L.L. PIER REACTION (HL93) NO IMPACT SERVICE LOADS		KIPS	207.6	215.3	222.7	229.9	237.0	244.0	253.2	268.2	284.4
NO. OF SPACES FOR 6a1 BARS (TOP)		"E"	159	174	189	204	219	234	249	264	284
NO. OF SPACES FOR 6a1 BARS (BOTTOM)		"H"	160	175	190	205	220	235	250	265	285
NO. OF SPACES FOR 5j1 BARS (TOP)		"J"	167	182	197	212	227	242	257	272	292
OUT TO OUT OF SLAB		"S"	141'-11 <sup>1</sup> / <sub>4</sub>	154'-5 <sup>1</sup> / <sub>4</sub>	166'-11 <sup>1</sup> / <sub>4</sub>	179'-5 <sup>1</sup> / <sub>4</sub>	191'-11 <sup>1</sup> / <sub>4</sub>	204'-5 <sup>1</sup> / <sub>4</sub>	216'-11 <sup>1</sup> / <sub>4</sub>	229'-5 <sup>1</sup> / <sub>4</sub>	246'-1 <sup>1</sup> / <sub>4</sub>
SLAB TRANSVERSE CONSTR. JT. DISTANCE FROM C.L. PIER		"X"	6'-7	7'-1	7'-7	8'-1	8'-8	9'-2	9'-8	10'-2	10'-2

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

\* VALUES SHOWN ARE FOR FIXED PIERS ONLY AND ALLOW FOR 1/16 INCH DEFLECTION OF THE 1 INCH NEOPRENE BEARING PAD. AT EXPANSION PIER LOCATIONS ADD 3/16 INCHES TO "U" VALUES SHOWN.

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

\*\*\* SEE SHEET H30-17-06 FOR ADDITIONAL CONCRETE REQUIRED IN ABUTMENT FOOTINGS.

LATEST REVISION DATE	APPROVED BY BRIDGE ENGINEER <i>Thomas L. Mc Donald</i>	<b>IOWADOT</b> Highway Division	
		STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
		<b>SUPERSTRUCTURE DETAILS</b> 15° SKEW	<b>H30-15-06</b>



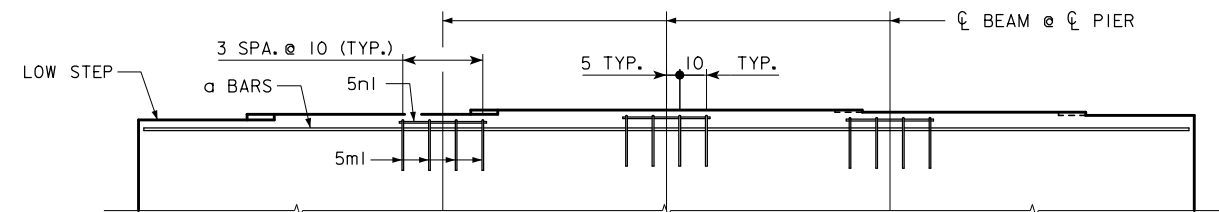
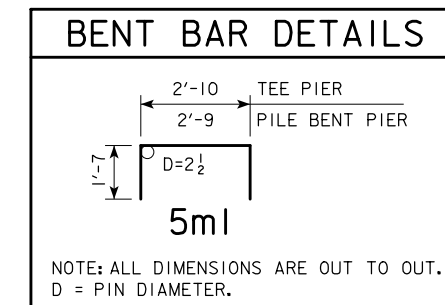


STEP REINFORCING BAR LIST ONE TEE PIER								
BAR	LENGTH	SHAPE	G ≤ 1.9%			1.9% < G ≤ 5.0%		
			NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
5ml	6'-0	┌	12	5	75	16	5	100
5nl	2'-8	—	12	5	33	16	5	45
TOTAL (LB.)			108			145		

G = GRADE (%)

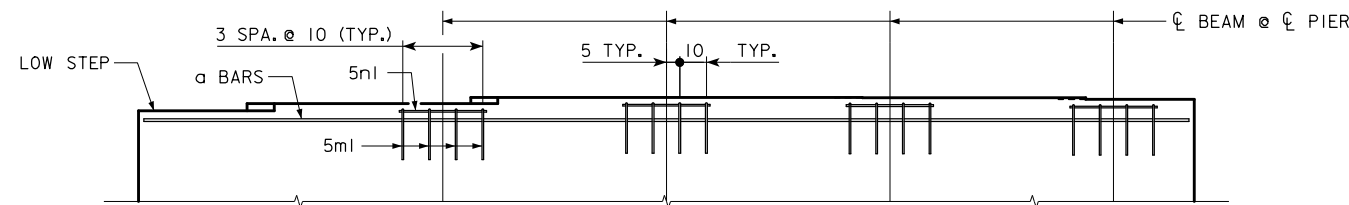
STEP REINFORCING BAR LIST ONE PILE BENT PIER								
BAR	LENGTH	SHAPE	G ≤ 1.9%			1.9% < G ≤ 5.0%		
			NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
5ml	5'-11	┌	12	5	74	16	5	99
5nl	2'-8	—	12	5	33	16	5	45
TOTAL (LB.)			107			144		

G = GRADE (%)



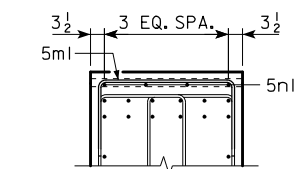
**PART ELEVATION VIEW OF PIER CAP**

GRADE (G): G ≤ 1.9%



**PART ELEVATION VIEW OF PIER CAP**

GRADE (G): 1.9% < G ≤ 5.0%



**TYPICAL SECTION**

**NOTES:**

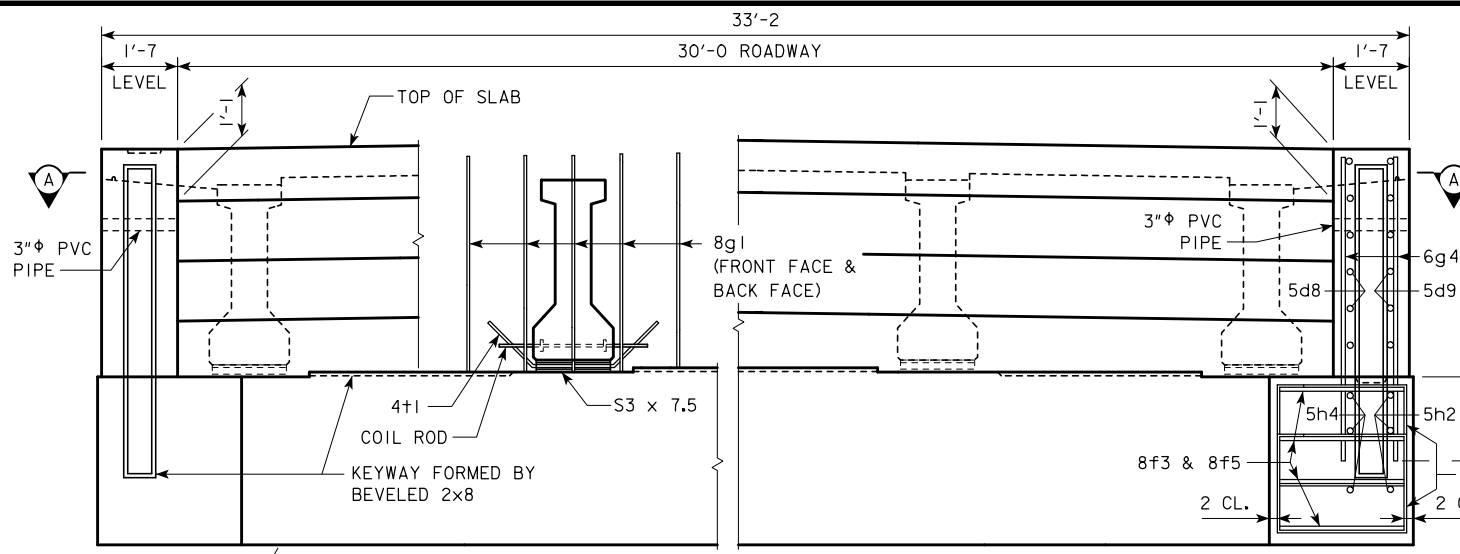
THE TABLE BELOW LISTS THE ADDITIONAL CONCRETE VOLUME REQUIRED IN EACH ABUTMENT FOOTING/PIER CAP BASED ON THE ROADWAY GRADE AT EACH ABUTMENT FOOTING/PIER CAP. ADDITIONAL CONCRETE SHOULD BE ADDED TO THE PLANS FOR EACH ABUTMENT FOOTING/PIER CAP THAT HAS 0.5 CU. YDS. OR MORE OF ADDITIONAL CONCRETE. VALUES IN THE TABLE BELOW HAVE BEEN EXCLUDED FOR SCENARIOS THAT HAVE LESS THAN 0.5 CU. YDS. OF ADDITIONAL CONCRETE PER SUBSTRUCTURE UNIT. VALUES MAY BE INTERPOLATED FOR GRADES BETWEEN THE VALUES SHOWN IN THE TABLE.

	ADDITIONAL CONCRETE VOLUME PER SUBSTRUCTURE UNIT (C.Y.)				
	ROADWAY GRADE AT SUBSTRUCTURE UNIT				
	1%	2%	3%	4%	5%
EACH ABUTMENT FOOTING					
A, B BEAMS	-----	-----	-----	0.5	0.7
C BEAMS	-----	-----	-----	0.6	0.8
EACH TEE PIER CAP - ALL BEAMS	-----	-----	-----	0.5	0.7
EACH PILE BENT PIER - ALL BEAMS	-----	-----	-----	0.5	0.6

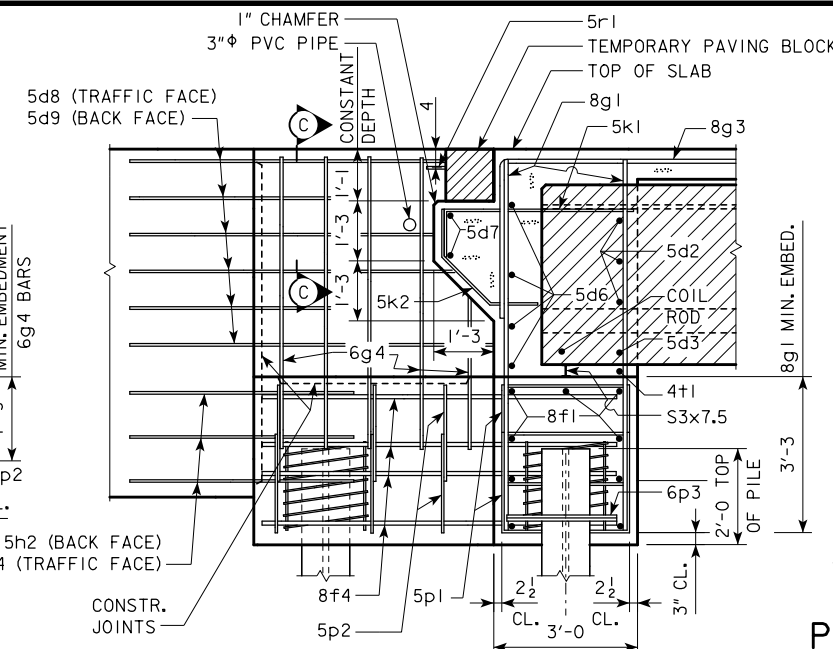
LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	 STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
		<b>ADDITIONAL QUANTITIES</b> 15° SKEW	<b>H30-17-06</b>





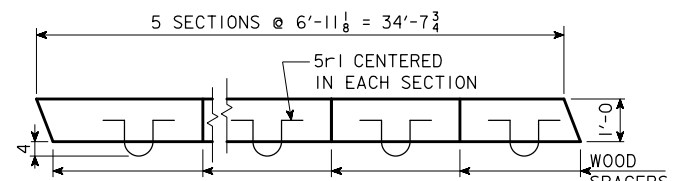


**PART REAR ELEVATION AT ABUTMENT**  
NOTE: TOP OF ABUTMENT SHOWN FOR SOLID BARRIER RAIL



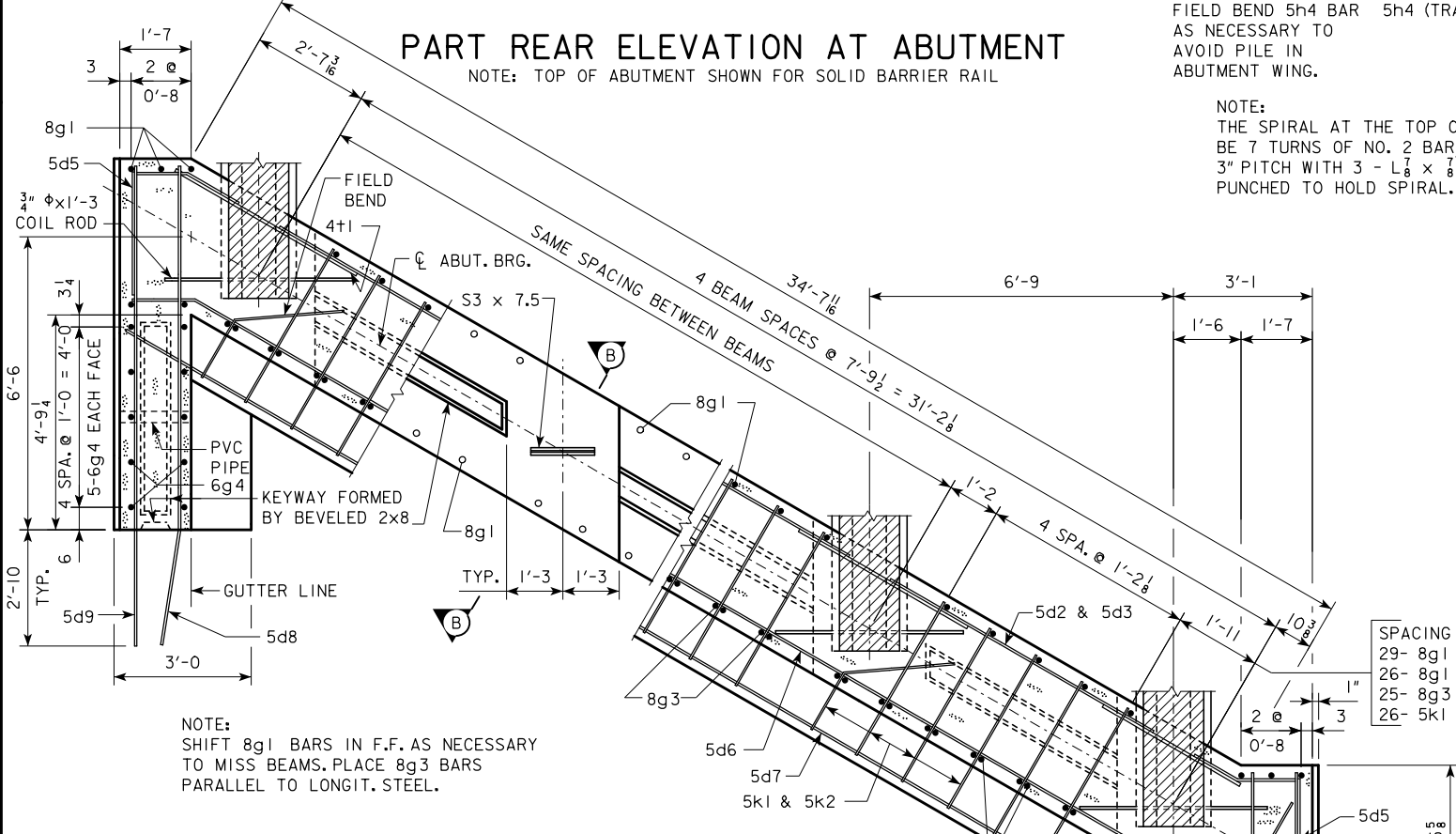
**PART SECTION B-B**  
16'-8"

**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.



**PLAN OF TEMPORARY PAVING BLOCK**

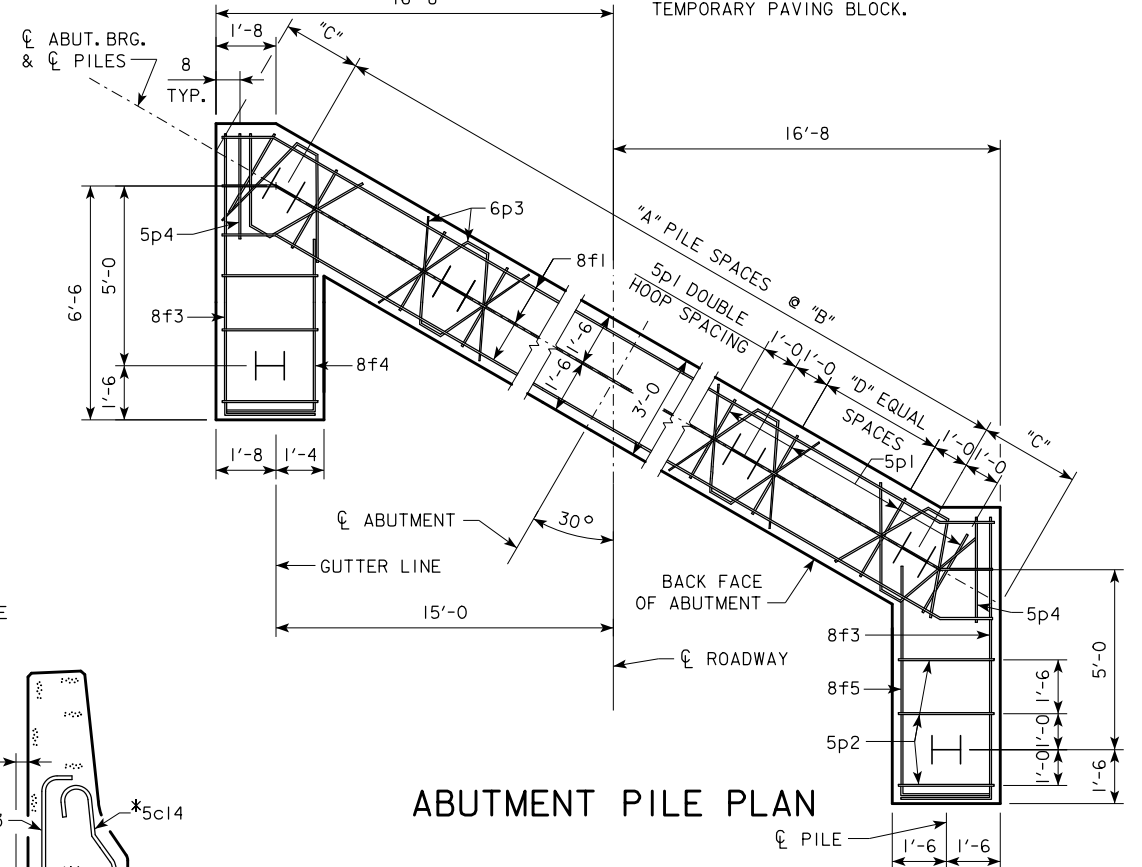
NOTE: LINE PAVING NOTCH WITH TAR PAPER BEFORE PLACING THE TEMPORARY PAVING BLOCK.



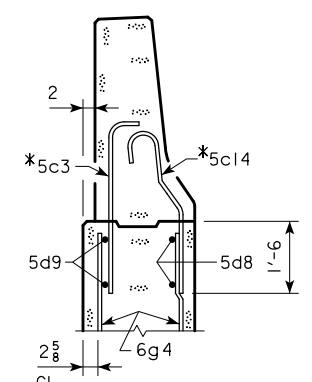
**PART SECTION A-A**

ABUTMENT PILE SPACING		CL-CL ABUT. BRG.	201'-4"	213'-10"	226'-4"	243'-0"
WITH STEEL H-PILES	"A" PILE SPACES		6	6	6	6
	"B" (FT. - IN.)		5'-6"	5'-6"	5'-6"	5'-6"
	"C" (FT. - IN.)		2'-8 15/16"	2'-8 15/16"	2'-8 15/16"	2'-8 15/16"
	"D" EQUAL SPACES		3	3	3	3
	NO. OF PILES PER ABUT.		9	9	9	9
Pu, STRENGTH I DESIGN LOAD (KIPS)			126	130	134	142

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



**ABUTMENT PILE PLAN**



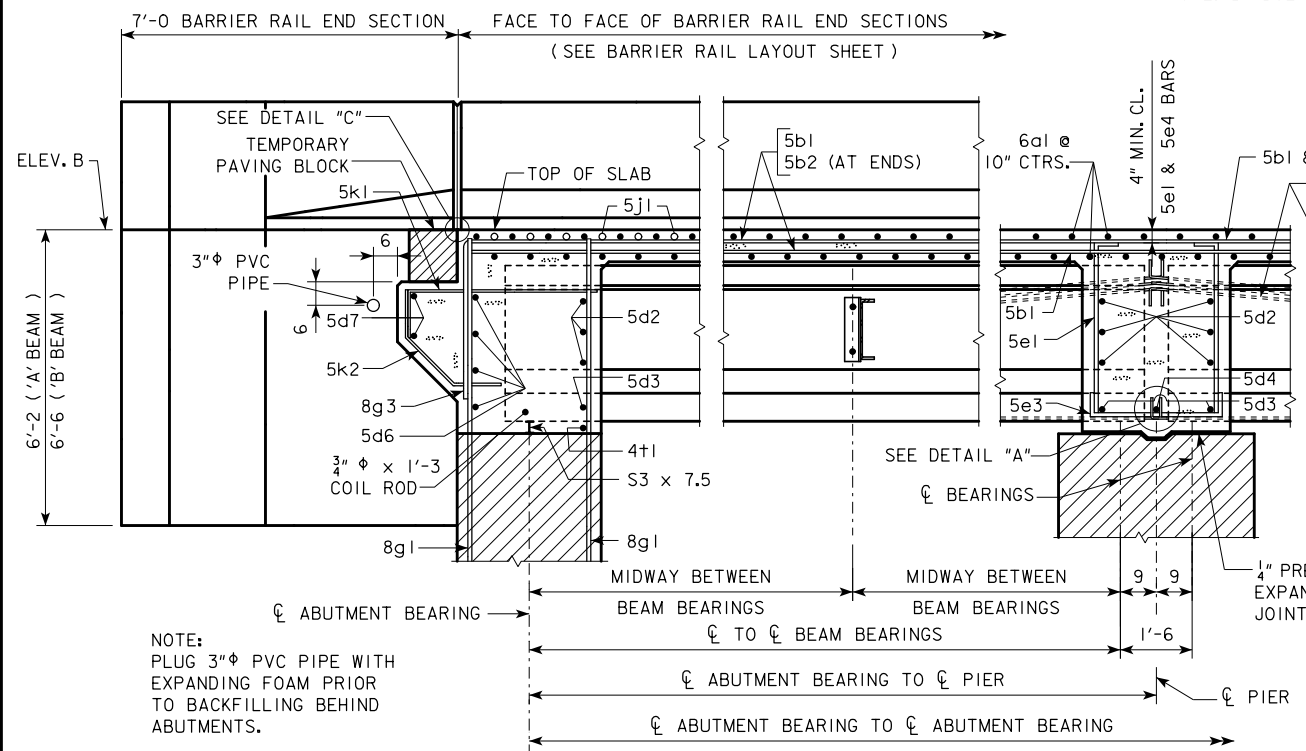
**PART SECTION C-C**

\* NOTE: SEE BARRIER RAIL SHEET FOR DETAILS. REINFORCING BARS 5c3 AND 5c14 ARE INCLUDED IN SUPERSTRUCTURE QUANTITIES.

REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.

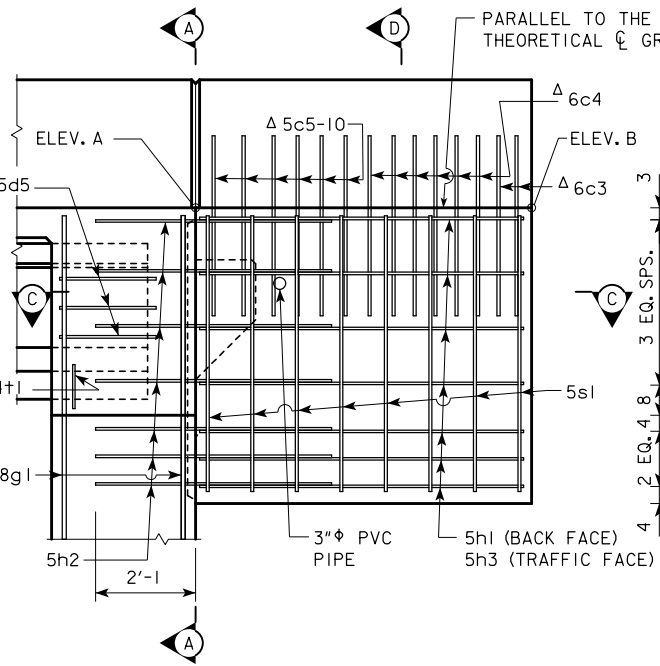
04-13 LATEST REVISION DATE	<i>Thomas L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER	<b>IOWADOT Highway Division</b>	
		STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
<b>ABUTMENT DETAILS</b> 30° SKEW C BEAMS		<b>H30-19-06</b>	

NOTE: BRIDGE IS SYMMETRICAL ABOUT  $\bar{C}$

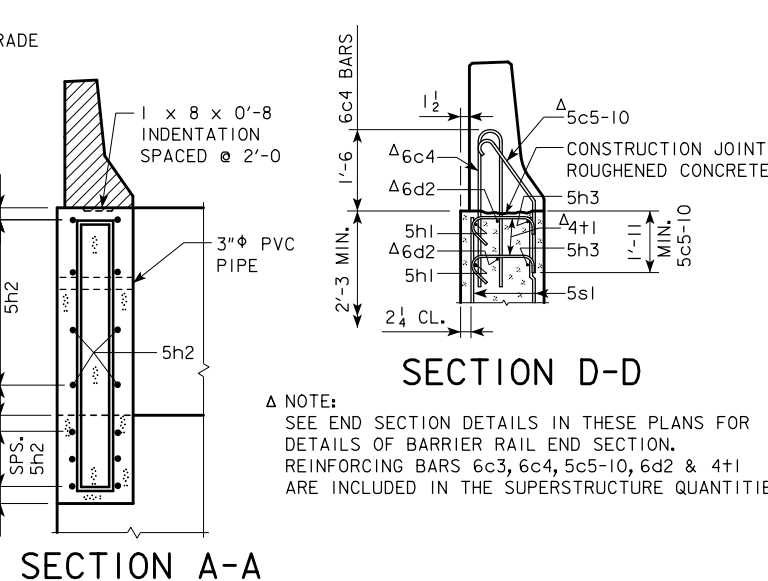


**ABUTMENT**  
**PART LONGITUDINAL SECTION NEAR GUTTER**  
 (FOR DETAILS OF INTERMEDIATE DIAPHRAGM SEE SHEET H30-38-06)

**EXPANSION PIER**  
 (REQUIRED AT ONE PIER, ONLY IF TEE PIERS ARE USED)

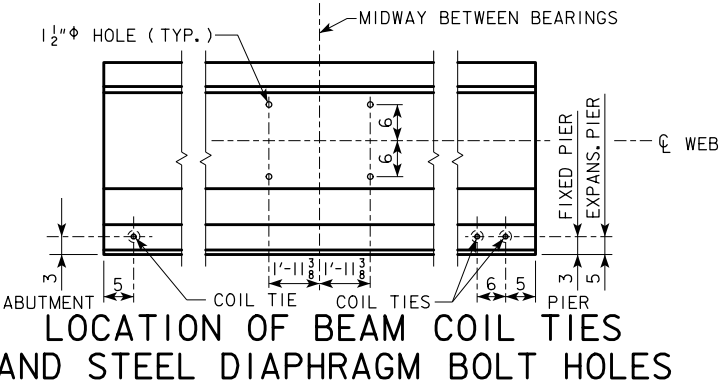


**PART END VIEW AT ABUTMENT**  
 PROVIDE ELEVATIONS A AND B IN THE BRIDGE PLAN SHEETS.

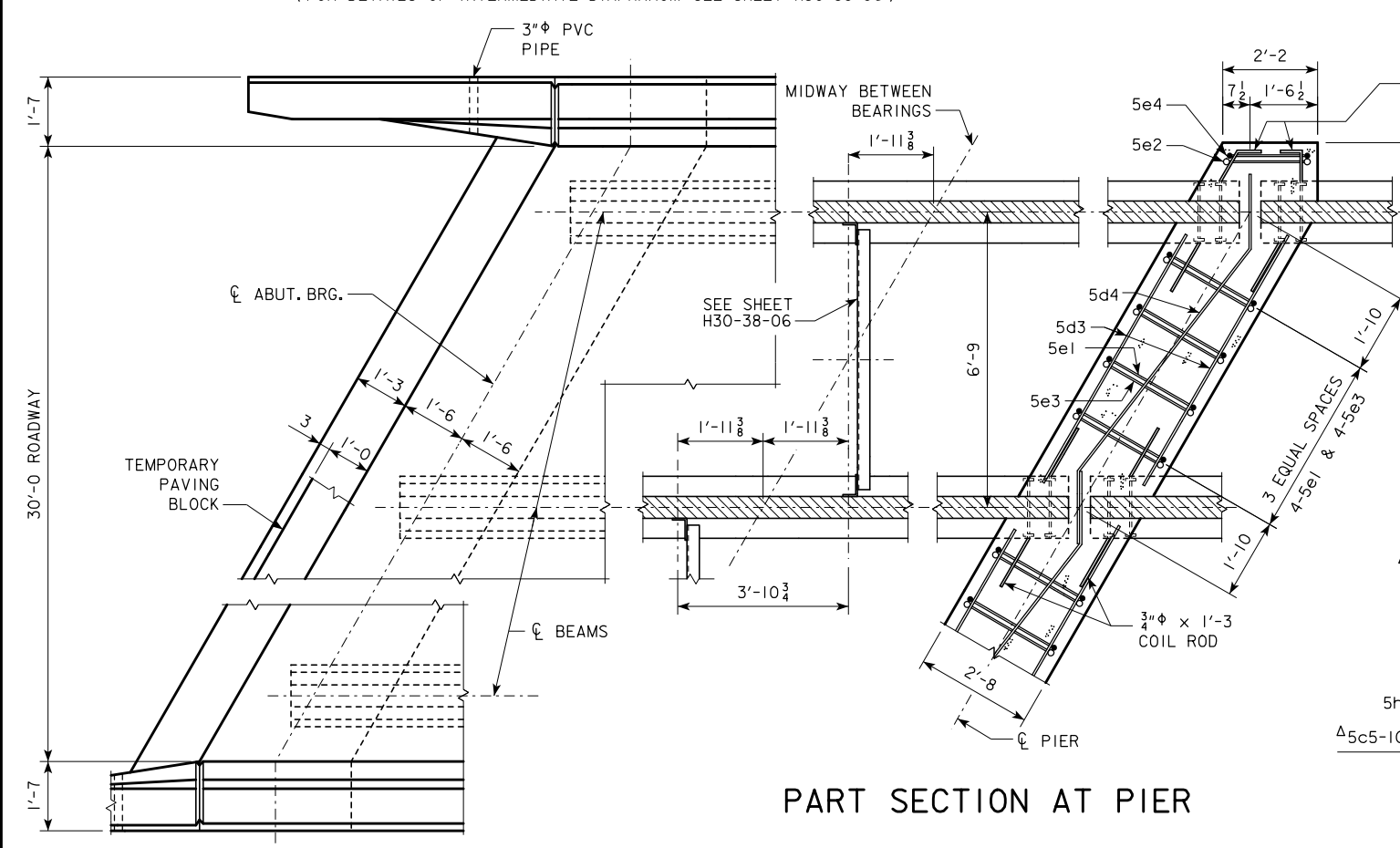


**SECTION D-D**

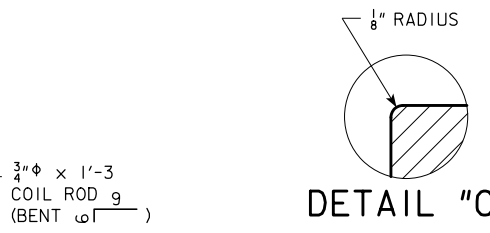
NOTE: SEE END SECTION DETAILS IN THESE PLANS FOR DETAILS OF BARRIER RAIL END SECTION. REINFORCING BARS 6c3, 6c4, 5c5-10, 6d2 & 4+1 ARE INCLUDED IN THE SUPERSTRUCTURE QUANTITIES.



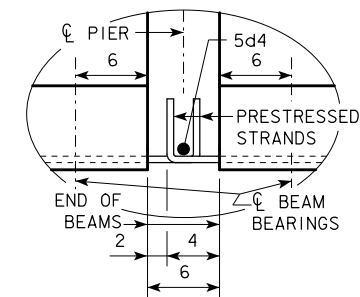
**LOCATION OF BEAM COIL TIES AND STEEL DIAPHRAGM BOLT HOLES**



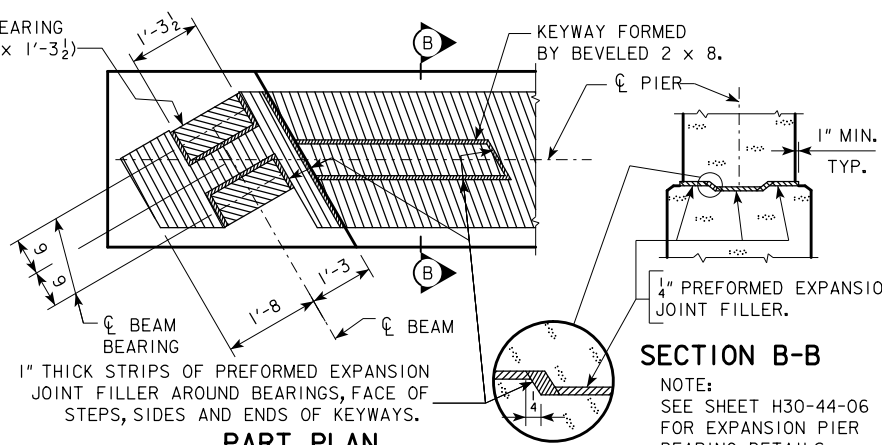
**PART SECTION AT PIER**



**DETAIL "C"**



**DETAIL "A"**



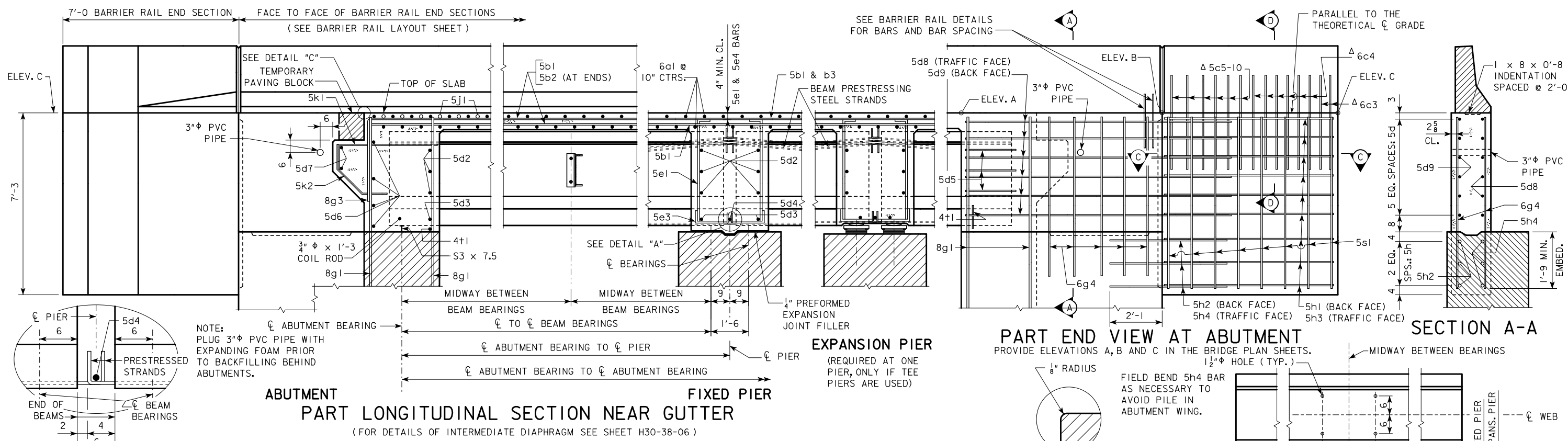
**PART PLAN TOP OF FIXED PIER DETAILS**

CORRECTION 09-10 - MINOR MODIFICATIONS TO PART SECTION C-C. REVISED 07-10 - ABUT. WING SHAPE CHANGED.

07-10 LATEST REVISION DATE  APPROVED BY BRIDGE ENGINEER [Signature]	
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006
	<span>LONGITUDINAL SECTION 30° SKEW A &amp; B BEAMS</span> <span>H30-20-06</span>



NOTE: BRIDGE IS SYMMETRICAL ABOUT CL

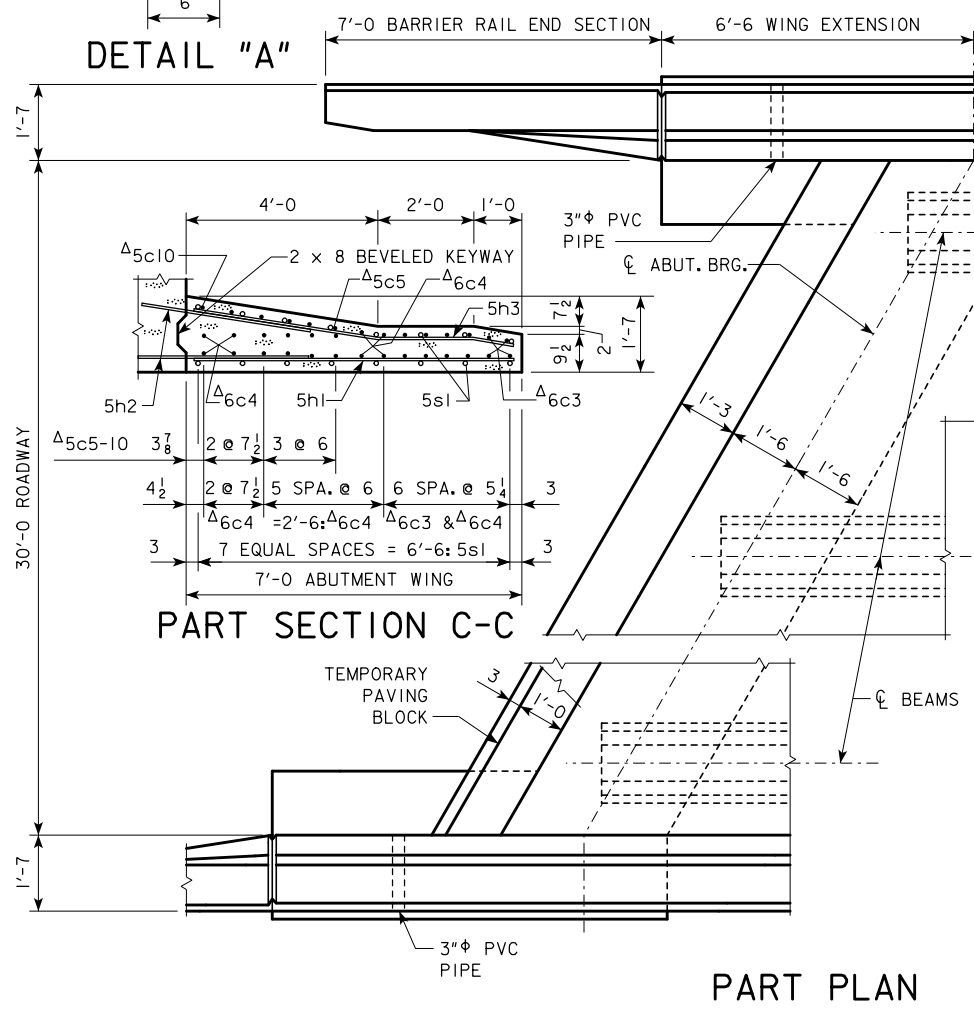


NOTE: PLUG 3" PVC PIPE WITH EXPANDING FOAM PRIOR TO BACKFILLING BEHIND ABUTMENTS.

EXPANSION PIER (REQUIRED AT ONE PIER, ONLY IF TEE PIERS ARE USED)

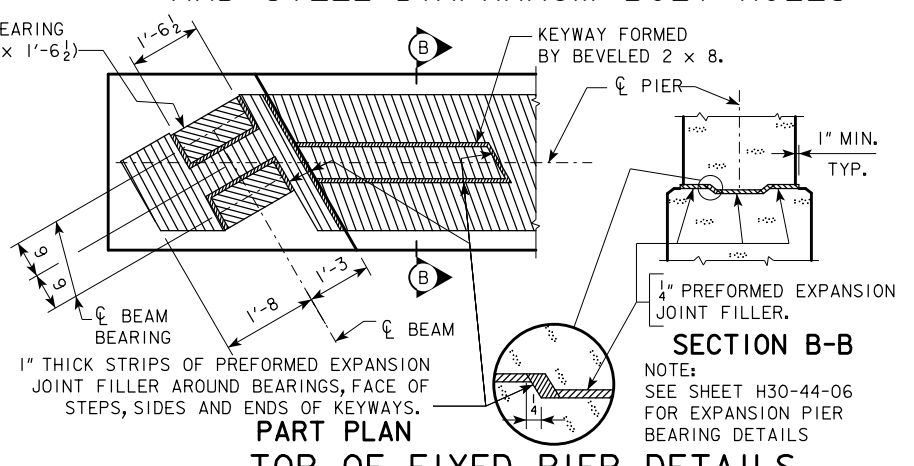
PART END VIEW AT ABUTMENT PROVIDE ELEVATIONS A, B AND C IN THE BRIDGE PLAN SHEETS.

SECTION A-A



DETAIL 'C'

LOCATION OF BEAM COIL TIES AND STEEL DIAPHRAGM BOLT HOLES



PART SECTION AT PIER

NOTE: SEE END SECTION DETAILS IN THESE PLANS FOR DETAILS OF BARRIER RAIL END SECTION. REINFORCING BARS 6c3, 6c4, 5c5-10, 6d2 & 4+1 ARE INCLUDED IN THE SUPERSTRUCTURE QUANTITIES.

SECTION D-D

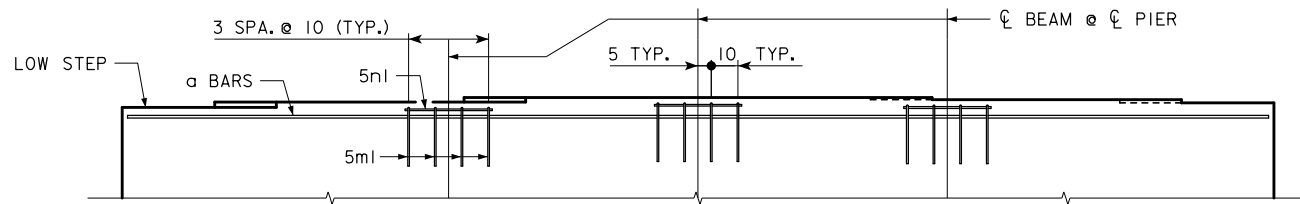
01-12 LATEST REVISION DATE  <i>Thomas L. McQuinn</i> APPROVED BY BRIDGE ENGINEER	
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006
	<div style="text-align: center;"> <b>LONGITUDINAL SECTION</b> 30° SKEW C BEAMS         </div> <div style="text-align: center;"> <b>H30-21-06</b> </div>

REVISED 01-12 - ADDED FIELD BEND 5h4 BAR TO AVOID PILE IN ABUTMENT WING NOTE.



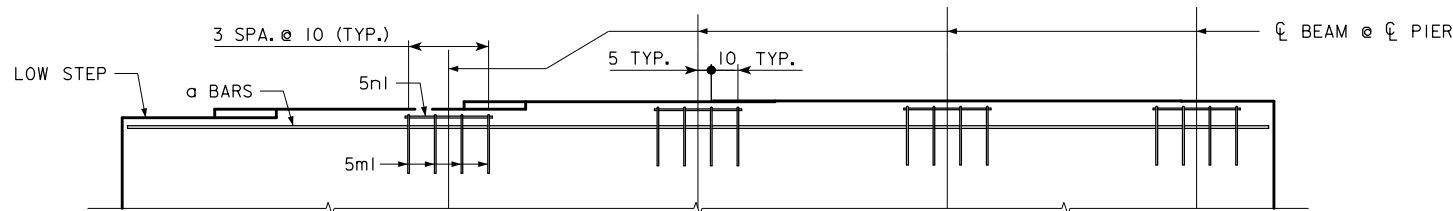






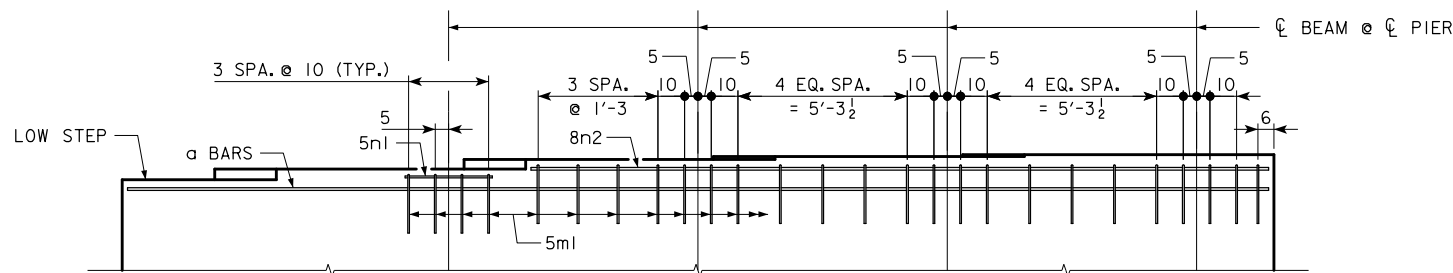
**PART ELEVATION VIEW OF PIER CAP**

GRADE (G):  $G \leq 0.9\%$



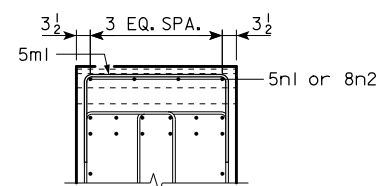
**PART ELEVATION VIEW OF PIER CAP**

GRADE (G):  $0.9\% < G \leq 3.3\%$



**PART ELEVATION VIEW OF PIER CAP**

GRADE (G):  $3.3\% < G \leq 5.0\%$



**TYPICAL SECTION**

**STEP REINFORCING BAR LIST  
ONE TEE PIER**

BAR	LENGTH	SHAPE	G <= 0.9%			0.9% < G <= 3.3%			3.3% < G <= 5.0%		
			NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
5m1	6'-8	□	12	5	83	16	5	111	26	5	181
5n1	2'-8	—	12	5	33	16	5	45	4	5	11
*8n2	VARIES	—	--	--	--	--	--	--	4	8	256
TOTAL (LB.)					116	156			448		

G = GRADE (%)

\*8n2 BARS VARY FROM 23'-2 TO 24'-9

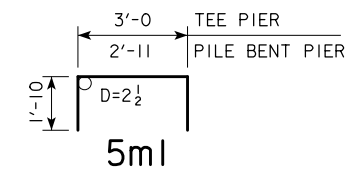
**STEP REINFORCING BAR LIST  
ONE PILE BENT PIER**

BAR	LENGTH	SHAPE	G <= 0.9%			0.9% < G <= 3.3%			3.3% < G <= 5.0%		
			NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
5m1	6'-7	□	12	5	82	16	5	110	26	5	179
5n1	2'-8	—	12	5	33	16	5	45	4	5	11
*8n2	VARIES	—	--	--	--	--	--	--	4	8	256
TOTAL (LB.)					115	155			446		

G = GRADE (%)

\*8n2 BARS VARY FROM 23'-2 TO 24'-9

**BENT BAR DETAILS**



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

**NOTES:**

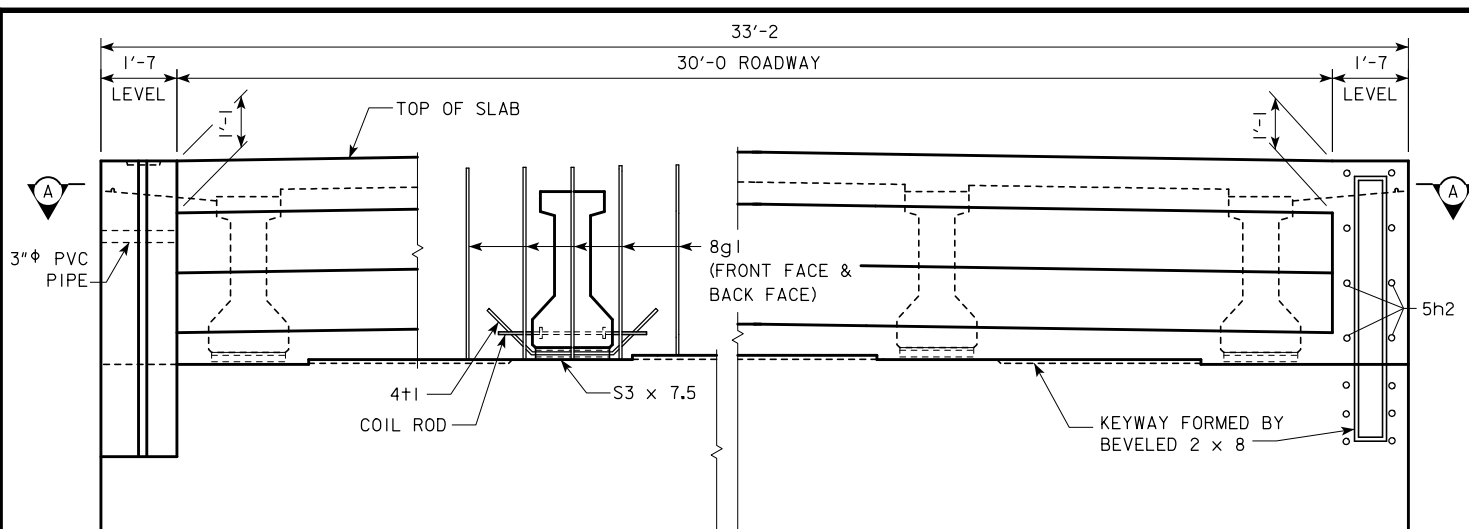
THE TABLE BELOW LISTS THE ADDITIONAL CONCRETE VOLUME REQUIRED IN EACH ABUTMENT FOOTING/PIER CAP BASED ON THE ROADWAY GRADE AT EACH ABUTMENT FOOTING/PIER CAP. ADDITIONAL CONCRETE SHOULD BE ADDED TO THE PLANS FOR EACH ABUTMENT FOOTING/PIER CAP THAT HAS 0.5 CU. YDS. OR MORE OF ADDITIONAL CONCRETE. VALUES IN THE TABLE BELOW HAVE BEEN EXCLUDED FOR SCENARIOS THAT HAVE LESS THAN 0.5 CU. YDS. OF ADDITIONAL CONCRETE PER SUBSTRUCTURE UNIT. VALUES MAY BE INTERPOLATED FOR GRADES BETWEEN THE VALUES SHOWN IN THE TABLE.

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

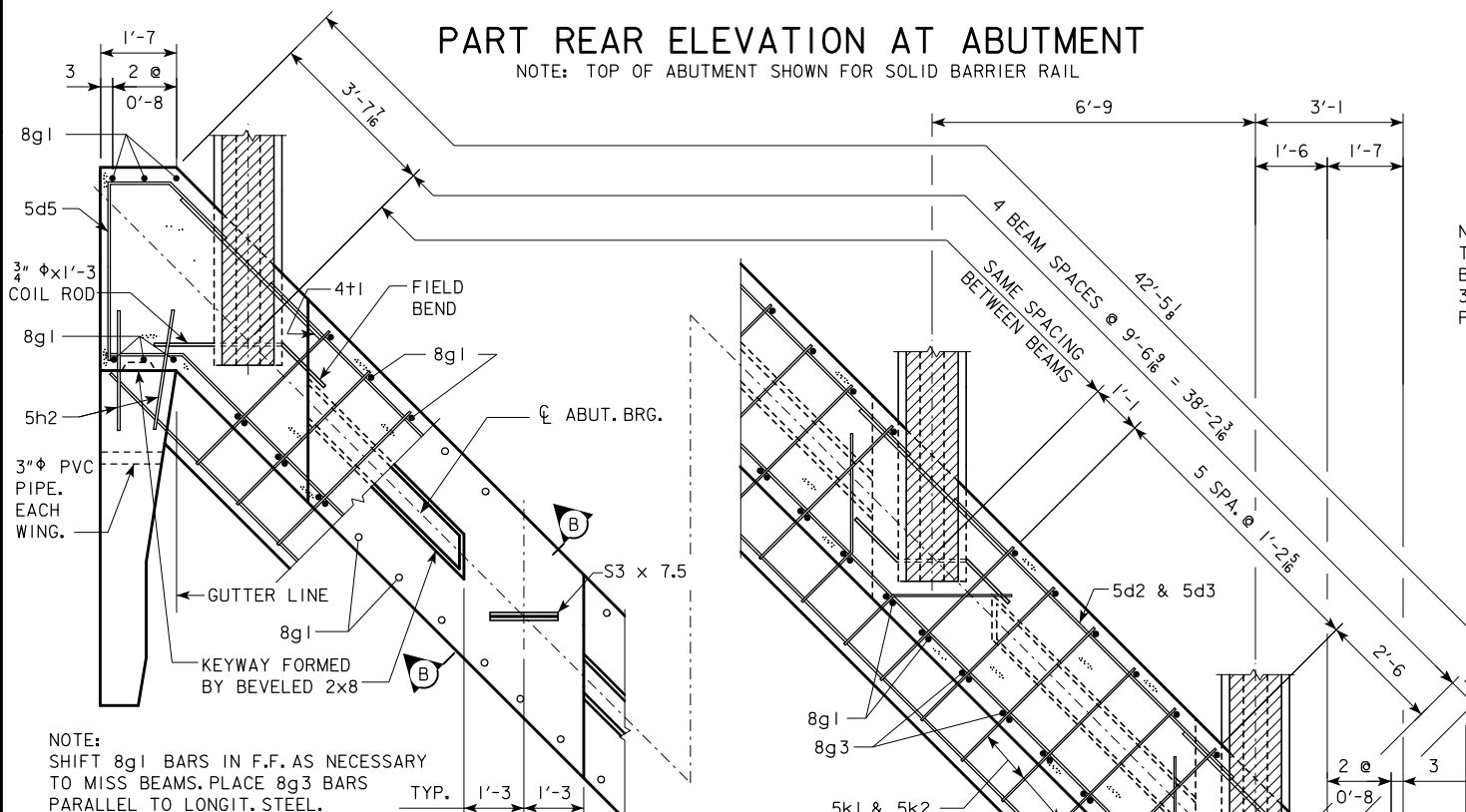
	ROADWAY GRADE AT SUBSTRUCTURE UNIT				
	1%	2%	3%	4%	5%
<b>EACH ABUTMENT FOOTING</b>					
A, B BEAMS	-----	0.6	0.9	1.3	1.6
C BEAMS	-----	0.7	1.1	1.6	2.0
<b>EACH TEE PIER CAP - ALL BEAMS</b>					
EACH PILE BENT PIER - ALL BEAMS	-----	0.6	0.9	1.3	1.7

LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	 STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
		<b>ADDITIONAL QUANTITIES</b> 30° SKEW	<b>H30-24-06</b>

REVISED 04-13 - REVISION FOR LRED PILE DESIGN.



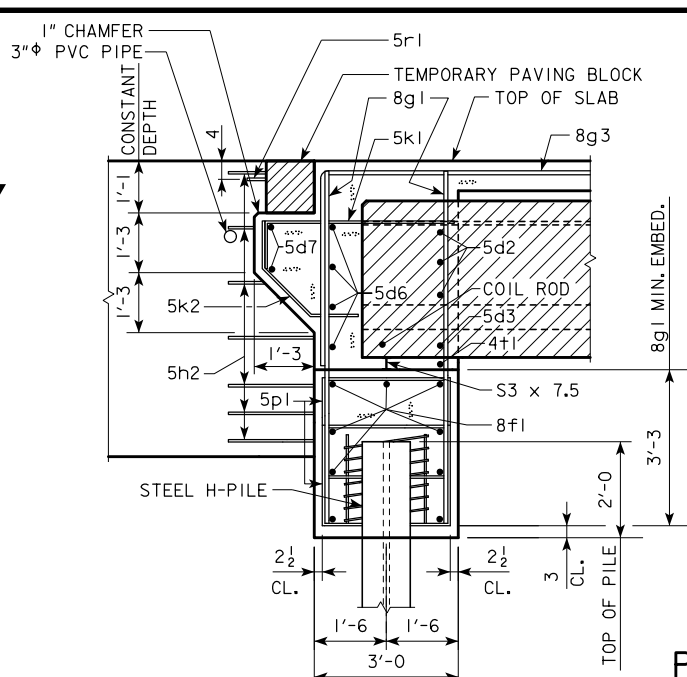
**PART REAR ELEVATION AT ABUTMENT**  
NOTE: TOP OF ABUTMENT SHOWN FOR SOLID BARRIER RAIL



**PART SECTION A-A**

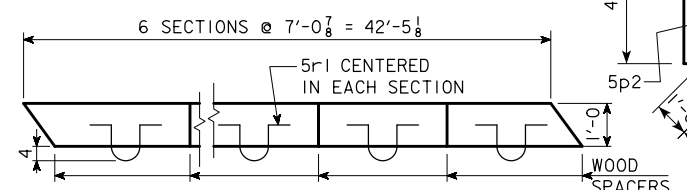
ABUTMENT PILE SPACING		℄-℄ ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10
WITH WOOD PILES	"A" PILE SPACES		11	12	13	13	13
	"B" (FT. - IN.)		3'-10	3'-6	3'-3	3'-3	3'-3
	"C" (FT. - IN.)		2'-4 <sup>7</sup> / <sub>16</sub>	2'-5 <sup>7</sup> / <sub>16</sub>	2'-3 <sup>15</sup> / <sub>16</sub>	2'-3 <sup>15</sup> / <sub>16</sub>	2'-3 <sup>15</sup> / <sub>16</sub>
	"D" EQUAL SPACES		2	2	1	1	1
	NO. OF PILES PER ABUT.		12	13	14	14	14
	P <sub>u</sub> , STRENGTH I DESIGN LOAD (KIPS)		57	54	54	56	58
WITH STEEL H-PILES	"A" PILE SPACES		5	5	5	5	5
	"B" (FT. - IN.)		8'-0	8'-0	8'-0	8'-0	8'-0
	"C" (FT. - IN.)		3'-5 <sup>7</sup> / <sub>16</sub>	3'-5 <sup>7</sup> / <sub>16</sub>	3'-5 <sup>7</sup> / <sub>16</sub>	3'-5 <sup>7</sup> / <sub>16</sub>	3'-5 <sup>7</sup> / <sub>16</sub>
	"D" EQUAL SPACES		5	5	5	5	5
	NO. OF PILES PER ABUT.		6	6	6	6	6
	P <sub>u</sub> , STRENGTH I DESIGN LOAD (KIPS)		123	128	137	141	146

NOTE: P<sub>u</sub>, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



**PART SECTION B-B (FOR STEEL H-PILING)**

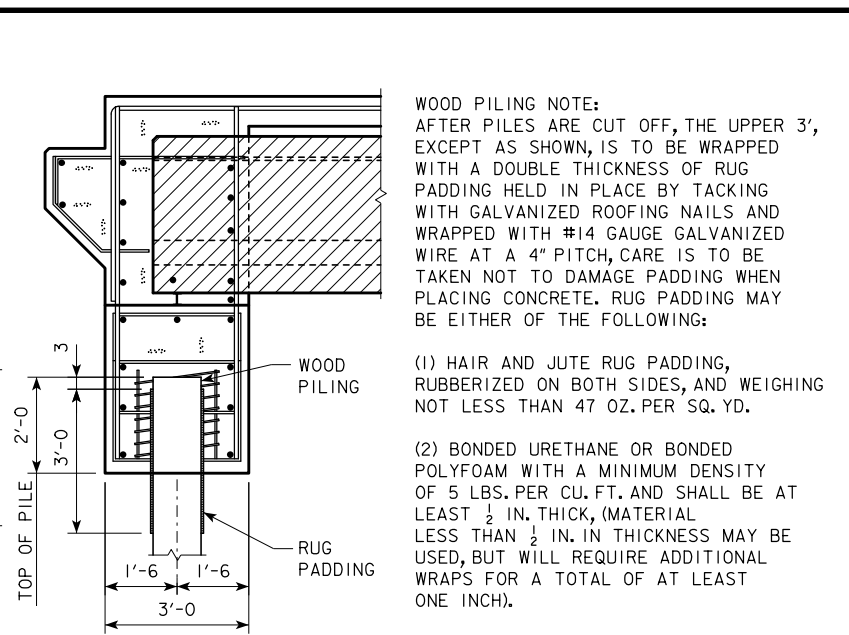
NOTE: THE SPIRAL AT THE TOP OF EACH PILE TO BE 7 TURNS OF NO. 2 BAR, 21" DIAMETER, 3" PITCH WITH 3 - L<sup>8</sup>/<sub>8</sub> x 8 x 8 SPACERS PUNCHED TO HOLD SPIRAL.



**PLAN OF TEMPORARY PAVING BLOCK**

NOTE: LINE PAVING NOTCH WITH TAR PAPER BEFORE PLACING THE TEMPORARY PAVING BLOCK.

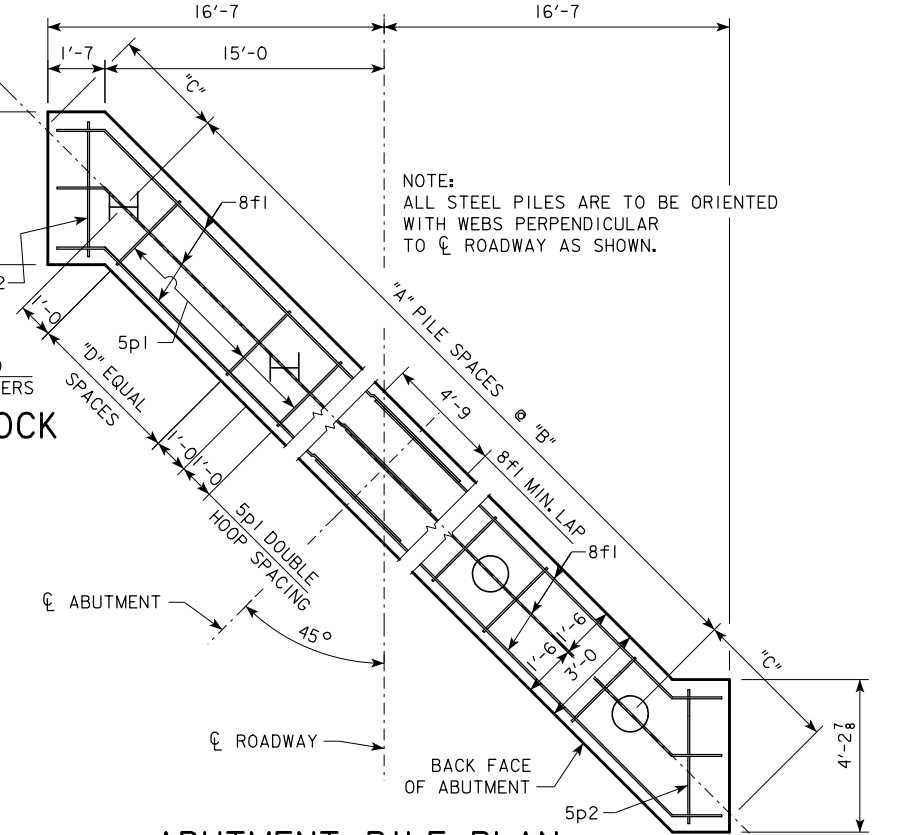
- SPACING FOR:
- 39- 8g1 BACK FACE
  - 30- 8g1 FRONT FACE
  - 33- 8g3 BACK FACE
  - 34- 5k1 & 5k2 BACK FACE



**PART SECTION B-B (FOR WOOD PILING)**

**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 #14 GAUGE GALVANIZED WIRE AT A 4" PITCH, CARE IS TO BE TAKEN NOT TO DAMAGE PADDING WHEN PLACING CONCRETE. RUG PADDING MAY BE EITHER OF THE FOLLOWING:

- (1) HAIR AND JUTE RUG PADDING, RUBBERIZED ON BOTH SIDES, AND WEIGHING NOT LESS THAN 47 OZ. PER SQ. YD.
- (2) BONDED URETHANE OR BONDED POLYFOAM WITH A MINIMUM DENSITY OF 5 LBS. PER CU. FT. AND SHALL BE AT LEAST 1/2 IN. THICK, (MATERIAL LESS THAN 1/2 IN. IN THICKNESS MAY BE USED, BUT WILL REQUIRE ADDITIONAL WRAPS FOR A TOTAL OF AT LEAST ONE INCH).



**ABUTMENT PILE PLAN**

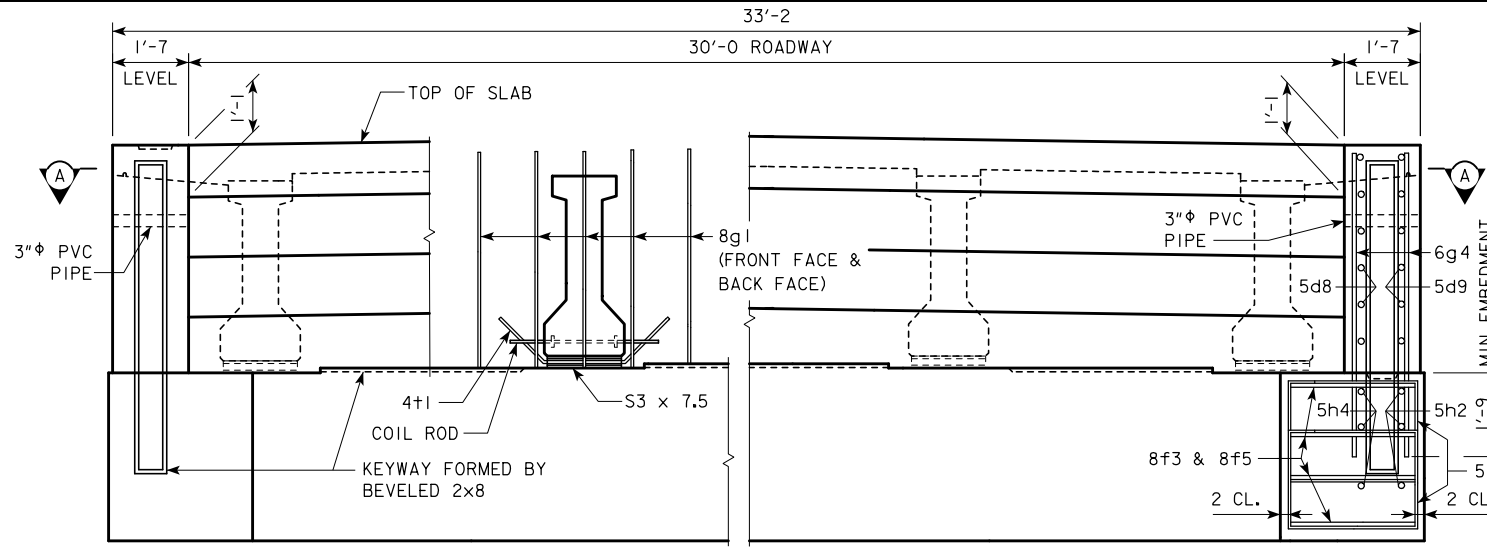
**ABUTMENT NOTES:**

- 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.

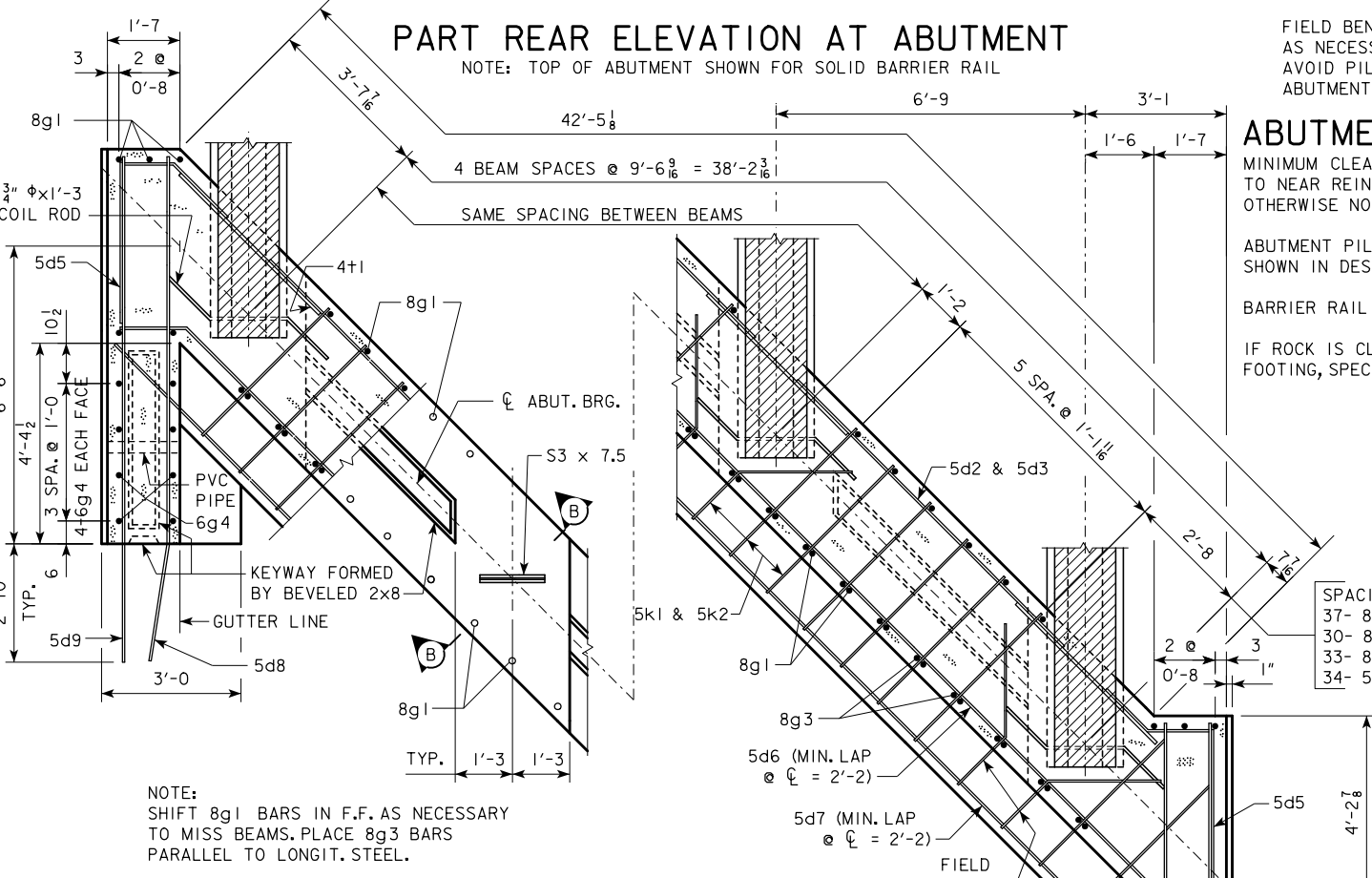
04-13 LATEST REVISION DATE  <i>Thomas L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER	
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006
	<div style="text-align: center;"> <b>ABUTMENT DETAILS</b> 45° SKEW A &amp; B BEAMS         </div> <div style="text-align: right;"> <b>H30-25-06</b> </div>



REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.



**PART REAR ELEVATION AT ABUTMENT**  
NOTE: TOP OF ABUTMENT SHOWN FOR SOLID BARRIER RAIL



**PART SECTION A - A**

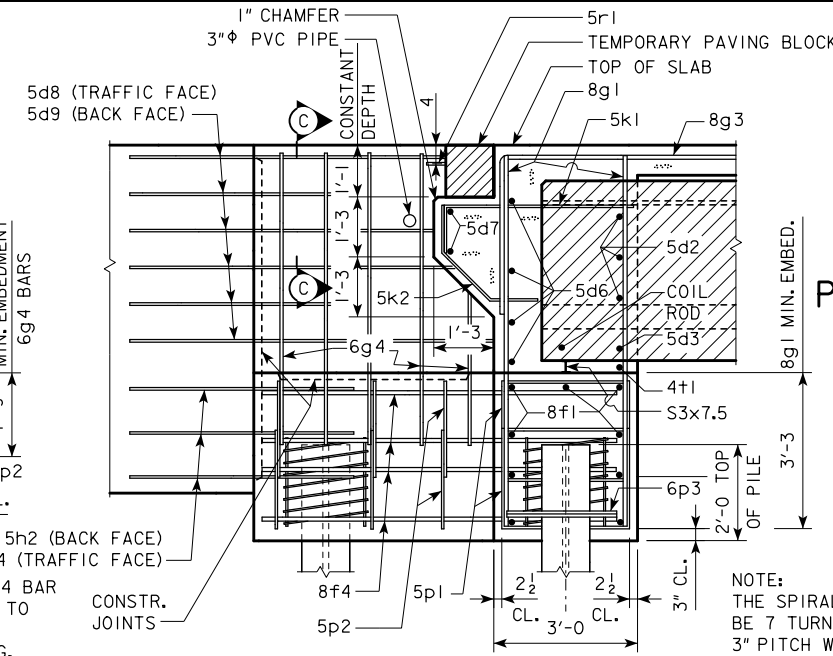
ABUTMENT PILE SPACING		CL-CL ABUT. BRG.	201'-4	213'-10	226'-4	243'-0
WITH STEEL H-PILES	"A" PILE SPACES		6	6	6	7
	"B" (FT. - IN.)		6'-9	6'-9	6'-9	5'-9
	"C" (FT. - IN.)		3'-3 <sup>13</sup> / <sub>16</sub>	3'-3 <sup>13</sup> / <sub>16</sub>	3'-3 <sup>13</sup> / <sub>16</sub>	3'-5 <sup>13</sup> / <sub>16</sub>
	"D" EQUAL SPACES		4	4	4	3
	NO. OF PILES PER ABUT.		9	9	9	10
Pu, STRENGTH I DESIGN LOAD (KIPS)			132	136	140	130

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

**ABUTMENT NOTES:**

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 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.

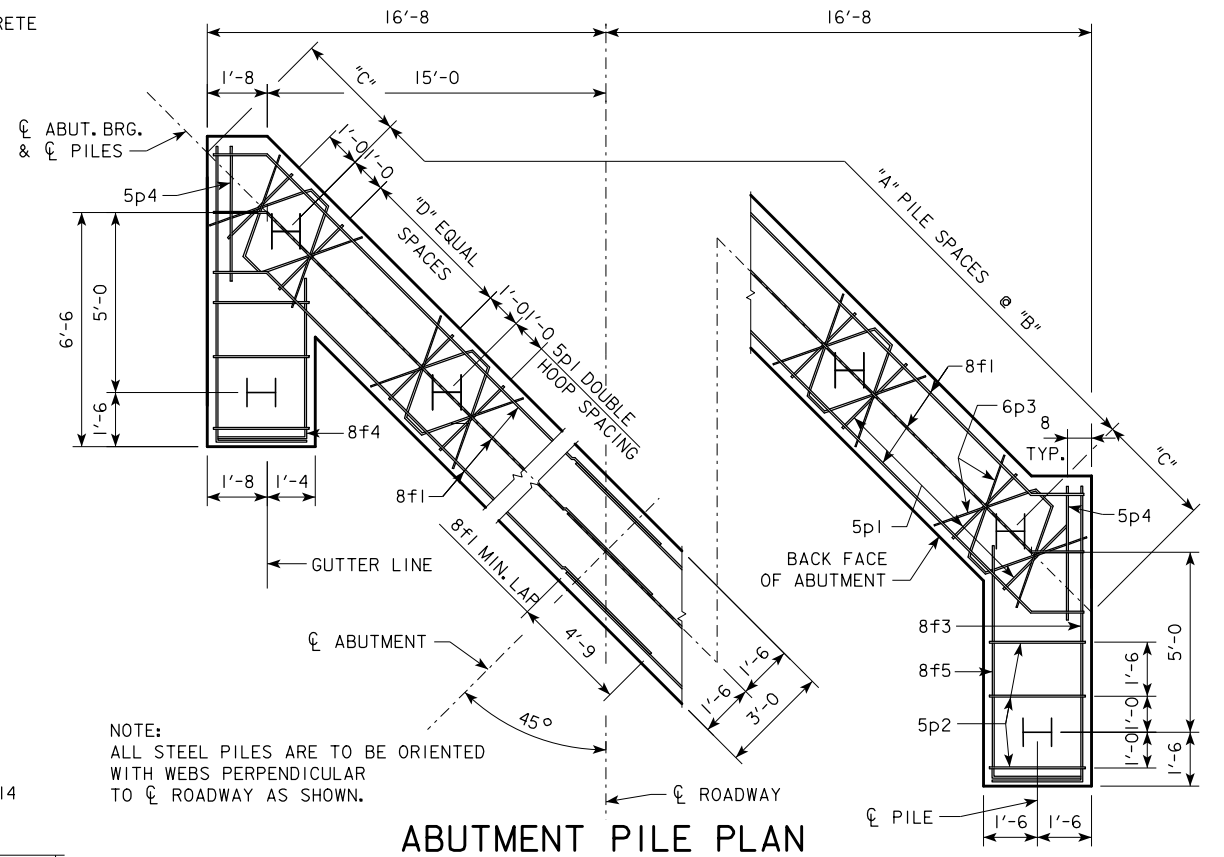
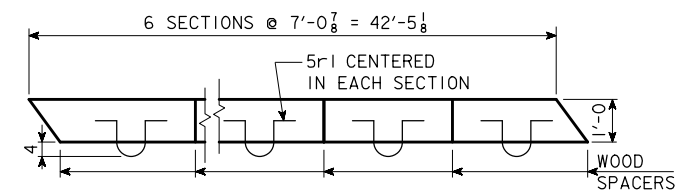
SPACING FOR:  
37- 8g1 BACK FACE  
30- 8g1 FRONT FACE  
33- 8g3 BACK FACE  
34- 5k1 & 5k2 BACK FACE



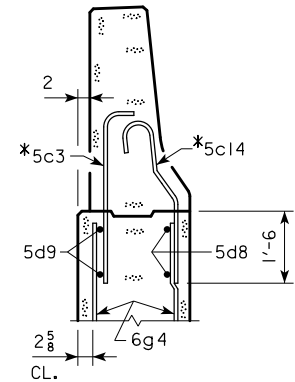
**PART SECTION B - B**

**PLAN OF TEMPORARY PAVING BLOCK**

NOTE: LINE PAVING NOTCH WITH TAR PAPER BEFORE PLACING THE TEMPORARY PAVING BLOCK.



**ABUTMENT PILE PLAN**

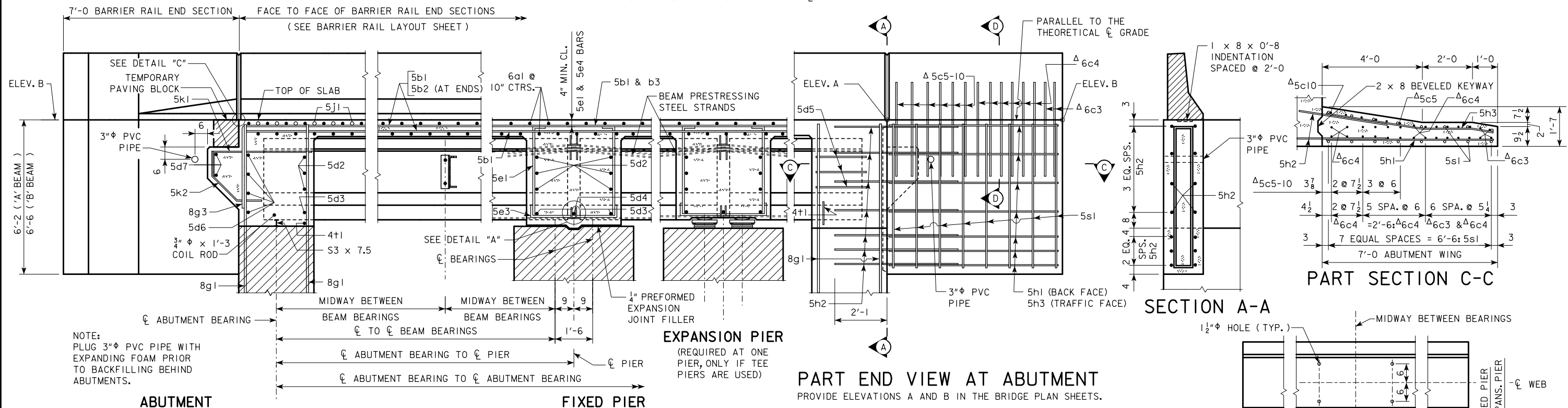


**PART SECTION C-C**

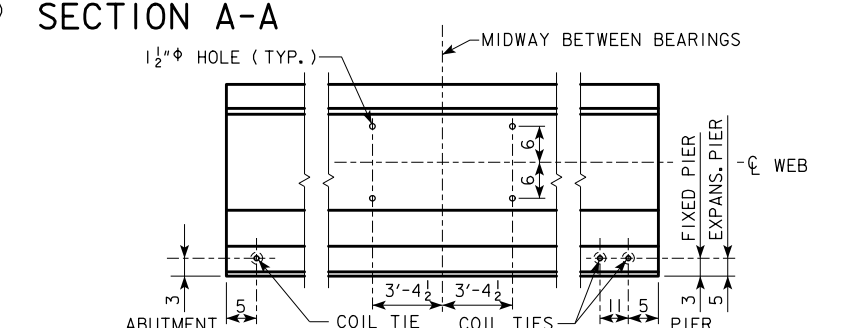
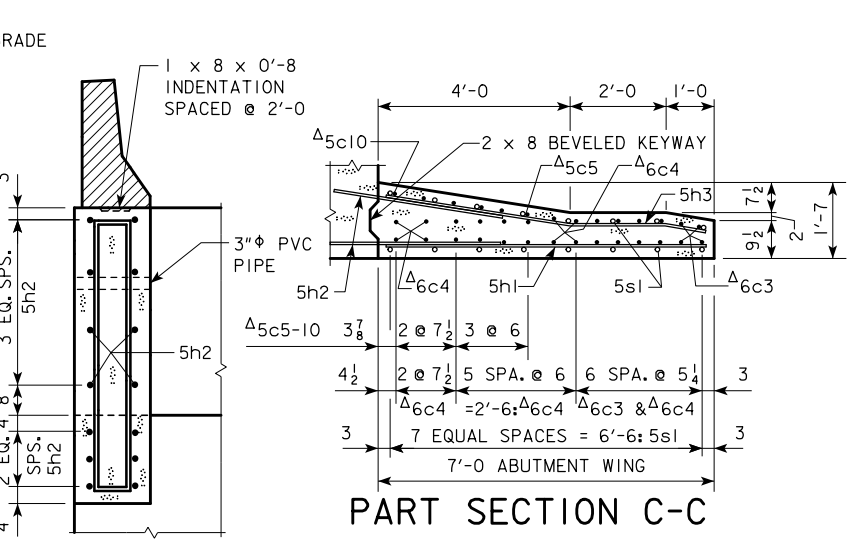
\* NOTE: SEE BARRIER RAIL SHEET FOR DETAILS. REINFORCING BARS 5c3 AND 5c14 ARE INCLUDED IN SUPERSTRUCTURE QUANTITIES.

04-13 LATEST REVISION DATE  Approved by BRIDGE ENGINEER <i>Thomas L. McDonald</i>		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
	<b>ABUTMENT DETAILS</b> 45° SKEW C BEAMS	<b>H30-26-06</b>

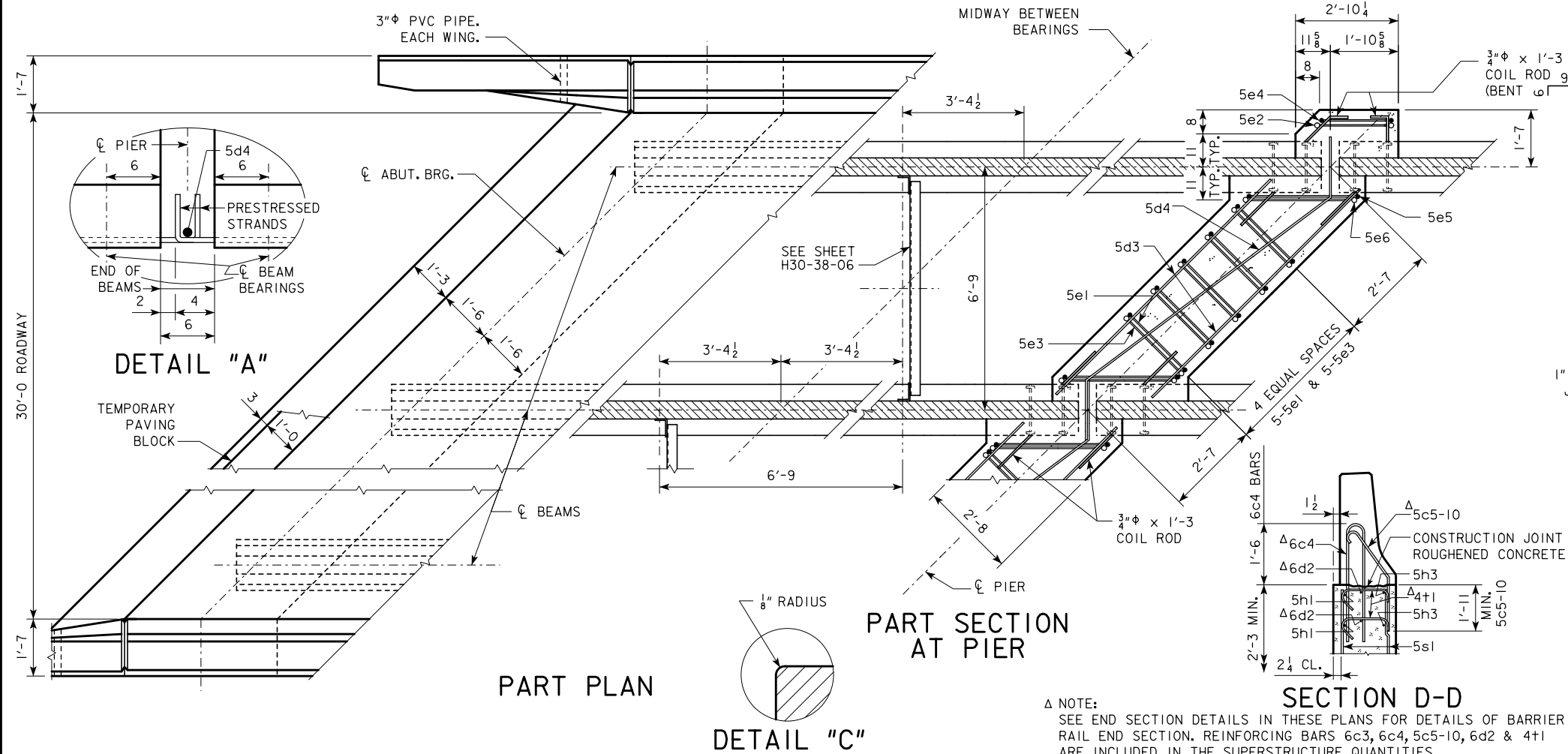
NOTE: BRIDGE IS SYMMETRICAL ABOUT C



**PART LONGITUDINAL SECTION NEAR GUTTER**  
(FOR DETAILS OF INTERMEDIATE DIAPHRAGM SEE SHEET H30-38-06)

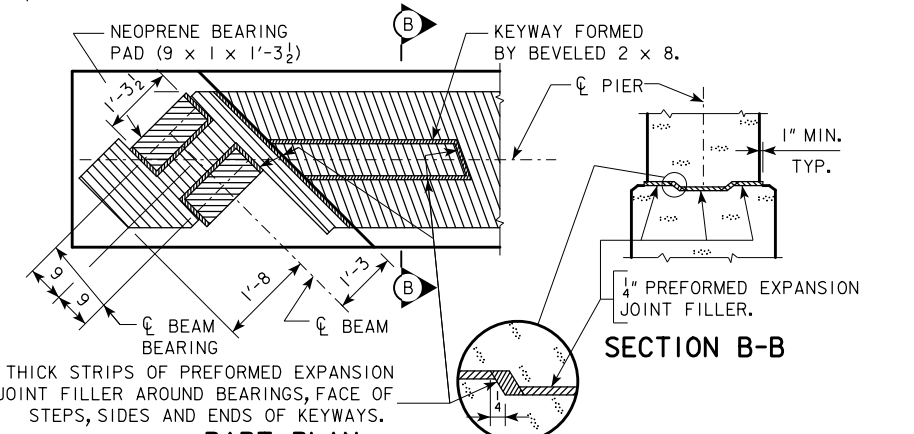


**LOCATION OF BEAM COIL TIES AND STEEL DIAPHRAGM BOLT HOLES**

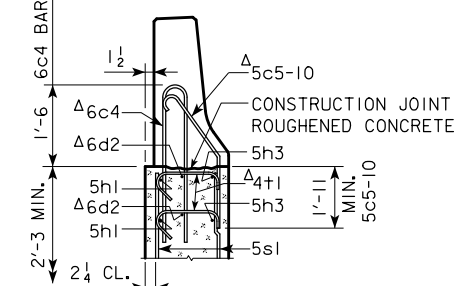


**PART PLAN**

**PART SECTION AT PIER**



**PART PLAN TOP OF FIXED PIER DETAILS**  
(SEE SHEET H30-44-06 FOR EXPANSION PIER BEARING DETAILS)



**SECTION D-D**

NOTE: SEE END SECTION DETAILS IN THESE PLANS FOR DETAILS OF BARRIER RAIL END SECTION. REINFORCING BARS 6c3, 6c4, 5c5-10, 6d2 & 4+1 ARE INCLUDED IN THE SUPERSTRUCTURE QUANTITIES.

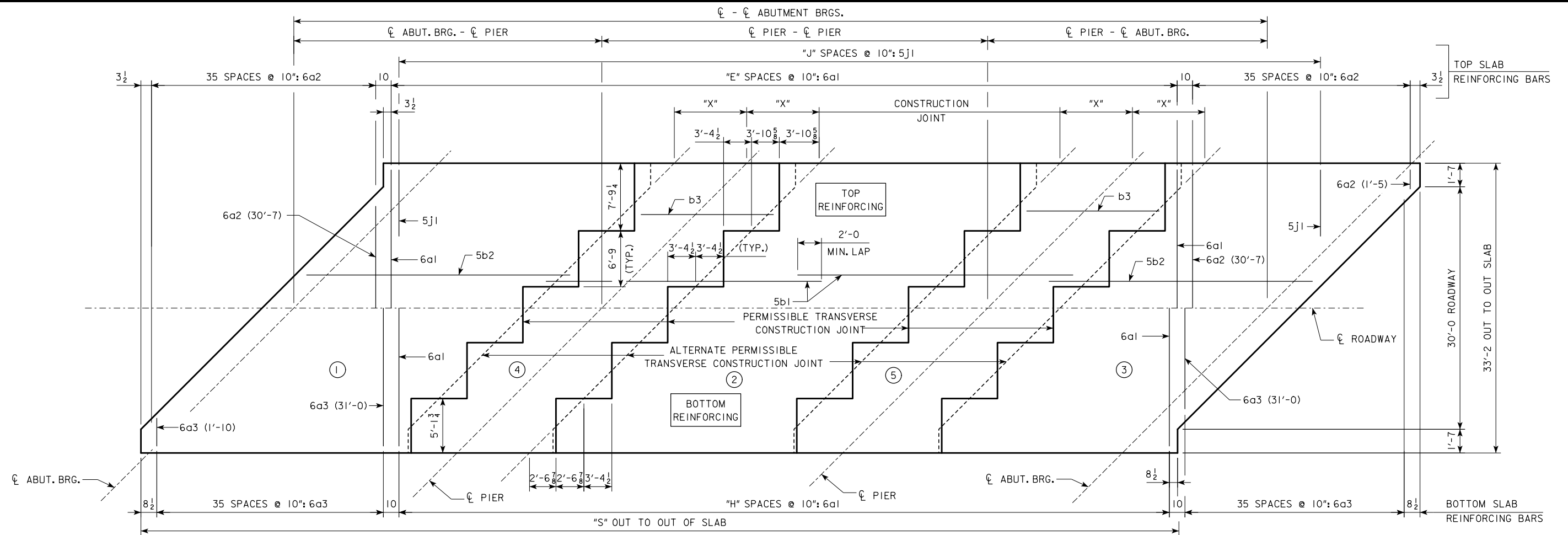
CORRECTION 09-10 - MINOR MODIFICATIONS TO PART SECTION C-C. REVISED 07-10 - ABUT. WING SHAPE CHANGED.

LATEST REVISION DATE 07-10 APPROVED BY BRIDGE ENGINEER <i>Norman L. McQuinn</i>	 STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	<b>H30-27-06</b>
	<b>LONGITUDINAL SECTION</b> 45° SKEW A & B BEAMS	
	<b>H30-27-06</b>	





REVISED 07-2015 - CHANGED CONCRETE PLACEMENT NOTE TO ACCOUNT FOR THE POSSIBLE ADDITION OF A RETARDING ADMIXTURE TO THE CONCRETE.



**SLAB LAYOUT**  
(LEFT AHEAD SKEW SHOWN, RIGHT AHEAD SKEW SIMILAR)

ESTIMATED QUANTITIES (SUPERSTRUCTURE PLUS INTEGRAL ABUTMENTS)		CL-CL ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
STRUCTURAL CONCRETE SUPERSTRUCTURE (INCLUDES ABUTMENT WINGS, PAV. BLOCKS)	WITH BARRIER RAIL	C.Y.	190.3	200.8	221.7	232.6	243.5	266.4	277.1	288.6	303.4
	WITH OPEN RAIL	C.Y.	192.8	203.5	224.7	235.8	246.9	269.9	280.8	292.5	307.6
STRUCTURAL CONCRETE ABUTMENTS (w/ WOOD PILES) ***		C.Y.	36.6	36.5	36.4	36.4	36.4	---	---	---	---
STRUCTURAL CONCRETE ABUTMENTS (w/ STEEL H PILES) ***		C.Y.	38.0	38.0	38.0	38.0	38.0	45.0	45.0	45.0	45.0
PRETENSIONED PRESTRESSED CONCRETE BEAM, CENTER SPAN		NO.	5-A50	5-A55	5-B59	5-B63	5-B67	5-C71	5-C75	5-C80	5-C80
PRETENSIONED PRESTRESSED CONCRETE BEAM, END SPAN		NO.	10-A42	10-A46	10-B50	10-B55	10-B59	10-C63	10-C67	10-C71	10-C80
CONCRETE RAIL (BARRIER OR OPEN)		L.F.	314.2	339.2	364.2	389.2	414.2	456.7	481.7	506.7	540.0
STRUCTURAL STEEL (w/ PILE BENT PIERS & DRAINS)		LB.	3985	3985	4073	4073	4073	4077	4077	4077	4077
STRUCTURAL STEEL (w/ PILE BENT PIERS & NO DRAINS)		LB.	3305	3305	3305	3305	3305	3229	3229	3229	3229
STRUCTURAL STEEL (w/ TEE PIERS & DRAINS)		LB.	4881	4881	4969	4969	4969	5135	5135	5135	5135
STRUCTURAL STEEL (w/ TEE PIERS & NO DRAINS)		LB.	4201	4201	4201	4201	4201	4287	4287	4287	4287
REINFORCING STEEL (w/ WOOD PILES & BARRIER RAIL)		LB.	53,802	57,451	60,673	64,538	68,117	---	---	---	---
REINFORCING STEEL (w/ WOOD PILES & OPEN RAIL)		LB.	54,467	58,072	61,441	65,482	68,991	---	---	---	---
REINFORCING STEEL (w/ STEEL H PILES & BARRIER RAIL)		LB.	53,547	57,044	60,683	64,548	68,127	74,517	78,661	82,239	86,532
REINFORCING STEEL (w/ STEEL H PILES & OPEN RAIL)		LB.	54,212	57,665	61,451	65,492	69,001	76,148	80,201	83,976	88,315
NO. OF WOOD PILES, TREATED FOR TWO ABUTMENTS		NO.	24	26	28	28	28	---	---	---	---
NO. OF STEEL H-PILES FOR TWO ABUTMENTS (HP 10 x 57)		NO.	12	12	12	12	12	18	18	18	20
PREBORED HOLES (w/ WOOD PILES)		L.F.	240	260	280	280	280	---	---	---	---
PREBORED HOLES (w/ STEEL H-PILES)		L.F.	120	120	120	120	120	180	180	180	200

CONCRETE PLACEMENT QUANT.		CL-CL ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
SLAB INCLUDING HAUNCH, ABUT. DIAPHRAGM, & WINGWALLS**, SECTIONS 1 & 3	WITH BARRIER RAIL	C.Y.	102.6	108.6	120.6	126.8	133.0	148.2	154.6	161.4	176.2
	WITH OPEN RAIL	C.Y.	103.9	110.0	122.2	128.5	134.8	150.1	156.6	163.5	178.6
SLAB INCLUDING HAUNCH, SECTION 2	WITH BARRIER RAIL	C.Y.	33.5	36.2	38.9	41.6	44.1	47.0	49.7	52.4	52.4
	WITH OPEN RAIL	C.Y.	34.2	37.0	39.7	42.5	45.1	48.0	50.7	53.5	53.5
SLAB INCLUDING HAUNCH & PIER DIAPHRAGM, SECTIONS 4 & 5	WITH BARRIER RAIL	C.Y.	43.6	45.4	51.2	53.2	55.4	59.4	61.0	63.0	63.0
	WITH OPEN RAIL	C.Y.	44.1	45.9	51.8	53.8	56.0	60.0	61.7	63.7	63.7
PAVING BLOCKS		C.Y.	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
ABUTMENT WINGS		C.Y.	7.2	7.2	7.6	7.6	7.6	8.4	8.4	8.4	8.4
ABUTMENT FOOTINGS (w/ WOOD PILES) ***		C.Y.	36.6	36.5	36.4	36.4	36.4	---	---	---	---
ABUTMENT FOOTINGS (w/ STEEL H PILES) ***		C.Y.	38.0	38.0	38.0	38.0	38.0	45.0	45.0	45.0	45.0

GENERAL DATA		CL-CL ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
VERTICAL CURVE	TOP OF SLAB TO ABUT. CONSTR. JT. AT C.L. ABUT. BRG.	"U"	3'-7 <sup>15</sup> / <sub>16</sub>	3'-7 <sup>3</sup> / <sub>4</sub>	4'-2 <sup>13</sup> / <sub>16</sub>	4'-2 <sup>13</sup> / <sub>16</sub>	4'-3	4'-8 <sup>1</sup> / <sub>2</sub>	4'-8 <sup>11</sup> / <sub>16</sub>	4'-9	4'-9 <sup>7</sup> / <sub>16</sub>
	TOP OF SLAB TO PIER TOP AT C.L. PIER*	"U"	3'-6 <sup>7</sup> / <sub>16</sub>	3'-6 <sup>5</sup> / <sub>8</sub>	4'-1 <sup>3</sup> / <sub>8</sub>	4'-1 <sup>5</sup> / <sub>8</sub>	4'-1 <sup>15</sup> / <sub>16</sub>	4'-7 <sup>5</sup> / <sub>16</sub>	4'-7 <sup>5</sup> / <sub>16</sub>	4'-7 <sup>9</sup> / <sub>16</sub>	4'-7 <sup>9</sup> / <sub>16</sub>
STRAIGHT GRADE	TOP OF SLAB TO ABUT. CONSTR. JT. AT C.L. ABUT. BRG.	"U"	3'-8 <sup>1</sup> / <sub>16</sub>	3'-7 <sup>7</sup> / <sub>8</sub>	4'-2 <sup>15</sup> / <sub>16</sub>	4'-2 <sup>15</sup> / <sub>16</sub>	4'-3 <sup>1</sup> / <sub>16</sub>	4'-8 <sup>11</sup> / <sub>16</sub>	4'-8 <sup>15</sup> / <sub>16</sub>	4'-9 <sup>3</sup> / <sub>8</sub>	4'-10
	TOP OF SLAB TO PIER TOP AT C.L. PIER*	"U"	3'-6 <sup>5</sup> / <sub>8</sub>	3'-6 <sup>7</sup> / <sub>8</sub>	4'-1 <sup>11</sup> / <sub>16</sub>	4'-1 <sup>15</sup> / <sub>16</sub>	4'-2 <sup>5</sup> / <sub>16</sub>	4'-7 <sup>15</sup> / <sub>16</sub>	4'-7 <sup>3</sup> / <sub>4</sub>	4'-8 <sup>1</sup> / <sub>16</sub>	4'-8 <sup>1</sup> / <sub>16</sub>
D.L. PIER REACTION (D.L. + F.W.S.) SERVICE LOADS		KIPS	364.7	392.9	449.7	479.4	509.3	609.0	642.1	675.9	708.7
L.L. PIER REACTION (HL93) NO IMPACT SERVICE LOADS		KIPS	207.6	215.3	222.7	229.9	237.0	244.0	253.2	268.2	284.4
NO. OF SPACES FOR 6a1 BARS (TOP)		"E"	135	150	165	180	195	210	225	240	260
NO. OF SPACES FOR 6a1 BARS (BOTTOM)		"H"	134	149	164	179	194	209	224	239	259
NO. OF SPACES FOR 5j1 BARS (TOP)		"J"	164	179	194	209	224	239	254	269	289
OUT TO OUT OF SLAB		"S"	143'-0 <sup>7</sup> / <sub>8</sub>	155'-6 <sup>7</sup> / <sub>8</sub>	168'-0 <sup>7</sup> / <sub>8</sub>	180'-6 <sup>7</sup> / <sub>8</sub>	193'-0 <sup>7</sup> / <sub>8</sub>	205'-6 <sup>7</sup> / <sub>8</sub>	218'-0 <sup>7</sup> / <sub>8</sub>	230'-6 <sup>7</sup> / <sub>8</sub>	247'-2 <sup>7</sup> / <sub>8</sub>
SLAB TRANSVERSE CONSTR. JT. DISTANCE FROM C.L. PIER		"X"	6'-7	7'-1	7'-7	8'-1	8'-8	9'-2	9'-8	10'-2	10'-2

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

\* VALUES SHOWN ARE FOR FIXED PIERS ONLY AND ALLOW FOR 1/16 INCH DEFLECTION OF THE 1 INCH NEOPRENE BEARING PAD. AT EXPANSION PIER LOCATIONS ADD 3/16 INCHES TO "U" VALUES SHOWN.

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

\*\*\* SEE SHEET H30-31-06 FOR ADDITIONAL CONCRETE REQUIRED IN ABUTMENT FOOTINGS.

**IOWADOT** Highway Division

STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES

**PRETENSIONED PRESTRESSED  
CONCRETE BEAM BRIDGES**

DECEMBER, 2006

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**SUPERSTRUCTURE DETAILS**      **H30-29-06**

45° SKEW

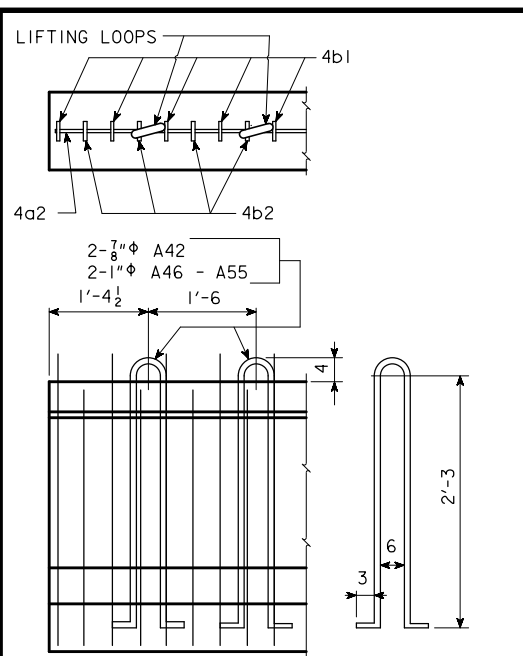
REVISED 05-11 - CORRECTED THE OPEN RAIL REBAR QUANTITIES FOR THE 201'-4, 231'-10, 226'-4, & 243'-0 BRIDGE LENGTHS.

REINFORCING BAR LIST			138'-10			151'-4			163'-10			176'-4			188'-10			201'-4			213'-10			226'-4			243'-0		
ONE SUPERSTRUCTURE AND TWO ABUTMENTS			42'-6			46'-8			50'-10			55'-0			59'-2			63'-4			67'-6			71'-8			80'-0		
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT			
6a1	SLAB TRANSV. TOP & BOTT.	=====	271	32'-10	13,365	301	32'-10	14,844	331	32'-10	16,323	361	32'-10	17,803	391	32'-10	19,282	421	32'-10	20,762	451	32'-10	22,241	481	32'-10	23,721	521	32'-10	25,693
6a2	SLAB TRANSV. TOP ENDS	=====	72	VARIES	1,730	72	VARIES	1,730	72	VARIES	1,730	72	VARIES	1,730	72	VARIES	1,730	72	VARIES	1,730	72	VARIES	1,730	72	VARIES	1,730	72	VARIES	1,730
6a3	SLAB TRANSV. BOTT. ENDS	=====	72	VARIES	1,775	72	VARIES	1,775	72	VARIES	1,775	72	VARIES	1,775	72	VARIES	1,775	72	VARIES	1,775	72	VARIES	1,775	72	VARIES	1,775	72	VARIES	1,775
5b1	SLAB LONGITUDINAL, TOP & BOTT.	=====	152	40'-0	6,341	228	40'-0	9,512	228	40'-0	9,512	228	40'-0	9,512	304	40'-0	12,683	304	40'-0	12,683	304	40'-0	12,683	380	40'-0	15,854	380	40'-0	15,854
5b2	SLAB LONGITUDINAL, TOP & BOTT., ENDS	=====	152	34'-5	5,456	152	21'-8	3,435	152	27'-11	4,426	152	34'-2	5,417	152	21'-5	3,395	152	27'-8	4,386	152	33'-11	5,377	152	21'-2	3,356	152	29'-6	4,677
6b3	SLAB LONGITUDINAL, TOP @ PIERS	=====	66	12'-10	1,272	66	13'-10	1,371	66	14'-10	1,470																		
7b3	SLAB LONGITUDINAL, TOP @ PIERS	=====																											
8b3	SLAB LONGITUDINAL, TOP @ PIERS	=====																											
5d1	PIER DIAPH. ENDS		12	3'-10	48	12	3'-10	48	12	3'-10	48	12	3'-10	48	12	3'-10	48	12	3'-10	48	12	3'-10	48	12	3'-10	48	12	3'-10	48
5d2	PIER & ABUT. DIAPH. LONGIT.		72	8'-2	613	72	8'-2	613	72	8'-2	613	72	8'-2	613	72	8'-2	613	72	8'-2	613	72	8'-2	613	72	8'-2	613	72	8'-2	613
5d3	PIER & ABUT. DIAPH. LONGIT.		24	7'-3	181	24	7'-3	181	24	7'-3	181	24	7'-3	181	24	7'-3	181	24	7'-3	181	24	7'-3	181	24	7'-3	181	24	7'-3	181
5d4	PIER DIAPH. LONGIT.		8	12'-0	100	8	12'-0	100	8	12'-0	100	8	12'-0	100	8	12'-0	100	8	12'-0	100	8	12'-0	100	8	12'-0	100	8	12'-0	100
5d5	ABUT. DIAPH. ENDS		12	6'-5	80	12	6'-5	80	12	6'-5	80	12	6'-5	80	12	6'-5	80	12	6'-5	80	12	6'-5	80	12	6'-5	80	12	6'-5	80
5d6	ABUT. DIAPH. LONGIT. B.F.		16	23'-9	396	16	23'-9	396	16	23'-9	396	16	23'-9	396	16	23'-9	396	16	23'-9	396	16	23'-9	396	16	23'-9	396	16	23'-9	396
5d7	PAVING NOTCH LONGIT.		8	23'-11	200	8	23'-11	200	8	23'-11	200	8	23'-11	200	8	23'-11	200	8	23'-11	200	8	23'-11	200	8	23'-11	200	8	23'-11	200
5d8	ABUT. DIAPH. WING EXT. LONGIT.																												
5d9	ABUT. DIAPH. WING EXT. LONGIT.																												
5e1	PIER DIAPH. HOOPS		40	9'-1	379	40	9'-1	379	40	10'-4	431	40	10'-4	431	40	10'-4	431	40	11'-4	473	40	11'-4	473	40	11'-4	473	40	11'-4	473
5e2	PIER DIAPH. TIES ENDS		4	2'-11	12	4	2'-11	12	4	2'-11	12	4	2'-11	12	4	2'-11	12	4	2'-11	12	4	2'-11	12	4	2'-11	12	4	2'-11	12
5e3	PIER DIAPH. TIES		40	3'-5	143	40	3'-5	143	40	3'-5	143	40	3'-5	143	40	3'-5	143	40	3'-5	143	40	3'-5	143	40	3'-5	143	40	3'-5	143
5e4	PIER DIAPH. HOOPS ENDS		4	8'-7	36	4	8'-7	36	4	9'-10	41	4	9'-10	41	4	9'-10	41	4	10'-10	45	4	10'-10	45	4	10'-10	45	4	10'-10	45
5e5	PIER DIAPH. HOOPS		16	10'-0	167	16	10'-0	167	16	11'-3	188	16	11'-3	188	16	11'-3	188	16	12'-3	204	16	12'-3	204	16	12'-3	204	16	12'-3	204
5e6	PIER DIAPH. TIES		16	4'-4	72	16	4'-4	72	16	4'-4	72	16	4'-4	72	16	4'-4	72	16	4'-4	72	16	4'-4	72	16	4'-4	72	16	4'-4	72
8f1	ABUT. FOOTING LONGIT.		36	25'-1	2,411	36	25'-1	2,411	36	25'-1	2,411	36	25'-1	2,411	36	25'-1	2,411	36	25'-2	2,419	36	25'-2	2,419	36	25'-2	2,419	36	25'-2	2,419
8f3	ABUT. EXTENSION LONGIT.																												
8f4	ABUT. EXTENSION LONGIT.																												
8f5	ABUT. EXTENSION LONGIT.																												
8g1	ABUT. VERT.		138	6'-8	2,456	138	6'-8	2,456	138	7'-3	2,671	138	7'-3	2,671	138	7'-3	2,671	134	7'-9	2,773	134	7'-9	2,773	134	7'-9	2,773	134	7'-10	2,803
8g3	ABUT. DIAPH. VERT. B.F.		66	15'-3	2,687	66	15'-3	2,687	66	15'-3	2,687	66	15'-3	2,687	66	15'-3	2,687	66	15'-9	2,775	66	15'-9	2,775	66	15'-9	2,775	66	15'-9	2,775
6g4	ABUT. DIAPH. WING EXT. VERT.																												
5h1	ABUT. WING HORIZ. B.F.		28	6'-8	195	28	6'-8	195	28	6'-8	195	28	6'-8	195	28	6'-8	195	36	6'-8	250	36	6'-8	250	36	6'-8	250	36	6'-8	250
5h2	ABUT. TO WING ANCHOR		56	4'-11	287	56	4'-11	287	56	4'-11	287	56	4'-11	287	56	4'-11	287	12	4'-11	62	12	4'-11	62	12	4'-11	62	12	4'-11	62
5h3	ABUT. WING HORIZ. TRAFFIC FACE		28	6'-9	197	28	6'-9	197	28	6'-9	197	28	6'-9	197	28	6'-9	197	36	6'-9	253	36	6'-9	253	36	6'-9	253	36	6'-9	253
5h4	ABUT. TO WING ANCHOR																												
5j1	TOP OF SLAB TRANSV. (AT RAIL)		330	6'-3	2,151	360	6'-3	2,347	390	6'-3	2,542	420	6'-3	2,738	450	6'-3	2,933	480	6'-3	3,129	510	6'-3	3,325	540	6'-3	3,520	580	6'-3	3,781
5k1	PAVING NOTCH		68	4'-9	337	68	4'-9	337	68	4'-9	337	68	4'-9	337	68	4'-9	337	68	4'-9	337	68	4'-9	337	68	4'-9	337	68	4'-9	337
5k2	PAVING NOTCH		68	3'-5	242	68	3'-5	242	68	3'-5	242	68	3'-5	242	68	3'-5	242	68	3'-5	242	68	3'-5	242	68	3'-5	242	68	3'-5	242
5p1	ABUTMENT HOOPS (WOOD/STEEL)		132/120	10'-6	1446/1314	144/120	10'-6	1577/1314	104/120	10'-6	1139/1314	104/120	10'-6	1139/1314	104/120	10'-6	1139/1314	104/120	10'-6	1,402	128	10'-6	1,402	128	10'-6	1,402	120	10'-6	1,314
5p2	ABUTMENT HOOPS		8	12'-11	108	8	12'-11	108	8	12'-11	108	8	12'-11	108	8	12'-11	108	8	12'-11	108	24	10'-8	267	24	10'-8	267	24	10'-8	267
6p3	ABUT. BOTT. AT PILES																												
5p4	ABUT. HOOPS AT ENDS																												
5r1	PAVING BLOCK LIFTING LOOPS		12	2'-10	35	12	2'-10	35	12	2'-10	35	12	2'-10	35	12	2'-10	35	12	2'-10	35	12	2'-10	35	12	2'-10	35	12	2'-10	35
5s1	WING VERT.		64	5'-10	389	64	5'-10	389	64	6'-2	412	64	6'-2	412	64	6'-2	412	64	6'-11	462	64	6'-11	462	64	6'-11	462	64	6'-11	462
4+1	UNDER BEAMS AT ABUTMENTS		10	5'-1	34	10	5'-1	34	10	5'-1	34	10	5'-1	34	10	5'-1	34	10	5'-5	36	10	5'-5	36	10	5'-5	36	10	5'-5	36
#2	PILE SPIRAL (WOOD/STEEL)*		24/12	38'-6	154/77	26/12	38'-6	167/77	28/12	38'-6	180/77	28/12	38'-6	180/77	28/12	38'-6	180/77	28/12	38'-6	116	18	38'-6	116	18	38'-6	116	18	38'-6	129
	SPIRAL SPACERS, L 7/8 x 7/8 x 1/8 x 0.70 (WOOD/STL)*		72/36	1'-10	92/46	78/36	1'-10	100/46	84/36	1'-10	108/46	84/36	1'-10	108/46	84/36	1'-1													



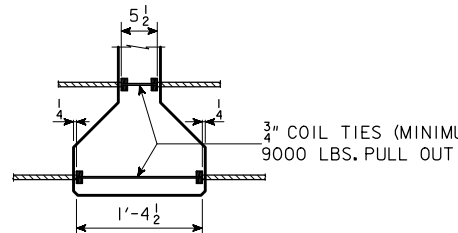


REVISED 07-10 - THE SPECIFICATION REFERENCES WERE CHANGED. THE BEAM DATA WAS UPDATED TO THE CURRENT BEAMS.



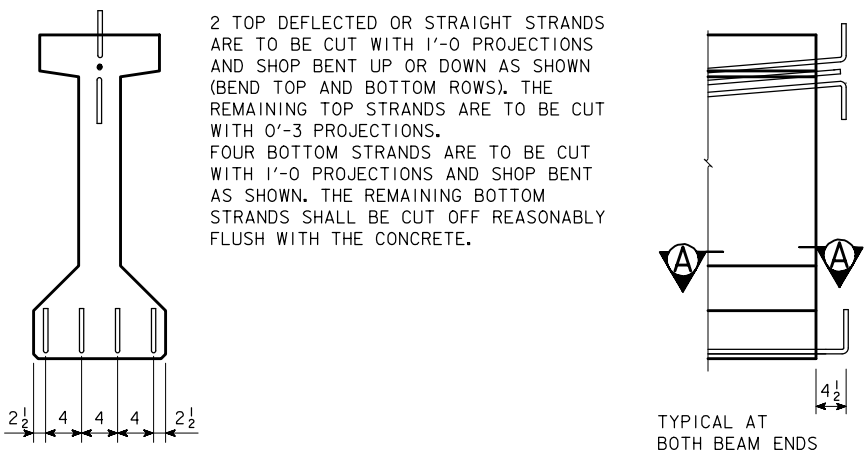
**LIFTING LOOP DETAIL**

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



**COIL TIE DETAIL**

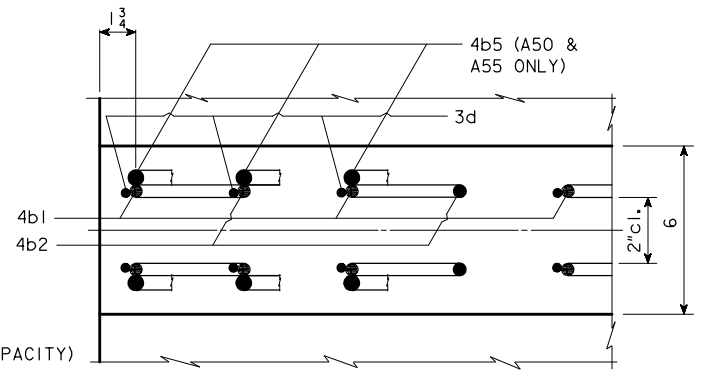
NUMBER AND EXACT LOCATION OF COIL TIES TO BE AS DETAILED ON SPECIFIC BRIDGE DESIGN.



**STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS**

2 TOP DEFLECTED OR STRAIGHT STRANDS ARE TO BE CUT WITH 1'-0" PROJECTIONS AND SHOP BENT UP OR DOWN AS SHOWN (BEND TOP AND BOTTOM ROWS). THE REMAINING TOP STRANDS ARE TO BE CUT WITH 0'-3" PROJECTIONS. FOUR BOTTOM STRANDS ARE TO BE CUT WITH 1'-0" PROJECTIONS AND SHOP BENT AS SHOWN. THE REMAINING BOTTOM STRANDS SHALL BE CUT OFF REASONABLY FLUSH WITH THE CONCRETE.

TYPICAL AT BOTH BEAM ENDS



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

**A BEAM DATA**

BEAM	SPAN LENGTH $\phi$ - $\ell$ BEARING	OVERALL BEAM LENGTH (L)	STRAND SIZE	NO. OF STRANDS		TOTAL INITIAL PRESTRESS KIPS	HOLD DOWN FORCE-KIPS	CAMBER (in.)		DEFLECTION (in.) $\Delta_D$				PERMISSIBLE SPACING		WEIGHT (TONS)	CONCRETE (C. Y.)	REINFORCING STEEL-(LB)				
				STRAIGHT	DEFLECTED			AT RELEASE	AFTER LOSSES	IMMEDIATE <sup>①</sup> (ELASTIC) $\Delta_T$		TIME <sup>②</sup> (PLASTIC) $\Delta_T$		HL93 LOADING								
										CONC. DIAPH.	STEEL DIAPH.	CONC. DIAPH.	STEEL DIAPH.	CONC. DIAPH.	STEEL DIAPH.							
A42	42'-6"	43'-6"	0.6"	7	2	383	9.3	0.70		1.24		0.38	0.35	0.09	0.09		7'-6"	7'-6"	7.1		3.49	452
*A46	46'-8"	47'-8"	0.6"	8	2	426	8.5	0.76		1.35		0.50	0.47	0.13	0.12		7'-6"	7'-6"	7.7		3.82	488
*A50	50'-10"	51'-10"	0.6"	9	3	510.9	11.7	1.02		1.82		0.69	0.65	0.17	0.16		7'-6"	7'-6"	8.4		4.15	503
*A55	55'-0"	56'-0"	0.6"	10	3	553.4	10.8	1.29		2.30		0.94	0.88	0.23	0.22		7'-6"	7'-6"	9.1		4.49	547

① DEFLECTIONS AT MID-SPAN DUE TO WEIGHT OF SLAB AND DIAPHRAGM. THE DEFLECTIONS SHOWN ARE FOR A SLAB WEIGHT OF 757 #/FT. (8" SLAB AND 7'-6" BEAM SPACING) AND ONE CONCRETE DIAPHRAGM (1912 #) OR ONE STEEL DIAPHRAGM (285 #) AT  $\phi$  OF SPAN. FOR DIFFERENT SLAB AND DIAPHRAGM WEIGHTS, DEFLECTIONS WILL BE DIRECTLY PROPORTIONAL.

② DEFLECTIONS DUE TO THE COMBINED EFFECT OF CREEP DUE TO WEIGHT OF SLAB AND SHRINKAGE OF SLAB.

TOTAL BEAM DEFLECTIONS AT  $\phi$  OF SPAN,  $\Delta_D$ , DUE TO WEIGHT OF SLAB AND DIAPHRAGMS FOR DETAILING PURPOSE:  
 (A)  $\Delta_D = \Delta_T + \Delta_T$  FOR SIMPLE SPAN.  
 (B)  $\Delta_D = \Delta_T + \frac{3}{4}\Delta_T$  FOR END SPANS OF CONTINUOUS BRIDGE.  
 (C)  $\Delta_D = \Delta_T + \frac{1}{2}\Delta_T$  FOR INTERIOR SPANS OF CONTINUOUS BRIDGE.

③ TOTAL INITIAL PRESTRESS IS BASED ON 72.6%  $f'_s$ ,  
 $f'_s = 270$  ksi AND  $A_s = 0.217$  sq. in.

\* MINIMUM CONCRETE  $f'_c$  (AT 28 DAYS) SHALL BE 7,000 psi. MINIMUM  $f'_c$  AT RELEASE SHALL BE 6,000 psi.

**SPECIFICATIONS:**

CONSTRUCTION: STANDARD SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION, CURRENT SERIES, WITH CURRENT APPLICABLE SPECIAL PROVISIONS AND SUPPLEMENTAL SPECIFICATIONS.  
 DESIGN: A.A.S.H.T.O. LRFD, SERIES OF 2004, WITH MINOR MODIFICATIONS.

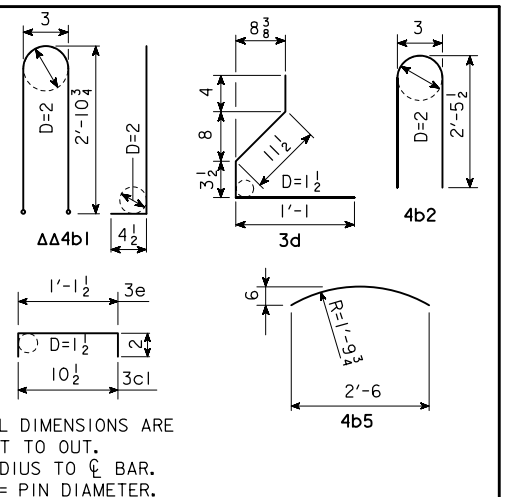
**DESIGN STRESSES:**

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE TO BE IN ACCORDANCE WITH A.A.S.H.T.O. LRFD SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 2004:  
 REINFORCING STEEL IN ACCORDANCE WITH SECTION 5, GRADE 60.  
 CONCRETE IN ACCORDANCE WITH SECTION 5,  $f'_c = 5000$  psi (EXCEPT AS NOTED)  
 PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 5,  $f'_s = 270,000$  psi.

**NOTES:**

THESE BEAMS ARE DESIGNED FOR AASHTO LIVE LOADS AS INDICATED IN ABOVE TABLE WITH AN ALLOWANCE OF 20 LB. PER SQUARE FOOT OF ROADWAY FOR FUTURE WEARING SURFACE.  
 HOLD DOWN POINTS FOR DEFLECTED STRANDS MAY BE MOVED TOWARD ENDS OF BEAM A DISTANCE OF 0.05 L MAXIMUM AT PRODUCER'S OPTION.  
 ALL PRESTRESSING STRANDS SHALL CONFORM TO ASTM A416 GRADE 270 LOW RELAXATION STRANDS.  
 TOPS OF BEAMS ARE TO BE STRUCK OFF LEVEL AND FINISHED AS PER MATERIALS IM570.  
 BEARINGS SHALL BE AS DETAILED ON OTHER DESIGN SHEETS. BEAMS TO BE USED IN BRIDGES MADE CONTINUOUS BY THE POURED IN PLACE FLOOR, ARE TO BE AT LEAST 28 DAYS OLD BEFORE THE FLOOR IS PLACED UNLESS A SHORTER CURING TIME IS APPROVED BY THE BRIDGE ENGINEER.  
 THE PORTIONS OF THE PRESTRESS BEAMS THAT ARE TO BE EMBEDDED IN THE ABUTMENT AND PIER DIAPHRAGMS SHALL BE ROUGHENED FOR A DISTANCE OF 10" FROM THE BEAM END BY SANDBLASTING OR OTHER APPROVED METHODS TO PROVIDE SUITABLE BOND BETWEEN THE BEAM AND THE DIAPHRAGM IN ACCORDANCE WITH ARTICLE 2403.14 OF THE SPECIFICATIONS.  
 ALL BEAMS ARE TO BE INCREASED IN LENGTH TO COMPENSATE FOR ELASTIC SHORTENING, CREEP AND SHRINKAGE.  
 IF THE STEEL DIAPHRAGM OPTION IS ALLOWED AND USED, HOLES MUST BE CAST IN THE WEB TO ACCOMMODATE THE STEEL DIAPHRAGM ATTACHMENTS AS DETAILED ON THE STEEL DIAPHRAGM DETAIL SHEET.  
 IF SOLE PLATE IS REQUIRED FOR BEARING, SOLE PLATE IS TO BE SET IN FORMS WHEN BEAM IS CAST AND FORMED OUT BELOW TO EXCLUDE CONCRETE AS DETAILED ON THE BEARING SHEET.  
 0.6" DIAMETER STRANDS STRESSED TO NOT MORE THAN 5,000 LBS. EACH MAY BE USED IN LIEU OF THE  $\alpha$  BARS WHICH RUN THE FULL LENGTH OF THE BEAM IN THE TOP FLANGE.

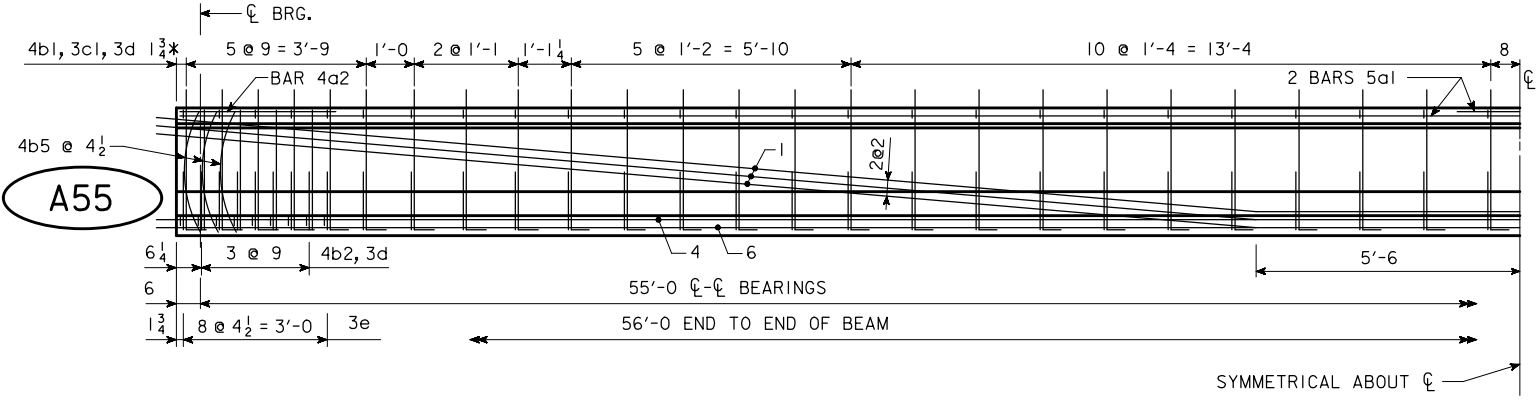
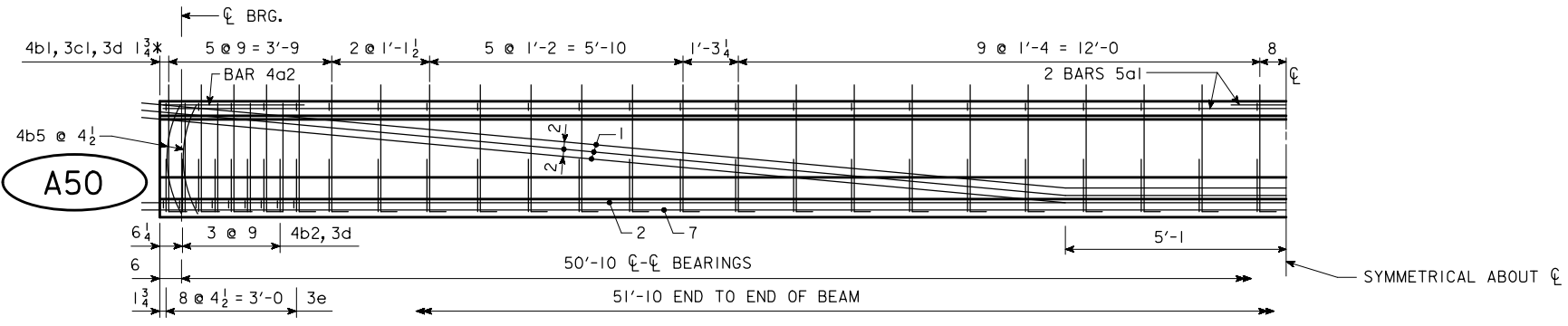
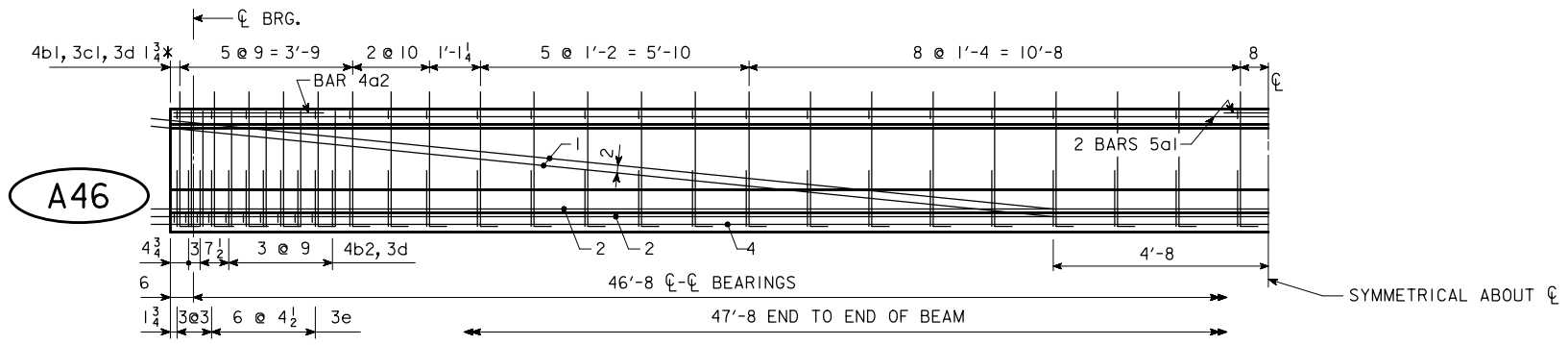
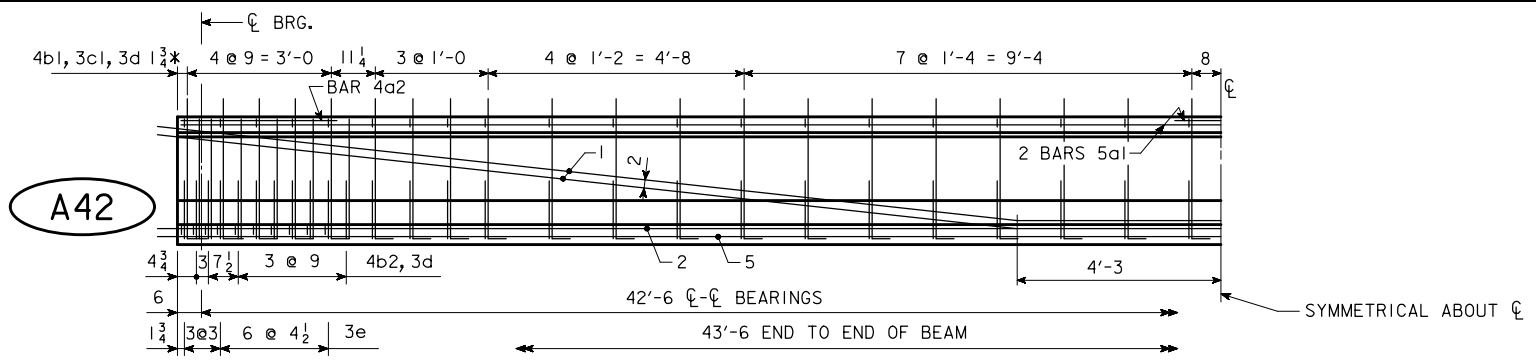
REINFORCING BAR LIST									
BEAM	SPAN	A42		A46		A50		A55	
		NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
		4	22'-10"	4	24'-11"	4	27'-0"	4	29'-1"
		2	3'-3"	2	3'-3"	2	3'-3"	2	3'-3"
$\Delta\Delta$	4b1	40	6'-8"	44	6'-8"	46	6'-8"	50	6'-8"
	4b2	12	5'-0"	12	5'-0"	8	5'-0"	8	5'-0"
	4b5					8	2'-9"	12	2'-9"
	3c1	40	1'-3"	44	1'-3"	46	1'-3"	50	1'-3"
**	3d	104	2'-8"	112	2'-8"	108	2'-8"	116	2'-8"
	3e	20	1'-6"	20	1'-6"	18	1'-6"	18	1'-6"



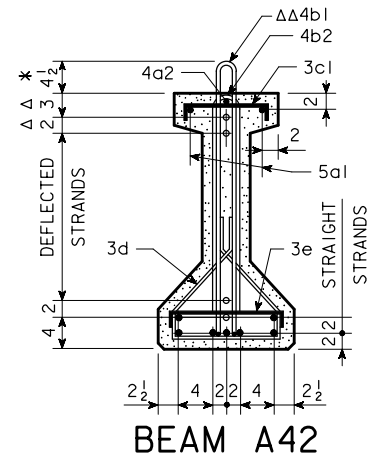
$\Delta\Delta$  4b1 BARS TO BE EPOXY COATED.  
 \*\* WHERE DEFLECTING STRANDS INTERFERE WITH PLACEMENT, SOME IN-PLACE BENDING MAY BE NECESSARY.

07-10 LATEST REVISION DATE  <i>Thomas L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER	
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006
	<span>A BEAM DETAILS</span> <span>H30-32-06</span>

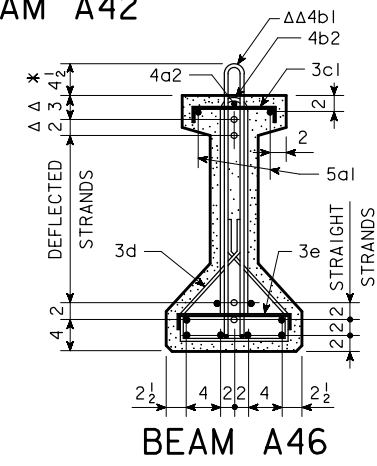
REVISED 07-10 - THE SPECIFICATION REFERENCES WERE CHANGED. THE BEAM DATA WAS UPDATED TO THE CURRENT BEAMS.



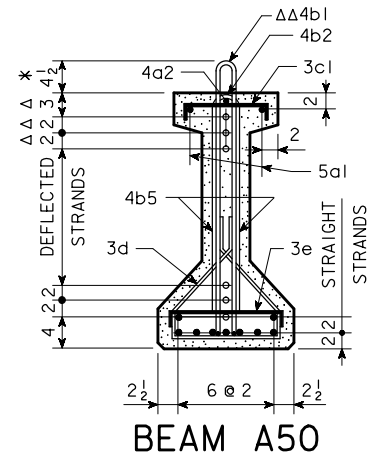
NOTE: DIMENSIONS FOR THE LOCATION OF THE DEFLECTED STRANDS ARE AT CL BEAM AND END OF BEAM.



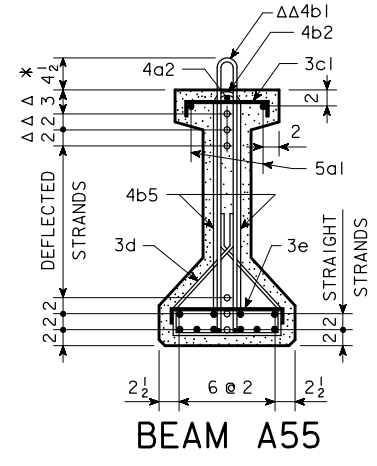
BEAM A42



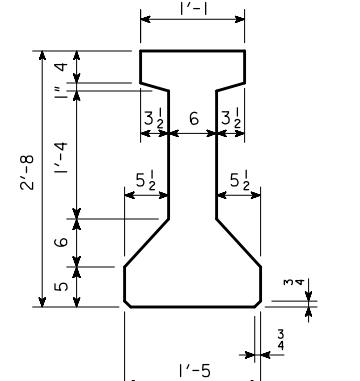
BEAM A46



BEAM A50



BEAM A55



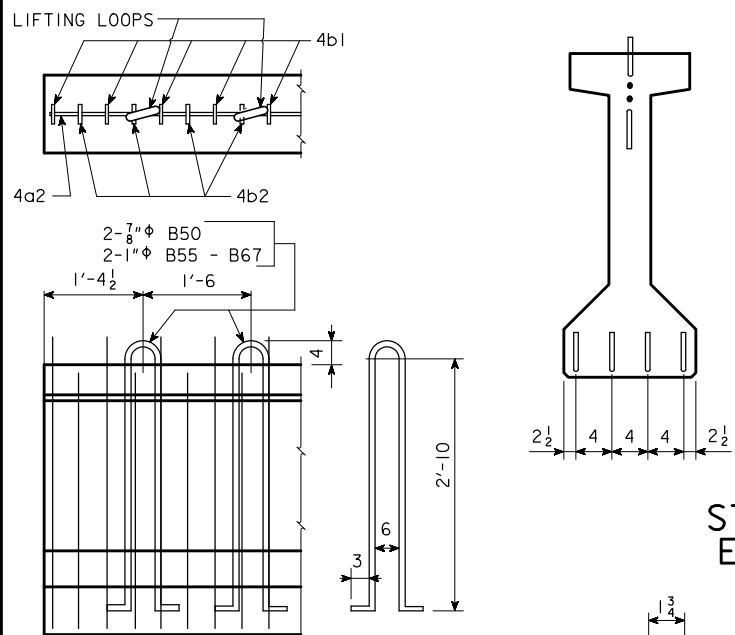
"A" BEAM CROSS SECTION

A = 311.5 in<sup>2</sup>  
 Y<sub>b</sub> = 14.05 in.  
 I = 34,082 in.<sup>4</sup>

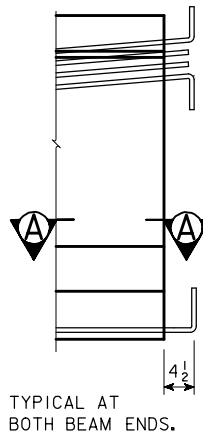
NOTE: BARS 3d ARE TO BE PLACED IN PAIRS.  
 ○ DEFLECTED STRANDS  
 \* KEEP  
 Δ DIMENSIONS AT END OF BEAM  
 ΔΔ EPOXY COATED BARS

07-10 LATEST REVISION DATE  <i>Harmon L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER	
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006
<b>A BEAM DETAILS</b>	<b>H30-33-06</b>

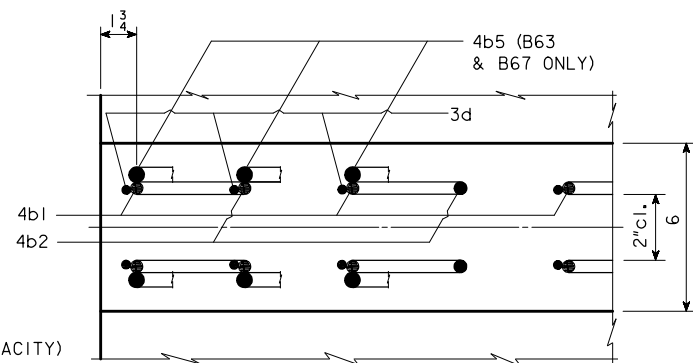
REVISED 07-10 - THE SPECIFICATION REFERENCES WERE CHANGED. THE BEAM DATA WAS UPDATED TO THE CURRENT BEAMS.



2 TOP DEFLECTED OR STRAIGHT STRANDS ARE TO BE CUT WITH 1'-0 PROJECTIONS AND SHOP BENT UP OR DOWN AS SHOWN (BEND TOP AND BOTTOM ROWS). THE REMAINING TOP STRANDS ARE TO BE CUT WITH 0'-3 PROJECTIONS. FOUR BOTTOM STRANDS ARE TO BE CUT WITH 1'-0 PROJECTIONS AND SHOP BENT AS SHOWN. THE REMAINING BOTTOM STRANDS SHALL BE CUT OFF REASONABLY FLUSH WITH THE CONCRETE.

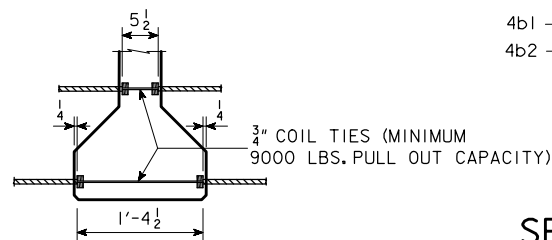


**STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS**



**LIFTING LOOP DETAIL**

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



**COIL TIE DETAIL**

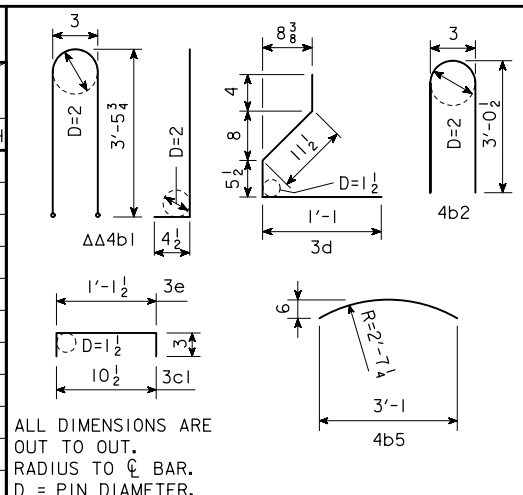
NUMBER AND EXACT LOCATION OF COIL TIES TO BE AS DETAILED ON SPECIFIC BRIDGE DESIGN.

ΔΔ4b1 BARS TO BE EPOXY COATED.

\*\* WHERE DEFLECTING STRANDS INTERFERE WITH PLACEMENT, SOME IN-PLACE BENDING MAY BE NECESSARY.

**REINFORCING BAR LIST**

BEAM	SPAN	B50		B55		B59		B63		B67	
		NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
6a1		4	27'-3"	4	29'-4"	4	31'-5"	4	33'-6"	4	35'-7"
4a2		2	4'-2"	2	4'-2"	2	4'-2"	2	4'-2"	2	4'-2"
ΔΔ	4b1	44	7'-10"	46	7'-10"	50	7'-10"	52	7'-10"	56	7'-10"
	4b2	12	6'-2"	12	6'-2"	12	6'-2"	12	6'-2"	12	6'-2"
	4b5							12	3'-3"	12	3'-3"
**	3c1	44	1'-5"	46	1'-5"	50	1'-5"	52	1'-5"	56	1'-5"
	3d	112	2'-10"	116	2'-10"	124	2'-10"	128	2'-10"	136	2'-10"
	3e	24	1'-8"	24	1'-8"	24	1'-8"	24	1'-8"	24	1'-8"



ALL DIMENSIONS ARE OUT TO OUT. RADIUS TO C. BAR. D = PIN DIAMETER.

**B BEAM DATA**

BEAM	SPAN LENGTH @ BEARING	OVERALL BEAM LENGTH (L)	STRAND SIZE DIA. (inches)	NO. OF STRANDS		TOTAL INITIAL PRESTRESS KIPS	HOLD DOWN FORCE-KIPS	CAMBER (in.)		DEFLECTION (in.) Δ <sub>D</sub>				PERMISSIBLE SPACING		WEIGHT (TONS)	CONCRETE (C. Y.)	REINFORCING STEEL-(LB)					
				STRAIGHT	DEFLECTED			AT RELEASE	AFTER LOSSES	IMMEDIATE (ELASTIC) Δ <sub>E</sub>		TIME (PLASTIC) Δ <sub>T</sub>		HL93 LOADING									
										CONC. DIAPH.	STEEL DIAPH.	CONC. DIAPH.	STEEL DIAPH.	CONC. DIAPH.	STEEL DIAPH.								
B50	50'-10"	51'-10"	0.60	8	2	425	10.8	0.67		1.24		0.43	0.39	0.11	0.10			7'-6"	7'-6"	10.3		5.10	607
*B55	55'-0"	56'-0"	0.60	8	3	468	14.1	0.85		1.51		0.58	0.54	0.14	0.13			7'-6"	7'-6"	11.2		5.51	635
*B59	59'-2"	60'-2"	0.60	10	3	554	13.2	1.12		1.99		0.82	0.77	0.21	0.19			7'-6"	7'-6"	12.0		5.92	680
*B63	63'-4"	64'-4"	0.60	12	3	639	12.3	1.30		2.32		0.91	0.84	0.23	0.21			7'-6"	7'-6"	12.8		6.33	733
*B67	67'-6"	68'-6"	0.60	14	3	724	11.6	1.69		2.98		1.16	1.09	0.29	0.27			7'-6"	7'-6"	13.6		6.74	778

① DEFLECTIONS AT MID-SPAN DUE TO WEIGHT OF SLAB AND DIAPHRAGM. THE DEFLECTIONS SHOWN ARE FOR A SLAB WEIGHT OF 757 #/FT. (8" SLAB AND 7'-6 BEAM SPACING) AND ONE CONCRETE DIAPHRAGM (2270 #) OR ONE STEEL DIAPHRAGM (285 #) AT C. OF SPAN. FOR DIFFERENT SLAB AND DIAPHRAGM WEIGHTS, DEFLECTIONS WILL BE DIRECTLY PROPORTIONAL.

② DEFLECTIONS DUE TO THE COMBINED EFFECT OF CREEP DUE TO WEIGHT OF SLAB AND SHRINKAGE OF SLAB.

TOTAL BEAM DEFLECTIONS AT C. OF SPAN, Δ<sub>D</sub>, DUE TO WEIGHT OF SLAB AND DIAPHRAGMS FOR DETAILING PURPOSE:

- (A) Δ<sub>D</sub> = Δ<sub>E</sub> + Δ<sub>T</sub> FOR SIMPLE SPAN.
- (B) Δ<sub>D</sub> = Δ<sub>E</sub> + 3/4 Δ<sub>T</sub> FOR END SPANS OF CONTINUOUS BRIDGE.
- (C) Δ<sub>D</sub> = Δ<sub>E</sub> + 1/2 Δ<sub>T</sub> FOR INTERIOR SPANS OF CONTINUOUS BRIDGE.

③ TOTAL INITIAL PRESTRESS IS BASED ON 72.6% f'<sub>s</sub>, f'<sub>s</sub> = 270 ksi AND A<sub>s</sub> = 0.217 sq. in.

\* MINIMUM CONCRETE f'<sub>c</sub> (AT 28 DAYS) SHALL BE 7,000 psi. MINIMUM f'<sub>c</sub> AT RELEASE SHALL BE 6,000 psi.

**SPECIFICATIONS:**

CONSTRUCTION: STANDARD SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION, CURRENT SERIES, WITH CURRENT APPLICABLE SPECIAL PROVISIONS AND SUPPLEMENTAL SPECIFICATIONS.

DESIGN: A.A.S.H.T.O. LRFD, SERIES OF 2004, WITH MINOR MODIFICATIONS.

**DESIGN STRESSES:**

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE TO BE IN ACCORDANCE WITH A.A.S.H.T.O. LRFD SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 2004:

REINFORCING STEEL IN ACCORDANCE WITH SECTION 5, GRADE 60.

CONCRETE IN ACCORDANCE WITH SECTION 5, f'<sub>c</sub> = 5000 psi (EXCEPT AS NOTED)

PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 5, f'<sub>s</sub> = 270,000 psi.

**NOTES:**

THESE BEAMS ARE DESIGNED FOR AASHTO LIVE LOADS AS INDICATED IN ABOVE TABLE WITH AN ALLOWANCE OF 20 LB. PER SQUARE FOOT OF ROADWAY FOR FUTURE WEARING SURFACE.

HOLD DOWN POINTS FOR DEFLECTED STRANDS MAY BE MOVED TOWARD ENDS OF BEAM A DISTANCE OF 0.05 L MAXIMUM AT PRODUCER'S OPTION.

ALL PRESTRESSING STRANDS SHALL CONFORM TO ASTM A416 GRADE 270 LOW RELAXATION STRANDS.

TOPS OF BEAMS ARE TO BE STRUCK OFF LEVEL AND FINISHED AS PER MATERIALS IM570.

BEARINGS SHALL BE AS DETAILED ON OTHER DESIGN SHEETS. BEAMS TO BE USED IN BRIDGES MADE CONTINUOUS BY THE POURED IN PLACE FLOOR, ARE TO BE AT LEAST 28 DAYS OLD BEFORE THE FLOOR IS PLACED UNLESS A SHORTER CURING TIME IS APPROVED BY THE BRIDGE ENGINEER.

THE PORTIONS OF THE PRESTRESS BEAMS THAT ARE TO BE EMBEDDED IN THE ABUTMENT AND PIER DIAPHRAGMS SHALL BE ROUGHENED FOR A DISTANCE OF 10" FROM THE BEAM END BY SANDBLASTING OR OTHER APPROVED METHODS TO PROVIDE SUITABLE BOND BETWEEN THE BEAM AND THE DIAPHRAGM IN ACCORDANCE WITH ARTICLE 2403.14 OF THE SPECIFICATIONS.

ALL BEAMS ARE TO BE INCREASED IN LENGTH TO COMPENSATE FOR ELASTIC SHORTENING, CREEP AND SHRINKAGE.

IF THE STEEL DIAPHRAGM OPTION IS ALLOWED AND USED, HOLES MUST BE CAST IN THE WEB TO ACCOMMODATE THE STEEL DIAPHRAGM ATTACHMENTS AS DETAILED ON THE STEEL DIAPHRAGM DETAIL SHEET.

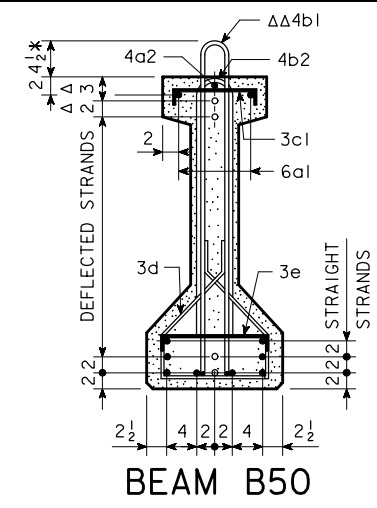
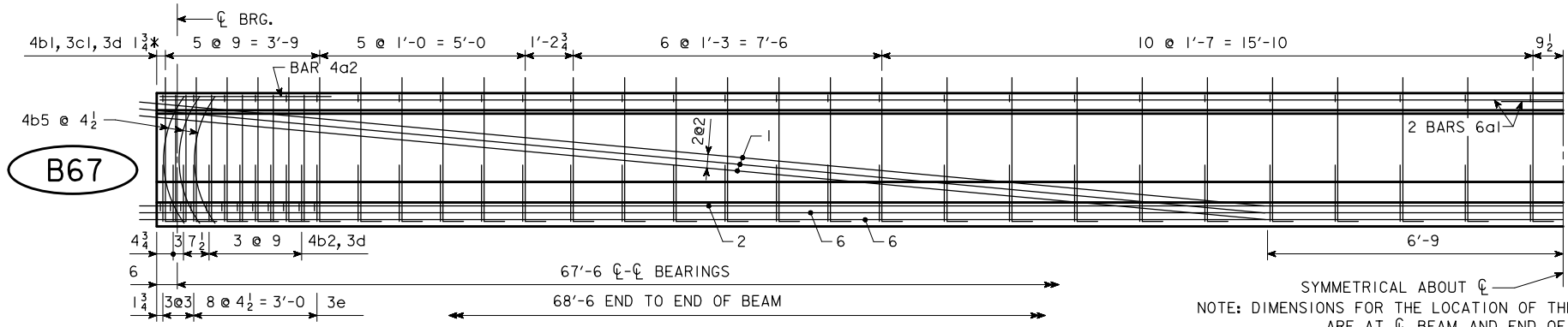
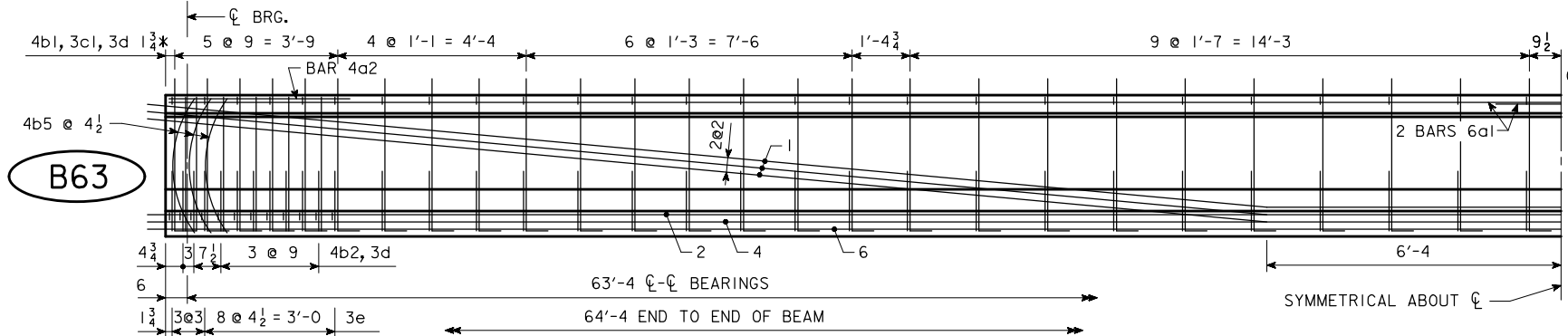
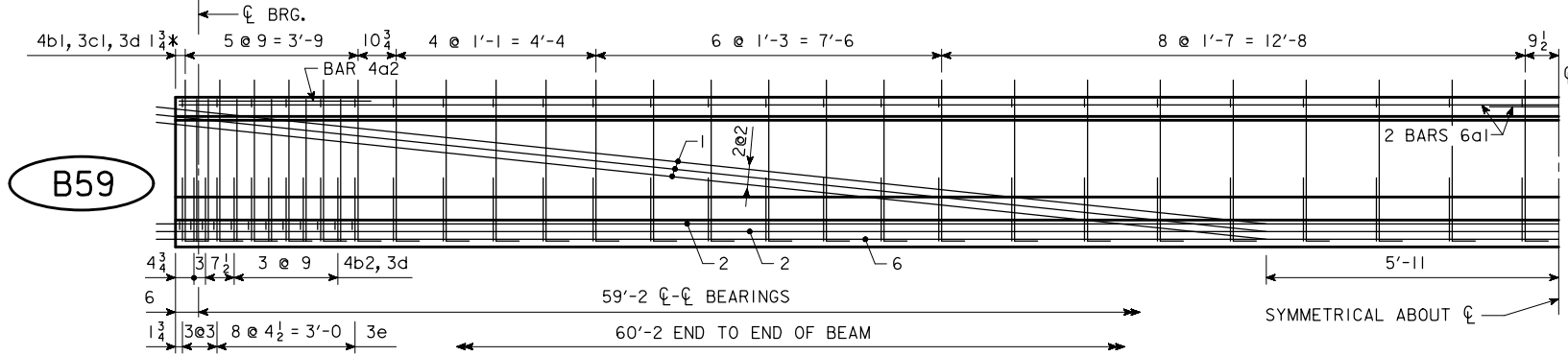
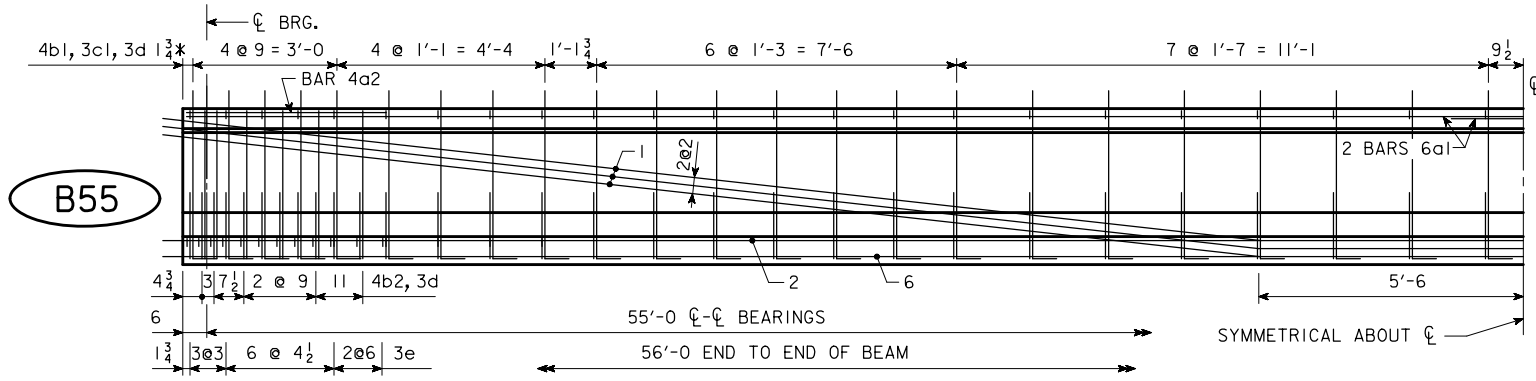
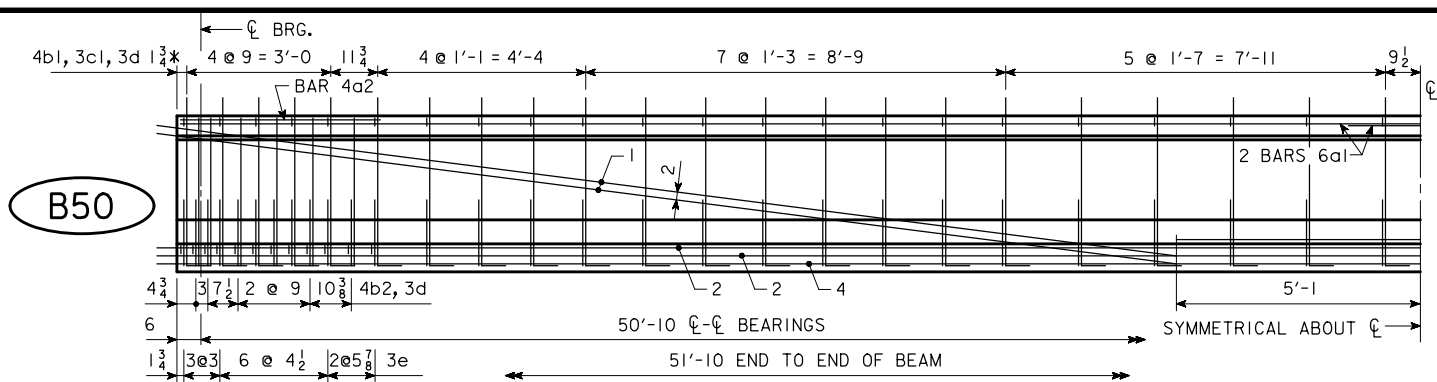
IF SOLE PLATE IS REQUIRED FOR BEARING, SOLE PLATE IS TO BE SET IN FORMS WHEN BEAM IS CAST AND FORMED OUT BELOW TO EXCLUDE CONCRETE AS DETAILED ON THE BEARING SHEET.

0.6" DIAMETER STRANDS STRESSED TO NOT MORE THAN 5,000 LBS. EACH MAY BE USED IN LIEU OF THE Δ BARS WHICH RUN THE FULL LENGTH OF THE BEAM IN THE TOP FLANGE.

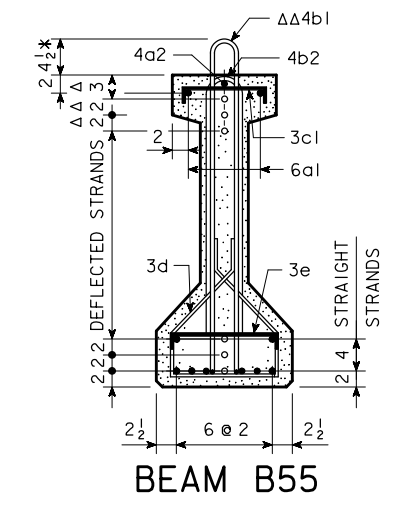
07-10 LATEST REVISION DATE  <i>Thomas L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER	
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006
	<span><b>B BEAM DETAILS</b></span> <span><b>H30-34-06</b></span>



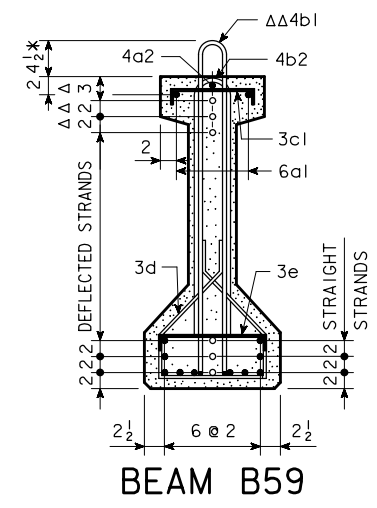
REVISED 07-10 - THE SPECIFICATION REFERENCES WERE CHANGED. THE BEAM DATA WAS UPDATED TO THE CURRENT BEAMS.



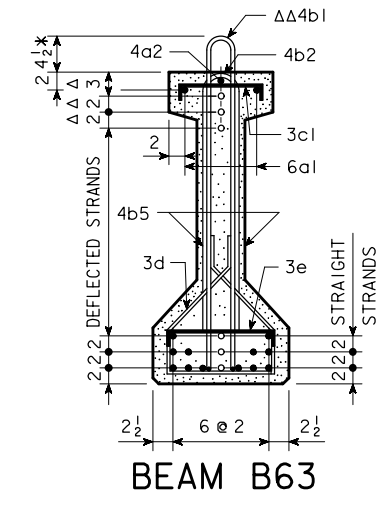
BEAM B50



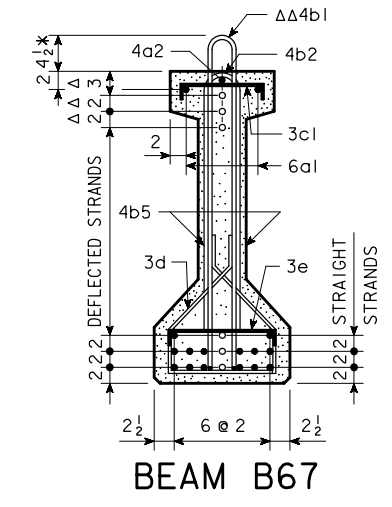
BEAM B55



BEAM B59



BEAM B63



BEAM B67

**"B" BEAM CROSS SECTION**  
 $A = 382.5 \text{ in.}^2$   
 $Y_b = 17.06 \text{ in.}$   
 $I = 62,000 \text{ in.}^4$

- NOTE: BARS 3d ARE TO BE PLACED IN PAIRS.
- DEFLECTED STRANDS
  - \* KEEP
  - Δ DIMENSIONS AT END OF BEAM
  - ΔΔ EPOXY COATED BARS

LATEST REVISION DATE  
07-10

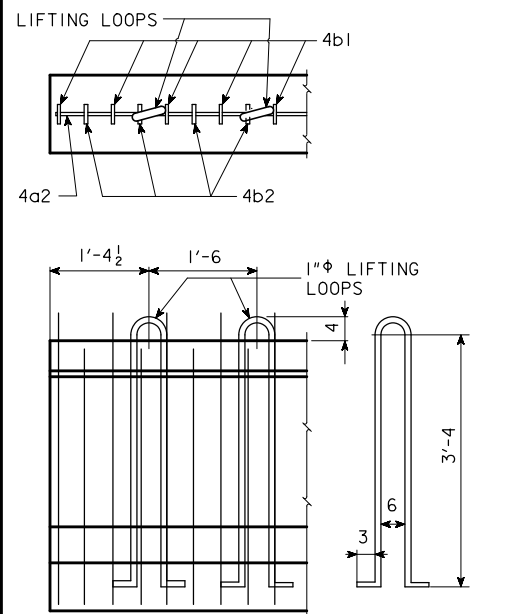
APPROVED BY BRIDGE ENGINEER  
*Norman L. Mc Donald*

**IOWADOT** Highway Division  
 STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES  
**PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES**  
 DECEMBER, 2006

**B BEAM DETAILS**

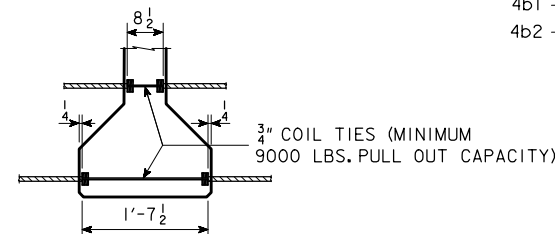
**H30-35-06**

REVISED 07-10 - THE SPECIFICATION REFERENCES WERE CHANGED. THE BEAM DATA WAS UPDATED TO THE CURRENT BEAMS.



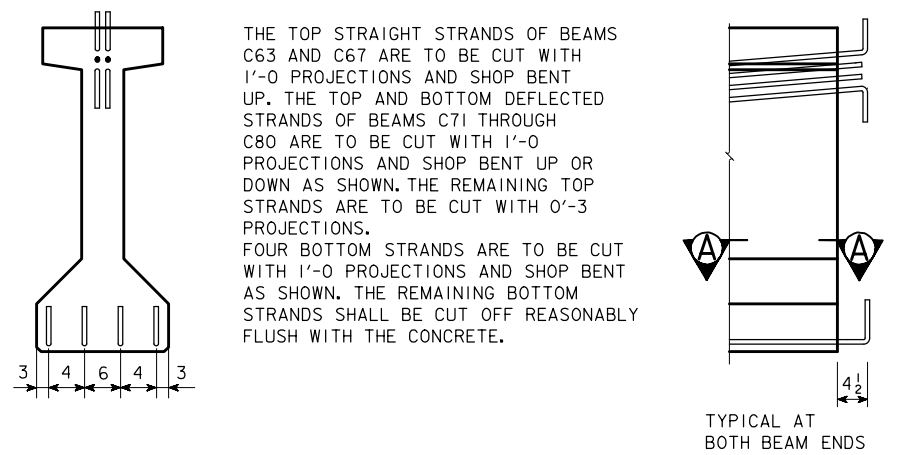
**LIFTING LOOP DETAIL**

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



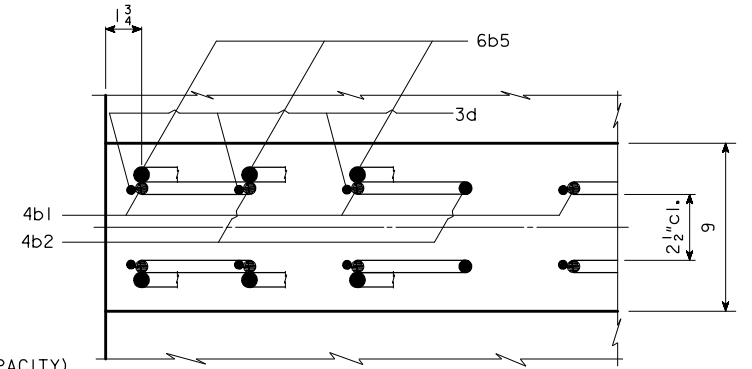
**COIL TIE DETAIL**

NUMBER AND EXACT LOCATION OF COIL TIES TO BE AS DETAILED ON SPECIFIC BRIDGE DESIGN.



**STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS**

THE TOP STRAIGHT STRANDS OF BEAMS C63 AND C67 ARE TO BE CUT WITH 1'-0 PROJECTIONS AND SHOP BENT UP. THE TOP AND BOTTOM DEFLECTED STRANDS OF BEAMS C71 THROUGH C80 ARE TO BE CUT WITH 1'-0 PROJECTIONS AND SHOP BENT UP OR DOWN AS SHOWN. THE REMAINING TOP STRANDS ARE TO BE CUT WITH 0'-3 PROJECTIONS. FOUR BOTTOM STRANDS ARE TO BE CUT WITH 1'-0 PROJECTIONS AND SHOP BENT AS SHOWN. THE REMAINING BOTTOM STRANDS SHALL BE CUT OFF REASONABLY FLUSH WITH THE CONCRETE.



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

\*\* WHERE DEFLECTING STRANDS INTERFERE WITH PLACEMENT, SOME IN-PLACE BENDING MAY BE NECESSARY.  
 ΔΔ 4b1 BARS TO BE EPOXY COATED.

**C BEAM DATA**

BEAM	SPAN LENGTH @ BEARING	OVERALL BEAM LENGTH (L)	STRAND SIZE DIA. (inches)	NO. OF STRANDS		TOTAL INITIAL PRESTRESS (3) KIPS	HOLD DOWN FORCE-KIPS	CAMBER (in.)		DEFLECTION (in.) Δ <sub>D</sub>				PERMISSIBLE SPACING		WEIGHT (TONS)	CONCRETE (C. Y.)	REINFORCING STEEL-(lb)
				STRAIGHT	DEFLECTED			AT RELEASE	AFTER LOSSES	IMMEDIATE (1) (ELASTIC) Δ <sub>T</sub>		TIME (2) (PLASTIC) Δ <sub>T</sub>		HL93 LOADING				
										CONC. DIAPH.	STEEL DIAPH.	CONC. DIAPH.	STEEL DIAPH.	CONC. DIAPH.	STEEL DIAPH.			
C63	63'-4	64'-4	0.60	16	—	681	—	0.70	1.24	0.59	0.54	0.15	0.14	7'-6	7'-6	18.9	9.34	536
C67	67'-6	68'-6	0.60	18	—	766	—	0.92	1.62	0.76	0.71	0.19	0.18	7'-6	7'-6	20.1	9.95	576
*C71	71'-8	72'-8	0.60	14	4	766	16	1.21	2.13	0.88	0.82	0.22	0.20	7'-6	7'-6	21.4	10.55	855
*C75	75'-10	76'-10	0.60	14	6	851	22	1.33	2.34	1.07	0.99	0.27	0.25	7'-6	7'-6	22.6	11.16	925
*C80	80'-0	81'-0	0.60	16	6	937	21	1.64	2.90	1.31	1.24	0.33	0.31	7'-6	7'-6	23.8	11.76	1191

- ① DEFLECTIONS AT MID-SPAN DUE TO WEIGHT OF SLAB AND DIAPHRAGM. THE DEFLECTIONS SHOWN ARE FOR A SLAB WEIGHT OF 757 #/FT. (8" SLAB AND 7'-6 BEAM SPACING) AND ONE CONCRETE DIAPHRAGM (2635 #) OR ONE STEEL DIAPHRAGM (285 #) AT 1/2 OF SPAN. FOR DIFFERENT SLAB AND DIAPHRAGM WEIGHTS, DEFLECTIONS WILL BE DIRECTLY PROPORTIONAL.
- ② DEFLECTIONS DUE TO THE COMBINED EFFECT OF CREEP DUE TO WEIGHT OF SLAB AND SHRINKAGE OF SLAB.
- TOTAL BEAM DEFLECTIONS AT 1/2 OF SPAN, Δ<sub>D</sub>, DUE TO WEIGHT OF SLAB AND DIAPHRAGMS FOR DETAILING PURPOSE:  
 (A) Δ<sub>D</sub> = Δ<sub>1</sub> + Δ<sub>T</sub> FOR SIMPLE SPAN.  
 (B) Δ<sub>D</sub> = Δ<sub>1</sub> + 3/4 Δ<sub>T</sub> FOR END SPANS OF CONTINUOUS BRIDGE.  
 (C) Δ<sub>D</sub> = Δ<sub>1</sub> + 1/2 Δ<sub>T</sub> FOR INTERIOR SPANS OF CONTINUOUS BRIDGE.
- ③ TOTAL INITIAL PRESTRESS IS BASED ON 72.6% f'<sub>s</sub>, f'<sub>s</sub> = 270 ksi AND A<sub>s</sub> = 0.217 sq. in.
- \* MINIMUM CONCRETE f'<sub>c</sub> (AT 28 DAYS) SHALL BE 6,000 psi. MINIMUM f'<sub>ci</sub> AT RELEASE SHALL BE 5,000 psi.

**NOTES:**

THESE BEAMS ARE DESIGNED FOR AASHTO LIVE LOADS AS INDICATED IN ABOVE TABLE WITH AN ALLOWANCE OF 20 LB. PER SQUARE FOOT OF ROADWAY FOR FUTURE WEARING SURFACE. HOLD DOWN POINTS FOR DEFLECTED STRANDS MAY BE MOVED TOWARD ENDS OF BEAM A DISTANCE OF 0.05 L MAXIMUM AT PRODUCER'S OPTION. ALL PRESTRESSING STRANDS SHALL CONFORM TO ASTM A416 GRADE 270 LOW RELAXATION STRANDS. TOPS OF BEAMS ARE TO BE STRUCK OFF LEVEL AND FINISHED AS PER MATERIALS IM570. BEARINGS SHALL BE AS DETAILED ON OTHER DESIGN SHEETS. BEAMS TO BE USED IN BRIDGES MADE CONTINUOUS BY THE POURED IN PLACE FLOOR, ARE TO BE AT LEAST 28 DAYS OLD BEFORE THE FLOOR IS PLACED UNLESS A SHORTER CURING TIME IS APPROVED BY THE BRIDGE ENGINEER. THE PORTIONS OF THE PRESTRESS BEAMS THAT ARE TO BE EMBEDDED IN THE ABUTMENT AND PIER DIAPHRAGMS SHALL BE ROUGHENED FOR A DISTANCE OF 10" FROM THE BEAM END BY SANDBLASTING OR OTHER APPROVED METHODS TO PROVIDE SUITABLE BOND BETWEEN THE BEAM AND THE DIAPHRAGM IN ACCORDANCE WITH ARTICLE 2403.14 OF THE SPECIFICATIONS. ALL BEAMS ARE TO BE INCREASED IN LENGTH TO COMPENSATE FOR ELASTIC SHORTENING, CREEP AND SHRINKAGE. IF THE STEEL DIAPHRAGM OPTION IS ALLOWED AND USED, HOLES MUST BE CAST IN THE WEB TO ACCOMMODATE THE STEEL DIAPHRAGM ATTACHMENTS AS DETAILED ON THE STEEL DIAPHRAGM DETAIL SHEET. IF SOLE PLATE IS REQUIRED FOR BEARING, SOLE PLATE IS TO BE SET IN FORMS WHEN BEAM IS CAST AND FORMED OUT BELOW TO EXCLUDE CONCRETE AS DETAILED ON THE BEARING SHEET. 0.6" DIAMETER STRANDS STRESSED TO NOT MORE THAN 5,000 LBS. EACH MAY BE USED IN LIEU OF THE α BARS WHICH RUN THE FULL LENGTH OF THE BEAM IN THE TOP FLANGE.

**SPECIFICATIONS:**

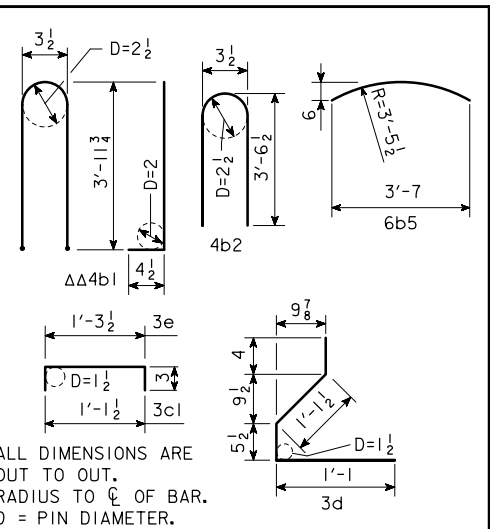
CONSTRUCTION: STANDARD SPECIFICATIONS OF THE IOWA DEPARTMENT OF TRANSPORTATION, CURRENT SERIES, WITH CURRENT APPLICABLE SPECIAL PROVISIONS AND SUPPLEMENTAL SPECIFICATIONS.

DESIGN: A.A.S.H.T.O. LRFD, SERIES OF 2004, WITH MINOR MODIFICATIONS.

**DESIGN STRESSES:**

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE TO BE IN ACCORDANCE WITH A.A.S.H.T.O. LRFD SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 2004:  
 REINFORCING STEEL IN ACCORDANCE WITH SECTION 5, GRADE 60.  
 CONCRETE IN ACCORDANCE WITH SECTION 5, f'<sub>c</sub> = 5000 psi (EXCEPT AS NOTED)  
 PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 5, f'<sub>s</sub> = 270,000 psi.

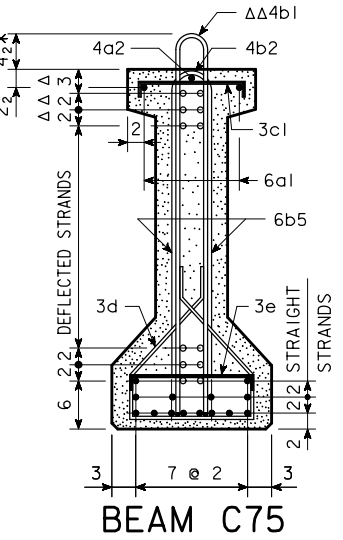
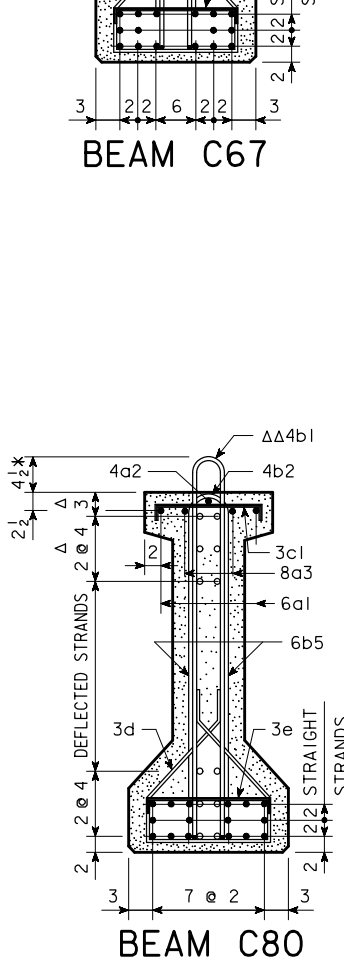
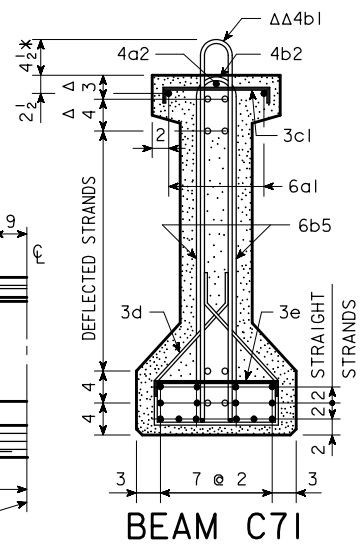
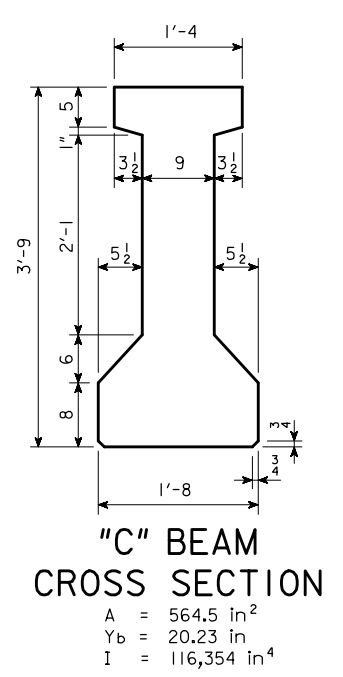
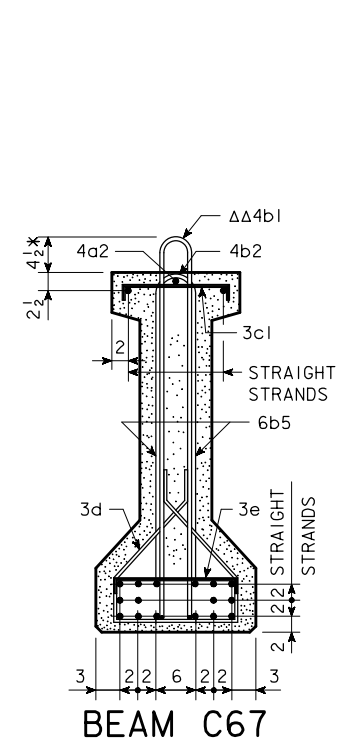
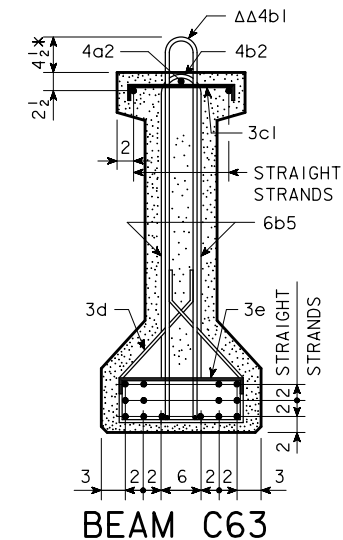
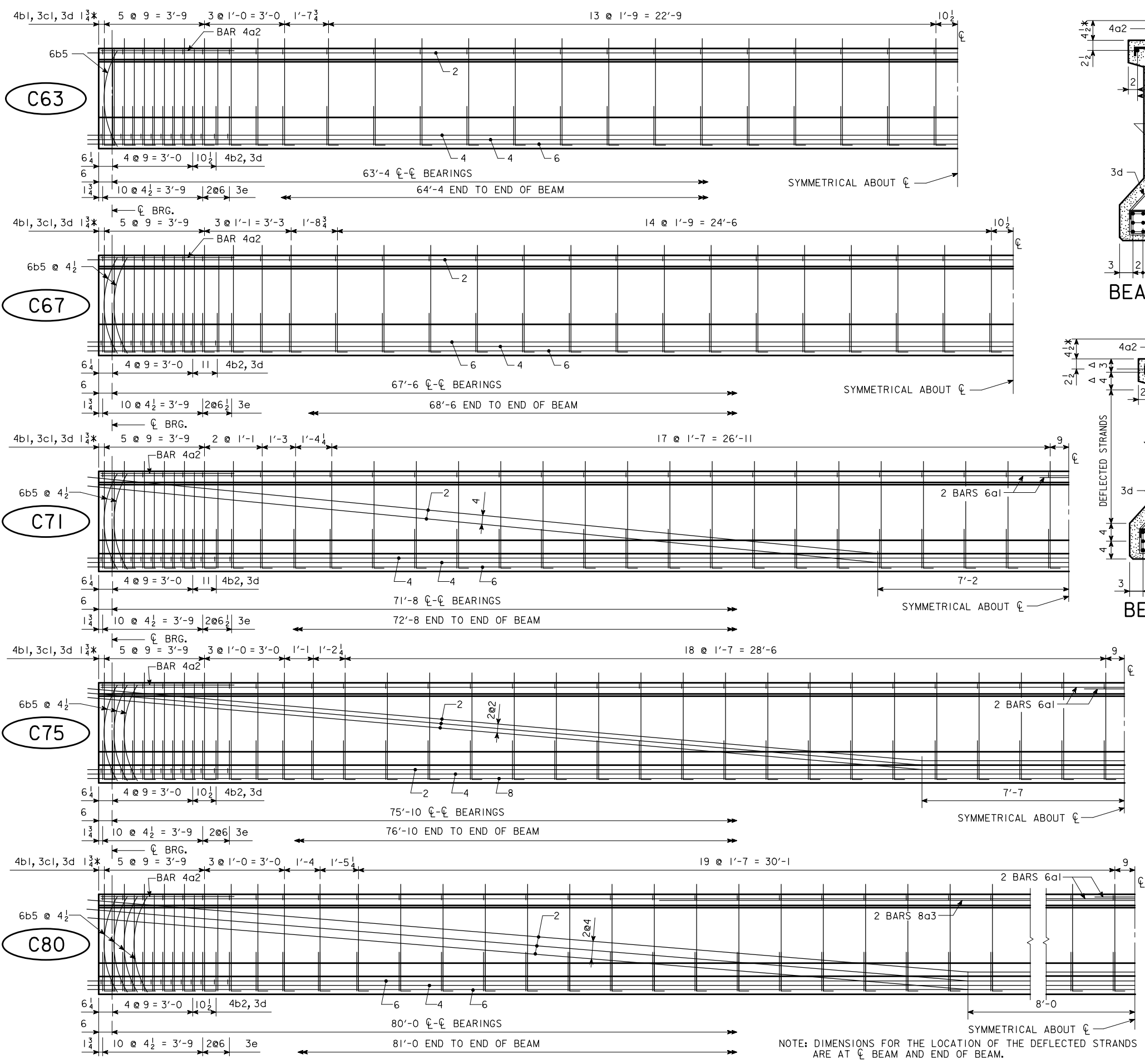
REINFORCING BAR LIST								
BEAM	SPAN	C63	C67	C71	C75	C80		
		63'-4	67'-6	71'-8	75'-10	80'-0		
BAR SHAPE	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH		
6a1	—	—	—	4	37'-8	4	41'-10	
4a2	2	5'-0	2	5'-0	2	5'-0	2	5'-0
8a3	—	—	—	—	—	—	2	40'-0
ΔΔ 4b1	46	8'-10	48	8'-10	54	8'-10	58	8'-10
4b2	12	7'-2	12	7'-2	12	7'-2	12	7'-2
6b5	4	3'-9	8	3'-9	8	3'-9	12	3'-9
3c1	46	1'-8	48	1'-8	54	1'-8	58	1'-8
** 3d	116	3'-0	120	3'-0	132	3'-0	140	3'-0
3e	26	1'-10	26	1'-10	26	1'-10	26	1'-10



ALL DIMENSIONS ARE OUT TO OUT. RADIUS TO 1/2 OF BAR. D = PIN DIAMETER.

LATEST REVISION DATE	07-10	Approved by <i>Thomas L. Mc Donald</i> BRIDGE ENGINEER		
			STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
			C BEAM DETAILS	H30-36-06

REVISED 07-10 - THE SPECIFICATION REFERENCES WERE CHANGED. THE BEAM DATA WAS UPDATED TO THE CURRENT BEAMS.



NOTE: BARS 3d ARE TO BE PLACED IN PAIRS.  
 \* KEEP  
 Δ DIMENSIONS AT END OF BEAM  
 ΔΔ EPOXY COATED BARS

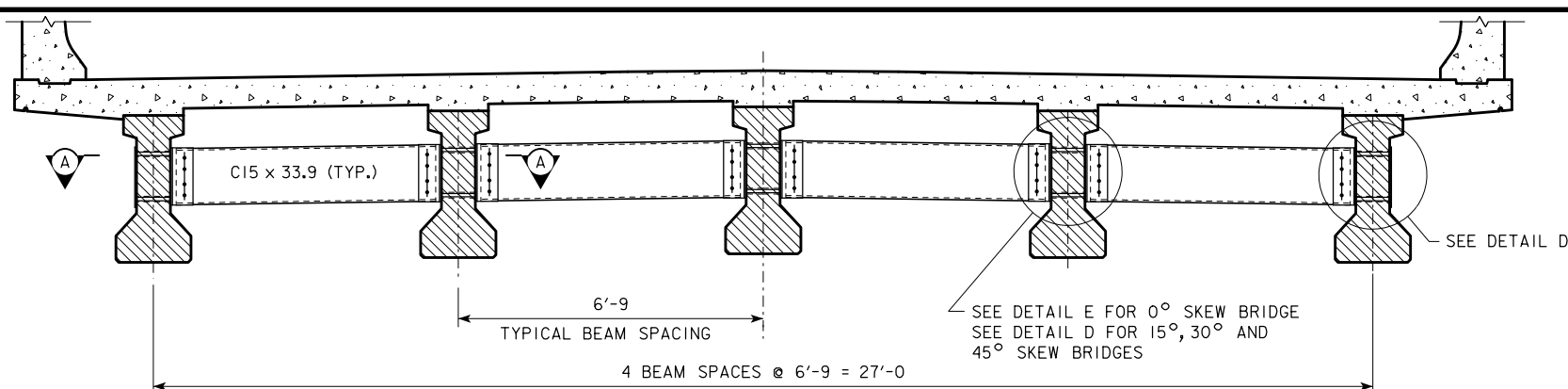
NOTE: DIMENSIONS FOR THE LOCATION OF THE DEFLECTED STRANDS ARE AT C-C BEAM AND END OF BEAM.

07-10  
 LATEST REVISION DATE  
 Approved by BRIDGE ENGINEER  
 Thomas L. Mc Donald

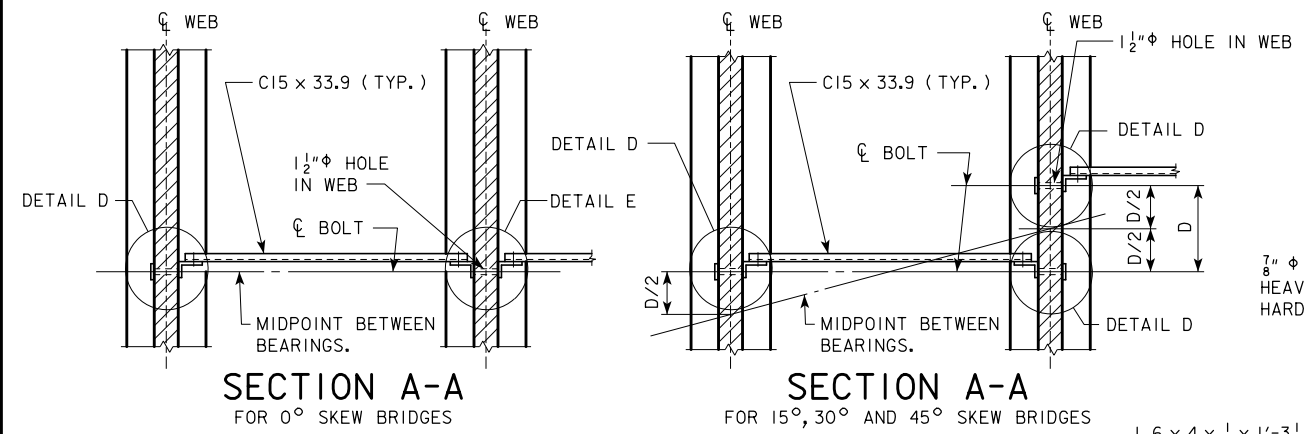
**IOWA DOT Highway Division**  
 STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES  
**PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES**  
 DECEMBER, 2006

**C BEAM DETAILS**      **H30-37-06**





SECTION SHOWING INTERMEDIATE DIAPHRAGM



SECTION A-A FOR 0° SKEW BRIDGES

SECTION A-A FOR 15°, 30° AND 45° SKEW BRIDGES

**NOTES:**

- ALL DIAPHRAGM MATERIALS, INCLUDING BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED.
- SHOP DRAWINGS OF THE STEEL DIAPHRAGMS SHOWING LAYOUT AND DETAILS OF THE DIAPHRAGMS SHALL BE SUBMITTED FOR APPROVAL.
- ALL COSTS FOR FURNISHING AND INSTALLING STEEL INTERMEDIATE DIAPHRAGMS SHALL BE INCLUDED IN THE PRICE BID FOR STRUCTURAL STEEL.
- THE 1/2" φ HOLES FOR THE 7/8" φ H.S. BOLTS SHALL BE CAST INTO THE WEB. DRILLING IS NOT ALLOWED.
- THE 7/8" φ H.S. BOLTS THROUGH THE WEB SHALL HAVE A THREAD LENGTH OF 3" MIN. AND 4" MAX. AND SHALL MEET THE REQUIREMENTS OF ASTM A449.
- ALL BOLTS ARE TO BE TIGHTENED PRIOR TO PLACING BRIDGE FLOOR CONCRETE.

CONCRETE DIAPHRAGMS DETAILS SHALL BE PROVIDED IN THE BRIDGE PLANS FOR OVERHEAD BRIDGES. DESIGNER SHALL ADJUST THE CONCRETE, REINFORCING AND STRUCTURAL STEEL QUANTITIES ACCORDINGLY.

**INTERMEDIATE DIAPHRAGM STRUCTURAL STEEL**

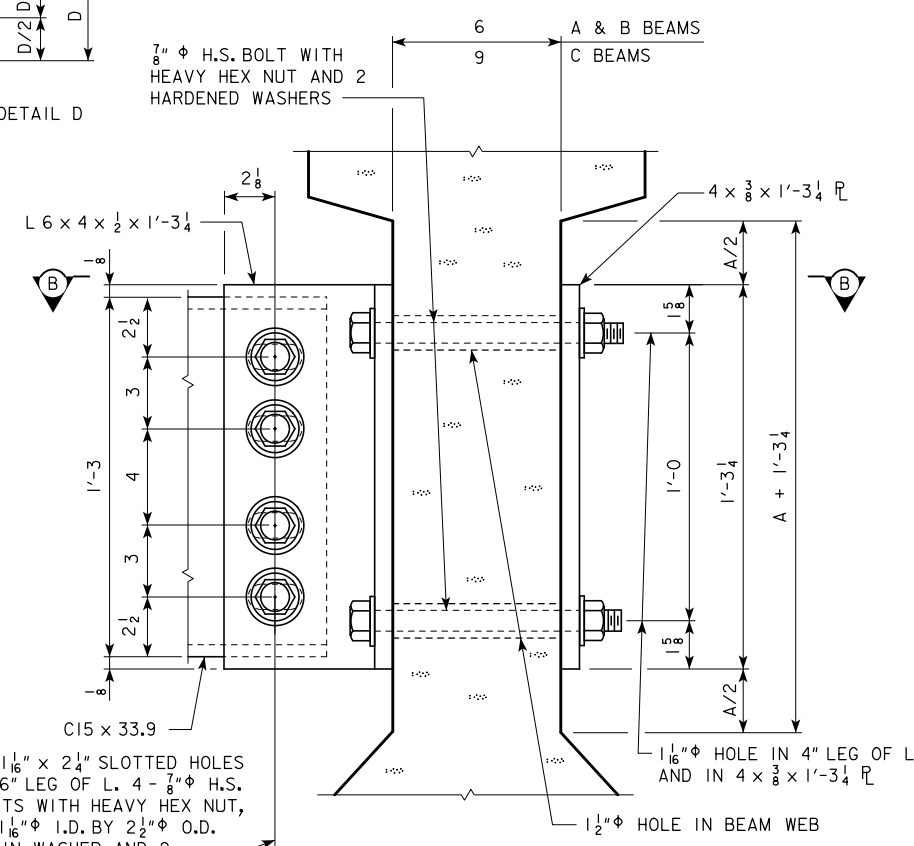
ONE CONNECTION DETAIL "E"					
2 - 7/8" φ x LENGTH H.S. BOLTS WITH NUTS AND WASHERS					
WEB THICKNESS (IN.)	LENGTH OF H.S. BOLTS (IN.)	WEIGHT PER DETAIL "E" (LB.)	BRIDGE SKEW		WEIGHT (LB.)
			0°	15°, 30° & 45°	
6	9	4.30	9	0	38.7
9	12	5.34	9	0	48.1
2 - L 6 x 4 x 1/2 x 1'-3 1/4 = 41.2 LB			9	0	370.8

ONE CONNECTION DETAIL "D"					
2 - 7/8" φ x LENGTH H.S. BOLTS WITH NUTS AND WASHERS					
WEB THICKNESS (IN.)	LENGTH OF H.S. BOLTS (IN.)	WEIGHT PER DETAIL "D" (LB.)	BRIDGE SKEW		WEIGHT (LB.)
			0°	15°, 30° & 45°	
6	9	4.30	6	24	25.8
9	12	5.34	6	24	32.0
1 - BACKING PL 4 x 3/8 x 1'-3 1/4 = 6.5 LB			6	24	39.0
1 - L 6 x 4 x 1/2 x 1'-3 1/4 = 20.6 LB			6	24	123.6

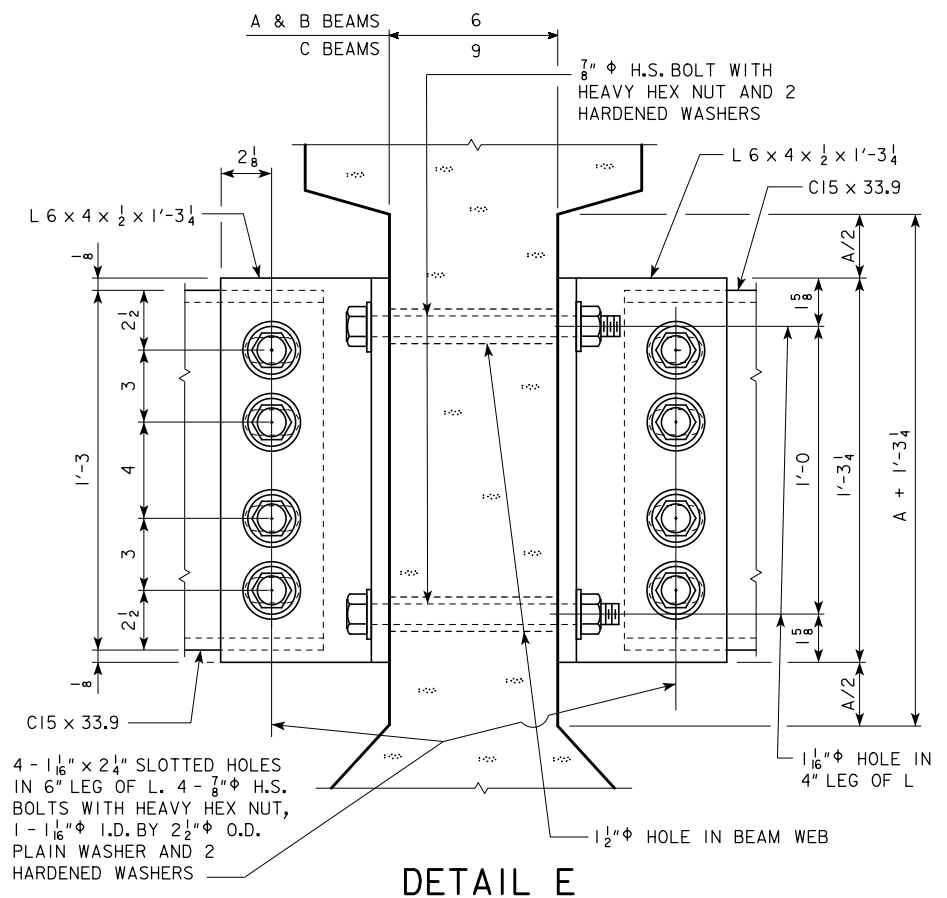
* ONE C15 x 33.9 DIAPHRAGM					
WEB THICKNESS (IN.)	BEAM SPACING	LENGTH	NO. OF DIAPH.	UNIT WEIGHT (LB.)	WEIGHT (LB.)
6	6'-9"	5'-11 5/8"	12	202.3	2427.6
9	6'-9"	5'-8 3/8"	12	193.9	2326.8

DIAPHRAGM CONNECTION BOLTS		
8-7/8" φ x 0'-2 3/4" H.S. BOLTS WITH NUTS AND WASHERS, PER UNIT DIAPHRAGM = 10.3 LB		
NO. OF DIAPH.		
12		
WEIGHT (LB.)		
123.6		

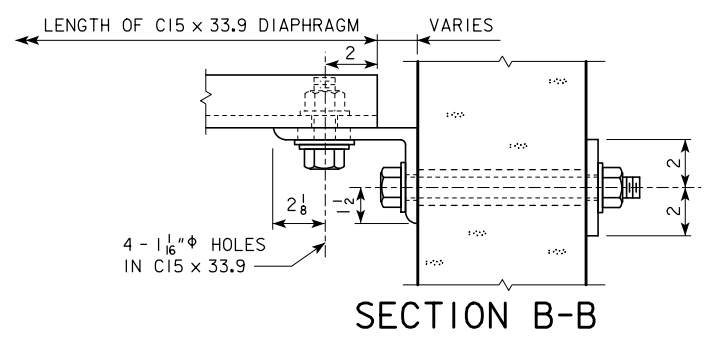
* THE LENGTH OF THE C15 x 33.9 IS BASED ON A VARIABLE CLEARANCE OF 1/16" TO 2/16" BETWEEN THE FACE OF BEAM WEB AND END OF C15 x 33.9.			
TOTAL WEIGHT			
INTERMEDIATE DIAPHR. STRUCT. STEEL - TOTAL (LB.) =	WEB THICKNESS (IN.)	BRIDGE SKEW	
		0°	15°, 30° & 45°
INTERMEDIATE DIAPHR. STRUCT. STEEL - TOTAL (LB.) =	6	3149	3305
INTERMEDIATE DIAPHR. STRUCT. STEEL - TOTAL (LB.) =	9	3064	3229



DETAIL D



DETAIL E



SECTION B-B

BEAM SERIES	DIMENSIONS	
	A + 1'-3 1/4	A/2
A	1'-4	2 3/8
B	1'-8	2 3/8
C	2'-1	4 3/8

07-10  
LATEST REVISION DATE  
Hansen L. Mc Donald  
APPROVED BY BRIDGE ENGINEER

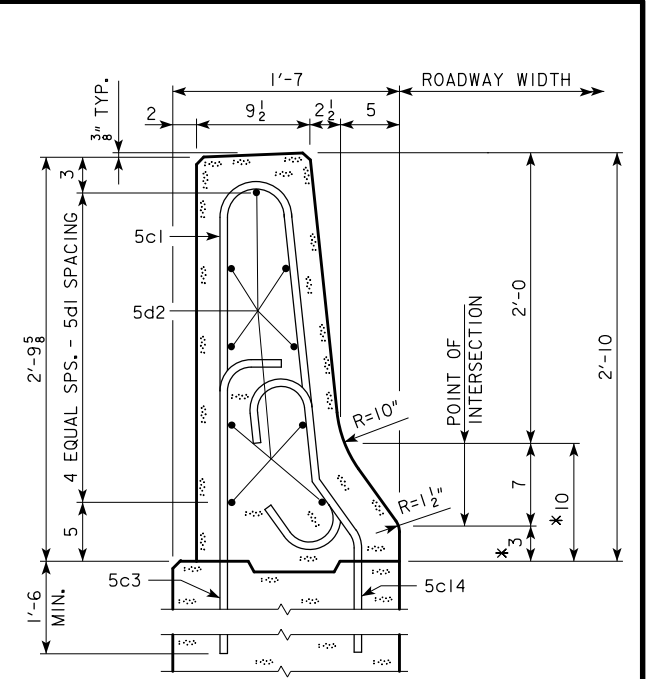
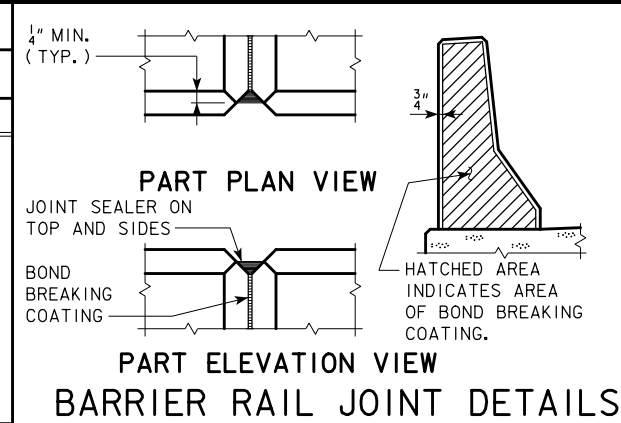
**IOWADOT Highway Division**  
STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES  
**PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES**  
DECEMBER, 2006

INTERMEDIATE STEEL DIAPHRAGMS	H30-38-06
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REVISED 07-10 - MINOR CHANGES WERE MADE TO AGREE WITH OFFICE STANDARD.

**TABLE OF BARRIER RAIL DIMENSIONS AND NUMBERS**

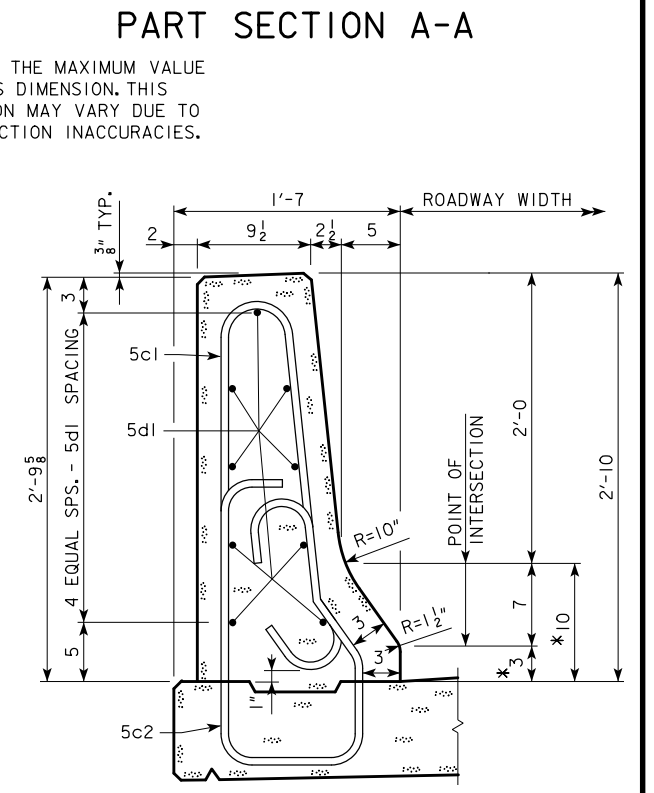
CL-CL ABUT. BRG	138'-10				151'-4				163'-10				176'-4				CL-CL ABUT. BRG
SKEW	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	SKEW
L (FT.-IN.)	155'-10	155'-11 1/4	156'-3 5/8	157'-0 7/8	168'-4	168'-5 1/4	168'-9 5/8	169'-6 7/8	180'-10	180'-11 1/4	181'-3 5/8	182'-0 7/8	193'-4	193'-5 1/4	193'-9 5/8	194'-6 7/8	L (FT.-IN.)
B (FT.-IN.)	141'-10	141'-11 1/4	142'-3 5/8	143'-0 7/8	154'-4	154'-5 1/4	154'-9 5/8	155'-6 7/8	166'-10	166'-11 1/4	167'-3 5/8	168'-0 7/8	179'-4	179'-5 1/4	179'-9 5/8	180'-6 7/8	B (FT.-IN.)
S (FT.-IN.)	141'-10	141'-11 1/4	142'-3 5/8	143'-0 7/8	154'-4	154'-5 1/4	154'-9 5/8	155'-6 7/8	166'-10	166'-11 1/4	167'-3 5/8	168'-0 7/8	179'-4	179'-5 1/4	179'-9 5/8	180'-6 7/8	S (FT.-IN.)
C	133	133	133	133	145	145	145	145	158	158	158	158	170	170	170	170	C
D (FT.-IN.)	133'-0	133'-0	133'-0	133'-0	145'-0	145'-0	145'-0	145'-0	158'-0	158'-0	158'-0	158'-0	170'-0	170'-0	170'-0	170'-0	D (FT.-IN.)
E	134	134	134	134	146	146	146	146	159	159	159	159	171	171	171	171	E
F (FT.-IN.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	F (FT.-IN.)
W (FT.-IN.)	3'-11	3'-11 5/8	4'-1 3/4	4'-6 1/2	4'-2	4'-2 5/8	4'-4 3/4	4'-9 1/2	3'-11	3'-11 5/8	4'-1 3/4	4'-6 1/2	4'-2	4'-2 5/8	4'-4 3/4	4'-9 1/2	W (FT.-IN.)
a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	a



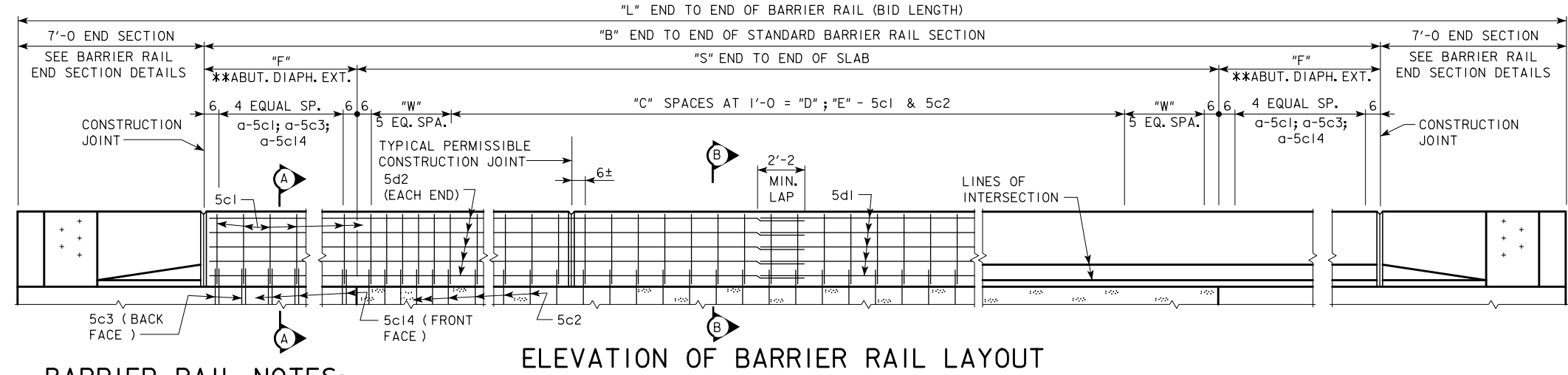
\* DENOTES THE MAXIMUM VALUE FOR THIS DIMENSION. THIS DIMENSION MAY VARY DUE TO CONSTRUCTION INACCURACIES.

**TABLE OF BARRIER RAIL DIMENSIONS AND NUMBERS**

CL-CL ABUT. BRG	188'-10				201'-4				213'-10				226'-4				243'-0				CL-CL ABUT. BRG
SKEW	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	SKEW
L (FT.-IN.)	205'-10	205'-11 1/4	206'-3 5/8	207'-0 7/8	228'-4	228'-4	228'-4	228'-4	240'-10	240'-10	240'-10	240'-10	253'-4	253'-4	253'-4	253'-4	270'-0	270'-0	270'-0	270'-0	L (FT.-IN.)
B (FT.-IN.)	191'-10	191'-11 1/4	192'-3 5/8	193'-0 7/8	214'-4	214'-4	214'-4	214'-4	226'-10	226'-10	226'-10	226'-10	239'-4	239'-4	239'-4	239'-4	256'-0	256'-0	256'-0	256'-0	B (FT.-IN.)
S (FT.-IN.)	191'-10	191'-11 1/4	192'-3 5/8	193'-0 7/8	204'-4	204'-5 1/4	204'-9 5/8	205'-6 7/8	216'-10	216'-11 1/4	217'-3 5/8	218'-0 7/8	229'-4	229'-5 1/4	229'-9 5/8	230'-6 7/8	246'-0	246'-1 1/4	246'-5 5/8	247'-2 7/8	S (FT.-IN.)
C	183	183	183	183	195	195	195	195	208	208	208	208	220	220	220	220	237	237	237	237	C
D (FT.-IN.)	183'-0	183'-0	183'-0	183'-0	195'-0	195'-0	195'-0	195'-0	208'-0	208'-0	208'-0	208'-0	220'-0	220'-0	220'-0	220'-0	237'-0	237'-0	237'-0	237'-0	D (FT.-IN.)
E	184	184	184	184	196	196	196	196	209	209	209	209	221	221	221	221	238	238	238	238	E
F (FT.-IN.)	0	0	0	0	5'-0	4'-11 3/8	4'-9 1/4	4'-4 1/2	5'-0	4'-11 3/8	4'-9 1/4	4'-4 1/2	5'-0	4'-11 3/8	4'-9 1/4	4'-4 1/2	5'-0	4'-11 3/8	4'-9 1/4	4'-4 1/2	F (FT.-IN.)
W (FT.-IN.)	3'-11	3'-11 5/8	4'-1 3/4	4'-6 1/2	4'-2	4'-2 5/8	4'-4 3/4	4'-9 1/2	3'-11	3'-11 5/8	4'-1 3/4	4'-6 1/2	4'-2	4'-2 5/8	4'-4 3/4	4'-9 1/2	4'-0	4'-0 5/8	4'-2 3/4	4'-7 1/2	W (FT.-IN.)
a	0	0	0	0	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	a



\*\* APPLIES TO 201'-4, 213'-10, 226'-4 & 243'-0 BRIDGES ONLY.



**BARRIER RAIL NOTES:**

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

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

COST OF THE JOINT SEALER AND BOND BREAKER SHALL BE CONSIDERED INCIDENTAL TO OTHER CONSTRUCTION.

THE CONCRETE BARRIER RAIL IS TO BE BID ON A LINEAL FOOT BASIS. THE NUMBER OF LINEAL FEET OF BARRIER RAIL INSTALLED WILL BE PAID FOR AT THE CONTRACT PRICE PER LINEAL FOOT BASED ON PLAN QUANTITIES. PRICE BID FOR CONCRETE BARRIER RAILING SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL, EXCLUDING REINFORCING STEEL, AND ALL OF THE EQUIPMENT AND LABOR REQUIRED TO ERECT THE RAIL IN ACCORDANCE WITH THESE PLANS AND CURRENT SPECIFICATIONS.

IF CONDUIT IS REQUIRED IN THIS PLAN THE RIGID STEEL CONDUIT, JUNCTION BOXES AND FITTINGS INCLUDING LABOR AND ANY ADDITIONAL WORK TO DO THE INSTALLATION IS CONSIDERED INCIDENTAL TO THE COST OF THE RAILING.

ALL BARRIER RAIL REINFORCING STEEL IS TO BE INCLUDED WITH THE SUPERSTRUCTURE REINFORCING STEEL.

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

TOP OF THE BARRIER RAIL IS TO BE PARALLEL TO THE THEORETICAL CL GRADE.

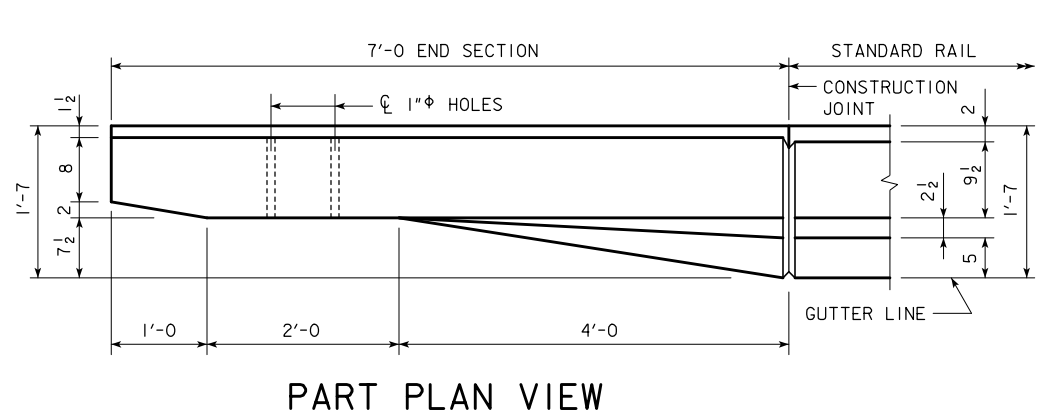
CROSS SECTIONAL AREA OF THE STANDARD SECTION OF THE BARRIER RAIL = 2.84 SQUARE FEET.

CONCRETE BARRIER RAILS PLACED USING THE SLIPFORM METHOD WILL REQUIRE THE USE OF A CLASS BR CONCRETE IN ACCORDANCE WITH ARTICLE 2513.03B OF THE STANDARD SPECIFICATION. CAST-IN-PLACE BARRIER RAILS SHALL USE CLASS C MIX. CLASS D CONCRETE IS NOT PERMITTED FOR CONCRETE BARRIER RAILS (CAST-IN-PLACE OR SLIPFORMED METHOD).

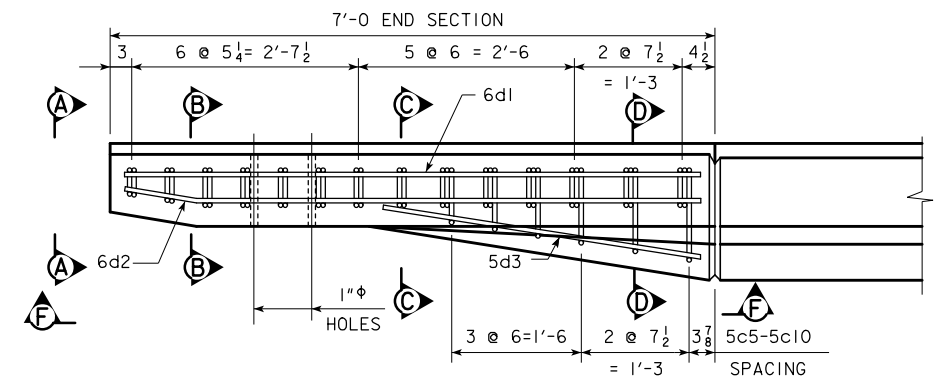
REVISED 07-10 - THE SPECIFICATION REFERENCES WERE CHANGED.

07-10 LATEST REVISION DATE  Approved by BRIDGE ENGINEER		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
	<b>BARRIER RAIL DETAILS</b> SHEET 1 OF 3	<b>H30-39-06</b>

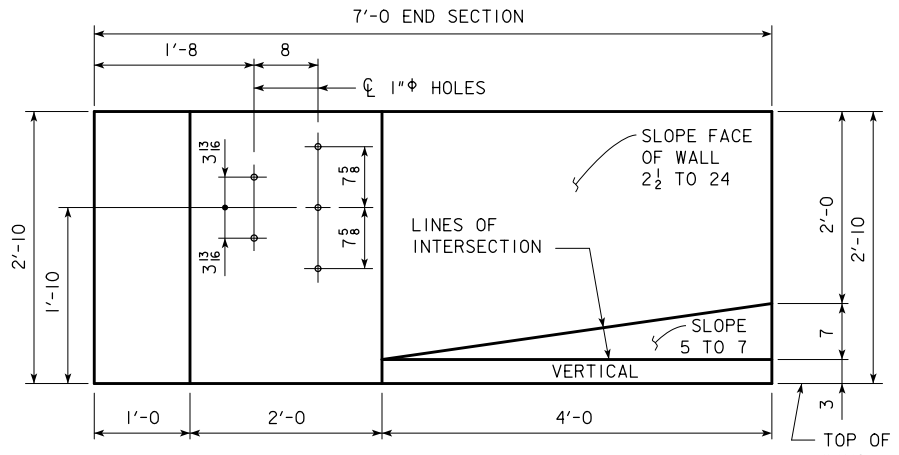
REVISED 07-10 - THE END SECTION STEEL WAS CHANGED TO AGREE WITH THE OFFICE STANDARD.



**PART PLAN VIEW**

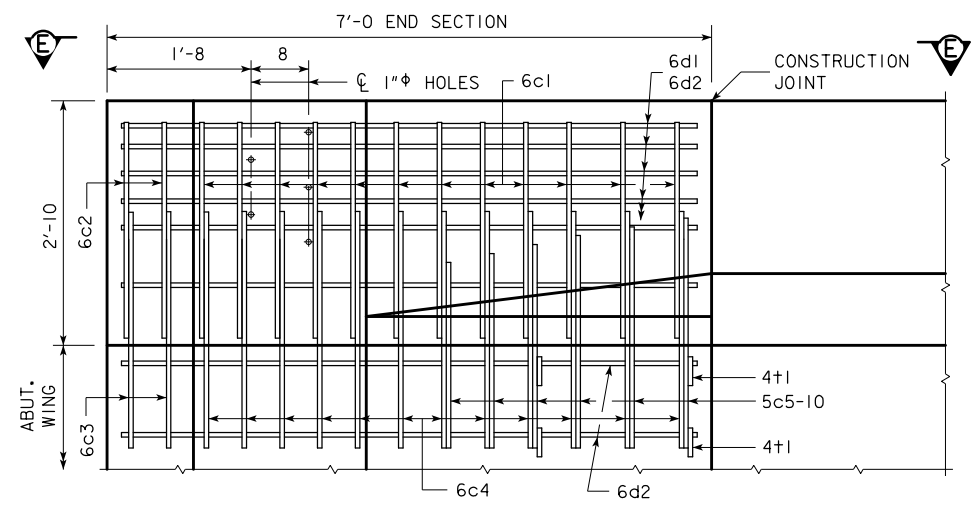


**PART VIEW E-E**

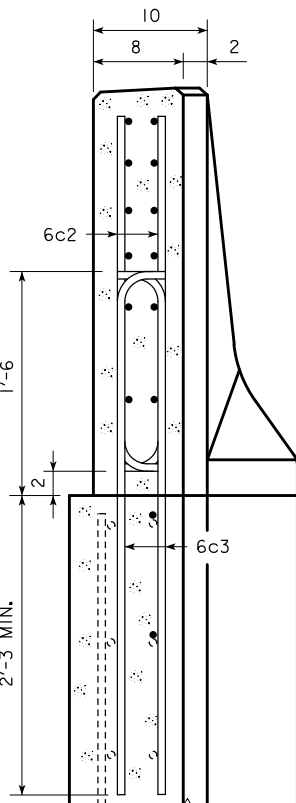


**PART ELEVATION VIEW**

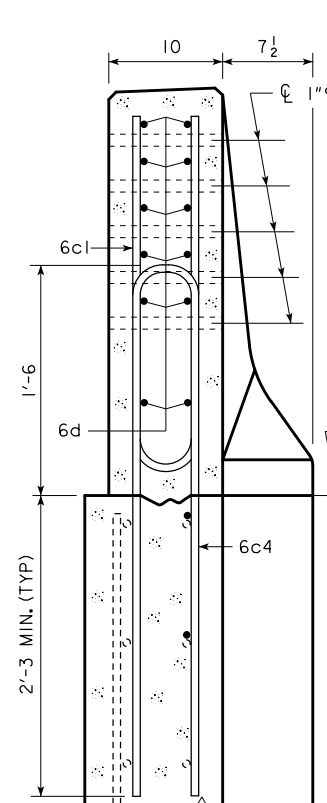
PROVIDE 5 HOLES FORMED WITH 1"ϕ PLASTIC CONDUIT. COST TO BE INCLUDED IN PRICE BID FOR CONCRETE BARRIER RAILING.



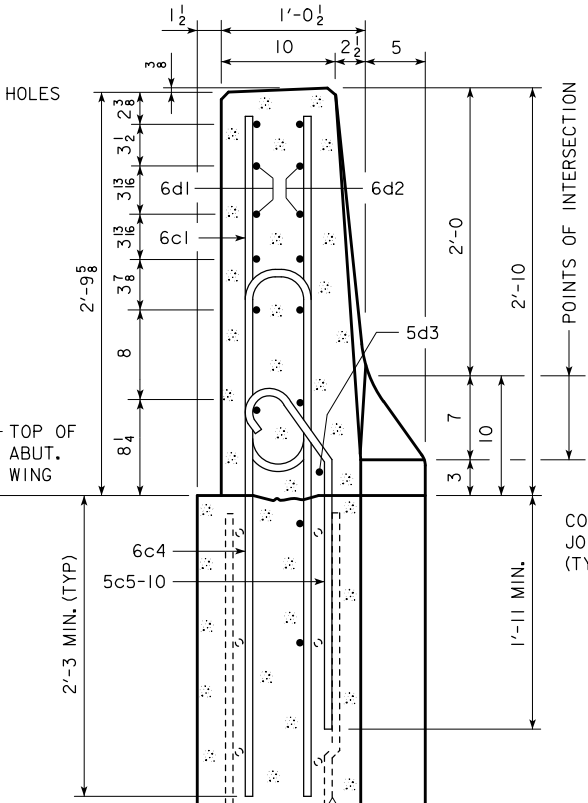
**PART VIEW F-F**



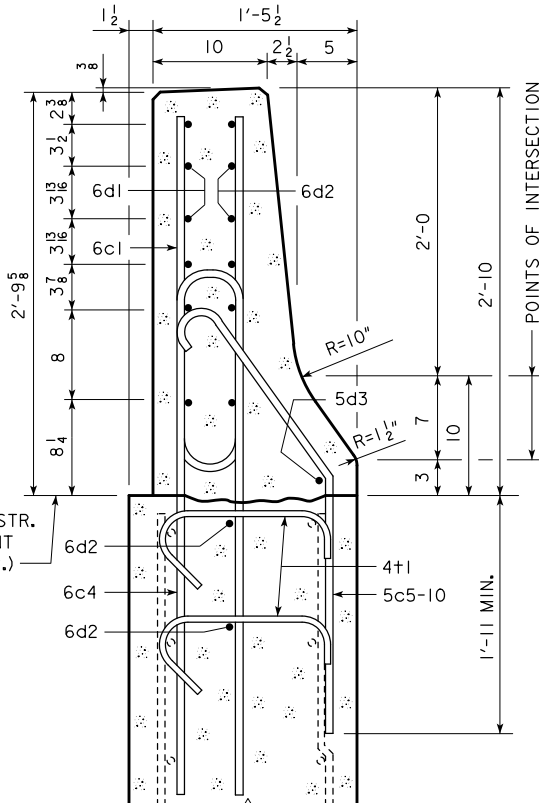
**VIEW A-A**



**SECTION B-B**



**SECTION C-C**



**SECTION D-D**

NOTE:  
4+1 PLACEMENT- 2 BARS EACH LEVEL OF 6d2 IN WING FOOTING.

NOTE:  
CONSTRUCTION JOINT BETWEEN TOP OF WING AND BARRIER RAIL IS ROUGHENED CONCRETE.

NOTE:  
THE 10" RADIUS AND 1 1/2" RADIUS ARE TYPICAL AND SHALL BE USED WHEN CONSTRUCTING THE CORNERS FOR VIEW A-A, SECTION B-B, SECTION C-C AND SECTION D-D.

NOTE:  
THE 6c4, 6c3, 5c5-10, 2 - 6d2 AND 4+1 BARS ARE TO BE PLACED WITH THE ABUTMENT WING. THE DETAILS FOR PLACEMENT ARE SHOWN ON THE WING ABUTMENT SHEET.

NOTE:  
DASHED LINES BELOW THE TOP OF WING ARE THE ABUTMENT WING REINFORCING STEEL. SEE WING ABUTMENT SHEET FOR PLACEMENT.

EPOXY REINFORCING STEEL - ONE END SECTION						
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT	
6c1	VERTICAL	⊏	12	5'-6"	99	
6c2	VERTICAL	⊏	4	2'-10"	17	
6c3	VERTICAL	⊏	4	4'-1"	25	
6c4	VERTICAL	⊏	12	8'-0"	144	
5c5-10	VERTICAL	⊏	6	VARIES	23	
6d1	HORIZONTAL	—	6	6'-8"	60	
6d2	HORIZONTAL	—	8	6'-9"	81	
5d3	HORIZONTAL	—	1	3'-9"	4	
4+1	ABUTMENT WING TIE BARS	⊏	4	VARIES	5	
(INCLUDE WITH BARRIER RAIL REINFORCING)					TOTAL WEIGHT (LBS.)	458

CONCRETE PLACEMENT SUMMARY	
SECTION	TOTAL
BARRIER RAIL ONE END SECTION	0.65 CU. YD.

### BENT BAR DETAILS

**6c1 & 6c4**

**6d2**

**4+1**

**6c2 & 6c3**

**5c5-5c10**

BAR	"X"
5c5	0'-6 1/2"
5c6	0'-8 1/2"
5c7	0'-10 1/4"
5c8	1'-0 1/4"
5c9	1'-2"
5c10	1'-4"

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

LATEST REVISION DATE 07-10	 APPROVED BY BRIDGE ENGINEER	 STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006
<b>BARRIER RAIL DETAILS</b> SHEET 2 OF 3		<b>H30-40-06</b>



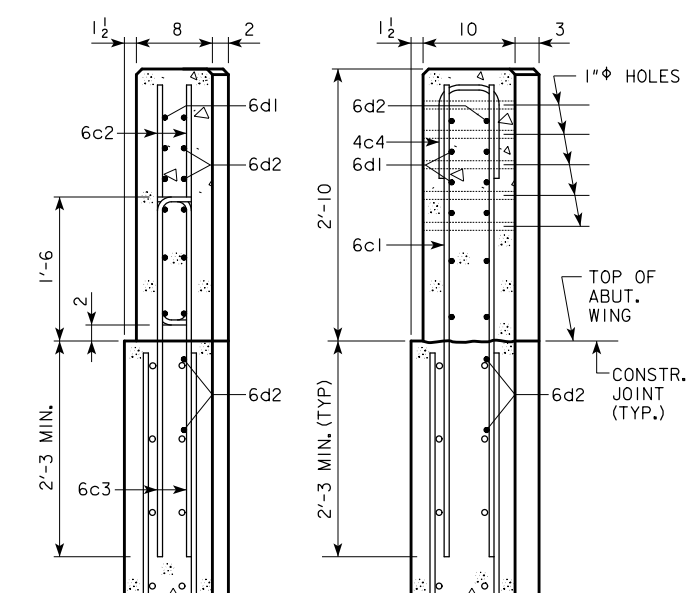


TABLE OF OPEN RAIL DIMENSIONS AND NUMBERS

CL-CL ABUT. BRG	138'-10				151'-4				163'-10				176'-4				188'-10				CL-CL ABUT. BRG
SKEW	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	SKEW
L (FT.-IN.)	155'-10	155'-11 1/4	156'-3 5/8	157'-0 7/8	168'-4	168'-5 1/4	168'-9 5/8	169'-6 7/8	180'-10	180'-11 1/4	181'-3 5/8	182'-0 7/8	193'-4	193'-5 1/4	193'-9 5/8	194'-6 7/8	205'-10	205'-11 1/4	206'-3 5/8	207'-0 7/8	L (FT.-IN.)
S (FT.-IN.)	141'-10	141'-11 1/4	142'-3 5/8	143'-0 7/8	154'-4	154'-5 1/4	154'-9 5/8	155'-6 7/8	166'-10	166'-11 1/4	167'-3 5/8	168'-0 7/8	179'-4	179'-5 1/4	179'-9 5/8	180'-6 7/8	191'-10	191'-11 1/4	192'-3 5/8	193'-0 7/8	S (FT.-IN.)
B	18	18	18	18	19	19	19	19	21	21	21	21	23	23	23	23	24	24	24	24	B
C (FT.-IN.)	7'-7 7/8	7'-8	7'-8 1/4	7'-8 3/4	7'-11	7'-11	7'-11 1/4	7'-11 3/4	7'-9	7'-9 1/8	7'-9 3/8	7'-9 3/4	7'-7 1/2	7'-7 1/2	7'-7 3/4	7'-8 1/8	7'-9 7/8	7'-10	7'-10 1/8	7'-10 1/2	C (FT.-IN.)
D (FT.-IN.)	137'-10	137'-11 1/4	138'-3 5/8	139'-0 7/8	150'-4	150'-5 1/4	150'-9 5/8	151'-6 7/8	162'-10	162'-11 1/4	163'-3 5/8	164'-0 7/8	175'-4	175'-5 1/4	175'-9 5/8	176'-6 7/8	187'-10	187'-11 1/4	188'-3 5/8	189'-0 7/8	D (FT.-IN.)
E	17	17	17	17	18	18	18	18	20	20	20	20	22	22	22	22	23	23	23	23	E
F (FT.-IN.)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	F (FT.-IN.)

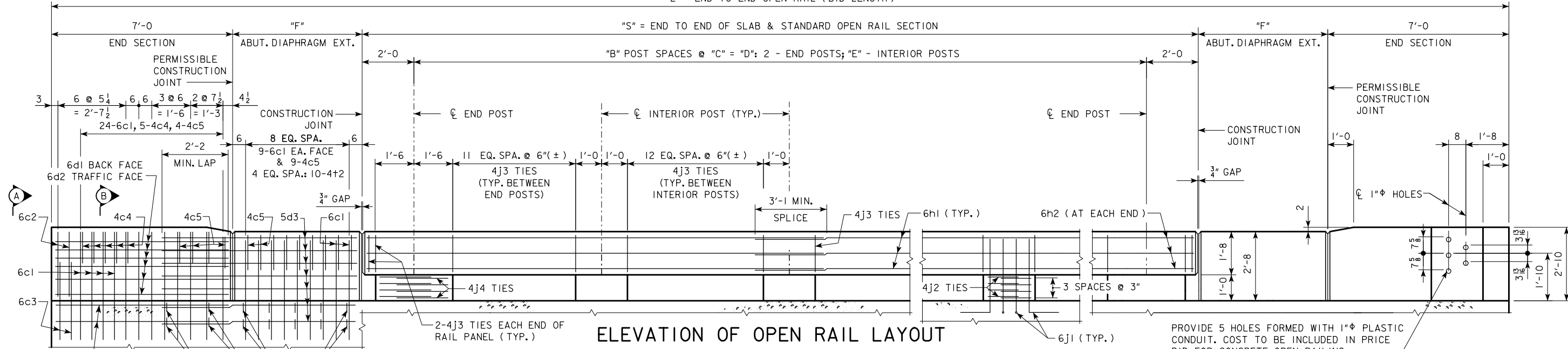
TABLE OF OPEN RAIL DIMENSIONS AND NUMBERS

CL-CL ABUT. BRG	201'-4				213'-10				226'-4				243'-0				CL-CL ABUT. BRG
SKEW	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	SKEW
L (FT.-IN.)	228'-4	228'-4	228'-4	228'-4	240'-10	240'-10	240'-10	240'-10	253'-4	253'-4	253'-4	253'-4	270'-0	270'-0	270'-0	270'-0	L (FT.-IN.)
S (FT.-IN.)	204'-4	204'-5 1/4	204'-9 5/8	205'-6 7/8	216'-10	216'-11 1/4	217'-3 5/8	218'-0 7/8	229'-4	229'-5 1/4	229'-9 5/8	230'-6 7/8	246'-0	246'-1 1/4	246'-5 5/8	247'-2 7/8	S (FT.-IN.)
B	26	26	26	26	27	27	27	27	29	29	29	29	31	31	31	31	B
C (FT.-IN.)	7'-8 1/2	7'-8 1/2	7'-8 5/8	7'-9	7'-10 5/8	7'-10 5/8	7'-10 3/4	7'-11 1/8	7'-9 1/4	7'-9 1/4	7'-9 3/8	7'-9 3/4	7'-9 5/8	7'-9 3/4	7'-9 7/8	7'-10 1/8	C (FT.-IN.)
D (FT.-IN.)	200'-4	200'-5 1/4	200'-9 5/8	201'-6 7/8	212'-10	212'-11 1/4	213'-3 5/8	214'-0 7/8	225'-4	225'-5 1/4	225'-9 5/8	226'-6 7/8	242'-0	242'-1 1/4	242'-5 5/8	243'-2 7/8	D (FT.-IN.)
E	25	25	25	25	26	26	26	26	28	28	28	28	30	30	30	30	E
F (FT.-IN.)	5'-0	4'-11 3/8	4'-9 1/4	4'-4 1/2	5'-0	4'-11 3/8	4'-9 1/4	4'-4 1/2	5'-0	4'-11 3/8	4'-9 1/4	4'-4 1/2	5'-0	4'-11 3/8	4'-9 1/4	4'-4 1/2	F (FT.-IN.)



VIEW A-A SECTION B-B

"L" = END TO END OPEN RAIL ( BID LENGTH )

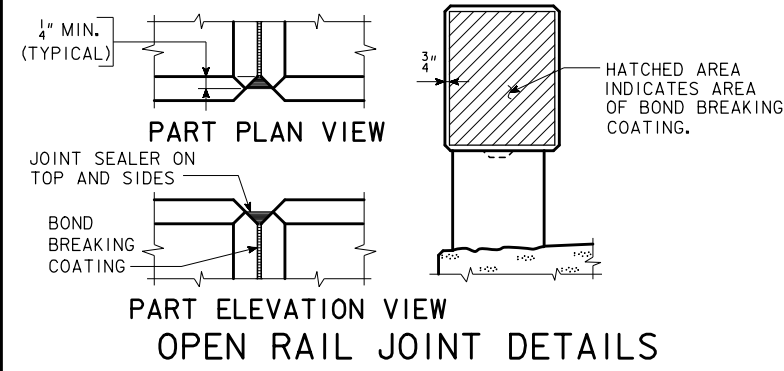


ELEVATION OF OPEN RAIL LAYOUT

OPEN RAIL NOTES:

- CONSTRUCTION JOINT BETWEEN TOP OF WING AND RAIL IS ROUGHENED CONCRETE.
- MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.
- COST OF THE JOINT SEALER AND BOND BREAKER SHALL BE CONSIDERED INCIDENTAL TO OTHER CONSTRUCTION.
- THE CONCRETE OPEN RAIL IS TO BE BID ON A LINEAL FOOT BASIS MEASURED FROM END TO END OF RAIL. THE NUMBER OF LINEAL FEET OF OPEN RAIL INSTALLED WILL BE PAID FOR AT THE CONTRACT PRICE PER LINEAL FOOT. PRICE BID FOR "CONCRETE OPEN RAILING, TL-4" SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL, EXCLUDING REINFORCING STEEL, AND ALL OF THE EQUIPMENT AND LABOR REQUIRED TO CONSTRUCT THE RAIL IN ACCORDANCE WITH THESE PLANS AND CURRENT SPECIFICATIONS.
- ALL OPEN RAIL REINFORCING STEEL IS TO BE INCLUDED WITH THE SUPERSTRUCTURE REINFORCING STEEL.
- THE CAST-IN-PLACE OPEN RAIL SHALL USE CLASS C MIX. CLASS D CONCRETE IS NOT PERMITTED.
- TOP OF THE OPEN RAIL IS TO BE PARALLEL TO THEORETICAL CL GRADE.
- IF CONDUIT IS REQUIRED IN THIS PLAN THE RIGID STEEL CONDUIT, JUNCTION BOXES AND FITTINGS INCLUDING LABOR AND ANY ADDITIONAL WORK TO DO THE INSTALLATION IS CONSIDERED INCIDENTAL TO THE COST OF THE RAILING.

REVISED 07-10 - END SECTIONS WERE CHANGED. VIEW A-A & SECTION B-B WERE ADDED.



PART ELEVATION VIEW OPEN RAIL JOINT DETAILS

07-10 LATEST REVISION DATE  APPROVED BY BRIDGE ENGINEER [Signature]	<b>IOWADOT Highway Division</b> STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
	<b>OPEN RAIL, TL-4 DETAILS</b> SHEET 1 OF 2	<b>H30-42-06</b>

# EPOXY COATED REINFORCING STEEL-TWO OPEN RAILS

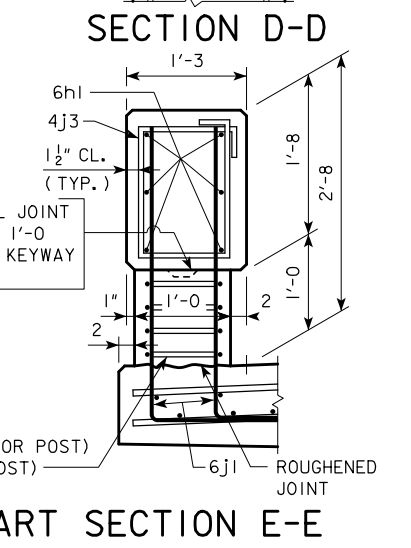
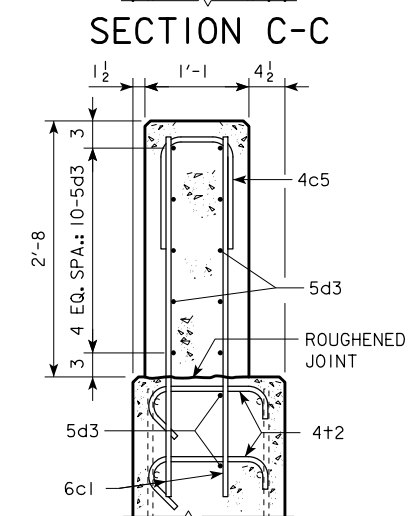
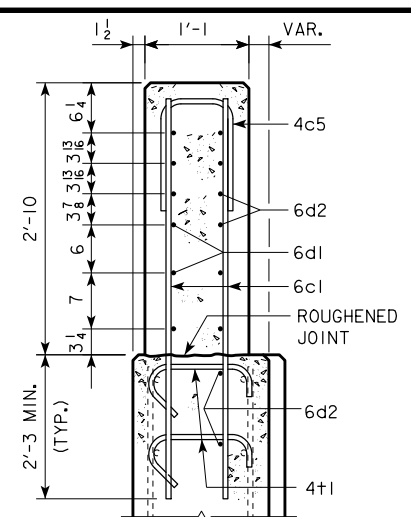
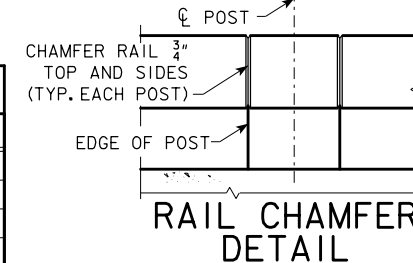
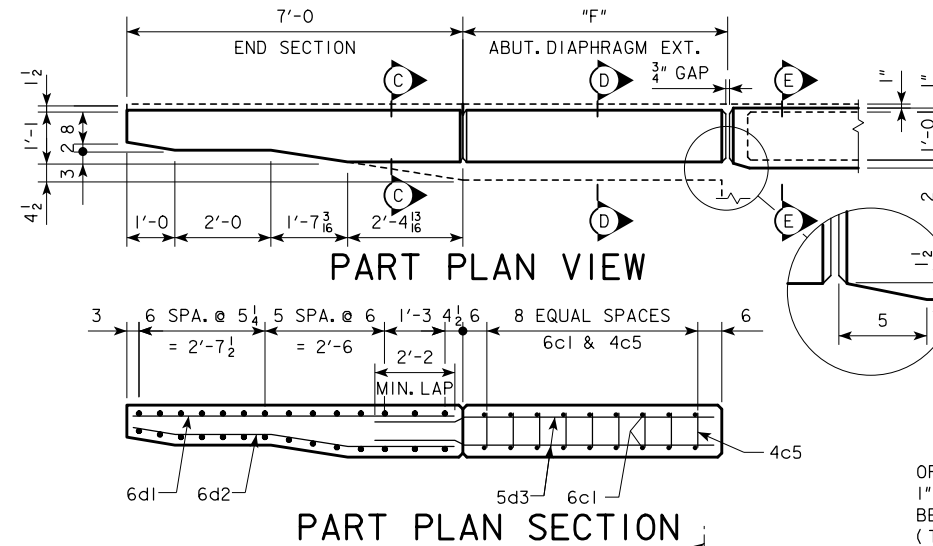
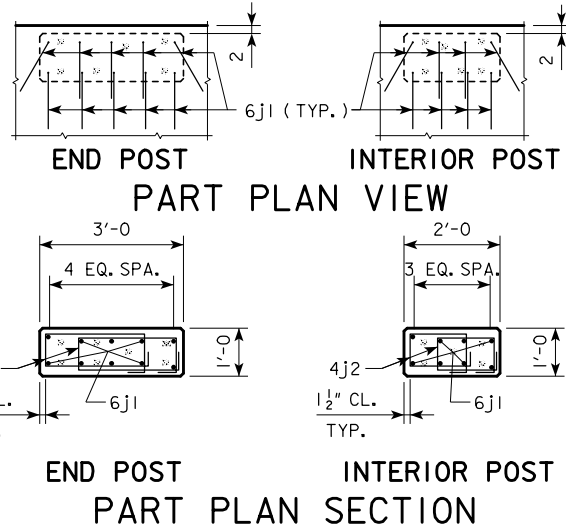
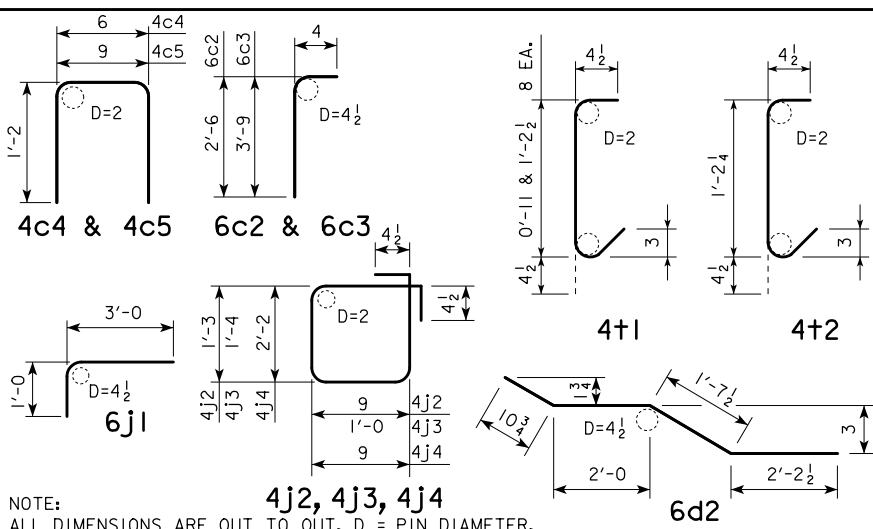
( NOTE: THESE REINFORCING BARS TO BE USED ON ALL SKEWS )

BRIDGE LENGTH			138'-10			151'-4			163'-10			176'-4			188'-10			201'-4			213'-10			226'-4			243'-0		
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT	NO.	LENGTH	WEIGHT
6c1	VERTICAL, END SECTION & ABUT. DIAPH. EXT.	—	96	4'-11	709	96	4'-11	709	96	4'-11	709	96	4'-11	709	96	4'-11	709	168	4'-11	1,241	168	4'-11	1,241	168	4'-11	1,241	168	4'-11	1,241
6c2	VERTICAL, END SECTION	—	16	2'-10	68	16	2'-10	68	16	2'-10	68	16	2'-10	68	16	2'-10	68	16	2'-10	68	16	2'-10	68	16	2'-10	68	16	2'-10	68
6c3	VERTICAL, END SECTION	—	16	4'-1	98	16	4'-1	98	16	4'-1	98	16	4'-1	98	16	4'-1	98	16	4'-1	98	16	4'-1	98	16	4'-1	98	16	4'-1	98
4c4	VERTICAL HOOPS, END SECTION	□	20	2'-10	38	20	2'-10	38	20	2'-10	38	20	2'-10	38	20	2'-10	38	20	2'-10	38	20	2'-10	38	20	2'-10	38	20	2'-10	38
4c5	VERT. HOOPS, END SEC. & ABUT. DIAPH. EXT.	□	16	3'-1	33	16	3'-1	33	16	3'-1	33	16	3'-1	33	16	3'-1	33	52	3'-1	107	52	3'-1	107	52	3'-1	107	52	3'-1	107
6d1	HORIZONTAL, END SECTION-BACK FACE	—	24	6'-8	240	24	6'-8	240	24	6'-8	240	24	6'-8	240	24	6'-8	240	24	6'-8	240	24	6'-8	240	24	6'-8	240	24	6'-8	240
6d2	HORIZONTAL, END SECTION-TRAFFIC FACE	—	32	6'-9	324	32	6'-9	324	32	6'-9	324	32	6'-9	324	32	6'-9	324	32	6'-9	324	32	6'-9	324	32	6'-9	324	32	6'-9	324
5d3*	HORIZONTAL, ABUT. DIAPH. EXT.-BOTH FACES	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	48	7'-2	359	48	7'-2	359	48	7'-2	359	48	7'-2	359
6h1	LONGITUDINAL, OPEN RAIL	—	24	40'-0	1,442	36	40'-0	2,163	36	40'-0	2,163	36	40'-0	2,163	48	40'-0	2,884	48	40'-0	2,884	48	40'-0	2,884	60	40'-0	3,605	60	40'-0	3,605
6h2	LONGITUDINAL, OPEN RAIL, ENDS	—	24	36'-8	1,322	24	24'-8	889	24	30'-11	1,114	24	37'-2	1,340	24	25'-2	907	24	31'-5	1,133	24	37'-8	1,358	24	25'-8	925	24	34'-0	1,226
6j1	VERTICAL DOWELS, OPEN RAIL	□	312	4'-0	1,875	328	4'-0	1,971	360	4'-0	2,163	392	4'-0	2,355	408	4'-0	2,451	440	4'-0	2,644	456	4'-0	2,740	488	4'-0	2,932	520	4'-0	3,124
4j2	HOOP, INTERIOR POST	□	272	4'-9	863	288	4'-9	914	320	4'-9	1,015	352	4'-9	1,117	368	4'-9	1,168	400	4'-9	1,269	416	4'-9	1,320	448	4'-9	1,422	480	4'-9	1,523
4j3	HOOP, OPEN RAIL	□	472	5'-5	1,708	498	5'-5	1,802	550	5'-5	1,990	602	5'-5	2,178	628	5'-5	2,272	680	5'-5	2,460	706	5'-5	2,555	758	5'-5	2,743	810	5'-5	2,931
4j4	HOOP, END POST	□	32	6'-7	141	32	6'-7	141	32	6'-7	141	32	6'-7	141	32	6'-7	141	32	6'-7	141	32	6'-7	141	32	6'-7	141	32	6'-7	141
4t1	WING FOOTING TIE BARS	—	16	VARIABLES	19	16	VARIABLES	19	16	VARIABLES	19	16	VARIABLES	19	16	VARIABLES	19	16	VARIABLES	19	16	VARIABLES	19	16	VARIABLES	19	16	VARIABLES	19
4t2	WING FOOTING TIE BARS	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	40	1'-11	51	40	1'-11	51	40	1'-11	51	40	1'-11	51
TOTAL LBS. ( INCLUDE WITH SUPERSTRUCTURE REINFORCING )			8,880			9,409			10,115			10,823			11,352			13,076			13,543			14,313			15,095		

NOTE: ALL BARRIER RAIL REINFORCEMENT TO BE EPOXY COATED IF EPOXY COATING OPTION IS USED. SEE SHEET H30-01-06.

\* TRAFFIC FACE 5d3 BARS MAY REQUIRE FIELD CUTTING OR BENDING FOR HIGHER SKEW BRIDGES.

## BENT BAR DETAILS



## CONCRETE PLACEMENT SUMMARY - C.Y.

BRIDGE LENGTH	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
OPEN RAIL SECTION	2 @ 0.077 CU. YDS. PER FT.	22.0	24.0	25.9	27.8	29.7	31.7	33.6	38.1
OPEN RAIL-END SECTION	4 @ 0.687 CU. YDS.	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
OPEN RAIL-ABUT. DIAPH. SECTION	4 @ 0.107 CU. YDS. PER FT.	—	—	—	—	1.9	1.9	1.9	1.9
OPEN RAIL-END POSTS	4 @ 0.11 CU. YDS.	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
OPEN RAIL-INTERIOR POSTS	2 x "E" @ 0.07 CU. YDS.	2.4	2.5	2.8	3.1	3.5	3.6	3.9	4.2
TOTAL (C.Y.)		27.5	29.6	31.8	34.0	40.2	42.2	44.4	47.3

CONCRETE QUANTITIES SHOWN ARE BASED ON 45° SKEW. FOR "E" SEE SHEET H30-42-06.

## OPEN CONCRETE RAIL, TL-4 QUANTITIES - L.F.

BRIDGE LENGTH	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
OPEN CONCRETE RAILING, TL-4 0° SKEW	311.7	336.7	361.7	386.7	411.7	456.7	481.7	506.7	540.0
OPEN CONCRETE RAILING, TL-4 15° SKEW	311.9	336.9	361.9	386.9	411.9	456.7	481.7	506.7	540.0
OPEN CONCRETE RAILING, TL-4 30° SKEW	312.6	337.6	362.6	387.6	412.6	456.7	481.7	506.7	540.0
OPEN CONCRETE RAILING, TL-4 45° SKEW	314.2	339.2	364.2	389.2	414.2	456.7	481.7	506.7	540.0

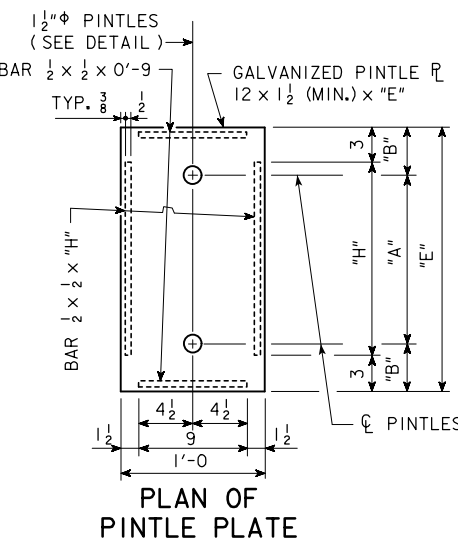
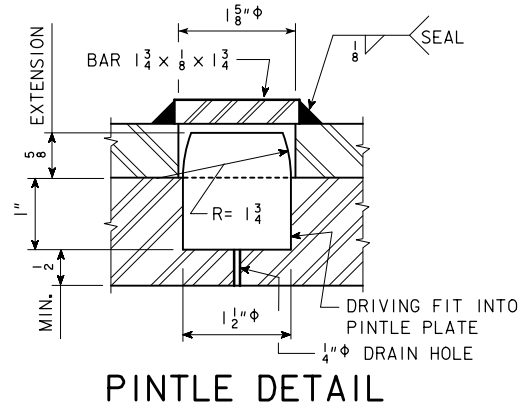
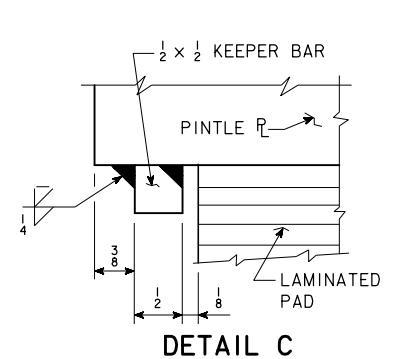
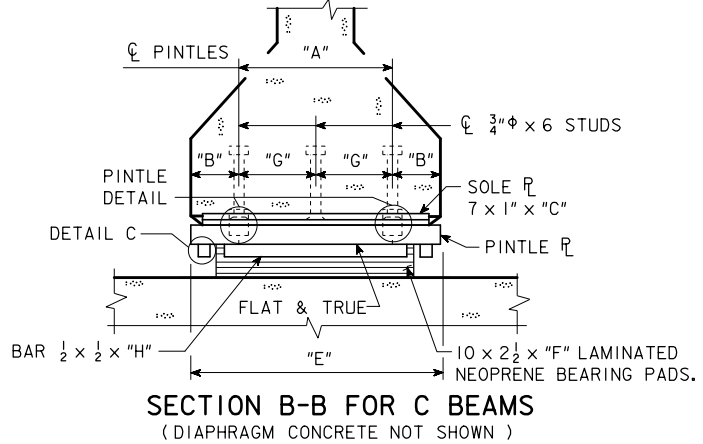
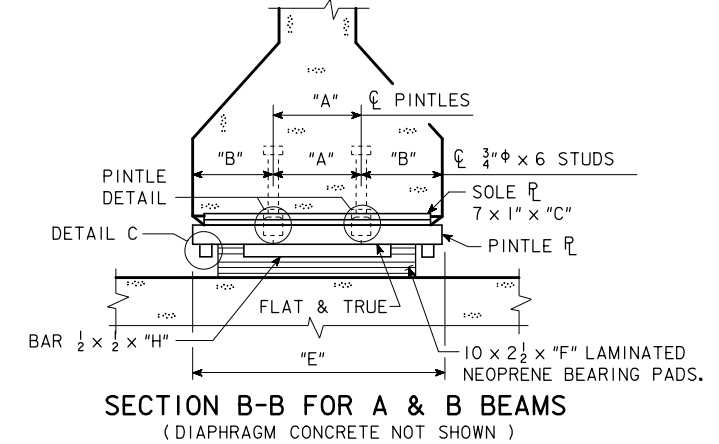
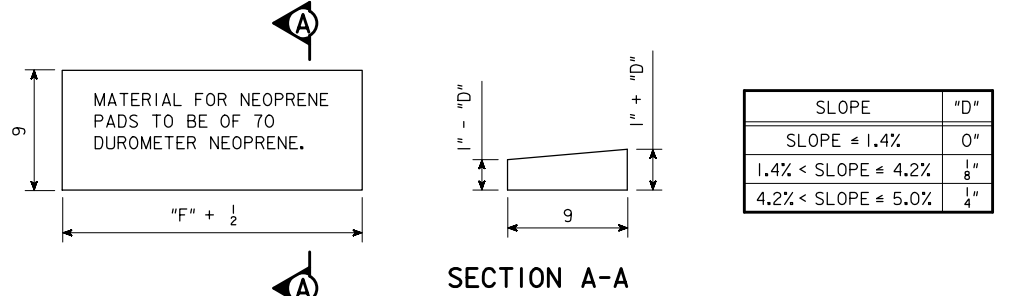
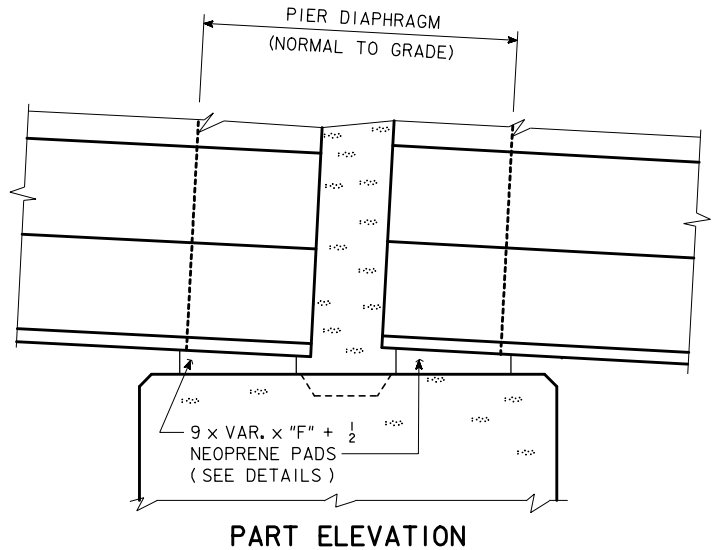
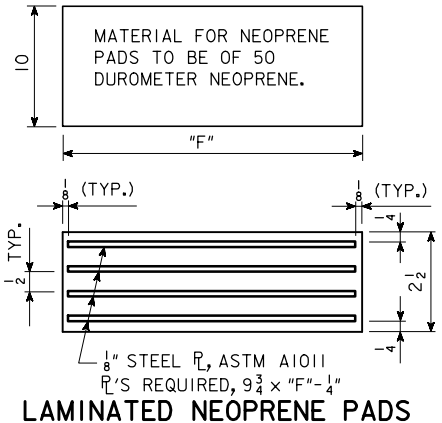
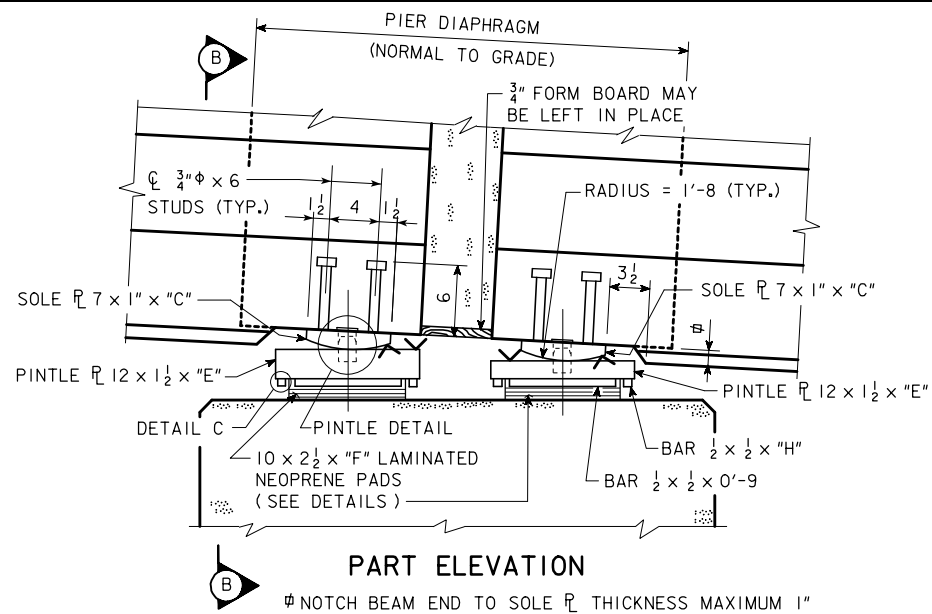
LATEST REVISION DATE  
05-11  
APPROVED BY BRIDGE ENGINEER  
*Thomas L. Mc Donald*

STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES  
**PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES**  
DECEMBER, 2006

**OPEN RAIL, TL-4 DETAILS**  
SHEET 2 OF 2

**H30-43-06**





**EXPANSION PIER BEARING NOTES:**

SURFACES MARKED "V" SHALL BE FINISHED ANSI 250.

PINTLE PLATES ARE A PART OF THE SUPERSTRUCTURE "STRUCTURAL STEEL QUANTITY". COSTS OF ANCHORED CURVED SOLE PLATES AND NEOPRENE PADS ARE TO BE INCLUDED IN THE PRICE BID FOR "PRETENSIONED PRESTRESSED CONCRETE BEAMS".

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

SOLE PLATES ARE TO BE SET IN FORMS WHEN BEAMS ARE CAST AND THE BOTTOM OF BEAMS FORMED OUT AS SHOWN TO EXCLUDE CONCRETE.

SOLE PLATES SHALL COMPLY WITH ONE OF THE FOLLOWING :

ASTM A 514 GRADE B

ASTM A 709 GRADE HPS 70W

**EXPANSION PIER**

SLOPE<sub>SPAN 1</sub> = 100%  $\frac{P/G \text{ ELEV. @ NEAR ABUT.} - P/G \text{ ELEV. @ PIER 1}}{\text{SPAN 1 LENGTH}}$

SLOPE<sub>SPAN 2</sub> = 100%  $\frac{P/G \text{ ELEV. @ PIER 1} - P/G \text{ ELEV. @ PIER 2}}{\text{SPAN 2 LENGTH}}$

SLOPE<sub>SPAN 3</sub> = 100%  $\frac{P/G \text{ ELEV. @ PIER 2} - P/G \text{ ELEV. @ FAR ABUT.}}{\text{SPAN 3 LENGTH}}$

**FIXED PIER BEARING NOTES:**

IF CALCULATED SLOPE FOR A GIVEN SPAN EXCEEDS 1.4%, 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".

**SLOPE CALCULATION FORMULA**

**FIXED PIER**

**VARIABLE DIMENSIONS**

	BEAM BOTTOM FLANGE WIDTH	
	A & B BEAMS 1'-5"	C BEAMS 1'-8"
"A"	0'-6"	1'-0"
"B"	0'-5 1/2"	0'-4"
"C"	1'-3 1/2"	1'-6 1/2"
"E"	1'-5"	1'-8"
"F"	1'-3"	1'-6"
"H"	0'-11"	1'-2"

09-12  
LATEST REVISION DATE

*Harmon L. Mc Donald*  
APPROVED BY BRIDGE ENGINEER

**IOWADOT Highway Division**

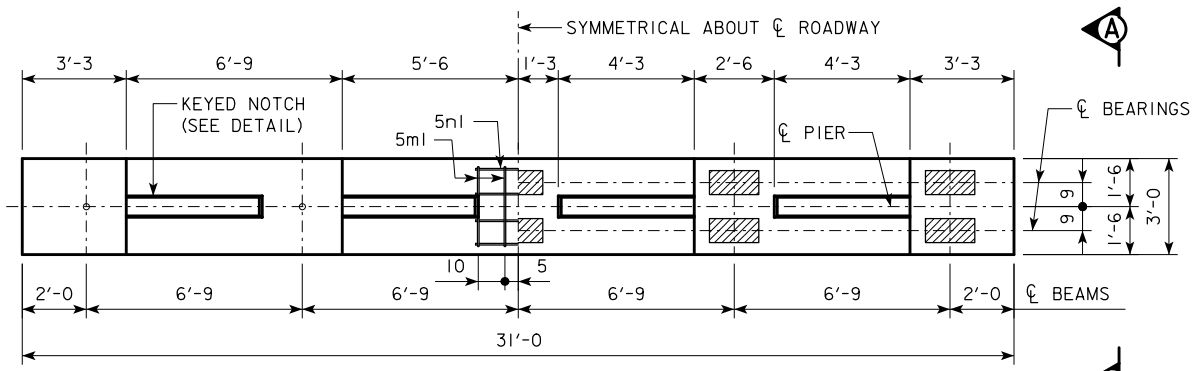
STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES

**PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES**

DECEMBER, 2006

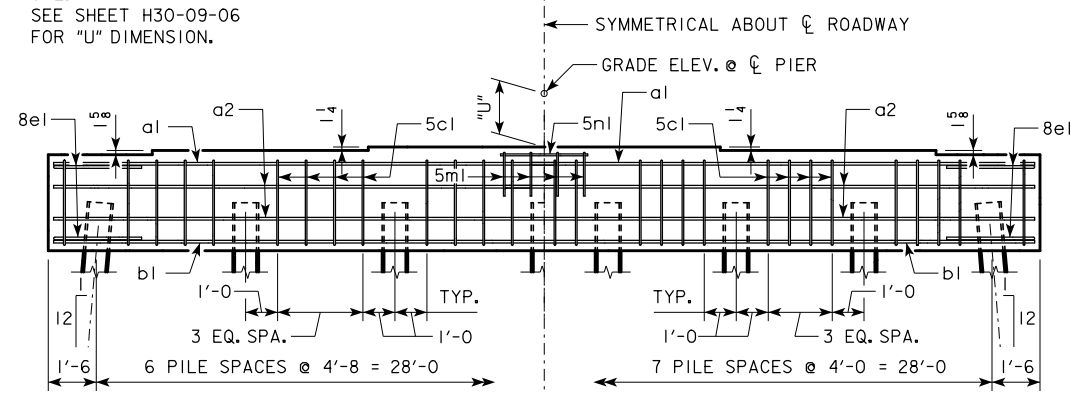
PIER BEARING DETAILS      H30-44-06

CORRECTION 09-12 - REFERENCE TO ASTM A852 WAS DELETED.



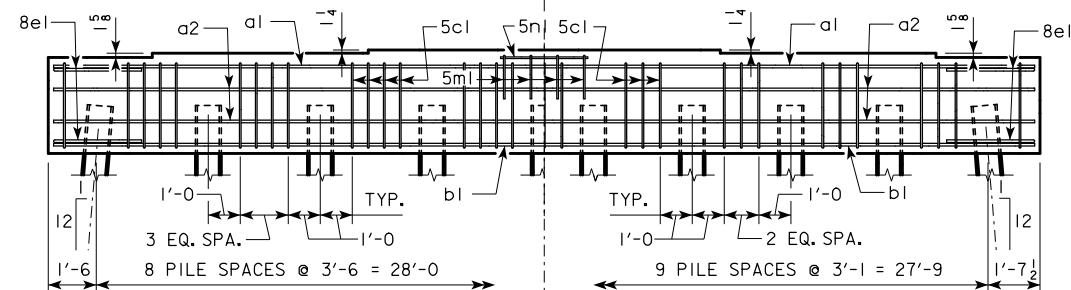
TYPICAL PLAN

NOTE:  
SEE SHEET H30-09-06  
FOR "U" DIMENSION.



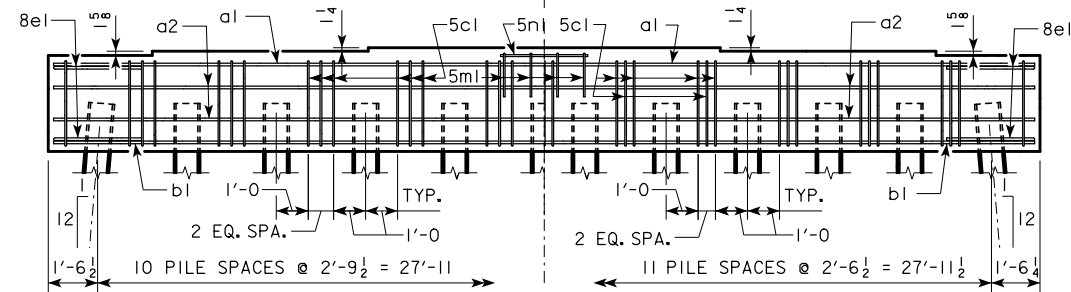
7 PILE BENT

8 PILE BENT



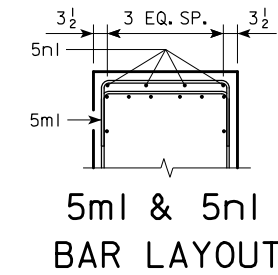
9 PILE BENT

10 PILE BENT

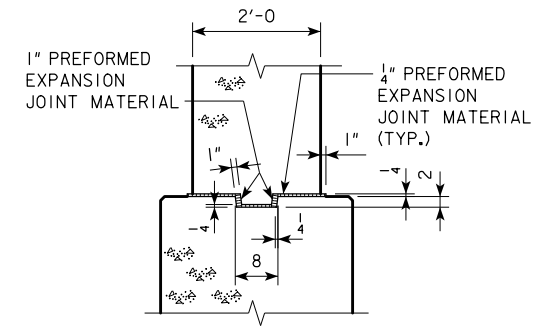


11 PILE BENT

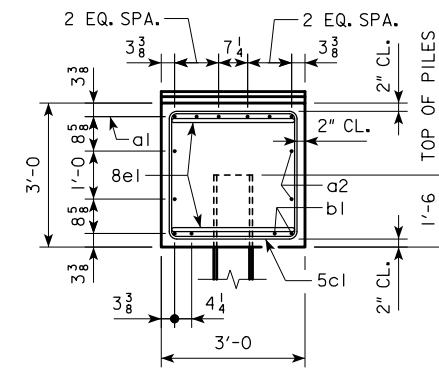
12 PILE BENT



5ml & 5nl  
BAR LAYOUT



KEYED NOTCH DETAIL



VIEW A-A  
FOR 7, 8, 9, 10, 11 & 12 PILE BENTS

REVISED 07-10 - SHEET WAS REVISED TO MEET LRFD SPECIFICATIONS.

07-10 LATEST REVISION DATE  <i>Harmon L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
	<b>PILE BENT PIERS</b> 0° SKEW	<b>H30-45-06</b>

**PILE BENT NOTES:**

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

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

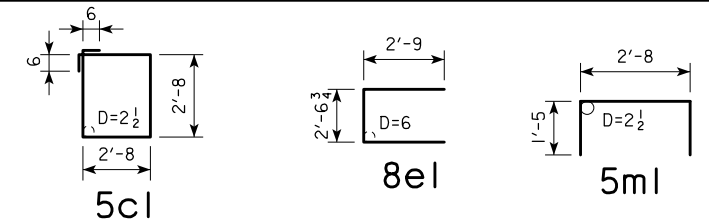
MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.

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

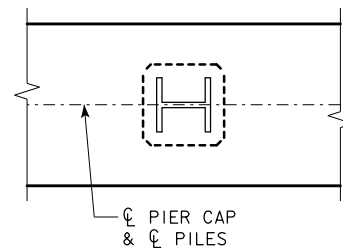
**REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT**

BAR	LENGTH	SHAPE	7 PILE BENT			8 PILE BENT			9 PILE BENT			10 PILE BENT			11 PILE BENT			12 PILE BENT		
			NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
a1	30'-8	=====	6	9	626	6	9	626	6	9	626	6	9	626	6	9	626	6	9	626
a2	30'-8	=====	4	8	328	4	8	328	4	8	328	4	8	328	4	8	328	4	8	328
b1	30'-8	=====	4	9	417	4	9	417	4	9	417	4	8	328	4	8	328	4	8	328
5c1	11'-8	=====	26	5	316	30	5	365	34	5	414	29	5	353	32	5	389	35	5	426
8e1	8'-1	=====	4	8	86	4	8	86	4	8	86	4	8	86	4	8	86	4	8	86
5m1	5'-6	=====	4	5	23	4	5	23	4	5	23	4	5	23	4	5	23	4	5	23
5n1	2'-8	=====	4	5	11	4	5	11	4	5	11	4	5	11	4	5	11	4	5	11
REINFORCING STEEL (LB.)			1807			1856			1905			1755			1791			1828		
STRUCTURAL CONCRETE (CY)	PILE TYPE		1, 2			-----			-----			10.4			10.4			10.3		
	PILE TYPE		3			10.8			10.8			10.8			10.8			10.8		

**BENT BAR DETAILS**



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



PILE ORIENTATION DETAIL FOR TYPE 3 TRESTLE BENT PILES

℄-℄ ABUTMENT BEARING	FRICTION BEARING PILING			FRICTION OR POINT BEARING PILING		
	PIOL TYPE 1 OR 2			PIOL TYPE 3		
	NUMBER OF TRESTLE PILES	② "K" (INCHES)	③ LRFD P <sub>u</sub> , STRENGTH I, DES. LOAD (KIPS)	NUMBER OF TRESTLE PILES	PILE SIZE	③ LRFD P <sub>u</sub> , STRENGTH I, DES. LOAD (KIPS)
138'-10	10	14	93	7	HP10x57	134
	9	16	104	7	HP12x53	134
151'-4	---	---	---	7	HP10x57	141
	9	16	109	8	HP12x53	123
163'-10	---	---	---	8	HP10x57	133
	---	---	---	8	HP12x53	133
176'-4	---	---	---	8	HP10x57	139
	---	---	---	9	HP12x53	124
188'-10	---	---	---	9	HP10x57	130
	---	---	---	9	HP12x53	130
201'-4	---	---	---	9	HP10x57	145
	---	---	---	10	HP12x53	130
213'-10	---	---	---	10	HP10x57	137
	---	---	---	11	HP12x53	124
226'-4	---	---	---	10	HP10x57	144
	---	---	---	11	HP12x53	131
243'-0	---	---	---	11	HP10x57	138
	---	---	---	12	HP12x53	126

- ① CONCRETE QUANTITIES SHOWN HAVE HAD THE VOLUME OF EMBEDDED PILES DEDUCTED FOR TYPES 1 AND 2 BASED ON 0.8 FT<sup>3</sup> PER FOOT OF EMBEDMENT. THE CONCRETE QUANTITIES FOR TYPE 3 PILES DO NOT REQUIRE REDUCTION FOR PILE EMBEDMENT.
- ② SEE STANDARD PIOL FOR "K" DIMENSION.
- ③ NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

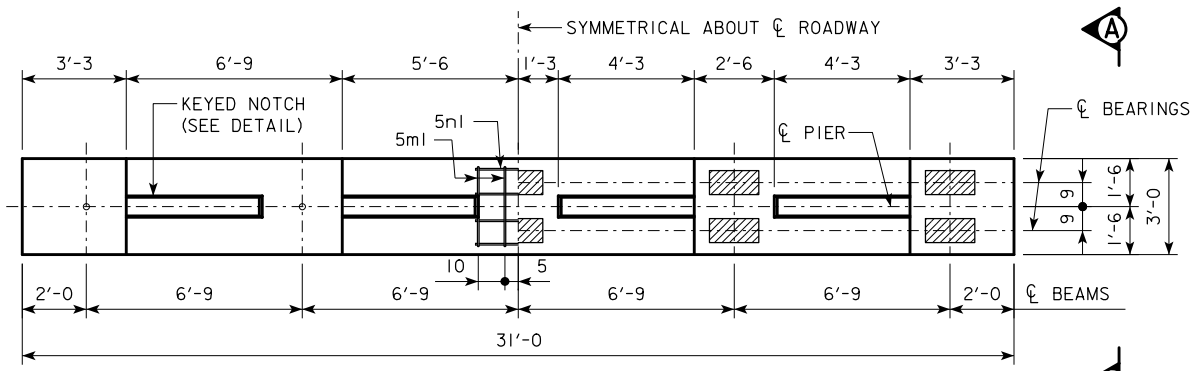
NOTE: FRICTION BEARING INCLUDES SIDE FRICTION AND END BEARING IN SOIL.  
POINT BEARING INCLUDES SIDE FRICTION AND POINT BEARING IN ROCK.

04-13 LATEST REVISION DATE  <i>Thomas L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER	
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006
	PILE BENT PIERS 0° SKEW

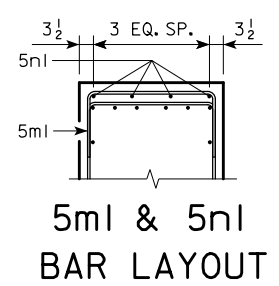
H30-46-06

REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.





TYPICAL PLAN

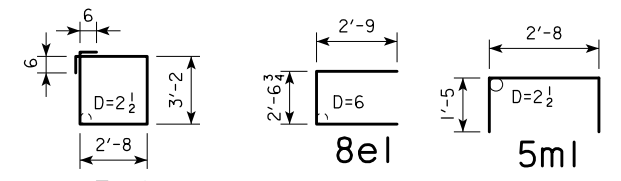


5m1 & 5nl  
BAR LAYOUT

REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

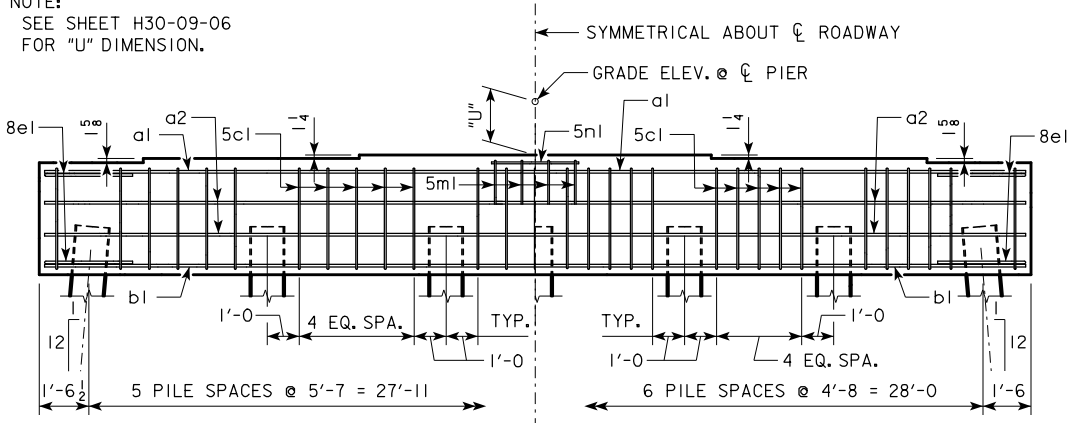
BAR	LENGTH	SHAPE	6 PILE BENT			7 PILE BENT			8 PILE BENT			9 PILE BENT		
			NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
a1	30'-8	—	8	9	834	8	9	834	6	9	626	6	9	626
a2	30'-8	—	4	8	328	4	8	328	4	8	328	4	8	328
b1	30'-8	—	4	9	417	4	9	417	4	8	328	4	8	328
5c1	12'-8	—	27	5	357	32	5	423	30	5	396	26	5	343
8e1	8'-1	—	4	8	86	4	8	86	4	8	86	4	8	86
5m1	5'-6	—	4	5	23	4	5	23	4	5	23	4	5	23
5nl	2'-8	—	4	5	11	4	5	11	4	5	11	4	5	11
REINFORCING STEEL (LB.)			2056			2122			1798			1745		
STRUCTURAL PILE TYPE														
CONCRETE (CY)			3			12.6			12.6			12.6		

BENT BAR DETAILS



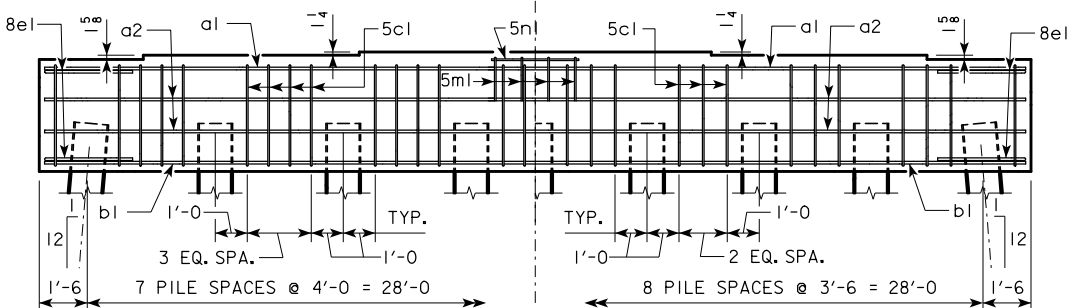
NOTE: ALL DIMENSIONS ARE OUT TO OUT. D=PIN DIAMETER.

NOTE: SEE SHEET H30-09-06 FOR "U" DIMENSION.



6 PILE BENT

7 PILE BENT



8 PILE BENT

9 PILE BENT

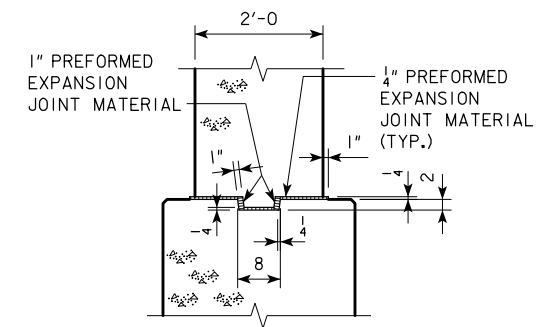
PILE BENT NOTES:

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

FOR DETAILS OF TRESTLE PILES, SEE STANDARD PIOL.

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

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



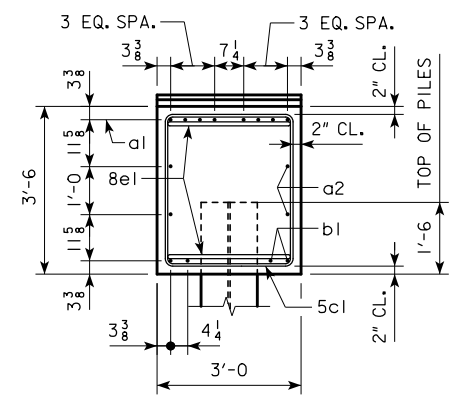
KEYED NOTCH DETAIL

FRICITION OR POINT BEARING PILING

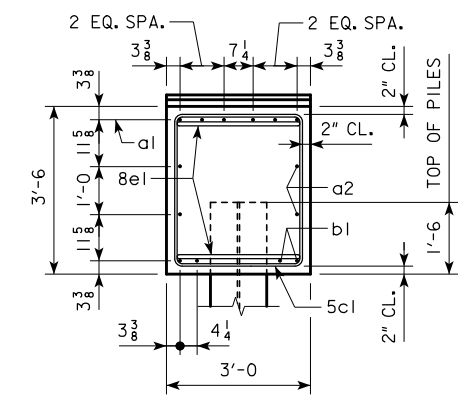
CL-CL ABUTMENT BEARING	PIOL TYPE 3		
	NUMBER OF TRESTLE PILES	PILE SIZE	① LRFD P <sub>u</sub> , STRENGTH I, DES. LOAD (KIPS)
138'-10	6	HP14x73	157
	6	HP14x89	157
151'-4	6	HP14x73	166
	6	HP14x89	166
163'-10	6	HP14x73	179
	6	HP14x89	179
176'-4	7	HP14x73	161
	6	HP14x89	187
188'-10	7	HP14x73	168
	6	HP14x89	196
201'-4	8	HP14x73	164
	6	HP14x89	218
213'-10	8	HP14x73	172
	7	HP14x89	197
226'-4	8	HP14x73	181
	7	HP14x89	207
243'-0	9	HP14x73	170
	7	HP14x89	218

① NOTE: P<sub>u</sub>, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

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



VIEW A-A  
FOR 6 & 7 PILE BENTS

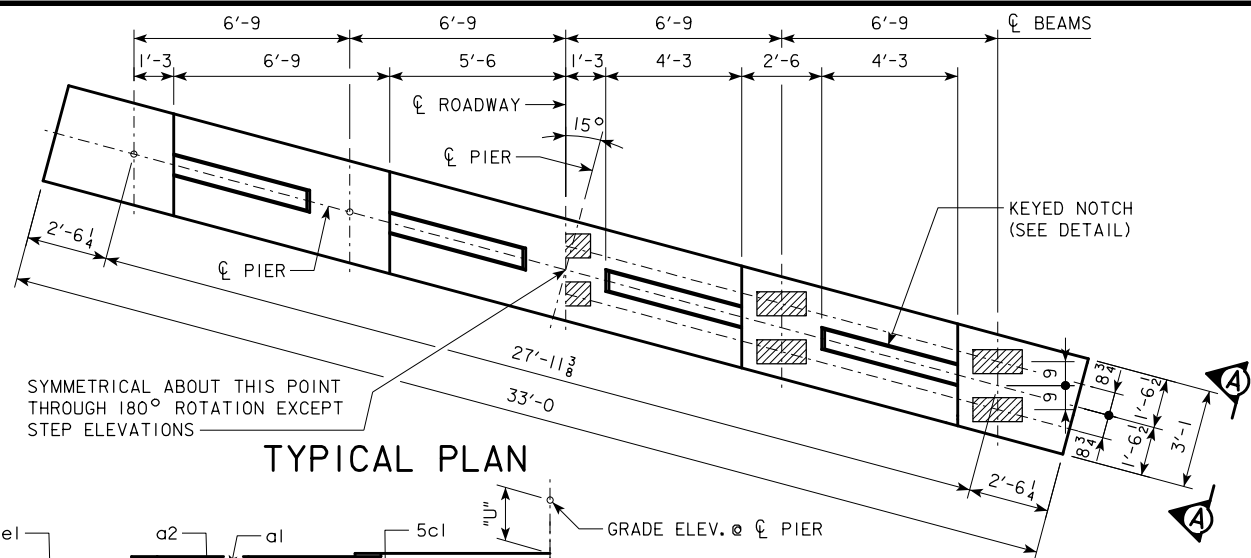


VIEW A-A  
FOR 8 & 9 PILE BENTS

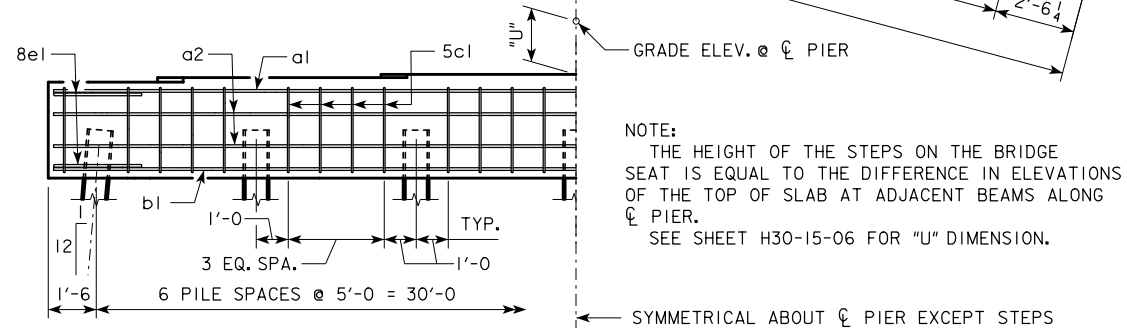
04-13  
LATEST REVISION DATE  
Hansen L. Mc Donald  
APPROVED BY BRIDGE ENGINEER

**IOWADOT** Highway Division  
STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES  
**PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES**  
DECEMBER, 2006  
**PILE BENT PIERS  
HP14 PILES**  
0° SKEW  
**H30-47-06**

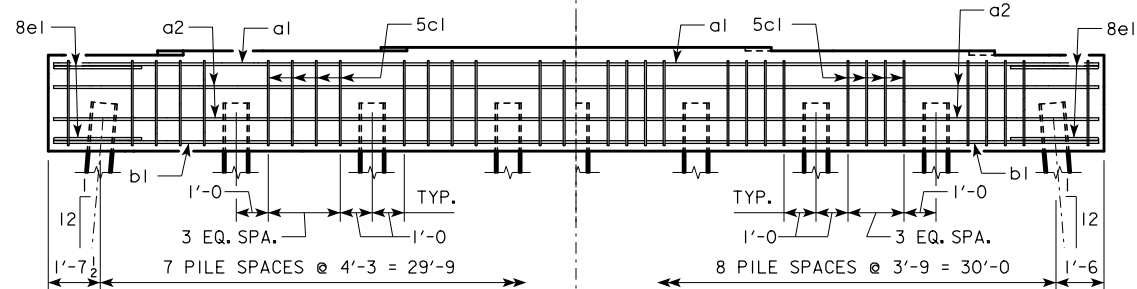
REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.



TYPICAL PLAN

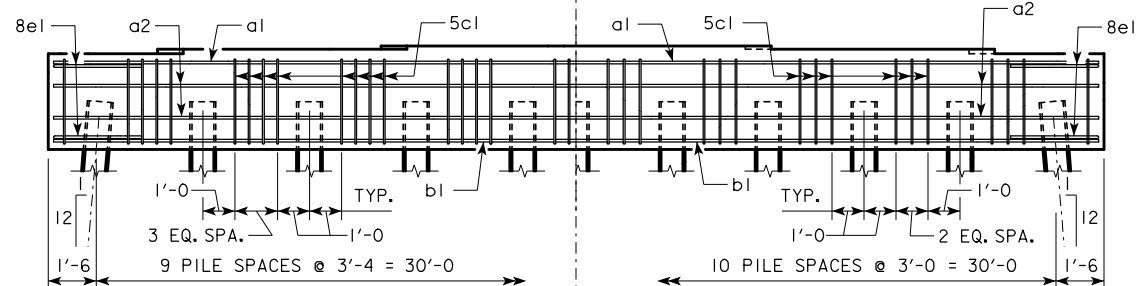


7 PILE BENT



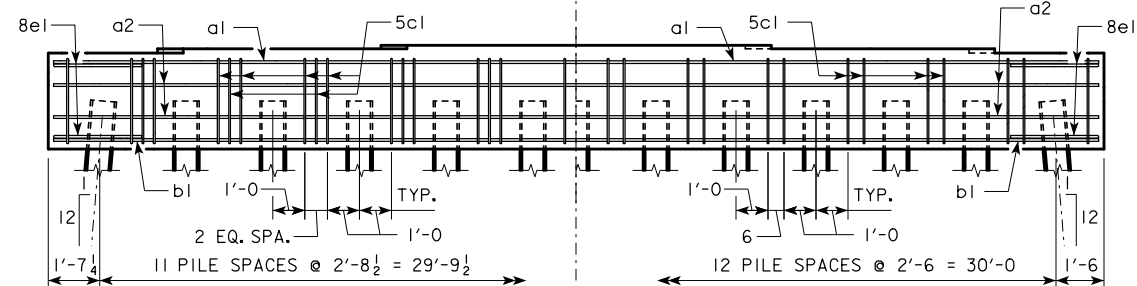
8 PILE BENT

9 PILE BENT



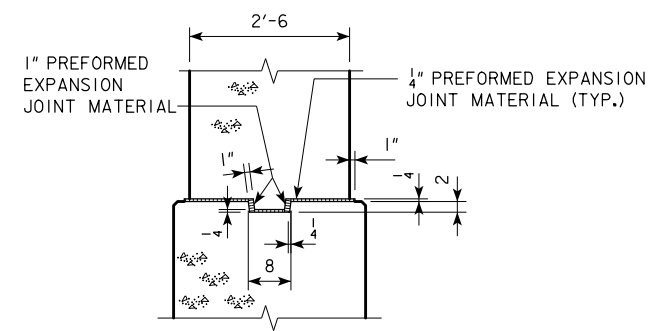
10 PILE BENT

11 PILE BENT

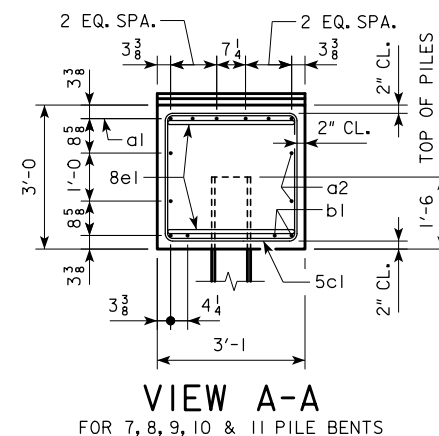


12 PILE BENT

13 PILE BENT

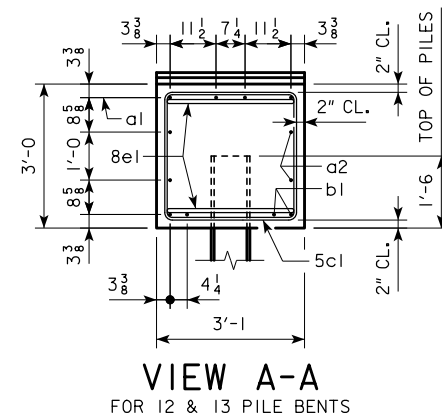


KEYED NOTCH DETAIL



VIEW A-A

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



VIEW A-A

FOR 12 & 13 PILE BENTS

REVISED 07-10 - SHEET WAS REVISED TO MEET LRFD SPECIFICATIONS.

07-10 LATEST REVISION DATE  <i>Harmon L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
	<b>PILE BENT PIERS</b> 15° SKEW	<b>H30-48-06</b>

**PILE BENT NOTES:**

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

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

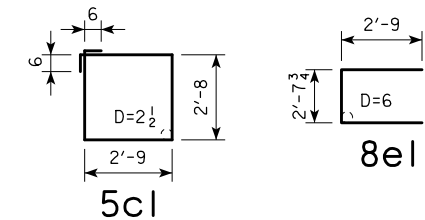
MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.

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

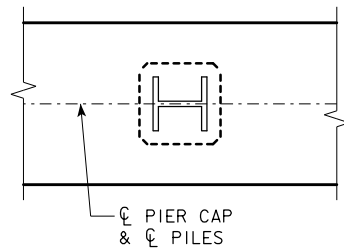
**REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT**

BAR	LENGTH	SHAPE	7 PILE BENT			8 PILE BENT			9 PILE BENT			10 PILE BENT			11 PILE BENT			12 PILE BENT			13 PILE BENT		
			NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
a1	32'-8	—	6	9	666	6	9	666	6	9	666	6	9	666	6	9	666	4	9	444	4	9	444
a2	32'-8	—	4	8	349	4	8	349	4	8	349	4	8	349	4	8	349	4	8	349	4	8	349
b1	32'-8	—	4	9	444	4	9	444	4	9	444	4	9	444	4	9	444	4	8	349	4	8	349
5c1	11'-10	□	26	5	321	30	5	370	34	5	420	38	5	469	32	5	395	35	5	432	26	5	321
8e1	8'-2	—	4	8	87	4	8	87	4	8	87	4	8	87	4	8	87	4	8	87	4	8	87
REINFORCING STEEL (LB.)			1867			1916			1966			2015			1941			1661			1550		
STRUCTURAL CONCRETE (CY)	PILE TYPE																						
	1, 2		-----			-----			11.5			11.4			11.4			11.3			11.3		
	3		11.9			11.9			11.9			11.9			11.9			11.9			-----		

**BENT BAR DETAILS**



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



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

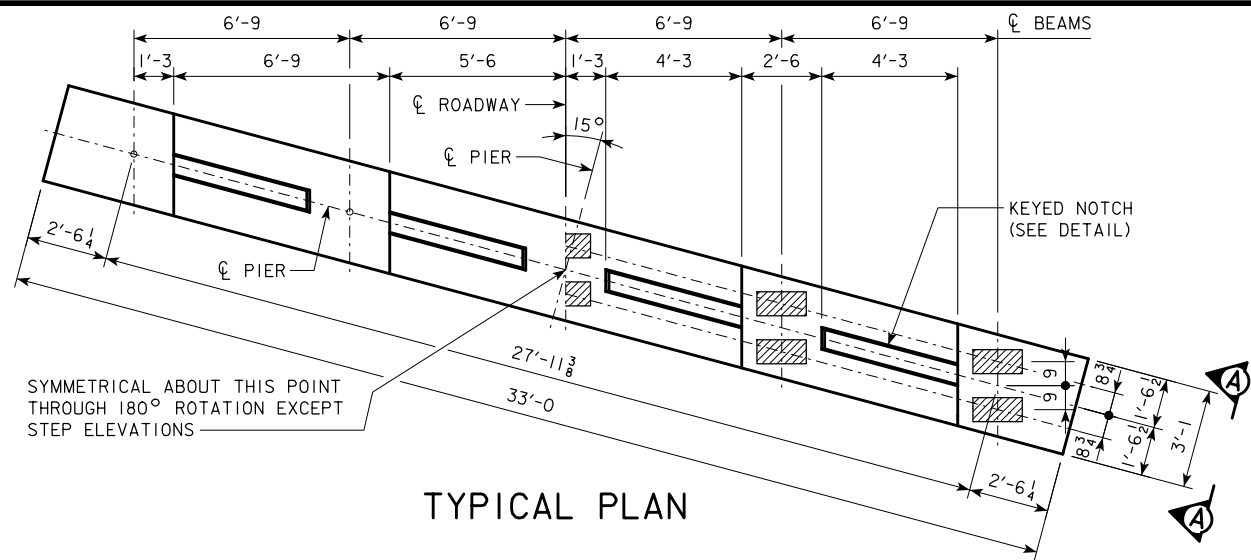
℄-℄ ABUTMENT BEARING	FRICTION BEARING PILING			FRICTION OR POINT BEARING PILING		
	PIOL TYPE 1 OR 2			PIOL TYPE 3		
	NUMBER OF TRESTLE PILES	③ "K" (INCHES)	④ LRFD PU, STRENGTH I, DES. LOAD (KIPS)	NUMBER OF TRESTLE PILES	PILE SIZE	④ LRFD PU, STRENGTH I, DES. LOAD (KIPS)
138'-10	10	14	95	7	HP10x57	135
	9	16	105	8	HP12x53	119
151'-4	11	14	91	7	HP10x57	143
	10	16	100	8	HP12x53	125
163'-10	-----	--	-----	8	HP10x57	135
	10	16	108	9	HP12x53	120
176'-4	-----	--	-----	8	HP10x57	141
	-----	--	-----	9	HP12x53	126
188'-10	-----	--	-----	9	HP10x57	131
	-----	--	-----	9	HP12x53	131
201'-4	-----	--	-----	10	HP10x57	132
	-----	--	-----	10	HP12x53	132
213'-10	-----	--	-----	10	HP10x57	138
	-----	--	-----	11	HP12x53	126
226'-4	-----	--	-----	11	HP10x57	133
	-----	--	-----	11	HP12x53	133
243'-0	-----	--	-----	11	HP10x57	139
	-----	--	-----	12	HP12x53	128

- ① SEE SHEET H30-17-06 FOR STEP REINFORCING STEEL QUANTITIES AND DETAILS.
- ② CONCRETE QUANTITIES SHOWN HAVE HAD THE VOLUME OF EMBEDDED PILES DEDUCTED FOR TYPES 1 AND 2 BASED ON 0.8 FT<sup>3</sup> PER FOOT OF EMBEDMENT. THE CONCRETE QUANTITIES FOR TYPE 3 PILES DO NOT REQUIRE REDUCTION FOR PILE EMBEDMENT.
- ③ SEE STANDARD PIOL FOR "K" DIMENSION.
- ④ NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

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

REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.

04-13 LATEST REVISION DATE  <i>Thomas L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER	
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006
	<b>PILE BENT PIERS</b> <b>H30-49-06</b> 15° SKEW



TYPICAL PLAN

SYMMETRICAL ABOUT THIS POINT THROUGH 180° ROTATION EXCEPT STEP ELEVATIONS

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 CL PIER.  
SEE SHEET H30-15-06 FOR "U" DIMENSION.

**PILE BENT NOTES:**

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

FOR DETAILS OF TRESTLE PILES, SEE STANDARD PIOL.

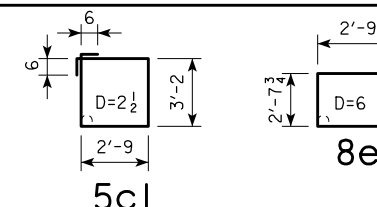
MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.

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

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

BAR	LENGTH	SHAPE	6 PILE BENT			7 PILE BENT			8 PILE BENT			9 PILE BENT		
			NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
a1	32'-8"	—	8	9	889	8	9	889	6	9	666	6	9	666
a2	32'-8"	—	4	8	349	4	8	349	4	8	349	4	8	349
b1	32'-8"	—	4	8	349	4	9	444	4	9	444	4	8	349
5c1	12'-10"	—	27	5	361	32	5	428	30	5	402	34	5	455
8e1	8'-2"	—	4	8	87	4	8	87	4	8	87	4	8	87
① REINFORCING STEEL (LB.)			2035			2197			1948			1906		
STRUCTURAL CONCRETE (CY)			3			13.8			13.8			13.8		

**BENT BAR DETAILS**



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

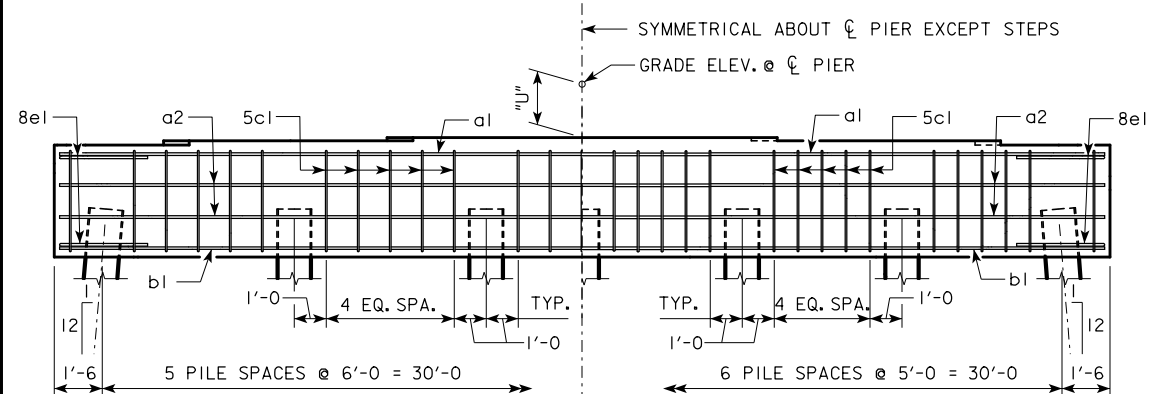
**FRICION OR POINT BEARING PILING**

CL-CL ABUTMENT BEARING	PIOL TYPE 3		
	NUMBER OF TRESTLE PILES	PILE	② LRFD PU, STRENGTH I, DES. LOAD (KIPS)
138'-10"	6	HP14x73	160
	6	HP14x89	160
151'-4"	6	HP14x73	168
	6	HP14x89	168
163'-10"	6	HP14x73	182
	6	HP14x89	182
176'-4"	7	HP14x73	163
	6	HP14x89	190
188'-10"	7	HP14x73	170
	6	HP14x89	198
201'-4"	8	HP14x73	166
	6	HP14x89	221
213'-10"	8	HP14x73	174
	7	HP14x89	199
226'-4"	8	HP14x73	184
	7	HP14x89	210
243'-0"	9	HP14x73	172
	7	HP14x89	221

① SEE SHEET H30-17-06 FOR STEP REINFORCING STEEL QUANTITIES AND DETAILS.

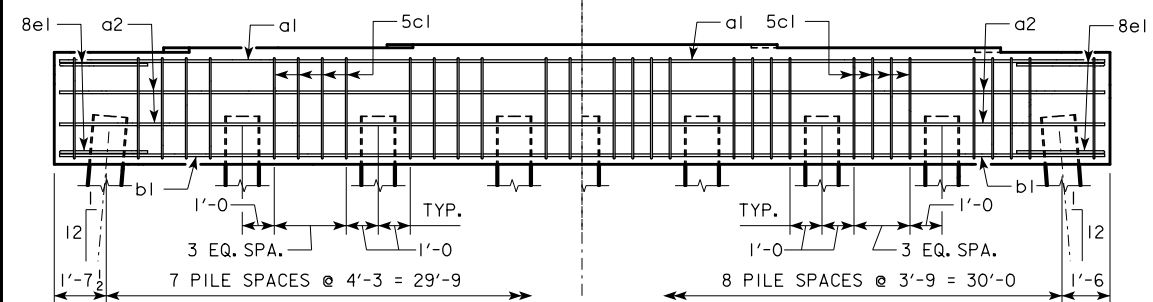
② NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

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



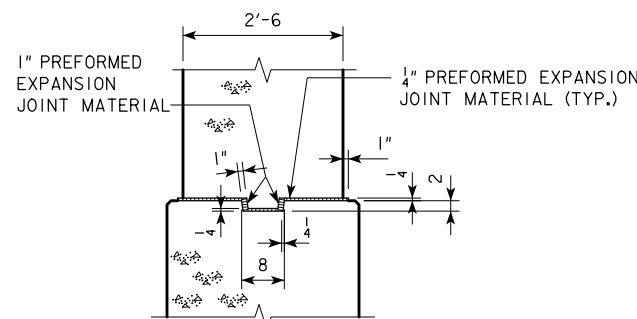
6 PILE BENT

7 PILE BENT

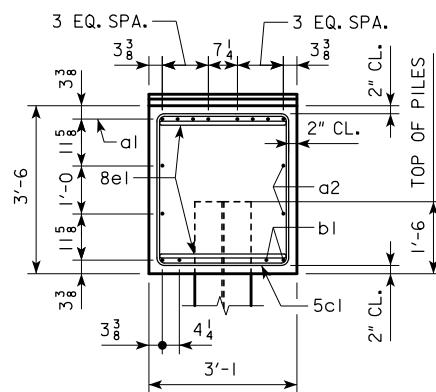


8 PILE BENT

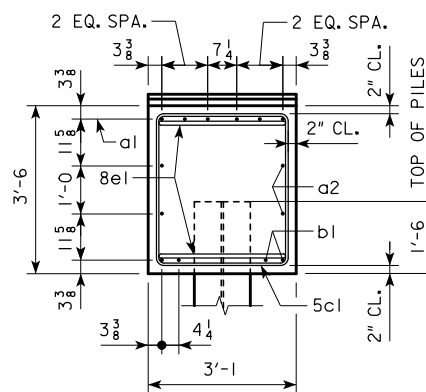
9 PILE BENT



KEYED NOTCH DETAIL



VIEW A-A FOR 6 & 7 PILE BENTS

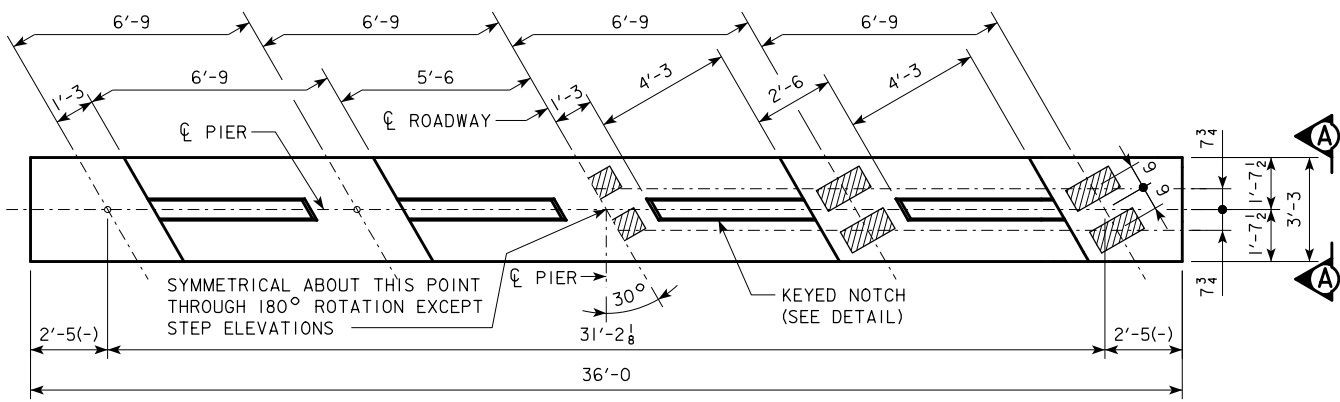


VIEW A-A FOR 8 & 9 PILE BENTS

REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.

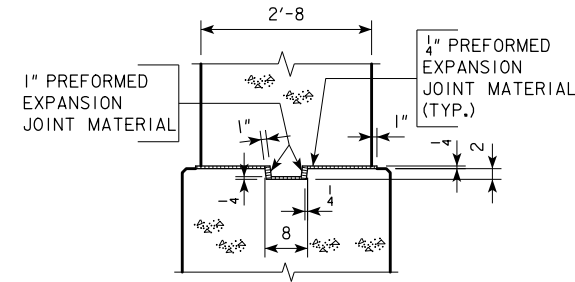
04-13 LATEST REVISION DATE  <i>Thomas L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
	<b>PILE BENT PIERS</b> HPI4 PILES 15° SKEW	<b>H30-50-06</b>



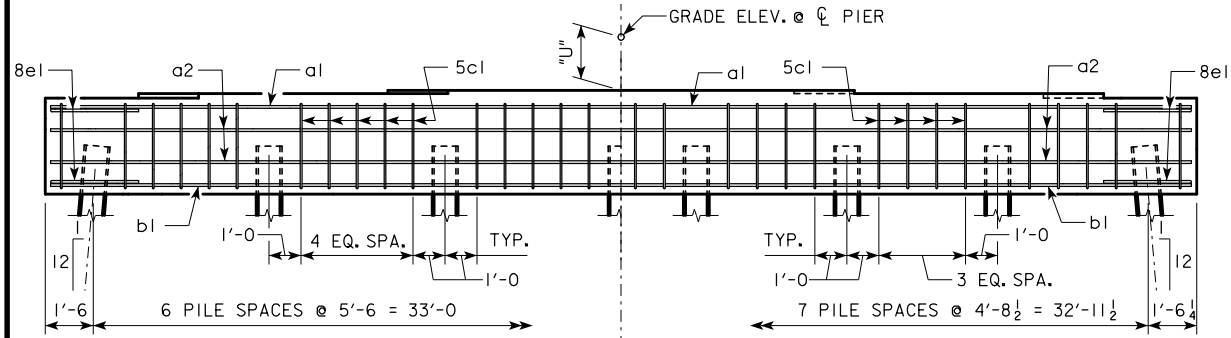


TYPICAL PLAN

NOTE:  
 THE HEIGHT OF THE STEPS ON THE BRIDGE SEAT IS EQUAL TO THE DIFFERENCE IN ELEVATIONS OF THE TOP OF SLAB AT ADJACENT BEAMS ALONG CL PIER.  
 SEE SHEET H30-22-06 FOR "U" DIMENSION.

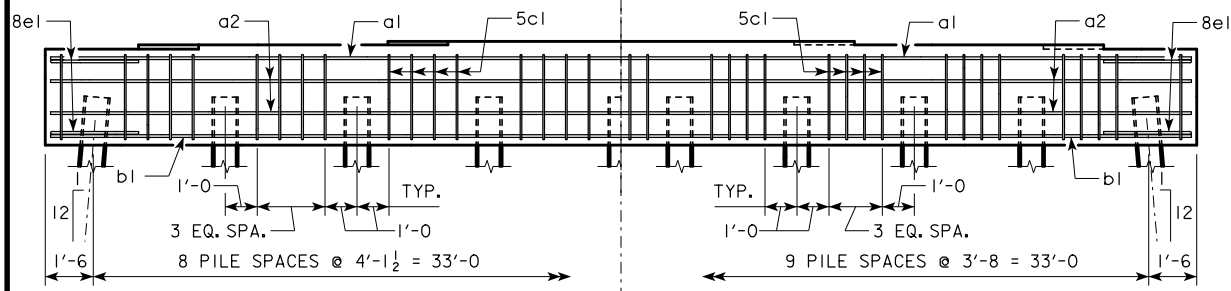


KEYED NOTCH DETAIL



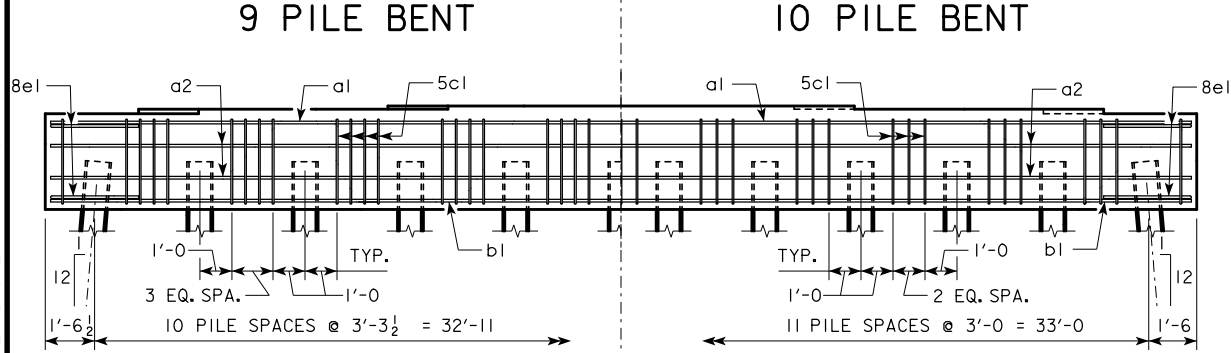
7 PILE BENT

8 PILE BENT



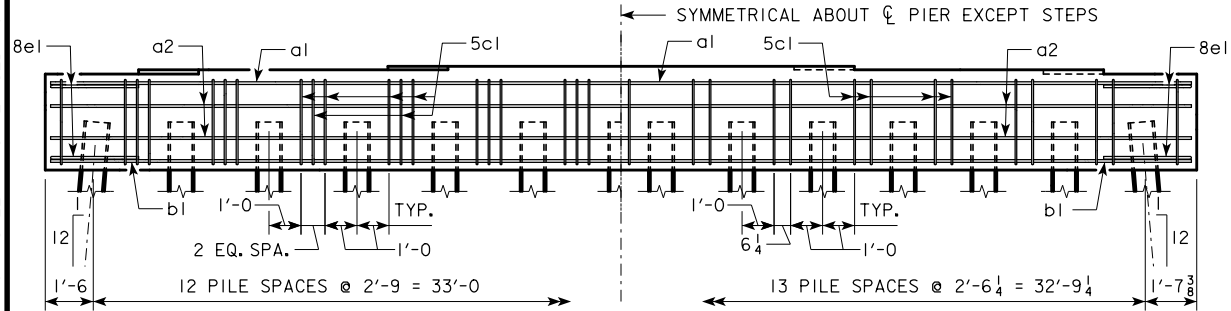
9 PILE BENT

10 PILE BENT



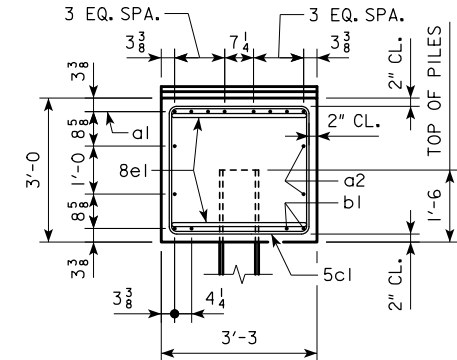
11 PILE BENT

12 PILE BENT

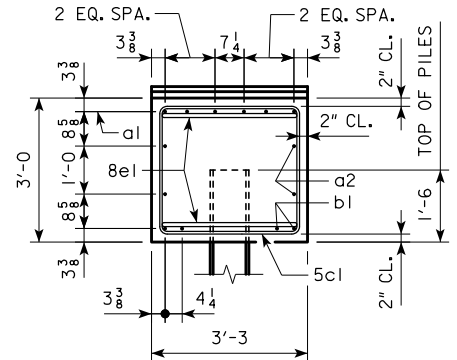


13 PILE BENT

14 PILE BENT



VIEW A-A  
FOR 7 PILE BENT



VIEW A-A  
FOR 8, 9, 10, 11, 12, 13 & 14 PILE BENTS

REVISED 07-10 - SHEET WAS REVISED TO MEET LRFD SPECIFICATIONS.

07-10 LATEST REVISION DATE  <i>Norman L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
<b>PILE BENT PIERS</b>		<b>H30-51-06</b>
30° SKEW		

**PILE BENT NOTES:**

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

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

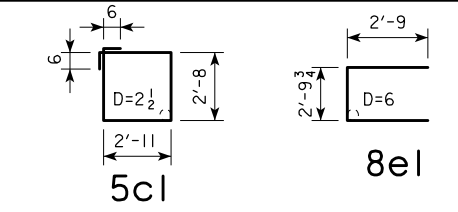
MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.

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

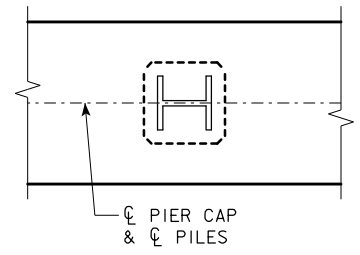
**REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT**

BAR	LENGTH	SHAPE	7 PILE BENT			8 PILE BENT			9 PILE BENT			10 PILE BENT			11 PILE BENT			12 PILE BENT			13 PILE BENT			14 PILE BENT					
			NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT			
a1	35'-8	————	8	9	970	6	9	728	6	9	728	6	9	728	6	9	728	6	9	728	6	9	728	6	9	728			
a2	35'-8	————	4	8	381	4	8	381	4	8	381	4	8	381	4	8	381	4	8	381	4	8	381	4	8	381			
b1	35'-8	————	4	9	485	4	9	485	4	9	485	4	9	485	4	9	485	4	9	485	4	8	381	4	8	381			
5c1	12'-2	□	32	5	406	30	5	381	34	5	431	38	5	482	42	5	533	35	5	444	38	5	482	28	5	355			
8e1	8'-4	————	4	8	89	4	8	89	4	8	89	4	8	89	4	8	89	4	8	89	4	8	89	4	8	89			
① REINFORCING STEEL (LB.)			2331			2064			2114			2165			2216			2127			2061			1934					
② STRUCTURAL CONCRETE (CY)			PILE TYPE			-----			-----			13.3			13.3			13.2			13.2			13.1			13.1		
			1, 2			-----			-----			13.3			13.3			13.2			13.2			13.1			13.1		
			3			13.7			13.7			13.7			13.7			13.7			-----			-----					

**BENT BAR DETAILS**



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



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

℄-℄ ABUTMENT BEARING	FRICTION BEARING PILING			FRICTION OR POINT BEARING PILING		
	PIOL TYPE 1 OR 2			PIOL TYPE 3		
	NUMBER OF TRESTLE PILES	③ "K" (INCHES)	④ LRFD P <sub>u</sub> , STRENGTH I, DES. LOAD (KIPS)	NUMBER OF TRESTLE PILES	PILE SIZE	④ LRFD P <sub>u</sub> , STRENGTH I, DES. LOAD (KIPS)
138'-10	11	14	88	7	HP10x57	138
	9	16	107	8	HP12x53	121
151'-4	11	14	92	7	HP10x57	145
	10	16	101	8	HP12x53	127
163'-10	12	14	92	8	HP10x57	137
	-----	---	----	9	HP12x53	122
176'-4	-----	---	----	8	HP10x57	144
	-----	---	----	9	HP12x53	128
188'-10	-----	---	----	9	HP10x57	133
	-----	---	----	9	HP12x53	133
201'-4	-----	---	----	10	HP10x57	134
	-----	---	----	10	HP12x53	134
213'-10	-----	---	----	10	HP10x57	140
	-----	---	----	11	HP12x53	128
226'-4	-----	---	----	11	HP10x57	134
	-----	---	----	11	HP12x53	134
243'-0	-----	---	----	11	HP10x57	141
	-----	---	----	12	HP12x53	129

- ① SEE SHEET H30-24-06 FOR STEP REINFORCING STEEL QUANTITIES AND DETAILS.
- ② CONCRETE QUANTITIES SHOWN HAVE HAD THE VOLUME OF EMBEDDED PILES DEDUCTED FOR TYPES 1 AND 2 BASED ON 0.8 FT<sup>3</sup> PER FOOT OF EMBEDMENT. THE CONCRETE QUANTITIES FOR TYPE 3 PILES DO NOT REQUIRE REDUCTION FOR PILE EMBEDMENT.
- ③ SEE STANDARD PIOL FOR "K" DIMENSION.
- ④ NOTE: P<sub>u</sub>, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

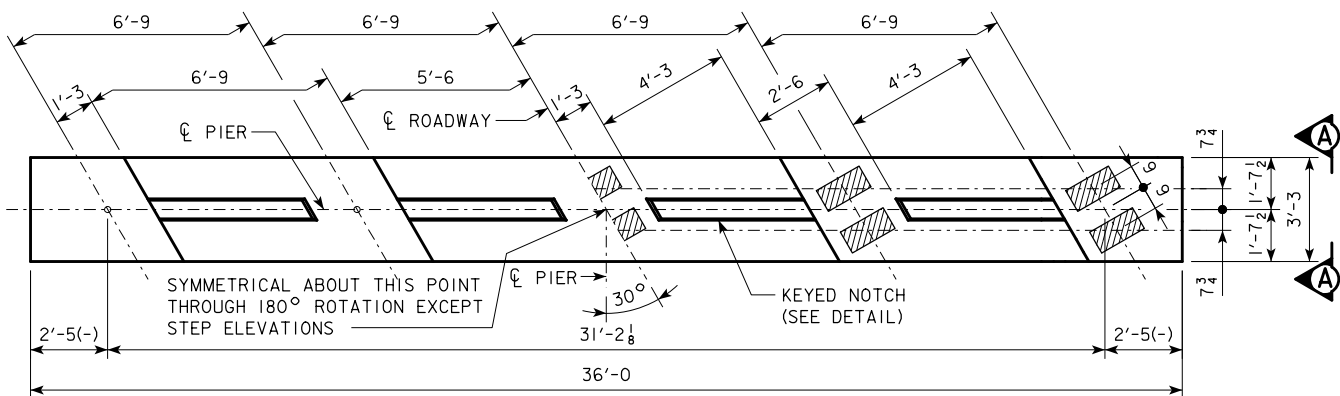
NOTE: FRICTION BEARING INCLUDES SIDE FRICTION AND END BEARING IN SOIL. POINT BEARING INCLUDES SIDE FRICTION AND POINT BEARING IN ROCK.

REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.

04-13 LATEST REVISION DATE  <i>Thomas L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER	
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006
	<b>PILE BENT PIERS</b>

H30-52-06

30° SKEW



TYPICAL PLAN

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

BAR	LENGTH	SHAPE	6 PILE BENT			7 PILE BENT			8 PILE BENT			9 PILE BENT		
			NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
a1	35'-8	—	8	9	970	8	9	970	6	9	728	6	9	728
a2	35'-8	—	4	8	381	4	8	381	4	8	381	4	8	381
b1	35'-8	—	4	9	485	4	9	485	4	9	485	4	9	485
5c1	13'-2	□	30	5	412	38	5	522	30	5	412	34	5	467
8e1	8'-4	—	4	8	89	4	8	89	4	8	89	4	8	89
① REINFORCING STEEL (LB.)			2337			2447			2095			2150		
STRUCTURAL CONCRETE (CY)			PILE TYPE 3			15.9			15.9			15.9		

**PILE BENT NOTES:**

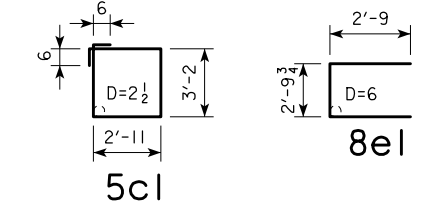
THESE PIER BENTS ARE DESIGNED FOR USE IN LOCATIONS WHERE ICE AND DRIFT CONDITIONS ARE NOT SEVERE.

FOR DETAILS OF TRESTLE PILES, SEE STANDARD PIOL.

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

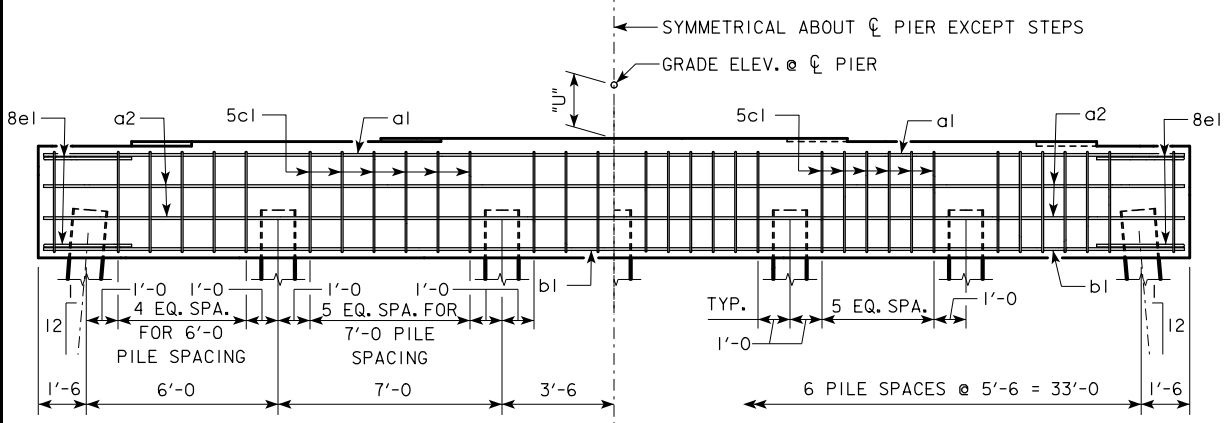
PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

**BENT BAR DETAILS**



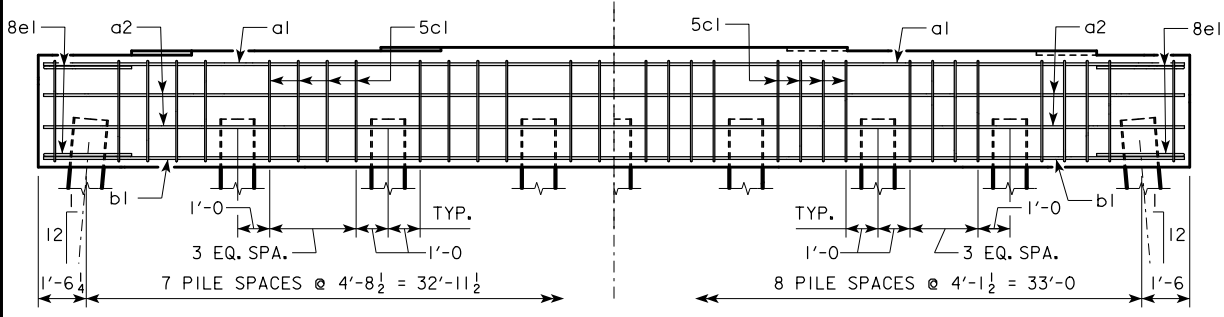
NOTE: ALL DIMENSIONS ARE OUT TO OUT. D=PIN DIAMETER.

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 CL PIER. SEE SHEET H30-22-06 FOR "U" DIMENSION.



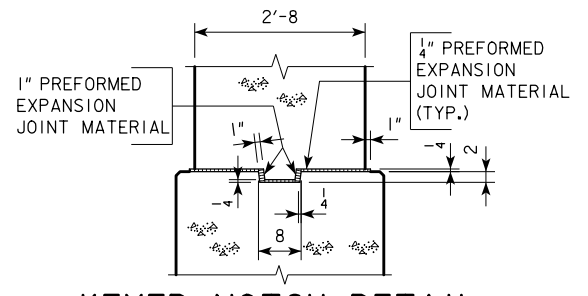
6 PILE BENT

7 PILE BENT



8 PILE BENT

9 PILE BENT



KEYED NOTCH DETAIL

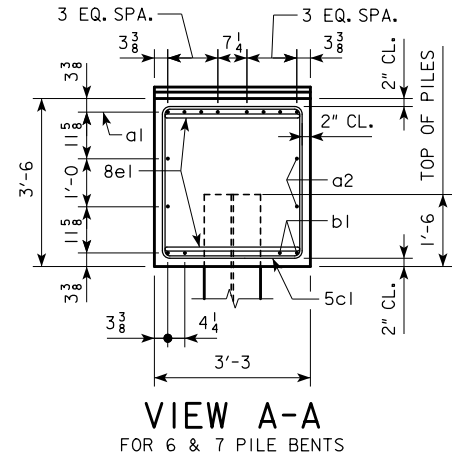
### FRICTION OR POINT BEARING PILING

CL-CL ABUTMENT BEARING	PIOL TYPE 3		
	NUMBER OF TRESTLE PILES	PILE SIZE	② LRFD P <sub>u</sub> , STRENGTH I, DES. LOAD (KIPS)
138'-10	6	HP14x73	163
	6	HP14x89	163
151'-4	6	HP14x73	171
	6	HP14x89	171
163'-10	6	HP14x73	185
	6	HP14x89	185
176'-4	7	HP14x73	166
	6	HP14x89	193
188'-10	7	HP14x73	173
	6	HP14x89	202
201'-4	8	HP14x73	168
	6	HP14x89	225
213'-10	8	HP14x73	177
	7	HP14x89	202
226'-4	9	HP14x73	165
	7	HP14x89	213
243'-0	9	HP14x73	174
	7	HP14x89	223

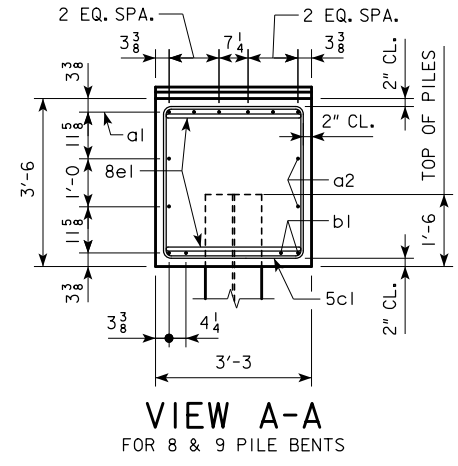
① SEE SHEET H30-24-06 FOR STEP REINFORCING STEEL QUANTITIES AND DETAILS.

② NOTE: P<sub>u</sub>, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

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



VIEW A-A FOR 6 & 7 PILE BENTS



VIEW A-A FOR 8 & 9 PILE BENTS

REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.

04-13 LATEST REVISION DATE

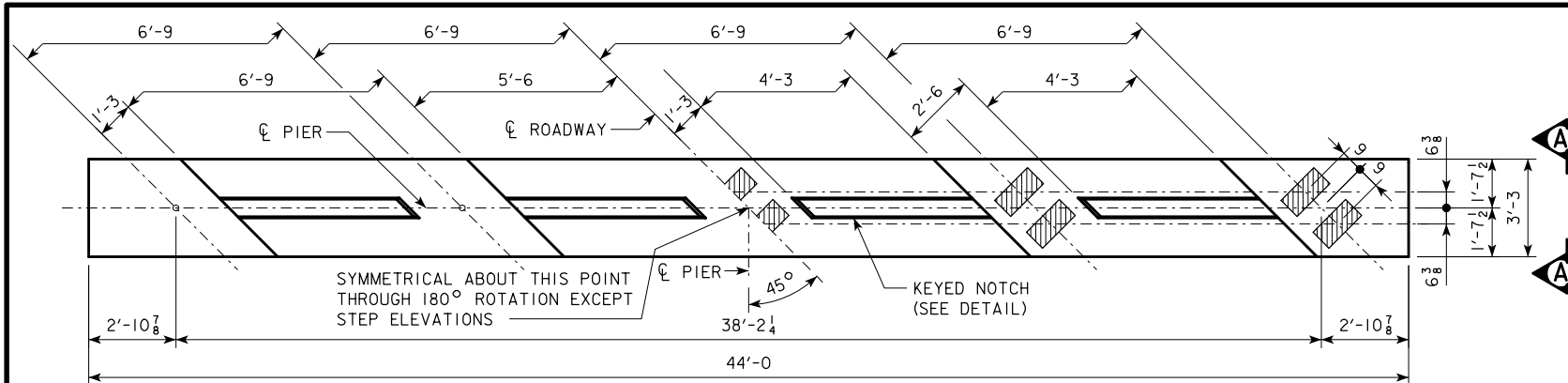
APPROVED BY BRIDGE ENGINEER  
*Thomas L. Mc Donald*

STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES

## PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

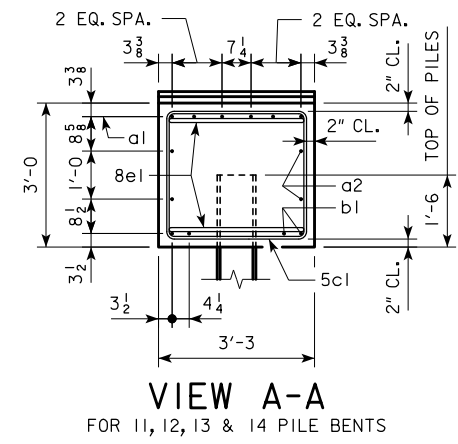
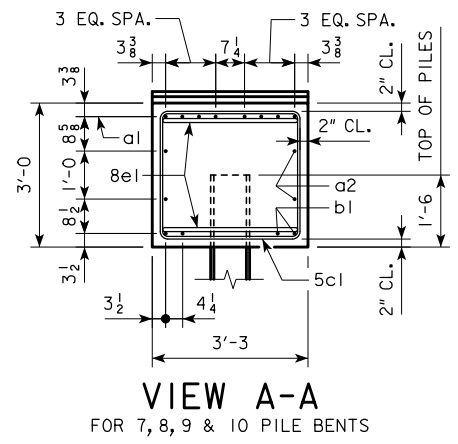
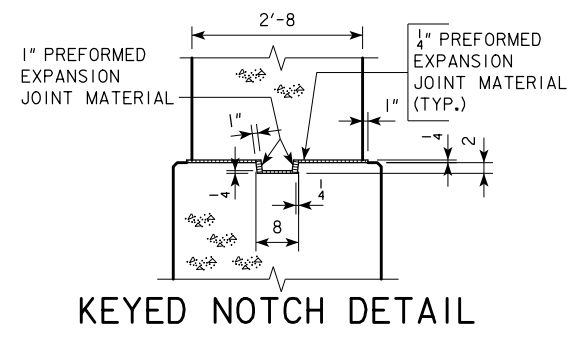
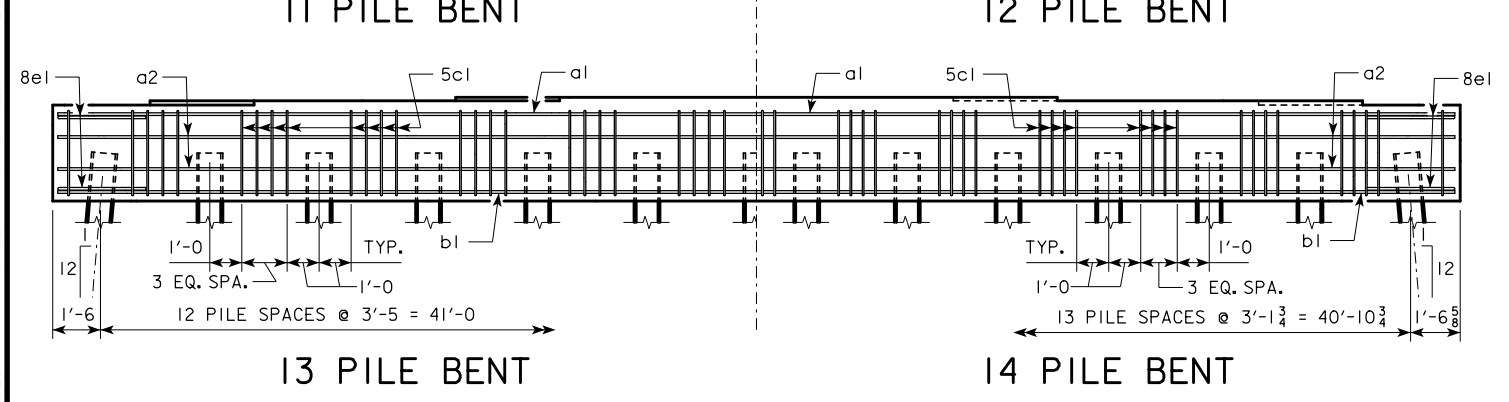
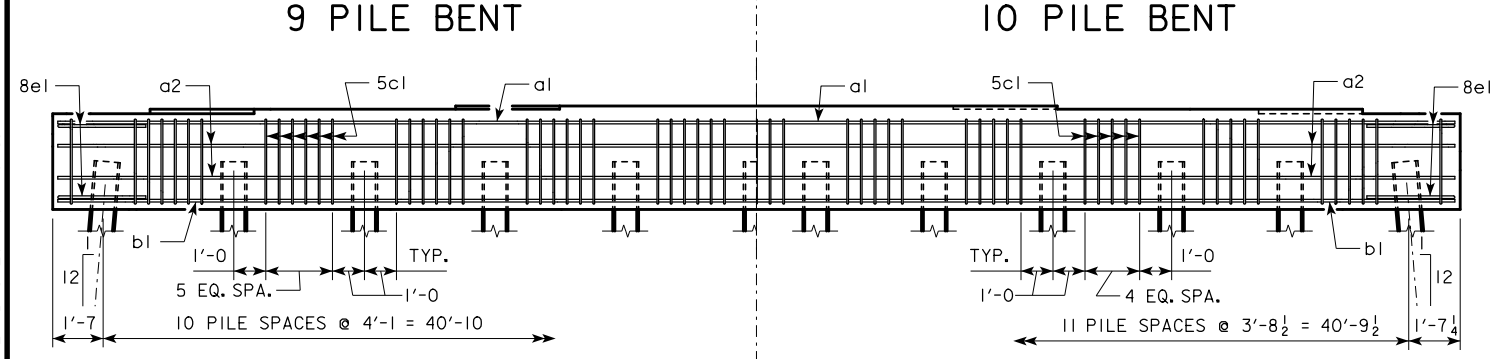
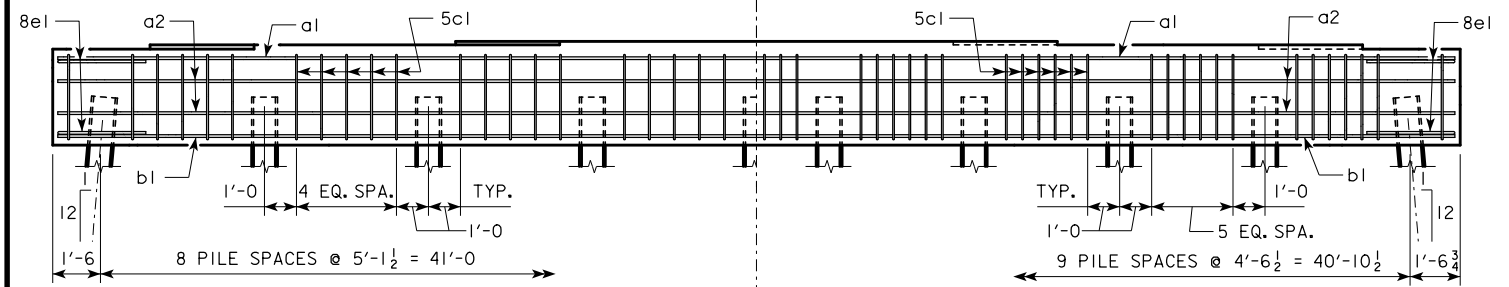
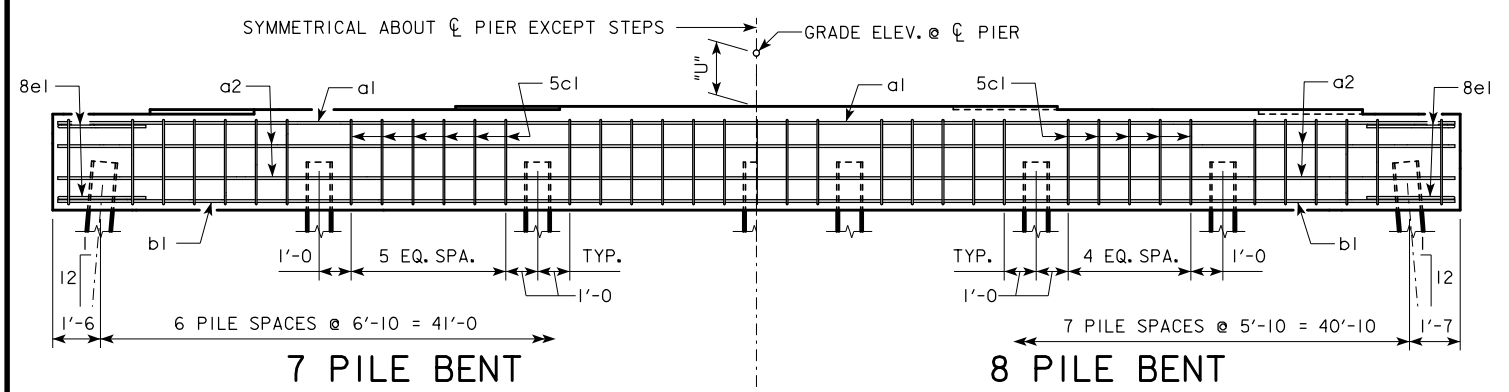
DECEMBER, 2006

<p><b>PILE BENT PIERS</b></p> <p><b>HP14 PILES</b></p> <p>30° SKEW</p>	<p><b>H30-53-06</b></p>
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NOTE:  
THE HEIGHT OF THE STEPS ON THE BRIDGE SEAT IS EQUAL TO THE DIFFERENCE IN ELEVATIONS OF THE TOP OF SLAB AT ADJACENT BEAMS ALONG CL PIER.  
SEE SHEET H30-29-06 FOR "U" DIMENSION.

TYPICAL PLAN



REVISED 07-10 - SHEET WAS REVISED TO MEET LRFD SPECIFICATIONS.

07-10 LATEST REVISION DATE  <i>Thomas L. McQuinn</i> APPROVED BY BRIDGE ENGINEER		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
	<b>PILE BENT PIERS</b>	<b>H30-54-06</b>

45° SKEW



**PILE BENT NOTES:**

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

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

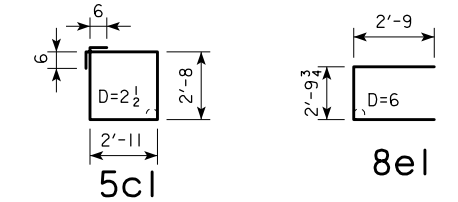
MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.

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

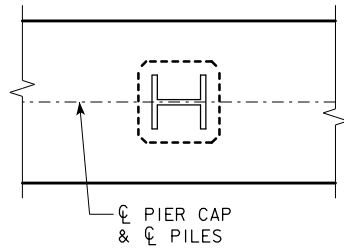
**REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT**

BAR	LENGTH	SHAPE	7 PILE BENT			8 PILE BENT			9 PILE BENT			10 PILE BENT			11 PILE BENT			12 PILE BENT			13 PILE BENT			14 PILE BENT					
			NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT			
a1	43'-8"	————	8	9	1188	8	9	1188	8	9	1188	8	9	1188	6	9	891	6	9	891	6	9	891	6	9	891			
a2	43'-8"	————	4	8	466	4	8	466	4	8	466	4	8	466	4	8	466	4	8	466	4	8	466	4	8	466			
b1	43'-8"	————	4	10	752	4	9	594	4	9	594	4	9	594	4	10	752	4	9	594	4	9	594	4	9	594			
5c1	12'-2"	□	38	5	482	37	5	470	42	5	533	56	5	711	62	5	787	57	5	723	50	5	634	54	5	685			
8e1	8'-4"	————	4	8	89	4	8	89	4	8	89	4	8	89	4	8	89	4	8	89	4	8	89	4	8	89			
① REINFORCING STEEL (LB.)			2977			2807			2870			3048			2985			2763			2674			2725					
② STRUCTURAL CONCRETE (CY)			PILE TYPE			1, 2			-----			-----			16.4			16.4			16.3			16.3			16.2		
			3			16.9			16.9			16.9			16.9			16.9			-----			-----					

**BENT BAR DETAILS**



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



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

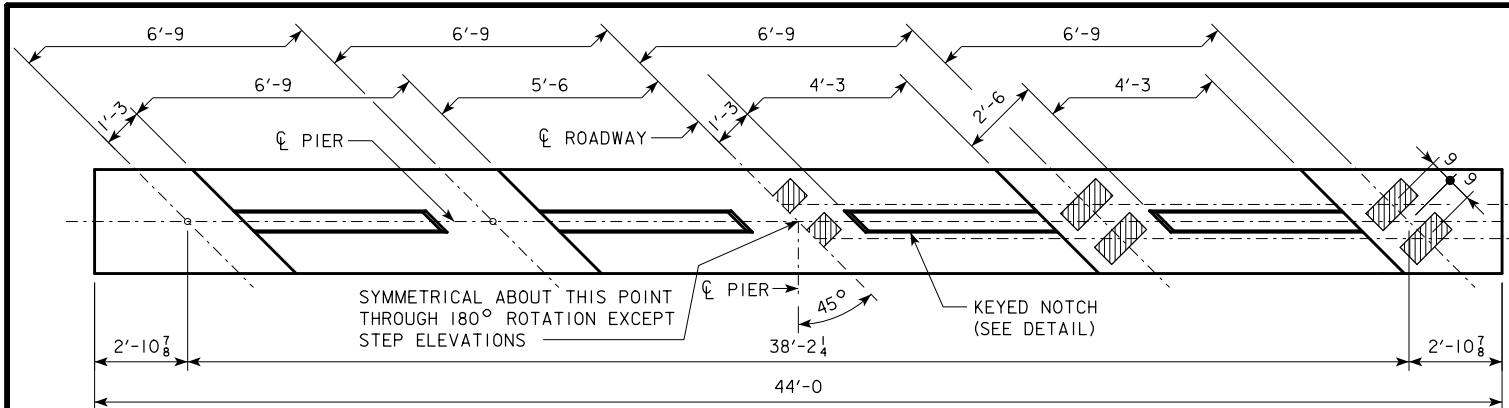
CL-CL ABUTMENT BEARING	FRICTION BEARING PILING			FRICTION OR POINT BEARING PILING		
	PIOL TYPE 1 OR 2			PIOL TYPE 3		
	NUMBER OF TRESTLE PILES	③ "K" (INCHES)	④ LRFD P <sub>u</sub> , STRENGTH I, DES. LOAD (KIPS)	NUMBER OF TRESTLE PILES	PILE SIZE	④ LRFD P <sub>u</sub> , STRENGTH I, DES. LOAD (KIPS)
138'-10	11	14	90	7	HP10x57	142
	10	16	99	8	HP12x53	124
151'-4	11	14	95	8	HP10x57	130
	10	16	104	8	HP12x53	130
163'-10	12	14	94	8	HP10x57	141
	11	16	102	9	HP12x53	125
176'-4	13	14	91	9	HP10x57	131
	11	16	107	9	HP12x53	131
188'-10	13	14	94	9	HP10x57	136
	12	16	102	10	HP12x53	123
201'-4	13	16	105	10	HP10x57	137
	11	16	107	11	HP12x53	124
213'-10	11	16	102	10	HP10x57	143
	11	16	107	11	HP12x53	130
226'-4	11	16	107	11	HP10x57	137
	12	16	107	12	HP12x53	126
243'-0	11	16	107	11	HP10x57	144
	12	16	107	12	HP12x53	132

- ① SEE SHEET H30-31-06 FOR STEP REINFORCING STEEL QUANTITIES AND DETAILS.
- ② CONCRETE QUANTITIES SHOWN HAVE HAD THE VOLUME OF EMBEDDED PILES DEDUCTED FOR TYPES 1 AND 2 BASED ON 0.8 FT<sup>3</sup> PER FOOT OF EMBEDMENT. THE CONCRETE QUANTITIES FOR TYPE 3 PILES DO NOT REQUIRE REDUCTION FOR PILE EMBEDMENT.
- ③ SEE STANDARD PIOL FOR "K" DIMENSION.
- ④ NOTE: P<sub>u</sub>, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

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

REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.

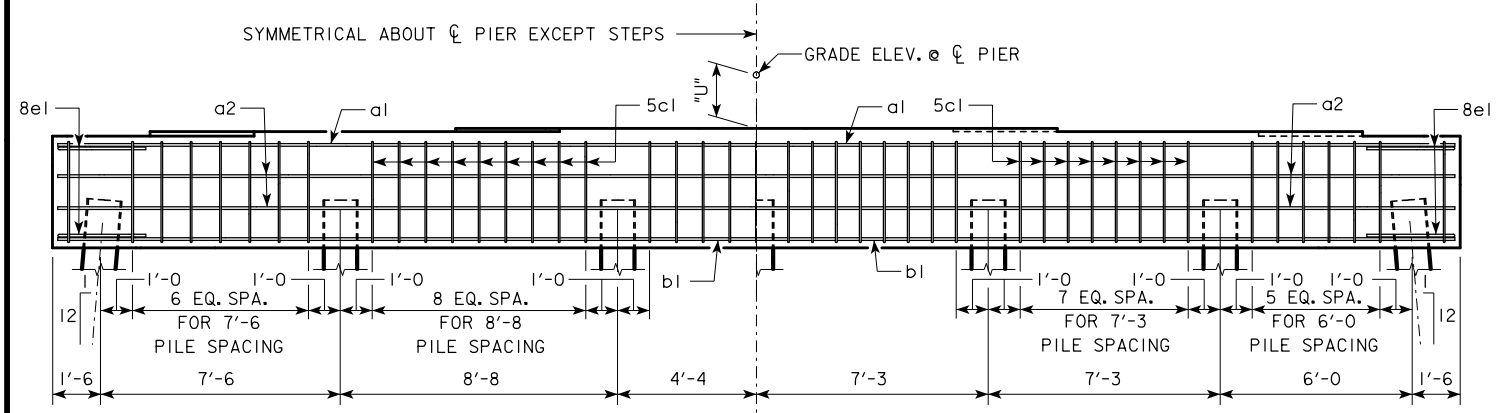
04-13 LATEST REVISION DATE  <i>Thomas L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
	<b>PILE BENT PIERS</b> 45° SKEW	<b>H30-55-06</b>



TYPICAL PLAN

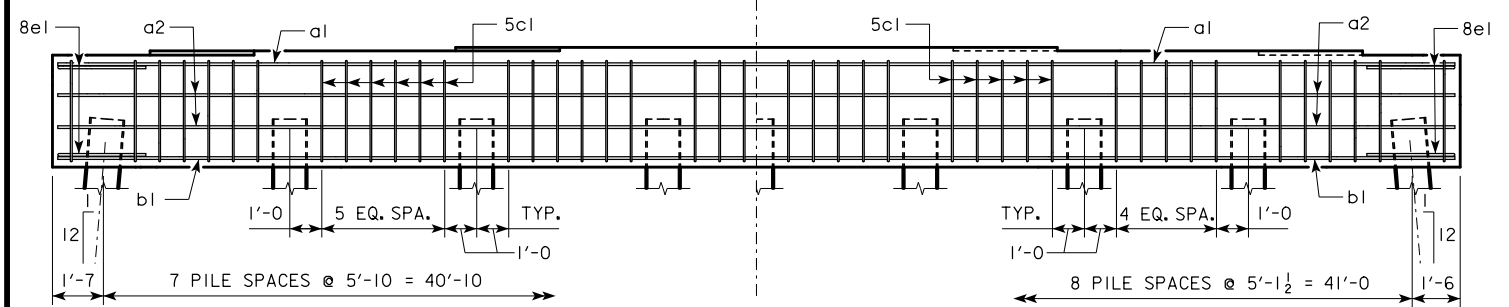
### REINFORCING BAR LIST AND ESTIMATED QUANTITIES - PER PILE BENT

BAR	LENGTH	SHAPE	6 PILE BENT			7 PILE BENT			8 PILE BENT			9 PILE BENT		
			NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT
a1	43'-8"	—	8	9	1188	8	9	1188	8	9	1188	8	9	1188
a2	43'-8"	—	4	8	466	4	8	466	4	8	466	4	8	466
b1	43'-8"	—	4	9	594	4	10	752	4	9	594	4	9	594
5c1	13'-2"	—	43	5	591	46	5	632	44	5	604	42	5	577
8e1	8'-4"	—	4	8	89	4	8	89	4	8	89	4	8	89
① REINFORCING STEEL (LB.)			2928			3127			2941			2914		
STRUCTURAL CONCRETE (CY)			3			3			3			3		



6 PILE BENT

7 PILE BENT



8 PILE BENT

9 PILE BENT

**PILE BENT NOTES:**

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

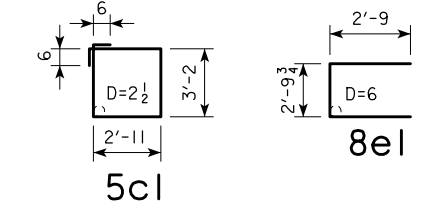
FOR DETAILS OF TRESTLE PILES, SEE STANDARD PIOL.

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

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

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 CL PIER.  
SEE SHEET H30-29-06 FOR "U" DIMENSION.

**BENT BAR DETAILS**

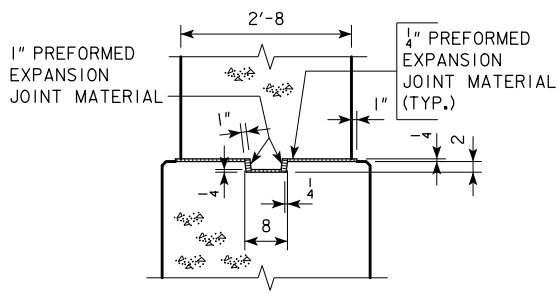


NOTE: ALL DIMENSIONS ARE OUT TO OUT. D=PIN DIAMETER.

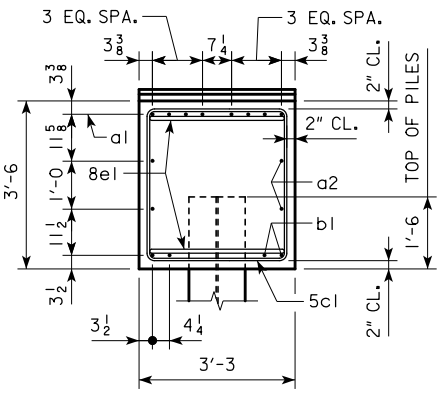
**FRICITION OR POINT BEARING PILING**

CL-CL ABUTMENT BEARING	PIOL TYPE 3		
	NUMBER OF TRESTLE PILES	PILE SIZE	② LRFD PU, STRENGTH I, DES. LOAD (KIPS)
138'-10"	6	HP14x73	167
	6	HP14x89	167
151'-4"	6	HP14x73	176
	6	HP14x89	176
163'-10"	7	HP14x73	163
	6	HP14x89	190
176'-4"	7	HP14x73	170
	6	HP14x89	198
188'-10"	7	HP14x73	177
	6	HP14x89	207
201'-4"	8	HP14x73	172
	7	HP14x89	197
213'-10"	8	HP14x73	181
	7	HP14x89	207
226'-4"	9	HP14x73	169
	7	HP14x89	217
243'-0"	9	HP14x73	177
	8	HP14x89	199

- ① SEE SHEET H30-31-06 FOR STEP REINFORCING STEEL QUANTITIES AND DETAILS.
- ② NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



KEYED NOTCH DETAIL



VIEW A-A FOR 6, 7, 8 & 9 PILE BENTS

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

REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.

04-13  
LATEST REVISION DATE

**IOWADOT** Highway Division

STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES

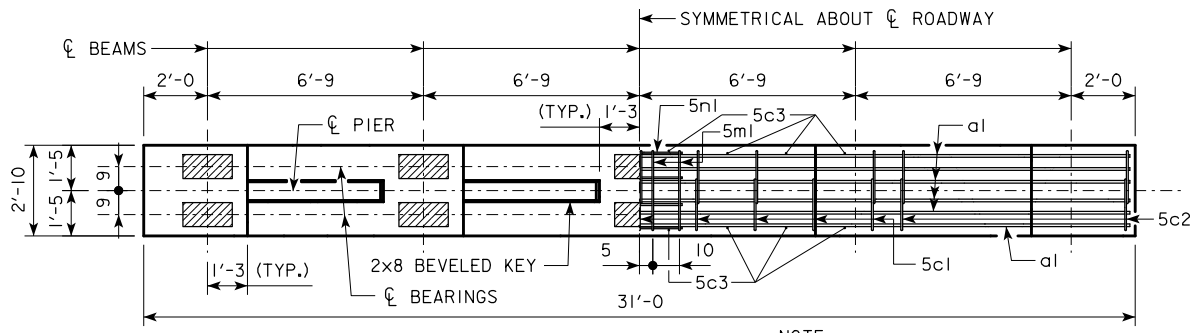
**PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES**

DECEMBER, 2006

APPROVED BY BRIDGE ENGINEER  
*Harmon L. Mc Donald*

**PILE BENT PIERS**  
HP14 PILES  
45° SKEW

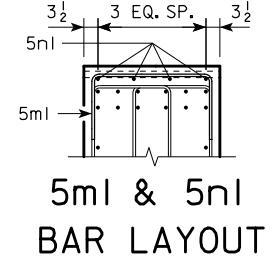
**H30-56-06**



**CAP PLAN**

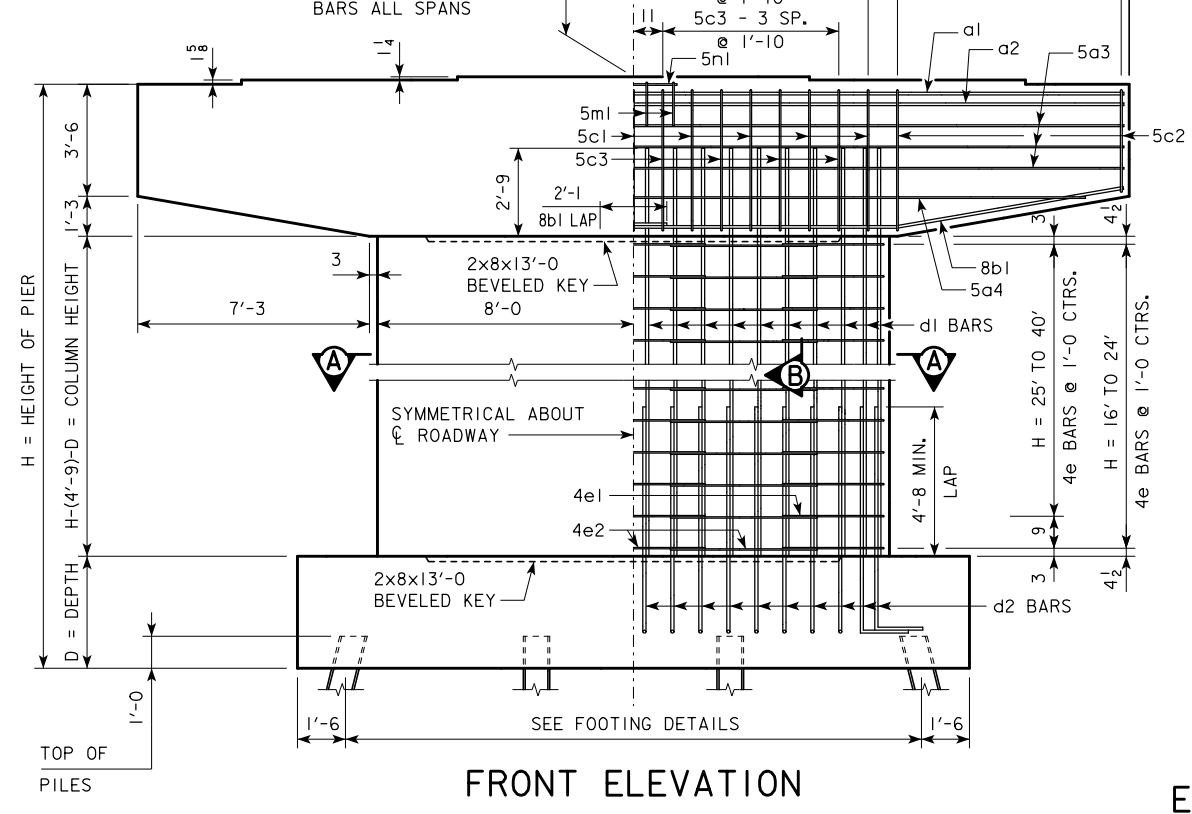
NOTE:  
FOR SIZE OF BEARING PADS SEE H30-44-06.

		CAP																								
CL - CL ABUT. BEARINGS		138'-10		151'-4		163'-10		176'-4		188'-10		201'-4		213'-10		226'-4		243'-0								
BAR	LENGTH	SHAPE	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT						
a1	30'-8		6	7	376	6	7	376	6	7	376	6	8	491	6	8	491	6	8	491	6	9	626	6	9	626
a2	30'-8		6	7	376	6	7	376	6	7	376	6	8	491	6	8	491	6	8	491	6	8	491	6	8	491
5a3	30'-8		6	5	192	6	5	192	6	5	192	6	5	192	6	5	192	6	5	192	6	5	192	6	5	192
5a4	28'-3		2	5	59	2	5	59	2	5	59	2	5	59	2	5	59	2	5	59	2	5	59	2	5	59
8b1	16'-6		8	8	352	8	8	352	8	8	352	8	8	352	8	8	352	8	8	352	8	8	352	8	8	352
5c1	13'-2		18	5	247	18	5	247	18	5	247	18	5	247	18	5	247	18	5	247	18	5	247	18	5	247
5c2	VARIABLES		32	5	399	32	5	399	32	5	399	32	5	399	32	5	399	32	5	399	32	5	399	36	5	449
5c3	4'-11		16	5	82	16	5	82	16	5	82	16	5	82	16	5	82	16	5	82	16	5	82	16	5	82
5m1	5'-4		4	5	22	4	5	22	4	5	22	4	5	22	4	5	22	4	5	22	4	5	22	4	5	22
5n1	2'-8		4	5	11	4	5	11	4	5	11	4	5	11	4	5	11	4	5	11	4	5	11	4	5	11
TOTAL (LB.)				2116		2116		2116		2231		2231		2346		2346		2481		2531						
STRUCTURAL CONCRETE (CY)				15.0		15.0		15.0		15.0		15.0		15.0		15.0		15.0		15.0						

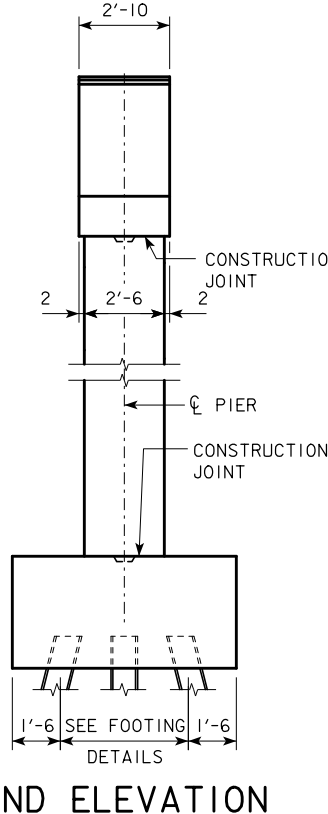


**5m1 & 5n1 BAR LAYOUT**

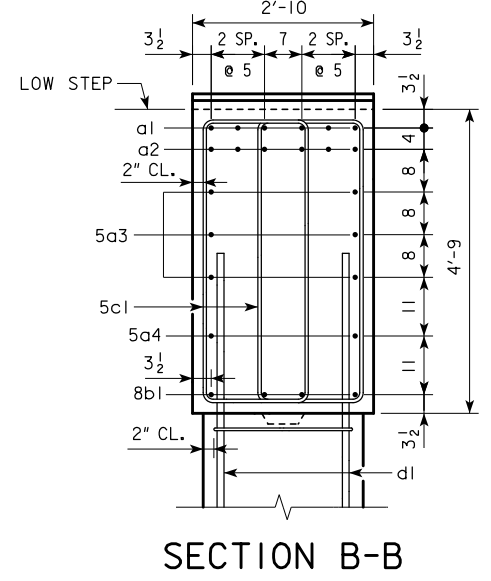
NOTE:  
SHIFT 5c1 BARS TO CLEAR d1 COLUMN BARS ALL SPANS



**FRONT ELEVATION**



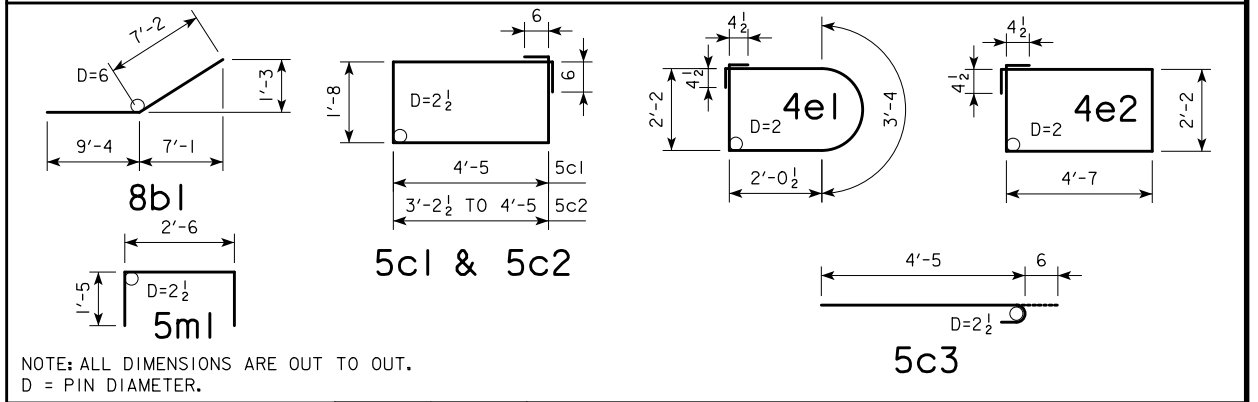
**END ELEVATION**



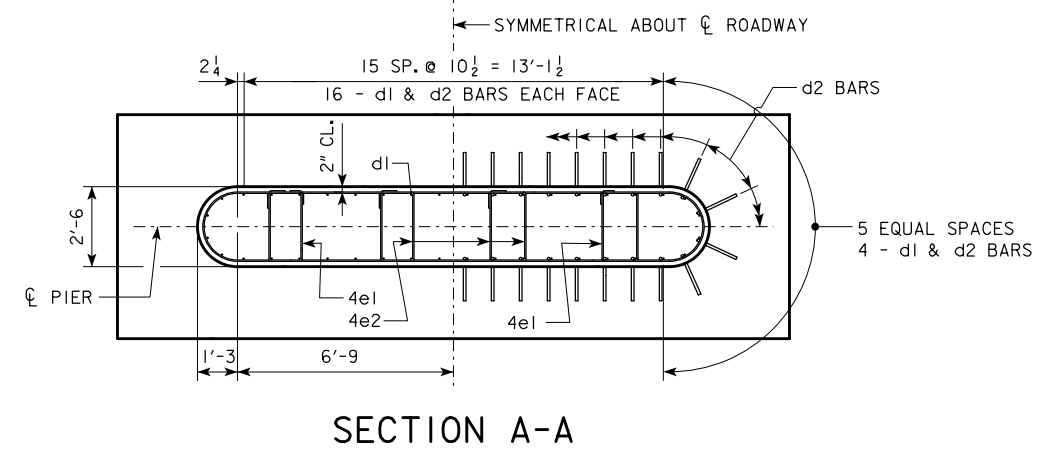
**SECTION B-B**

		COLUMN													
H IN FEET		COLUMN HEIGHT	STRUCTURAL CONCRETE (CY)		REINFORCING STEEL										TOTAL WEIGHT (LB.)
					d1 BAR		4e1 BAR		4e2 BAR						
			NO.	SIZE	NO.	SIZE	NO.	SIZE	NO.	SIZE	NO.	SIZE	NO.		
			NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	
16	7'-9	11.1	40	9	10'-6	1428	16	4	10'-4	110	24	4	14'-3	228	1766
17	8'-9	12.5	40	9	11'-6	1564	18	4	10'-4	124	27	4	14'-3	257	1945
18	9'-9	14.0	40	9	12'-6	1700	20	4	10'-4	138	30	4	14'-3	286	2124
19	10'-9	15.4	40	9	13'-6	1836	22	4	10'-4	152	33	4	14'-3	314	2302
20	11'-9	16.8	40	9	14'-6	1972	24	4	10'-4	166	36	4	14'-3	343	2481
21	12'-9	18.3	40	9	15'-6	2108	26	4	10'-4	179	39	4	14'-3	371	2658
22	13'-9	19.7	40	9	16'-6	2244	28	4	10'-4	193	42	4	14'-3	400	2837
23	14'-9	21.1	40	9	17'-6	2380	30	4	10'-4	207	45	4	14'-3	428	3015
24	15'-9	22.6	40	9	18'-6	2516	32	4	10'-4	221	48	4	14'-3	457	3194
25	16'-3	23.3	40	9	19'-0	2584	34	4	10'-4	235	51	4	14'-3	485	3304
26	17'-3	24.7	40	9	20'-0	2720	36	4	10'-4	248	54	4	14'-3	514	3482
27	18'-3	26.1	40	9	21'-0	2856	38	4	10'-4	262	57	4	14'-3	543	3661
28	19'-3	27.6	40	9	22'-0	2992	40	4	10'-4	276	60	4	14'-3	571	3839
29	20'-3	29.0	40	9	23'-0	3128	42	4	10'-4	290	63	4	14'-3	600	4018
30	21'-3	30.4	40	9	24'-0	3264	44	4	10'-4	304	66	4	14'-3	628	4196
31	22'-3	31.9	40	9	25'-0	3400	46	4	10'-4	318	69	4	14'-3	657	4375
32	23'-3	33.3	40	9	26'-0	3536	48	4	10'-4	331	72	4	14'-3	685	4552
33	24'-3	34.7	40	9	27'-0	3672	50	4	10'-4	345	75	4	14'-3	714	4731
34	25'-3	36.2	40	9	28'-0	3808	52	4	10'-4	359	78	4	14'-3	742	4909
35	26'-3	37.6	40	9	29'-0	3944	54	4	10'-4	373	81	4	14'-3	771	5088
36	27'-3	39.0	40	9	30'-0	4080	56	4	10'-4	387	84	4	14'-3	800	5267
37	28'-3	40.4	40	9	31'-0	4216	58	4	10'-4	400	87	4	14'-3	828	5444
38	29'-3	41.9	40	9	32'-0	4352	60	4	10'-4	414	90	4	14'-3	857	5623
39	30'-3	43.3	40	9	33'-0	4488	62	4	10'-4	428	93	4	14'-3	885	5801
40	31'-3	44.7	40	9	34'-0	4624	64	4	10'-4	442	96	4	14'-3	914	5980

**BENT BAR DETAILS**



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



**SECTION A-A**

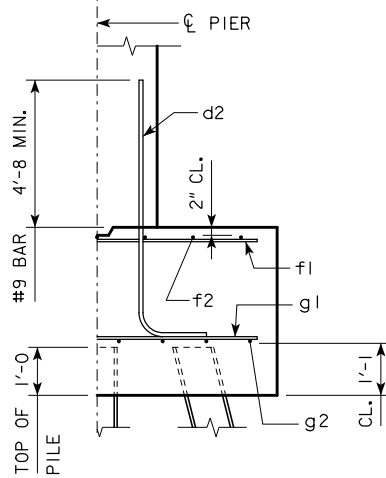
**PIER NOTES:**

- SEE "TEE PIER NOTES" ON H30-02-06 FOR NOTES REGARDING APPLICATION OF THESE PIER STANDARDS.
- MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.
- ELIMINATE 2x8 BEVELED KEYWAY ON TOP OF CAP FOR EXPANSION PIERS.
- SEE SHEET H30-09-06 FOR "U" DIMENSION.

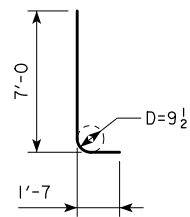
07-10  
LATEST REVISION DATE  
Approved by: *Thomas L. Mc Donald*  
BRIDGE ENGINEER

**IOWADOT** Highway Division  
STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES  
**PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES**  
DECEMBER, 2006  
**TEE PIER CAP AND COLUMN**  
0° SKEW  
**H30-57-06**

REVISED 07-10 - SHEET WAS REVISED TO MEET LRFD SPECIFICATIONS.



TYPICAL SECTION

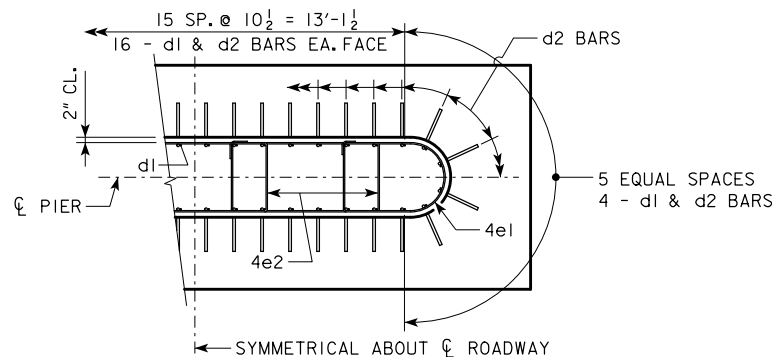


d2

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

H IN FT.	PILING (HP10x57)			FOOTING SIZE
	CL - CL ABUT. BRG.	NO. & LAYOUT	① LRFD P <sub>u</sub> , STRENGTH I, DES. LOAD (KIPS)	
18 TO 16	201'-4	15A	141	3'-6 x 8' x 20'
	213'-10	16A	138	
	226'-4	16A	144	
	243'-0	17A	144	
21 TO 19	201'-4	15B	143	3'-6 x 8' x 22'
	213'-10	16B	140	
	226'-4	16B	146	
	243'-0	17B	146	
24 TO 22	201'-4	16B	139	3'-6 x 8' x 22'
	213'-10	16B	144	
	226'-4	17B	144	
	243'-0	18A	143	

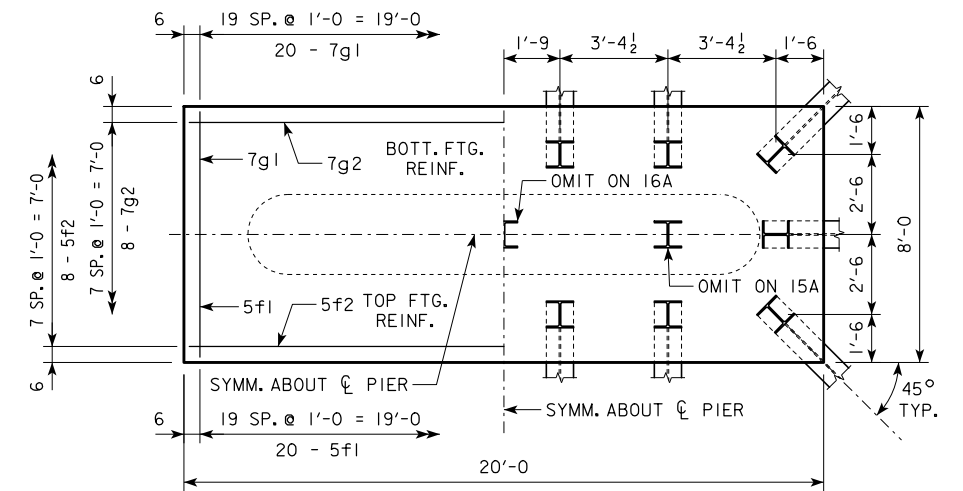
FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)					STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	
3'-6 x 8' x 20'	d2	40 - #9 AS SHOWN	8'-7	1167	2126	20.7
	f1	20 - #5 @ 1'-0	7'-8	160		
	f2	8 - #5 @ 1'-0	19'-8	164		
	g1	20 - #7 1'-0	7'-8	313		
	g2	8 - #7 @ 1'-0	19'-8	322		
3'-6 x 8' x 22'	d2	40 - #9 AS SHOWN	8'-7	1167	2505	22.8
	f1	22 - #5 @ 1'-0	7'-8	176		
	f2	8 - #5 @ 1'-0	21'-8	181		
	g1	22 - #7 @ 1'-0	7'-8	345		
	g2	11 - #8 @ 0'-9	21'-8	636		



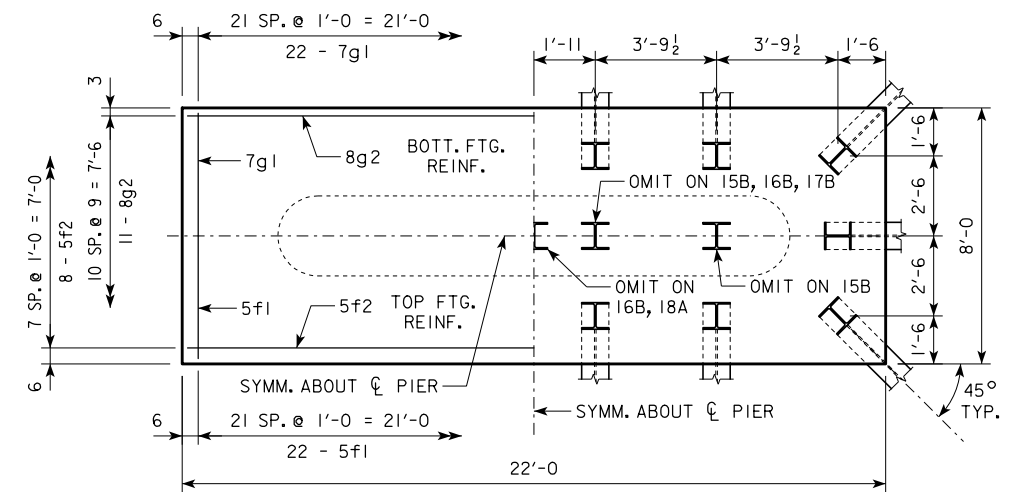
d2 BAR LAYOUT

(SEE SECTION A-A ON SHEET H30-57-06.)

① NOTE: P<sub>u</sub>, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



3'-6 x 8'-0 x 20'-0 FOR 15A, 16A & 17A



3'-6 x 8'-0 x 22'-0 FOR 15B, 16B, 17B & 18A

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 H30-57-06.

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

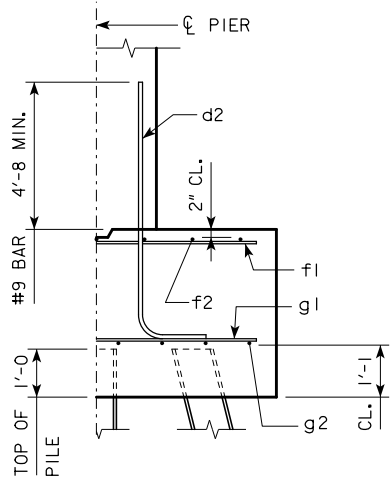
STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

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

REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.

04-13 LATEST REVISION DATE  <i>Thomas L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
	<b>TEE PIER-HP10x57 SRL-1 STEEL PILE FOOTINGS</b> 0° SKEW - H=16' to 24'	<b>H30-58-06</b>

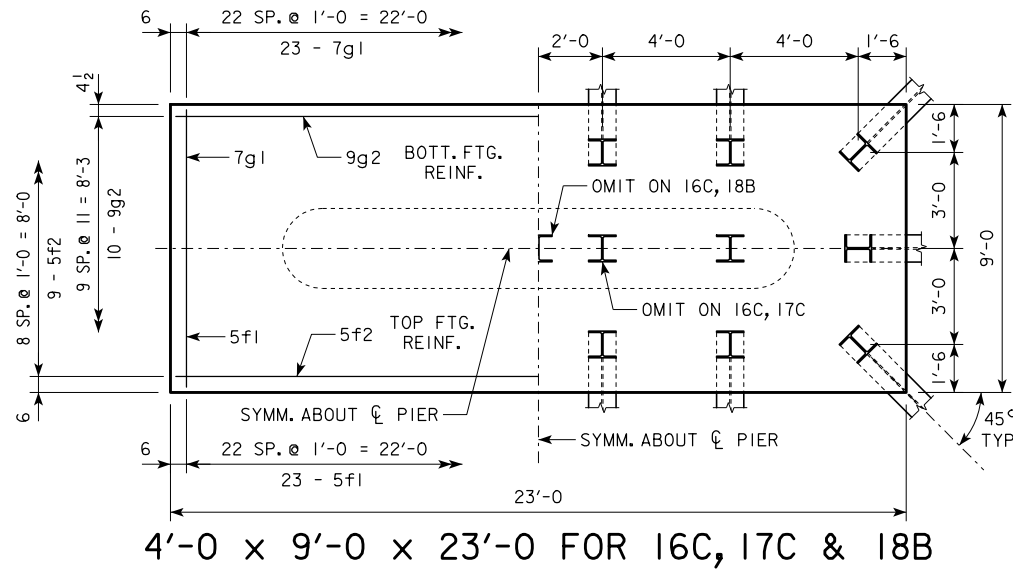




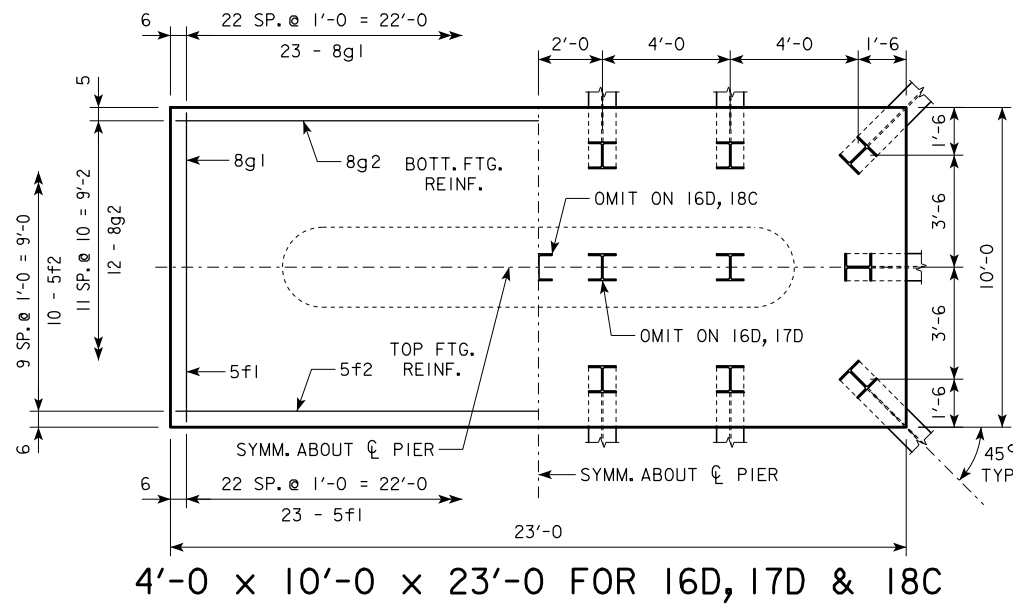
TYPICAL SECTION

H IN FT.	CL - CL ABUT. BRG.	PILING (HP10x57)		FOOTING SIZE
		NO. & LAYOUT	① LRFD P <sub>u</sub> , STRENGTH I, DES. LOAD (KIPS)	
201'-4 213'-10 226'-4 243'-0	16C	138	4' x 9' x 23'	
	16C	143		
	17C	143		
	18B	143		
201'-4 213'-10 226'-4 243'-0	16D	139	4' x 10' x 23'	
	16D	144		
	17D	144		
	18C	144		
201'-4 213'-10 226'-4 243'-0	16E	142	4' x 11' x 23'	
	16E	146		
	17E	146		
	18D	145		
201'-4 213'-10 226'-4 243'-0	17F	138	4' x 11' x 25'	
	17F	141		
	17F	144		
	18E	141		
201'-4 213'-10 226'-4 243'-0	18E	135	4' x 11' x 25'	
	18E	138		
	18E	141		
	18E	146		

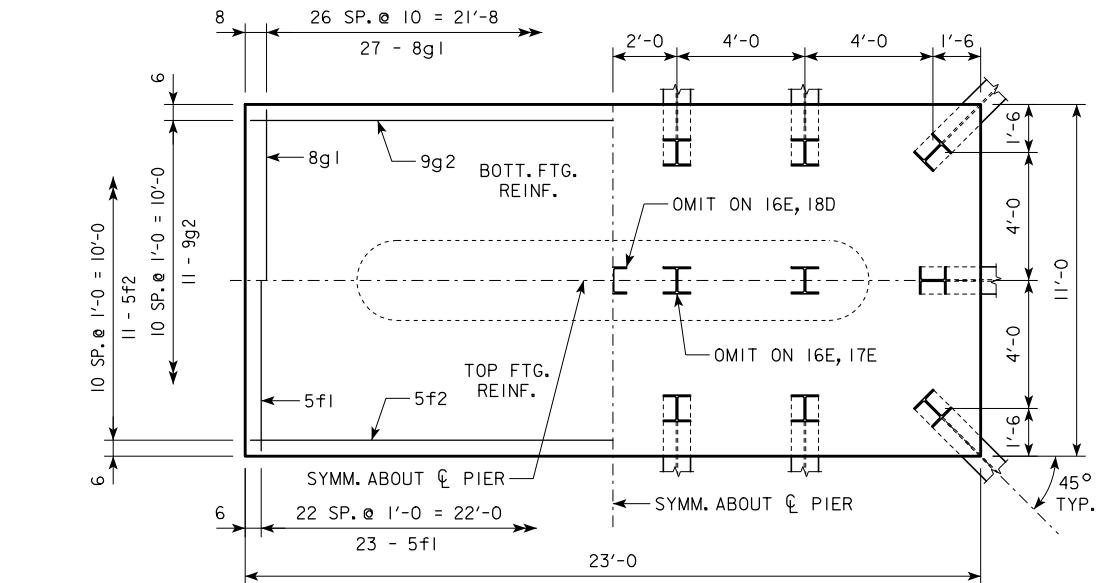
FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)				TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)		
4' x 9' x 23'	d2	40 - #9 AS SHOWN	9'-1	1235	2834	30.7
	f1	23 - #5 @ 1'-0	8'-8	208		
	f2	9 - #5 @ 1'-0	22'-8	213		
	g1	23 - #7 @ 1'-0	8'-8	407		
	g2	10 - #9 @ 0'-11	22'-8	771		
4' x 10' x 23'	d2	40 - #9 AS SHOWN	9'-1	1235	3023	34.1
	f1	23 - #5 @ 1'-0	9'-8	232		
	f2	10 - #5 @ 1'-0	22'-8	236		
	g1	23 - #8 @ 1'-0	9'-8	594		
	g2	12 - #8 @ 0'-10	22'-8	726		
4' x 11' x 23'	d2	40 - #9 AS SHOWN	9'-1	1235	3368	37.5
	f1	23 - #5 @ 1'-0	10'-8	256		
	f2	11 - #5 @ 1'-0	22'-8	260		
	g1	27 - #8 @ 0'-10	10'-8	769		
	g2	11 - #9 @ 1'-0	22'-8	848		
4' x 11' x 25'	d2	40 - #9 AS SHOWN	9'-1	1235	3877	40.7
	f1	25 - #5 @ 1'-0	10'-8	278		
	f2	11 - #5 @ 1'-0	24'-8	283		
	g1	25 - #9 @ 1'-0	10'-8	907		
	g2	14 - #9 @ 0'-9 1/2	24'-8	1174		



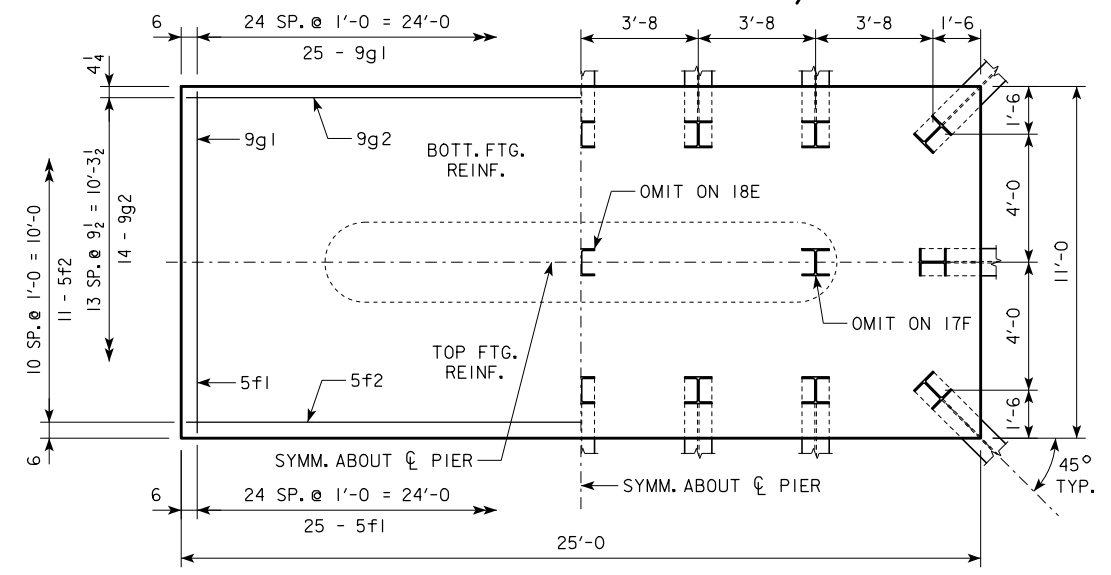
4'-0 x 9'-0 x 23'-0 FOR 16C, 17C & 18B



4'-0 x 10'-0 x 23'-0 FOR 16D, 17D & 18C



4'-0 x 11'-0 x 23'-0 FOR 16E, 17E & 18D



4'-0 x 11'-0 x 25'-0 FOR 17F & 18E

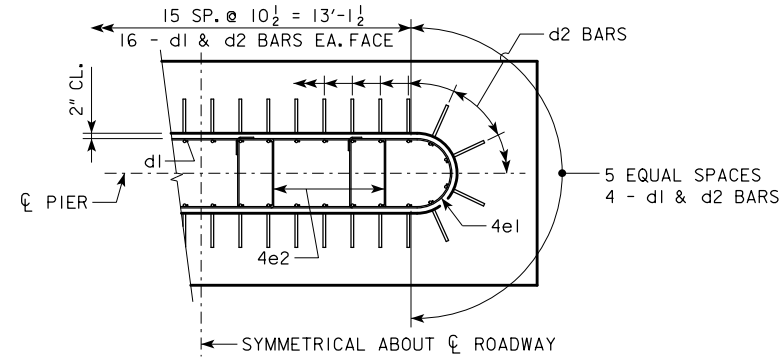
FOOTING NOTES:

THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H30-57-06.

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

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

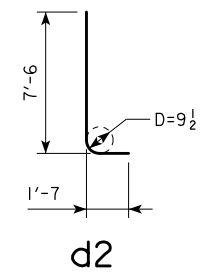
PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.



d2 BAR LAYOUT

(SEE SECTION A-A ON SHEET H30-57-06.)

① NOTE: P<sub>u</sub>, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

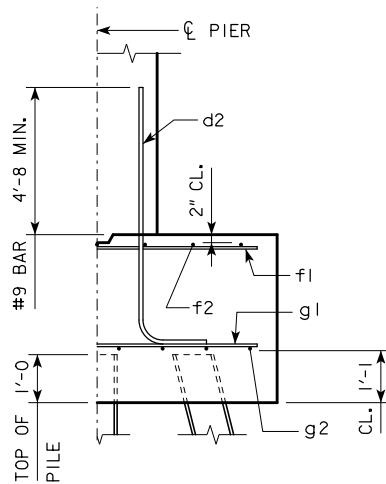


d2

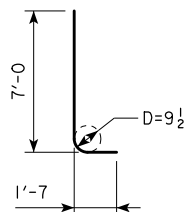
NOTE: D = PIN DIAMETER. DIMENSIONS ARE OUT TO OUT.

04-13 LATEST REVISION DATE  APPROVED BY BRIDGE ENGINEER <i>Thomas L. Mc Donald</i>		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
	<b>TEE PIER-HP10x57 SRL-1 STEEL PILE FOOTINGS</b> 0° SKEW - H=25' to 40'	<b>H30-59-06</b>

REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.

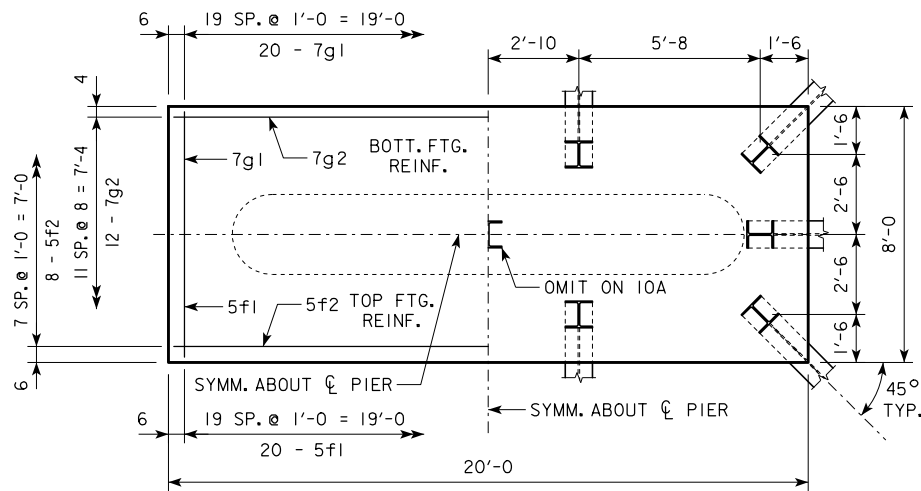


TYPICAL SECTION

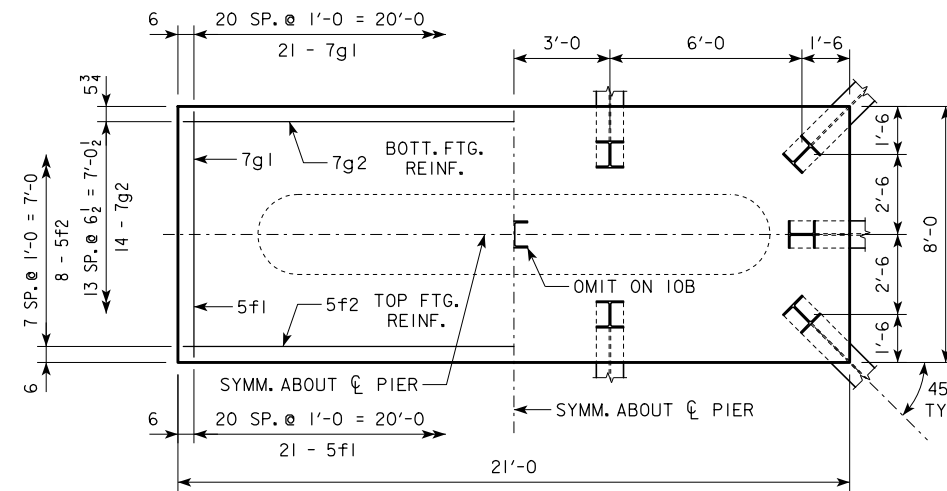


d2

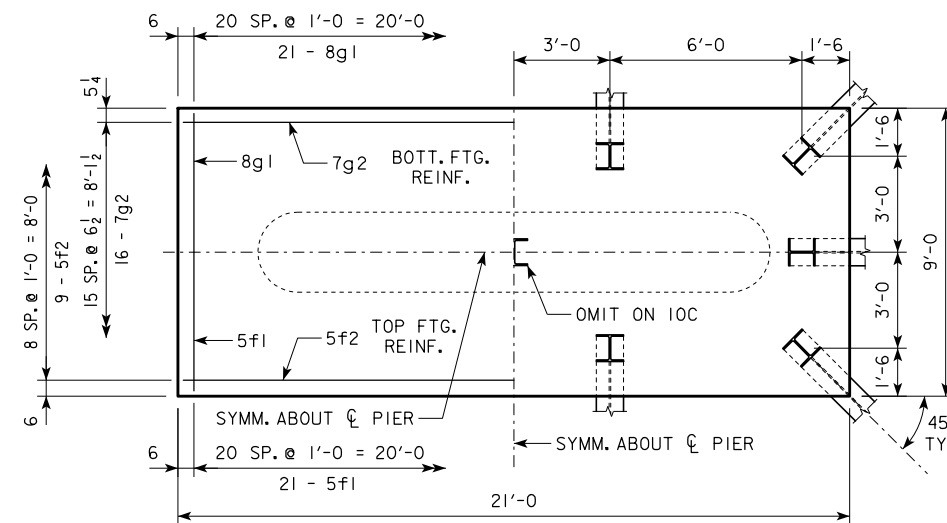
NOTE: D = PIN DIAMETER.  
DIMENSIONS ARE OUT TO OUT.



3'-6 x 8'-0 x 20'-0 FOR 10A & 11A



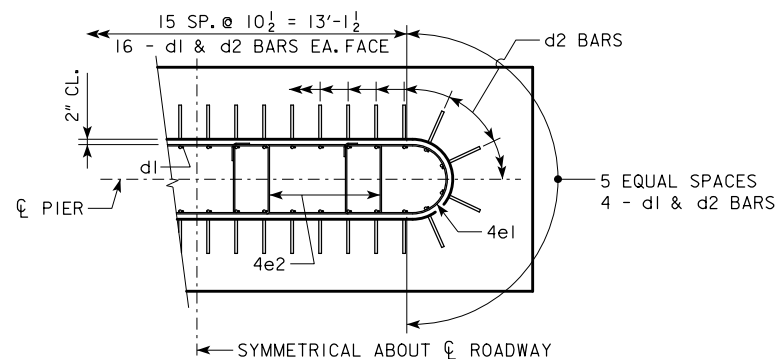
3'-6 x 8'-0 x 21'-0 FOR 10B & 11B



3'-6 x 9'-0 x 21'-0 FOR 10C & 11C

H IN FT.	CL - CL ABUT. BRG.	PILING (HP10x57)		FOOTING SIZE
		NO. & LAYOUT	① LRFD P <sub>u</sub> , STRENGTH I, DES. LOAD (KIPS)	
18 TO 16	201'-4	10A	203	3'-6 x 8' x 20'
	213'-10	10A	211	
	226'-4	11A	206	
	243'-0	11A	214	
21 TO 19	201'-4	10B	208	3'-6 x 8' x 21'
	213'-10	10B	215	
	226'-4	11B	210	
	243'-0	11B	218	
24 TO 22	201'-4	10C	209	3'-6 x 9' x 21'
	213'-10	10C	216	
	226'-4	11C	211	
	243'-0	11C	219	

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)				STRUCTURAL CONCRETE (CY)	
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)		
3'-6 x 8' x 20'	d2	40 - #9 AS SHOWN	8'-7	1167	2286	20.7
	f1	20 - #5 @ 1'-0	7'-8	160		
	f2	8 - #5 @ 1'-0	19'-8	164		
	g1	20 - #7 @ 1'-0	7'-8	313		
	g2	12 - #7 @ 0'-8	19'-8	482		
3'-6 x 8' x 21'	d2	40 - #9 AS SHOWN	8'-7	1167	2427	21.8
	f1	21 - #5 @ 1'-0	7'-8	168		
	f2	8 - #5 @ 1'-0	20'-8	172		
	g1	21 - #7 @ 1'-0	7'-8	329		
	g2	14 - #7 @ 0'-6 1/2	20'-8	591		
3'-6 x 9' x 21'	d2	40 - #9 AS SHOWN	8'-7	1167	2713	24.5
	f1	21 - #5 @ 1'-0	8'-8	190		
	f2	9 - #5 @ 1'-0	20'-8	194		
	g1	21 - #8 @ 1'-0	8'-8	486		
	g2	16 - #7 @ 0'-6 1/2	20'-8	676		



d2 BAR LAYOUT

(SEE SECTION A-A ON SHEET H30-57-06.)

① NOTE: P<sub>u</sub>, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

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 H30-57-06.

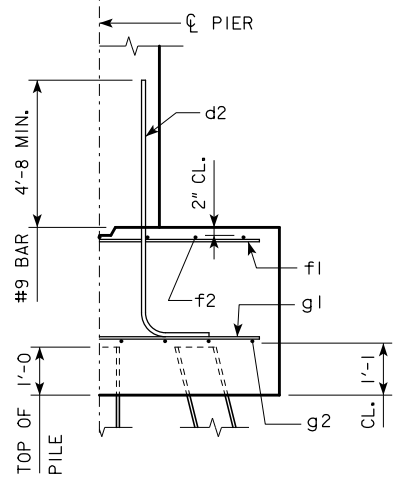
BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

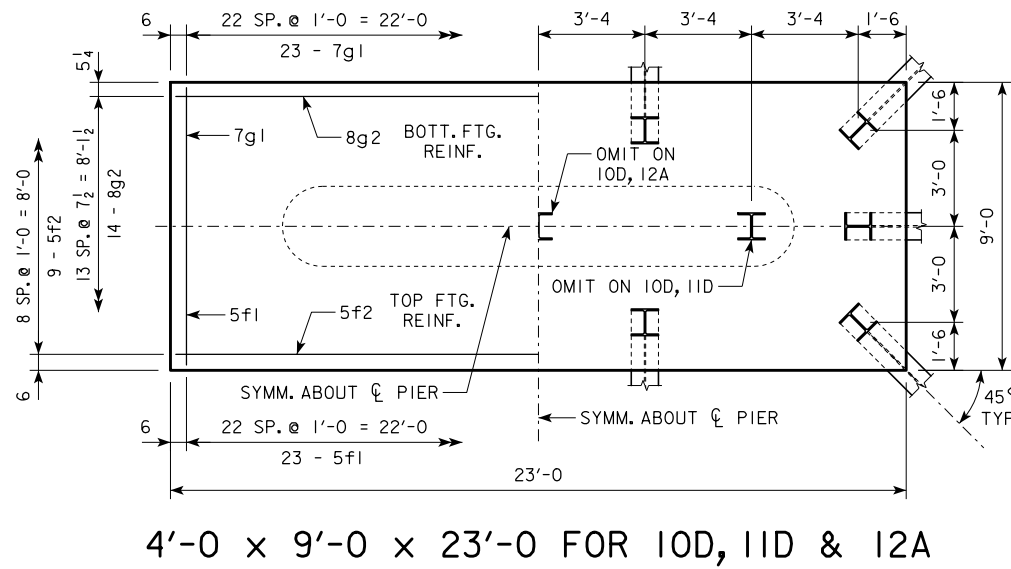
PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

04-13 LATEST REVISION DATE	<i>Thomas L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER		
		STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
		<b>TEE PIER-HP10x57 SRL-2 STEEL PILE FOOTINGS</b> 0° SKEW - H=16' to 24'	<b>H30-60-06</b>

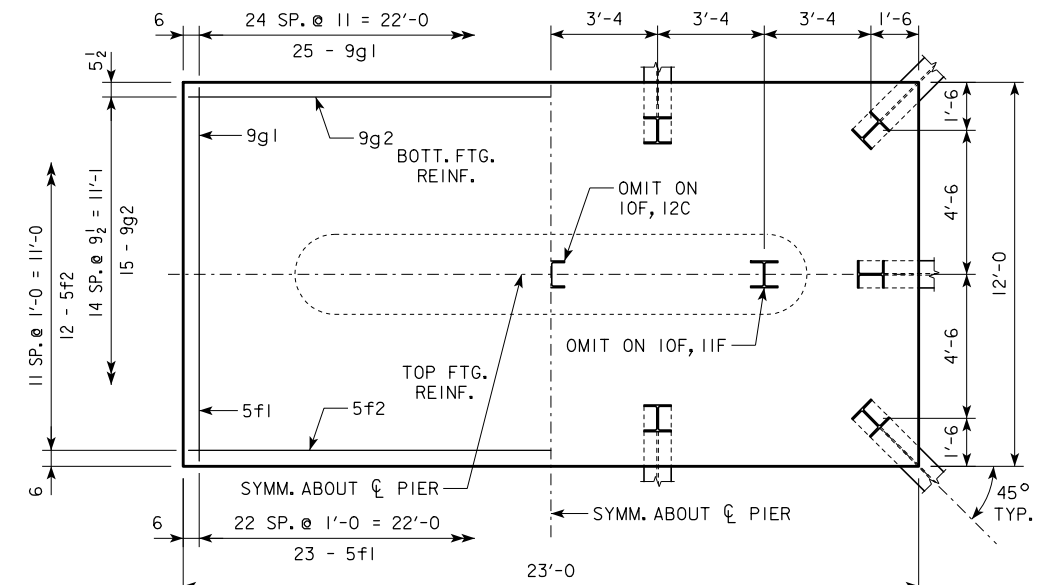
REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.



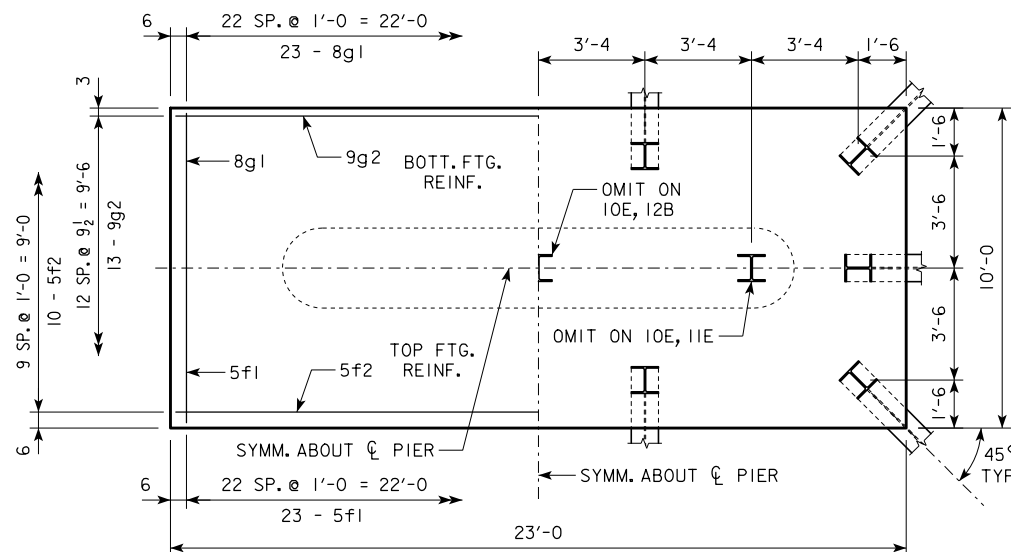
TYPICAL SECTION



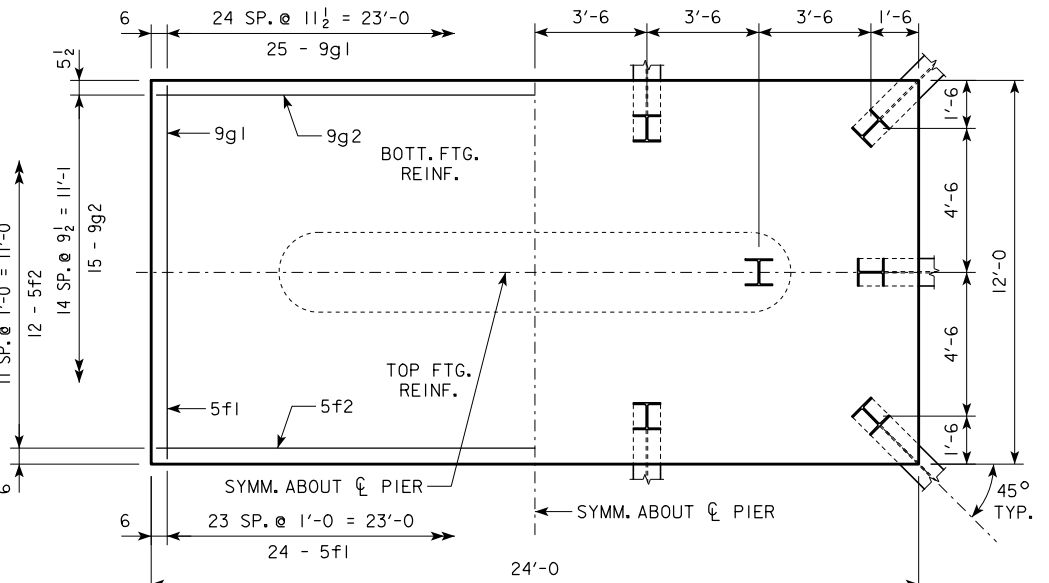
4'-0 x 9'-0 x 23'-0 FOR 10D, IID & 12A



4'-0 x 12'-0 x 23'-0 FOR 10F, IIF & 12C



4'-0 x 10'-0 x 23'-0 FOR 10E, IIE & 12B



4'-0 x 12'-0 x 24'-0 FOR 12D

H FT.	CL - CL ABUT. BRG.	PILING (HP10x57)		FOOTING SIZE
		NO. & LAYOUT	① LRFD P <sub>u</sub> , STRENGTH I, DES. LOAD (KIPS)	
20' 25 TO 27'	201'-4	10D	212	4' x 9' x 23'
	213'-10	10D	219	
	226'-4	11D	213	
	243'-0	12A	204	
20' 28 TO 30'	201'-4	10D	216	4' x 9' x 23'
	213'-10	11D	211	
	226'-4	11D	219	
	243'-0	12A	210	
20' 31 TO 33'	201'-4	10E	218	4' x 10' x 23'
	213'-10	11E	212	
	226'-4	12B	204	
	243'-0	12B	211	
20' 34 TO 36'	201'-4	10F	218	4' x 12' x 23'
	213'-10	11F	211	
	226'-4	11F	220	
	243'-0	12C	210	
20' 37 TO 40'	201'-4	12D	195	4' x 12' x 24'
	213'-10	12D	201	
	226'-4	12D	208	
	243'-0	12D	215	

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)				TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)		
4' x 9' x 23'	d2	40 - #9 AS SHOWN	9'-1	1235	2910	30.7
	f1	23 - #5 @ 1'-0	8'-8	208		
	f2	9 - #5 @ 1'-0	22'-8	213		
	g1	23 - #7 @ 1'-0	8'-8	407		
4' x 10' x 23'	d2	40 - #9 AS SHOWN	9'-1	1235	3299	34.1
	f1	23 - #5 @ 1'-0	9'-8	232		
	f2	10 - #5 @ 1'-0	22'-8	236		
	g1	23 - #8 @ 1'-0	9'-8	594		
4' x 12' x 23'	d2	40 - #9 AS SHOWN	9'-1	1235	3947	40.9
	f1	23 - #5 @ 1'-0	11'-8	280		
	f2	12 - #5 @ 1'-0	22'-8	284		
	g1	25 - #9 @ 0'-11	11'-8	992		
4' x 12' x 24'	d2	40 - #9 AS SHOWN	9'-1	1235	4022	42.7
	f1	24 - #5 @ 1'-0	11'-8	292		
	f2	12 - #5 @ 1'-0	23'-8	296		
	g1	25 - #9 @ 0'-11 1/2	11'-8	992		
		g2	15 - #9 @ 0'-9 1/2	23'-8	1207	

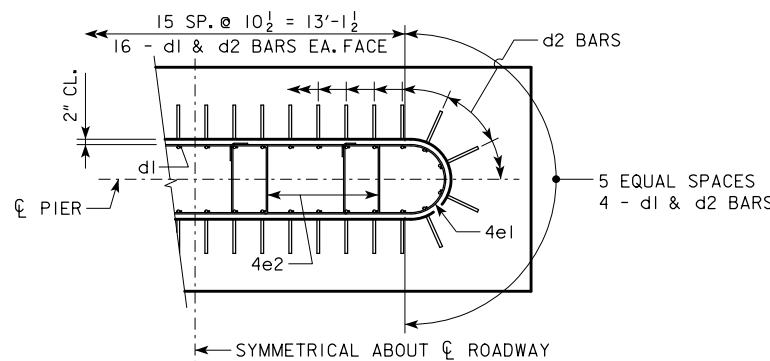
FOOTING NOTES:

THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H30-57-06.

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

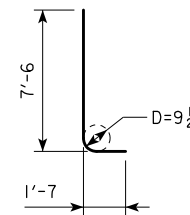
STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

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



d2 BAR LAYOUT  
(SEE SECTION A-A ON SHEET H30-57-06.)

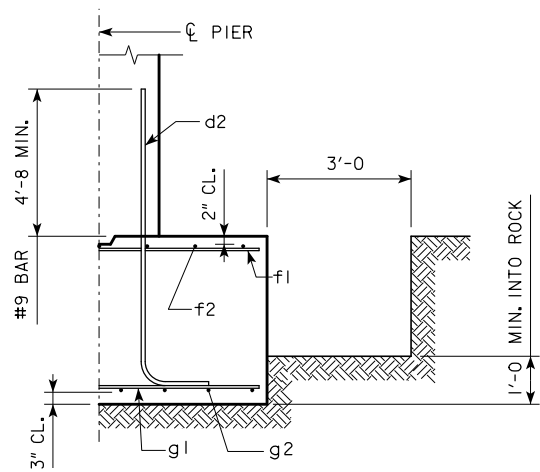
① NOTE: P<sub>u</sub>, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



d2  
NOTE: D = PIN DIAMETER.  
DIMENSIONS ARE OUT TO OUT.

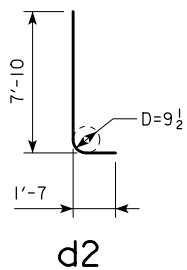
LATEST REVISION DATE 04-13	APPROVED BY BRIDGE ENGINEER <i>Thomas L. Mc Donald</i>		
		STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
TEE PIER-HP10x57 SRL-2 STEEL PILE FOOTINGS 0° SKEW - H=25' to 40'		<b>H30-61-06</b>	

REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.

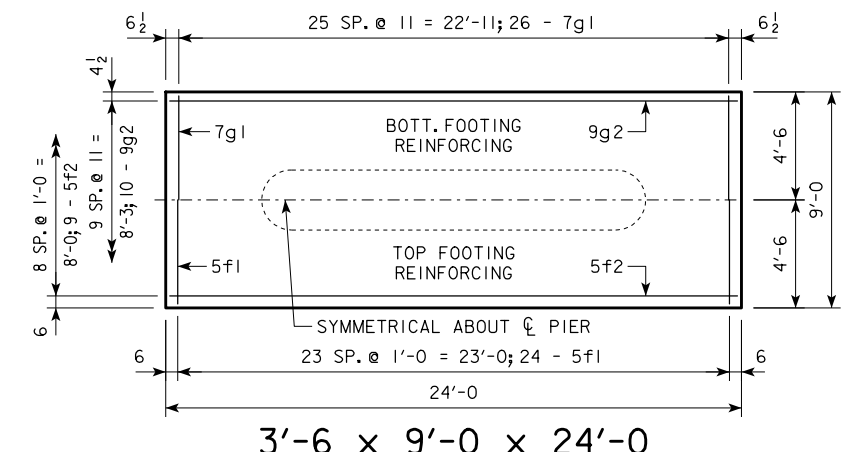
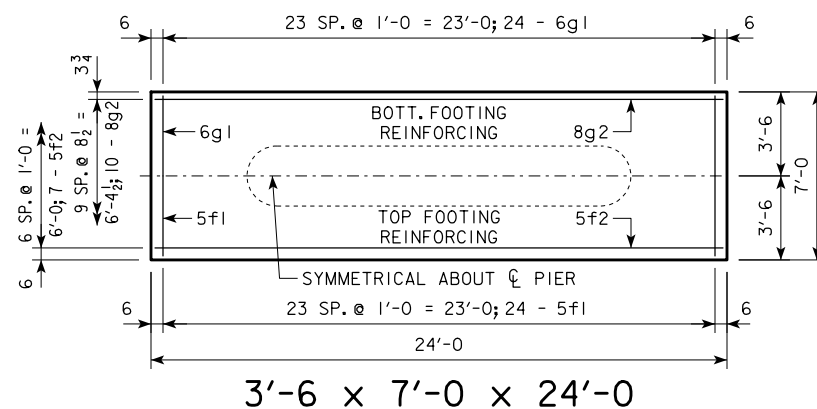
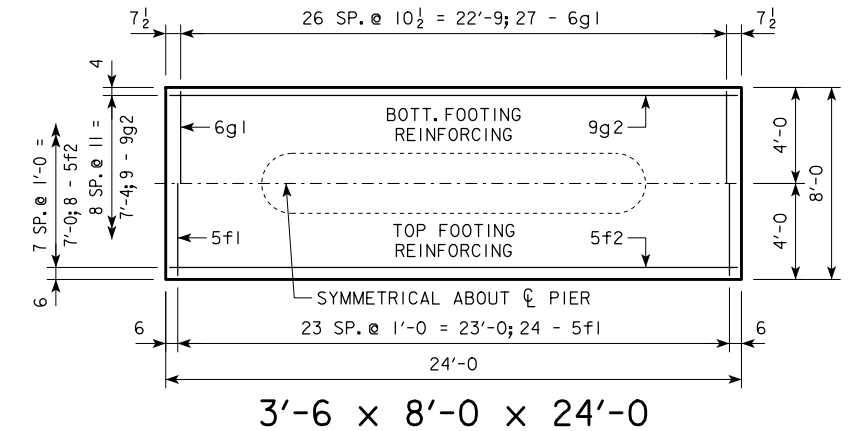
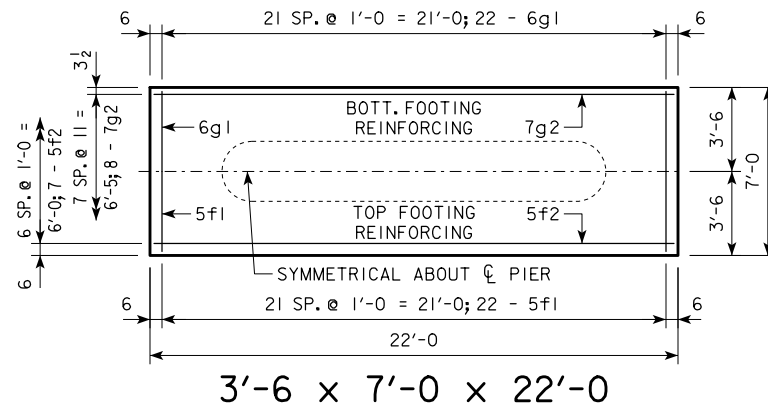


TYPICAL SECTION

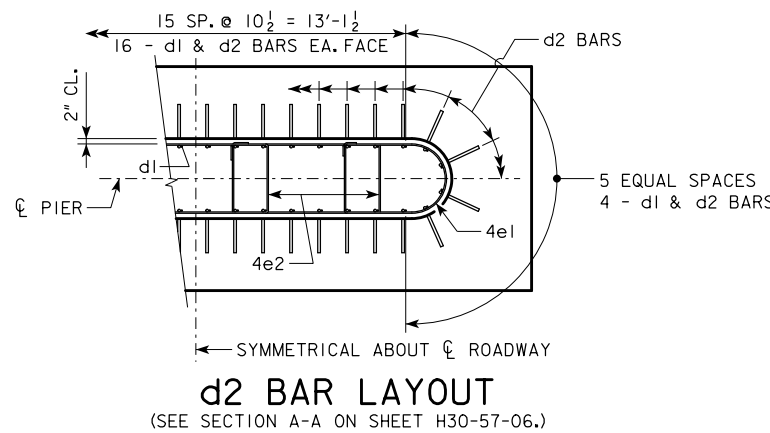
H IN FT.	CL - CL ABUT. BRG.	FOOTING SIZE
16 TO 18	138'-10	3'-6 x 7' x 22'
	151'-4	
	163'-10	3'-6 x 7' x 24'
	176'-4	
	188'-10	
19 TO 21	201'-4	3'-6 x 8' x 24'
	213'-10	
	226'-4	3'-6 x 9' x 24'
	243'-0	
	226'-4	
243'-0		
22 TO 24	138'-10	3'-6 x 7' x 24'
	151'-4	
	163'-10	3'-6 x 8' x 24'
	176'-4	
	188'-10	
201'-4	3'-6 x 9' x 24'	
243'-0		



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



FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)				TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)		
3'-6 x 7' x 22'	d2	40 - #9 AS SHOWN	9'-5	1281	2166	20.0
	f1	22 - #5 @ 1'-0	6'-8	153		
	f2	7 - #5 @ 1'-0	21'-8	158		
	g1	22 - #6 @ 1'-0	6'-8	220		
3'-6 x 7' x 24'	g2	8 - #7 @ 0'-11	21'-8	354	2493	21.8
	d2	40 - #9 AS SHOWN	9'-5	1281		
	f1	24 - #5 @ 1'-0	6'-8	167		
	f2	7 - #5 @ 1'-0	23'-8	173		
	g1	24 - #6 @ 1'-0	6'-8	240		
3'-6 x 8' x 24'	g2	10 - #8 @ 0'-8 1/2	23'-8	632	2705	24.9
	d2	40 - #9 AS SHOWN	9'-5	1281		
	f1	24 - #5 @ 1'-0	7'-8	192		
	f2	8 - #5 @ 1'-0	23'-8	197		
3'-6 x 9' x 24'	g1	27 - #6 @ 0'-10 1/2	7'-8	311	2986	28.0
	g2	9 - #9 @ 0'-11	23'-8	724		
	d2	40 - #9 AS SHOWN	9'-5	1281		
	f1	24 - #5 @ 1'-0	8'-8	217		
	f2	9 - #5 @ 1'-0	23'-8	222		
	g1	26 - #7 @ 0'-11	8'-8	461		
	g2	10 - #9 @ 0'-11	23'-8	805		



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 H30-57-06.

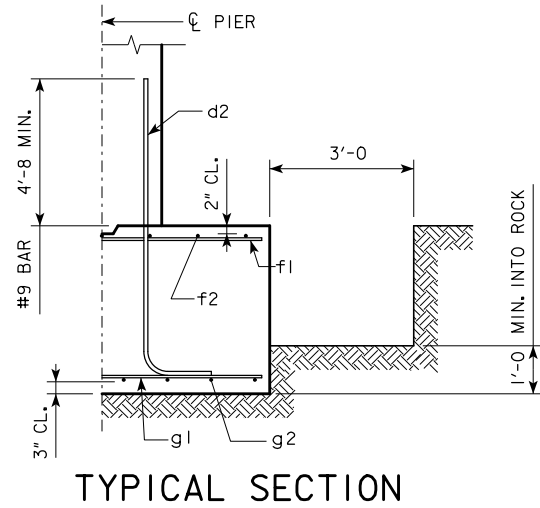
THESE SPREAD FOOTINGS SHALL EXTEND AT LEAST 12 INCHES INTO SUITABLE FOUNDATION ROCK AND THE LAST 12 INCHES OF ROCK EXCAVATION SHALL BE TO NEAT LINES OF MASONRY. THE FOUNDATION ROCK SHALL HAVE A MINIMUM LRFD NOMINAL BEARING RESISTANCE OF 30 KIPS PER SQUARE FOOT (ALLOWABLE SERVICE LOAD BEARING VALUE OF AT LEAST 10 KIPS PER SQUARE FOOT).

04-13 LATEST REVISION DATE	<i>Harmon L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER		
		STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
<b>TEE PIER - SPREAD FOOTINGS</b> 0° SKEW - H=16' to 24'		<b>H30-62-06</b>	

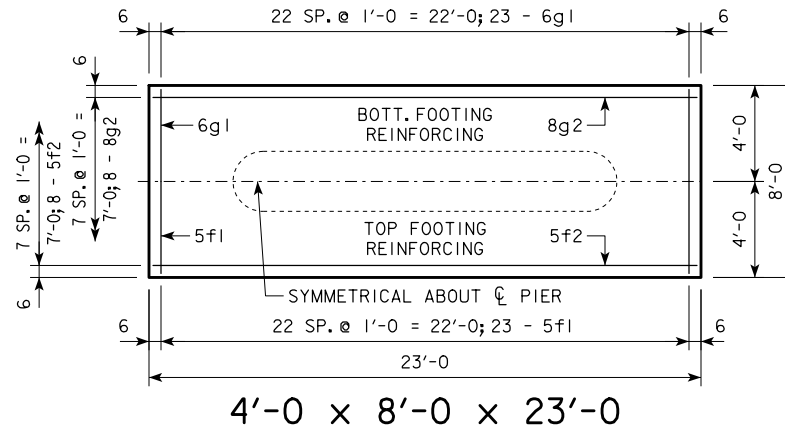
REVISED 04-13 - FOOTING NOTES MODIFIED.



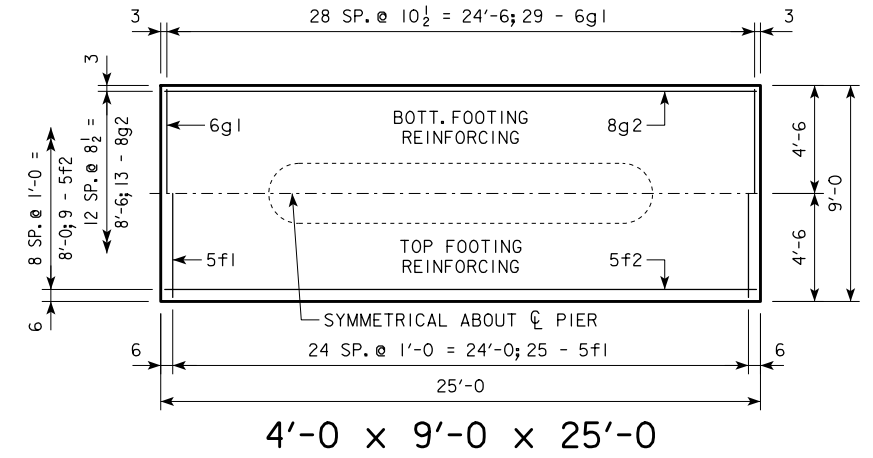
H IN FT.	CL - CL ABUT. BRG.	FOOTING SIZE
25 TO 27	138'-10	4' x 8' x 23'
	151'-4	
	163'-10	
	176'-4	
	188'-10	
28 TO 30	201'-4	4' x 8' x 25'
	213'-10	
	226'-4	
	243'-0	
	255'-6	
31 TO 33	138'-10	4' x 8' x 25'
	151'-4	
	163'-10	
	176'-4	
	188'-10	
34 TO 36	201'-4	4' x 9' x 25'
	213'-10	
	226'-4	
	243'-0	
	255'-6	
37 TO 40	138'-10	4' x 9' x 25'
	151'-4	
	163'-10	
	176'-4	
	188'-10	
	201'-4	4' x 9' x 27'
	213'-10	
	226'-4	
	243'-0	
	255'-6	



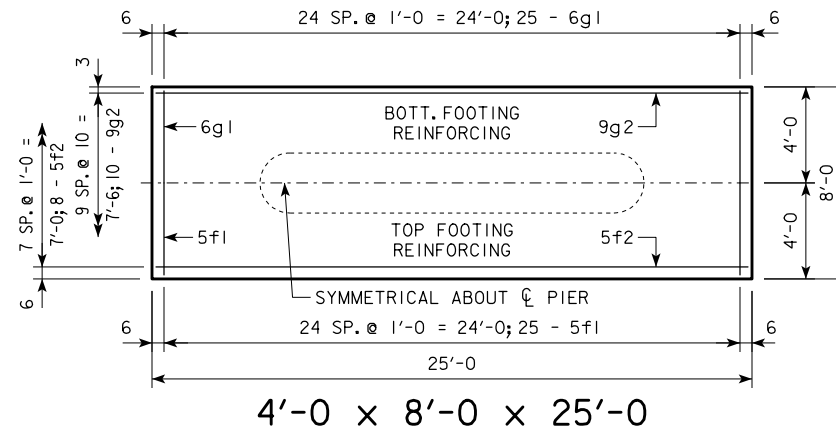
TYPICAL SECTION



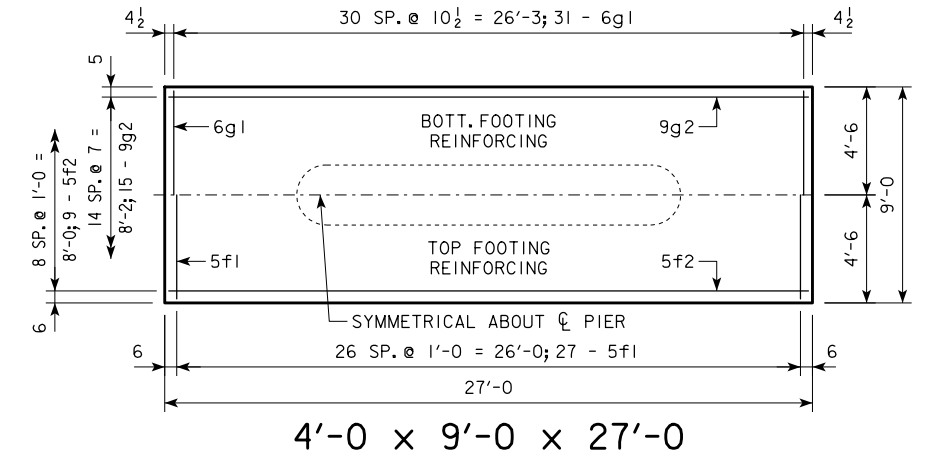
4'-0 x 8'-0 x 23'-0



4'-0 x 9'-0 x 25'-0

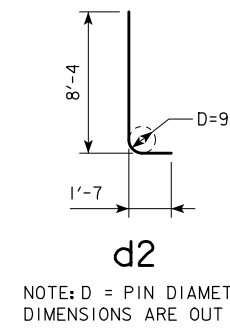
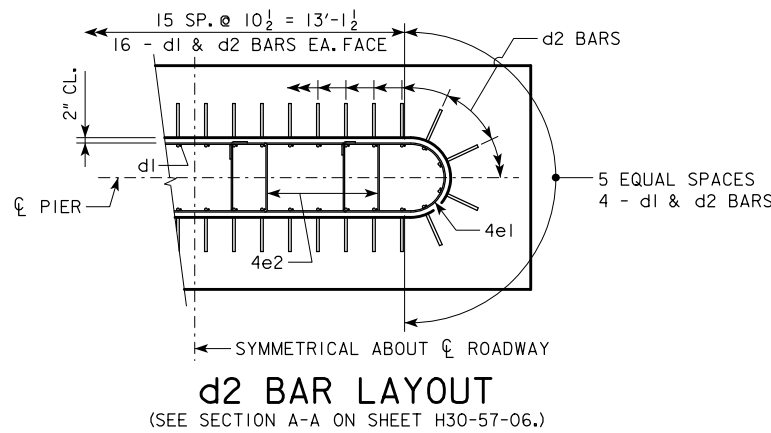


4'-0 x 8'-0 x 25'-0



4'-0 x 9'-0 x 27'-0

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)				TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)		
4' x 8' x 23'	d2	40 - #9 AS SHOWN	9'-11	1349	2471	27.3
	f1	23 - #5 @ 1'-0	7'-8	184		
	f2	8 - #5 @ 1'-0	22'-8	189		
	g1	23 - #6 @ 1'-0	7'-8	265		
4' x 8' x 25'	g2	8 - #8 @ 1'-0	22'-8	484	2882	29.6
	d2	40 - #9 AS SHOWN	9'-11	1349		
	f1	25 - #5 @ 1'-0	7'-8	200		
	f2	8 - #5 @ 1'-0	24'-8	206		
	g1	25 - #6 @ 1'-0	7'-8	288		
4' x 9' x 25'	g2	10 - #9 @ 0'-10	24'-8	839	3041	33.3
	d2	40 - #9 AS SHOWN	9'-11	1349		
	f1	25 - #5 @ 1'-0	8'-8	226		
	f2	9 - #5 @ 1'-0	24'-8	232		
4' x 9' x 27'	g1	29 - #6 @ 0'-10 1/2	8'-8	378	3607	36.0
	g2	13 - #8 @ 0'-8 1/2	24'-8	856		
	d2	40 - #9 AS SHOWN	9'-11	1349		
	f1	27 - #5 @ 1'-0	8'-8	244		
	f2	9 - #5 @ 1'-0	26'-8	250		
	g1	31 - #6 @ 0'-10 1/2	8'-8	404		
	g2	15 - #9 @ 0'-7	26'-8	1360		



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

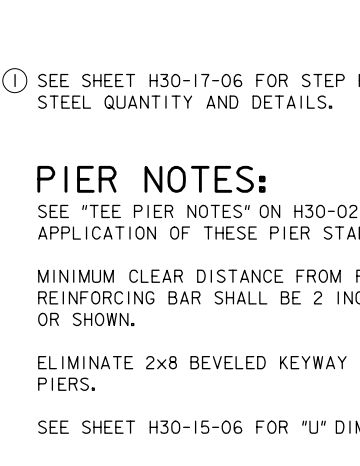
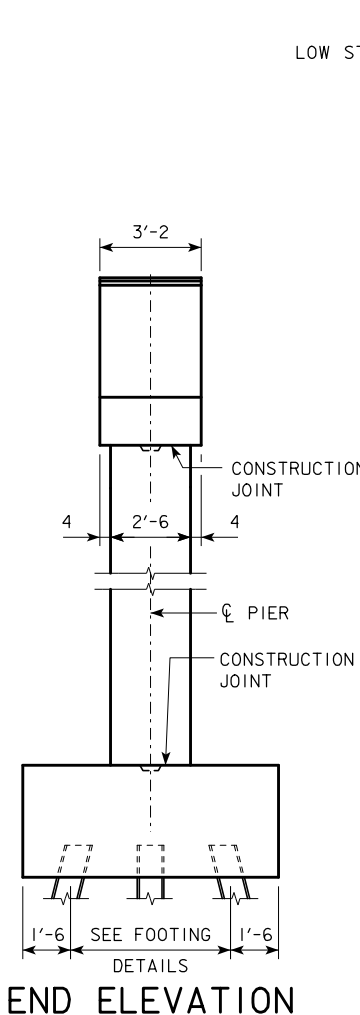
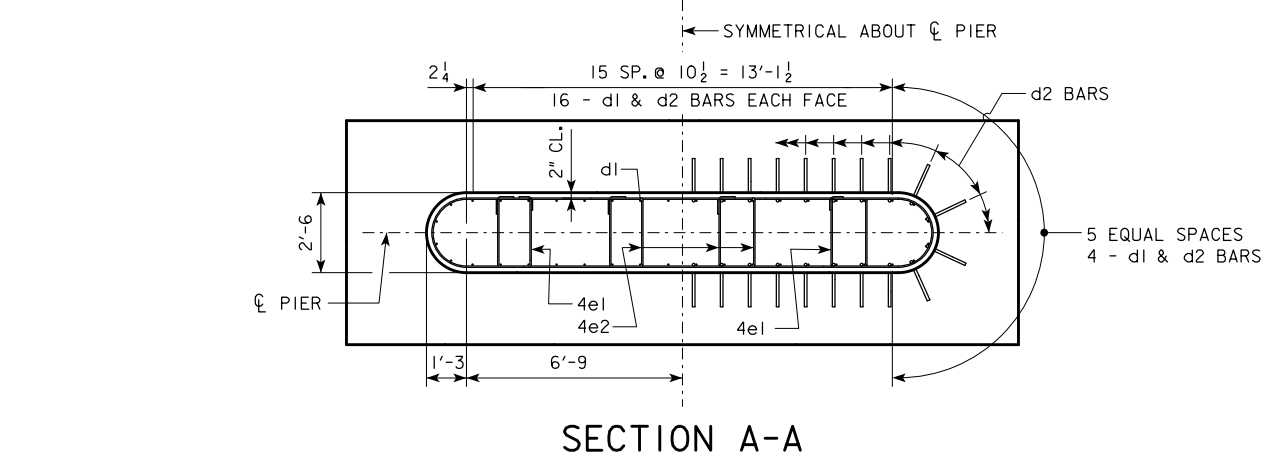
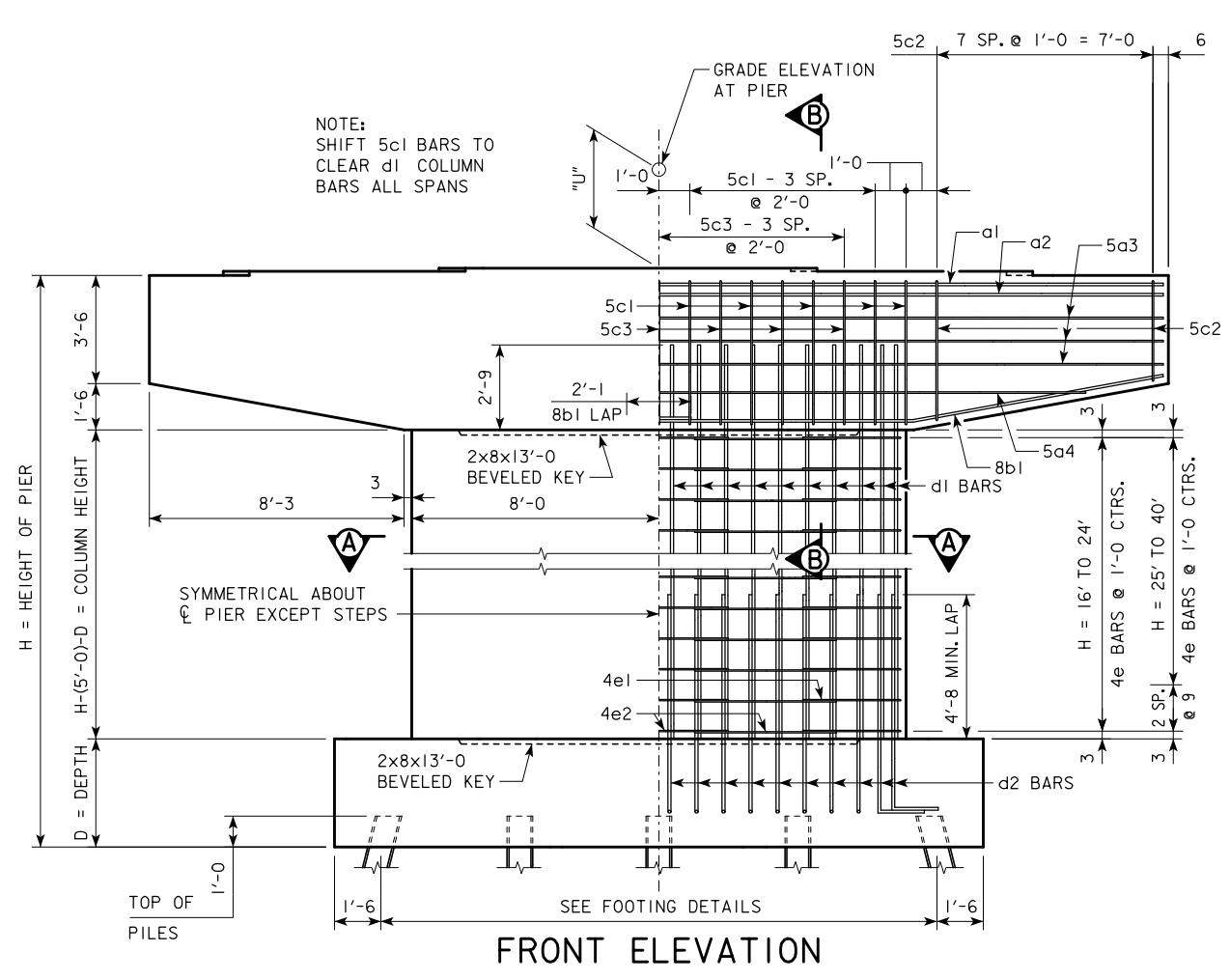
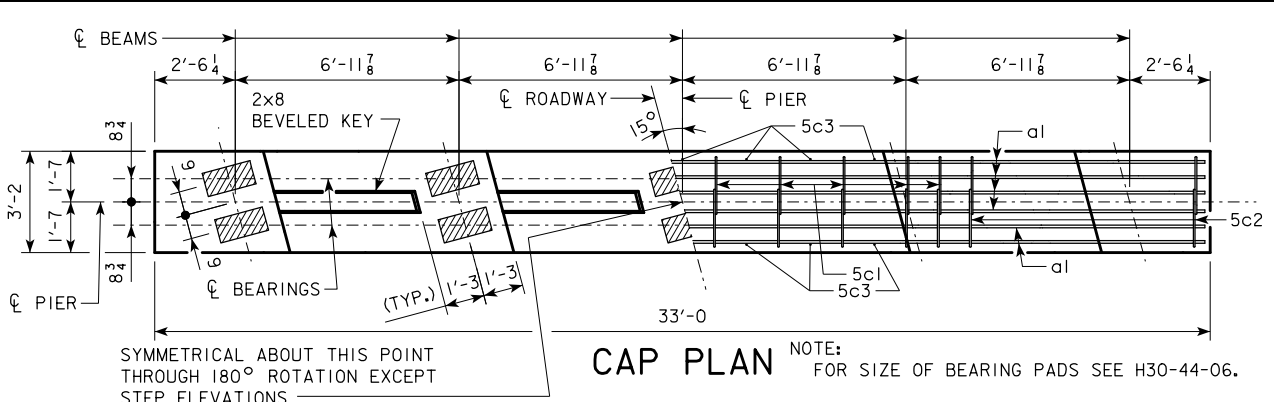
FOOTING NOTES:

THESE SPREAD FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H30-57-06.

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 NOMINAL BEARING RESISTANCE OF 30 KIPS PER SQUARE FOOT (ALLOWABLE SERVICE LOAD BEARING VALUE OF AT LEAST 10 KIPS PER SQUARE FOOT).

REVISED 04-13 - FOOTING NOTES MODIFIED.

04-13 LATEST REVISION DATE	<i>Thomas L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER		
		STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
<b>TEE PIER - SPREAD FOOTINGS</b> 0° SKEW - H=25' to 40'		<b>H30-63-06</b>	



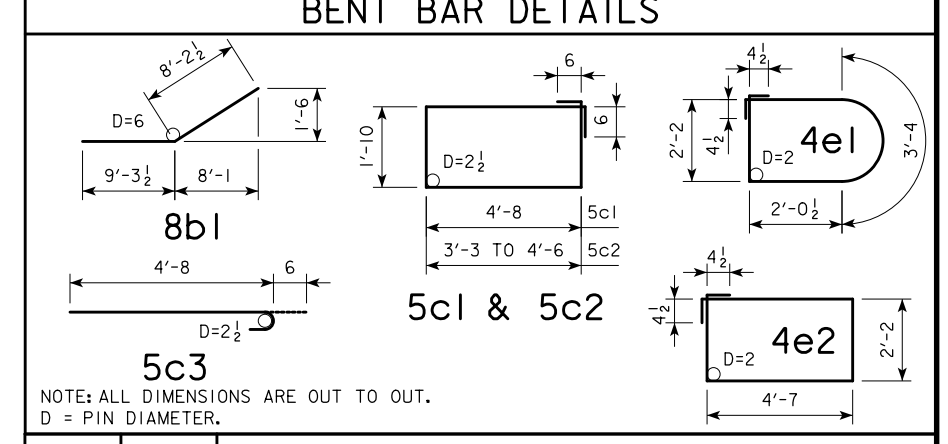
① SEE SHEET H30-17-06 FOR STEP REINFORCING STEEL QUANTITY AND DETAILS.

**PIER NOTES:**  
 SEE "TEE PIER NOTES" ON H30-02-06 FOR NOTES REGARDING APPLICATION OF THESE PIER STANDARDS.  
 MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.  
 ELIMINATE 2x8 BEVELED KEYWAY ON TOP OF CAP FOR EXPANSION PIERS.  
 SEE SHEET H30-15-06 FOR "U" DIMENSION.

		CAP																					
REINFORCING STEEL		138'-10		151'-4		163'-10		176'-4		188'-10		201'-4		213'-10		226'-4		243'-0					
BAR	LENGTH	SHAPE	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT			
a1	32'-8		6	7	401	6	7	401	6	8	523	6	8	523	6	8	523	6	9	666	6	9	666
a2	32'-8		6	7	401	6	7	401	6	7	401	6	7	401	6	8	523	6	8	523	6	8	523
5a3	32'-8		6	5	204	6	5	204	6	5	204	6	5	204	6	5	204	6	5	204	6	5	204
5a4	27'-7		2	5	58	2	5	58	2	5	58	2	5	58	2	5	58	2	5	58	2	5	58
8b1	17'-6		8	8	374	8	8	374	8	8	374	8	8	374	8	8	374	8	8	374	8	8	374
5c1	14'-0		20	5	292	20	5	292	20	5	292	20	5	292	20	5	292	20	5	292	20	5	292
5c2	VARIES		32	5	414	32	5	414	32	5	414	32	5	414	32	5	414	32	5	414	32	5	414
5c3	5'-2		14	5	75	14	5	75	14	5	75	14	5	75	14	5	75	14	5	75	14	5	75
TOTAL (LB.)		2219		2219		2341		2341		2341		2463		2463		2606		2606					
STRUCTURAL CONCRETE (CY)		18.5		18.5		18.5		18.5		18.5		18.5		18.5		18.5		18.5					

		COLUMN																				
REINFORCING STEEL		138'-10		151'-4		163'-10		176'-4		188'-10		201'-4		213'-10		226'-4		243'-0				
H IN FEET	COLUMN HEIGHT	STRUCTURAL CONCRETE (CY)	d1 BAR		4e1 BAR		4e2 BAR		TOTAL WEIGHT (LB.)													
			NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT
16	7'-6	10.7	40	9	10'-3	1394	16	4	10'-4	110	24	4	14'-3	228	1732							
17	8'-6	12.2	40	9	11'-3	1530	18	4	10'-4	124	27	4	14'-3	257	1911							
18	9'-6	13.6	40	9	12'-3	1666	20	4	10'-4	138	30	4	14'-3	286	2090							
19	10'-6	15.0	40	9	13'-3	1802	22	4	10'-4	152	33	4	14'-3	314	2268							
20	11'-6	16.5	40	9	14'-3	1938	24	4	10'-4	166	36	4	14'-3	343	2447							
21	12'-6	17.9	40	9	15'-3	2074	26	4	10'-4	179	39	4	14'-3	371	2624							
22	13'-6	19.3	40	9	16'-3	2210	28	4	10'-4	193	42	4	14'-3	400	2803							
23	14'-6	20.8	40	9	17'-3	2346	30	4	10'-4	207	45	4	14'-3	428	2981							
24	15'-6	22.2	40	9	18'-3	2482	32	4	10'-4	221	48	4	14'-3	457	3160							
25	16'-0	22.9	40	9	18'-9	2550	34	4	10'-4	235	51	4	14'-3	485	3270							
26	17'-0	24.3	40	9	19'-9	2686	36	4	10'-4	248	54	4	14'-3	514	3448							
27	18'-0	25.8	40	9	20'-9	2822	38	4	10'-4	262	57	4	14'-3	543	3627							
28	19'-0	27.2	40	9	21'-9	2958	40	4	10'-4	276	60	4	14'-3	571	3805							
29	20'-0	28.6	40	9	22'-9	3094	42	4	10'-4	290	63	4	14'-3	600	3984							
30	21'-0	30.1	40	9	23'-9	3230	44	4	10'-4	304	66	4	14'-3	628	4162							
31	22'-0	31.5	40	9	24'-9	3366	46	4	10'-4	318	69	4	14'-3	657	4341							
32	23'-0	32.9	40	9	25'-9	3502	48	4	10'-4	331	72	4	14'-3	685	4518							
33	24'-0	34.4	40	9	26'-9	3638	50	4	10'-4	345	75	4	14'-3	714	4697							
34	25'-0	35.8	40	9	27'-9	3774	52	4	10'-4	359	78	4	14'-3	742	4875							
35	26'-0	37.2	40	9	28'-9	3910	54	4	10'-4	373	81	4	14'-3	771	5054							
36	27'-0	38.7	40	9	29'-9	4046	56	4	10'-4	387	84	4	14'-3	800	5233							
37	28'-0	40.1	40	9	30'-9	4182	58	4	10'-4	400	87	4	14'-3	828	5410							
38	29'-0	41.5	40	9	31'-9	4318	60	4	10'-4	414	90	4	14'-3	857	5589							
39	30'-0	43.0	40	9	32'-9	4454	62	4	10'-4	428	93	4	14'-3	885	5767							
40	31'-0	44.4	40	9	33'-9	4590	64	4	10'-4	442	96	4	14'-3	914	5946							

		BENT BAR DETAILS																				
REINFORCING STEEL		138'-10		151'-4		163'-10		176'-4		188'-10		201'-4		213'-10		226'-4		243'-0				
H IN FEET	COLUMN HEIGHT	STRUCTURAL CONCRETE (CY)	d1 BAR		4e1 BAR		4e2 BAR		TOTAL WEIGHT (LB.)													
			NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT
16	7'-6	10.7	40	9	10'-3	1394	16	4	10'-4	110	24	4	14'-3	228	1732							
17	8'-6	12.2	40	9	11'-3	1530	18	4	10'-4	124	27	4	14'-3	257	1911							
18	9'-6	13.6	40	9	12'-3	1666	20	4	10'-4	138	30	4	14'-3	286	2090							
19	10'-6	15.0	40	9	13'-3	1802	22	4	10'-4	152	33	4	14'-3	314	2268							
20	11'-6	16.5	40	9	14'-3	1938	24	4	10'-4	166	36	4	14'-3	343	2447							
21	12'-6	17.9	40	9	15'-3	2074	26	4	10'-4	179	39	4	14'-3	371	2624							
22	13'-6	19.3	40	9	16'-3	2210	28	4	10'-4	193	42	4	14'-3	400	2803							
23	14'-6	20.8	40	9	17'-3	2346	30	4	10'-4	207	45	4	14'-3	428	2981							
24	15'-6	22.2	40	9	18'-3	2482	32	4	10'-4	221	48	4	14'-3	457	3160							
25	16'-0	22.9	40	9	18'-9	2550	34	4	10'-4	235	51	4	14'-3	485	3270							
26	17'-0	24.3	40	9	19'-9	2686	36	4	10'-4	248	54	4	14'-3	514	3448							
27	18'-0	25.8	40	9	20'-9	2822	38	4	10'-4	262	57	4	14'-3	543	3627							
28	19'-0	27.2	40	9	21'-9	2958	40	4	10'-4	276	60	4	14'-3	571	3805							
29	20'-0	28.6	40	9	22'-9	3094	42	4	10'-4	290	63	4	14'-3	600	3984							
30	21'-0	30.1	40	9	23'-9	3230	44	4	10'-4	304	66	4	14'-3	628	4162							
31	22'-0	31.5	40	9	24'-9	3366	46	4	10'-4	318	69	4	14'-3	657	4341							
32	23'-0	32.9	40	9	25'-9	3502	48	4	10'-4	331	72	4	14'-3	685	4518							
33	24'-0	34.4	40	9	26'-9	3638	50	4	10'-4	345	75	4	14'-3	714	4697							
34	25'-0	35.8	40	9	27'-9	3774	52	4	10'-4	359	78	4	14'-3	742	4875							
35	26'-0	37.2	40	9	28'-9	3910	54	4	10'-4	373	81	4	14'-3	771	5054							
36	27'-0	38.7	40	9	29'-9	4046	56	4	10'-4	387	84	4	14'-3	800	5233							
37	28'-0	40.1	40	9	30'-9	4182	58	4	10'-4	400	87	4	14'-3	828	5410							
38	29'-0	41.5	40	9	31'-9	4318	60	4	10'-4	414	90	4	14'-3	857	5589							
39	30'-0	43.0	40	9	32'-9	4454	62	4	10'-4	428	93	4	14'-3	885	5767							
40	31'-0	44.4	40	9	33'-9	4590	64	4	10'-4	442	96	4	14'-3	914	5946							



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

07-10  
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER  
*Thomas L. Mc Donald*

**IOWADOT** Highway Division

STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES

**PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES**

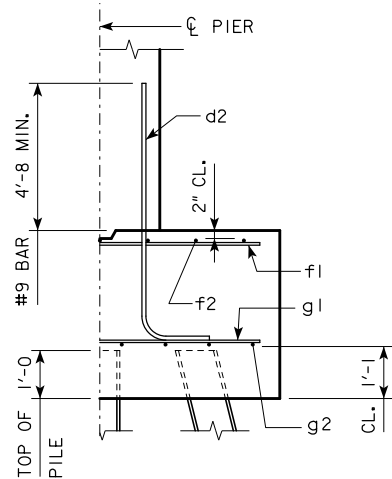
DECEMBER, 2006

**TEE PIER CAP AND COLUMN**

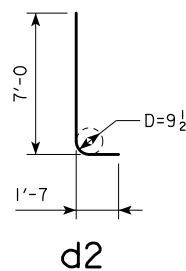
15° SKEW

**H30-64-06**

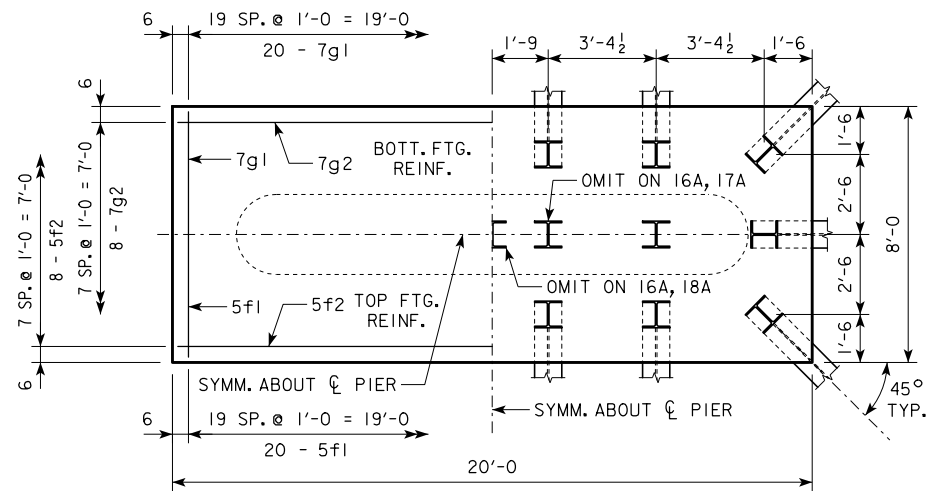
REVISED 07-10 - SHEET WAS REVISED TO MEET LRFD SPECIFICATIONS.



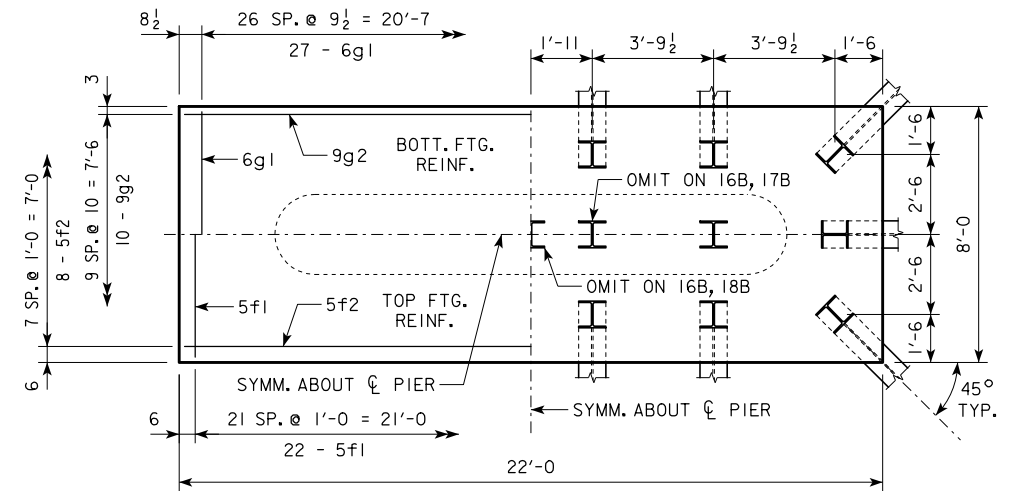
TYPICAL SECTION



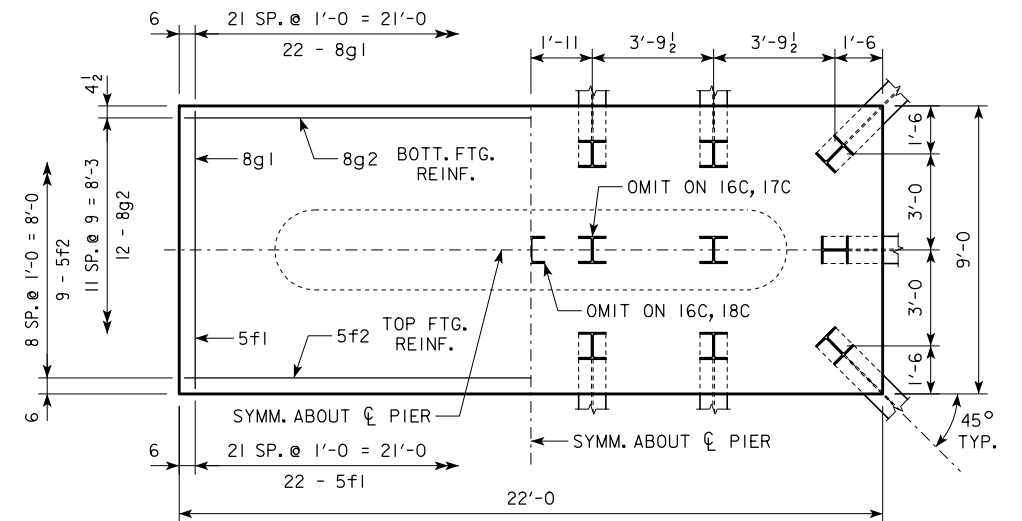
NOTE: D = PIN DIAMETER. DIMENSIONS ARE OUT TO OUT.



3'-6 x 8'-0 x 20'-0 FOR 16A, 17A & 18A



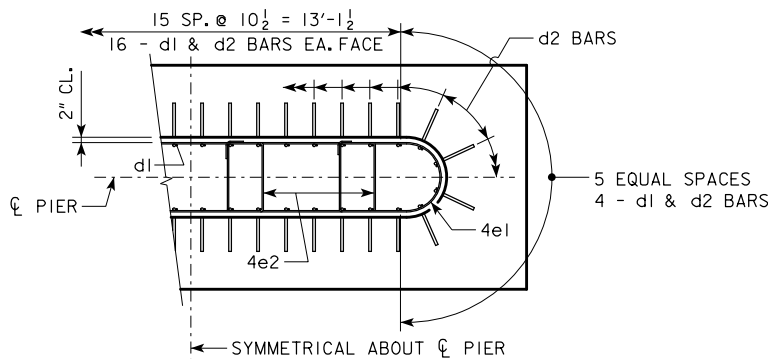
3'-6 x 8'-0 x 22'-0 FOR 16B, 17B & 18B



3'-6 x 9'-0 x 22'-0 FOR 16C, 17C & 18C

H IN FT.	CL - CL ABUT. BRG.	PILING (HP10x57)		FOOTING SIZE
		NO. & LAYOUT	① LRFD PU, STRENGTH I, DES. LOAD (KIPS)	
18 TO 16	201'-4	16A	138	3'-6 x 8' x 20'
	213'-10	16A	143	
	226'-4	17A	144	
	243'-0	18A	144	
21 TO 19	201'-4	16B	140	3'-6 x 8' x 22'
	213'-10	16B	145	
	226'-4	17B	145	
	243'-0	18B	145	
24 TO 22	201'-4	16C	141	3'-6 x 9' x 22'
	213'-10	16C	146	
	226'-4	17C	146	
	243'-0	18C	146	

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)				STRUCTURAL CONCRETE (CY)	
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)		
3'-6 x 8' x 20'	d2	40 - #9 AS SHOWN	8'-7	1167	2126	20.7
	f1	20 - #5 @ 1'-0	7'-8	160		
	f2	8 - #5 @ 1'-0	19'-8	164		
	g1	20 - #7 @ 1'-0	7'-8	313		
	g2	8 - #7 @ 1'-0	19'-8	322		
3'-6 x 8' x 22'	d2	40 - #9 AS SHOWN	8'-7	1167	2572	22.8
	f1	22 - #5 @ 1'-0	7'-8	176		
	f2	8 - #5 @ 1'-0	21'-8	181		
	g1	27 - #6 @ 0'-9 1/2	7'-8	311		
	g2	10 - #9 @ 0'-10	21'-8	737		
3'-6 x 9' x 22'	d2	40 - #9 AS SHOWN	8'-7	1167	2772	25.7
	f1	22 - #5 @ 1'-0	8'-8	199		
	f2	9 - #5 @ 1'-0	21'-8	203		
	g1	22 - #8 @ 1'-0	8'-8	509		
	g2	12 - #8 @ 0'-9	21'-8	694		



d2 BAR LAYOUT (SEE SECTION A-A ON SHEET H30-64-06.)  
 ① NOTE: PU, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

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 H30-57-06.

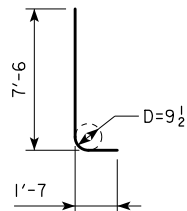
BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

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

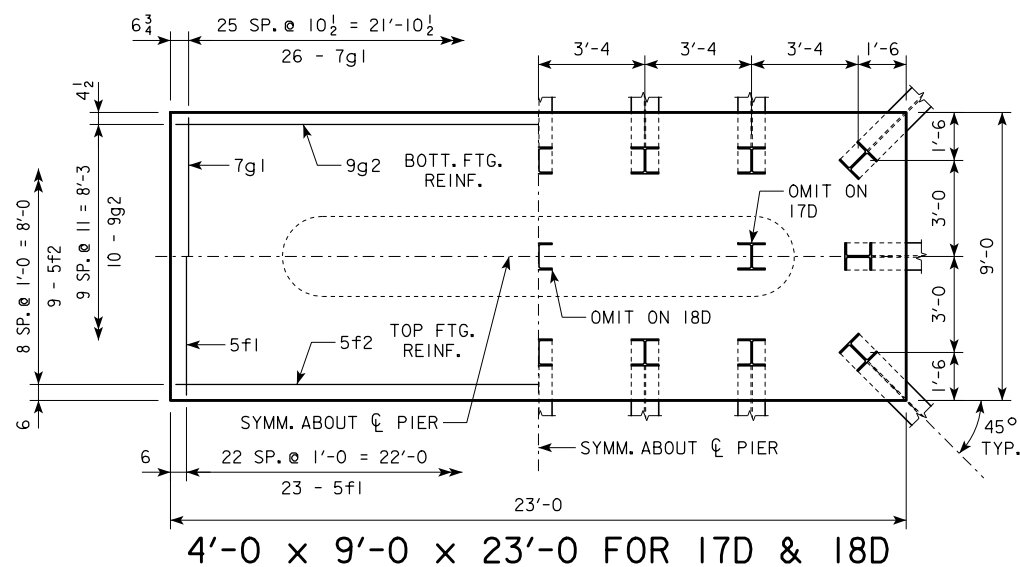
04-13 LATEST REVISION DATE	<i>Thomas L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER		
		STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
		<b>TEE PIER-HP10x57 SRL-1 STEEL PILE FOOTINGS</b> 15° SKEW - H=16' to 24'	<b>H30-65-06</b>

REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.

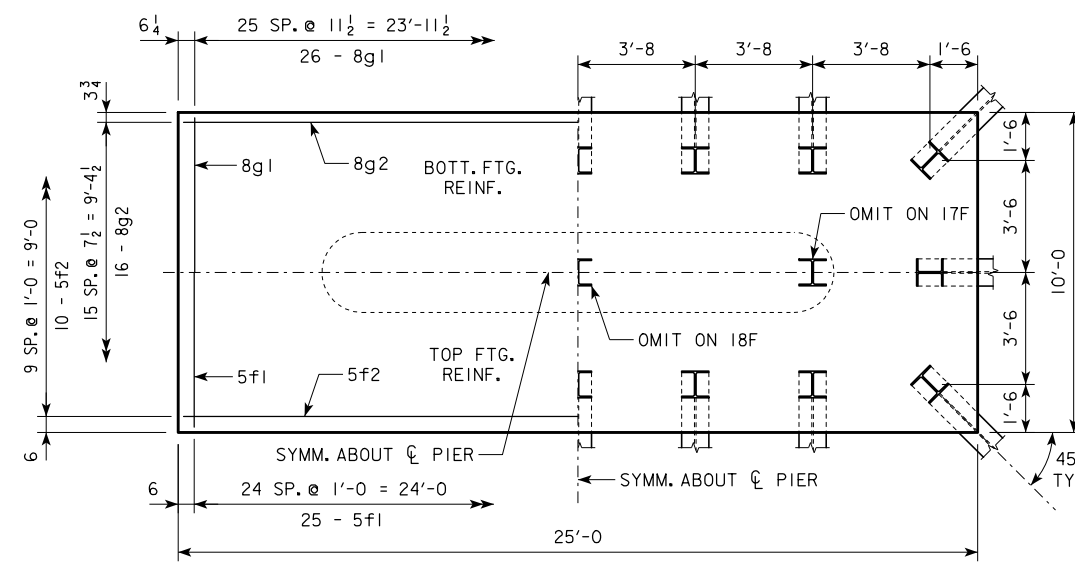


d2

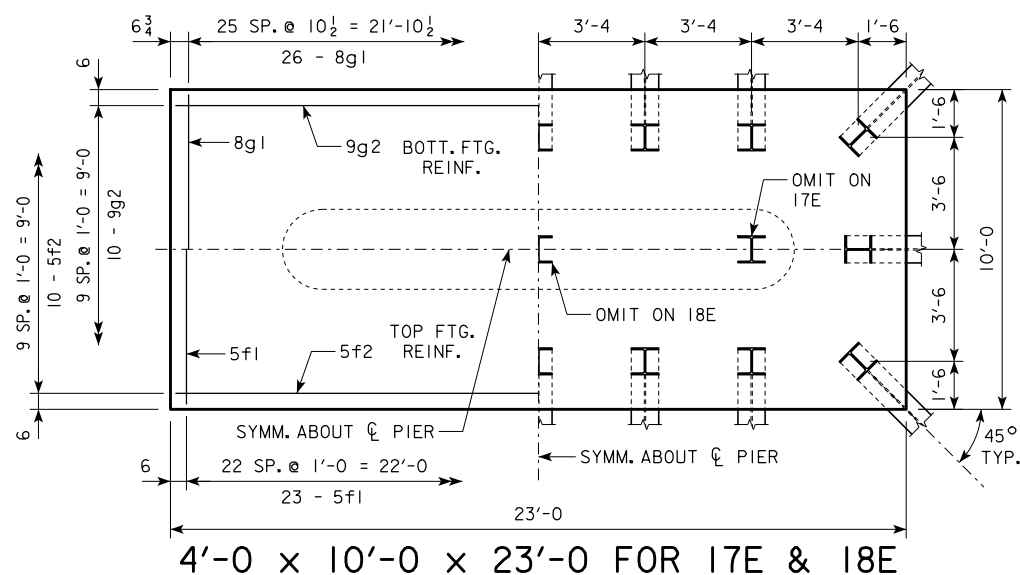
NOTE: D = PIN DIAMETER.  
DIMENSIONS ARE OUT TO OUT.



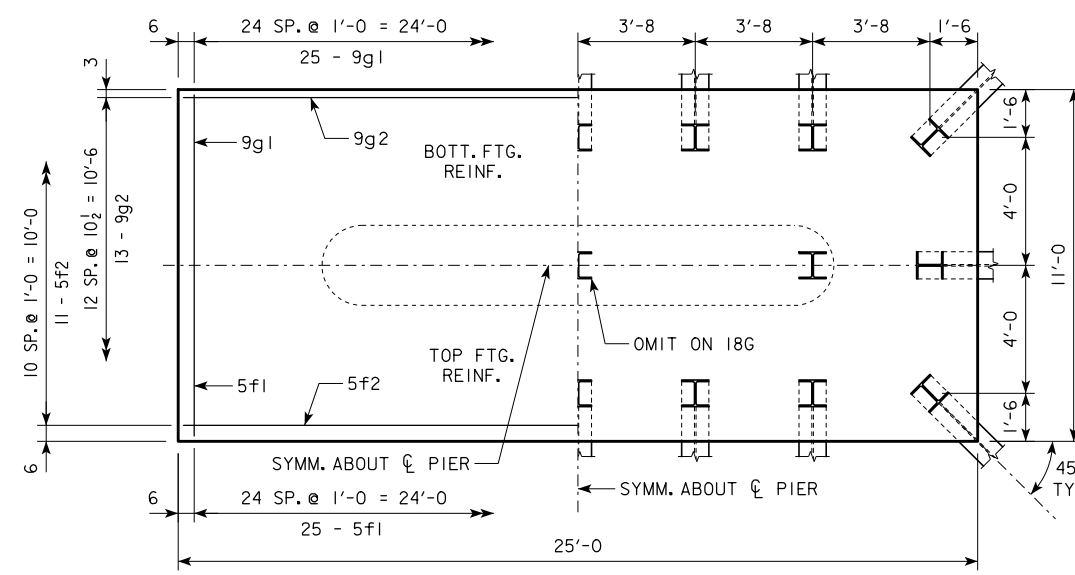
4'-0 x 9'-0 x 23'-0 FOR 17D & 18D



4'-0 x 10'-0 x 25'-0 FOR 17F & 18F



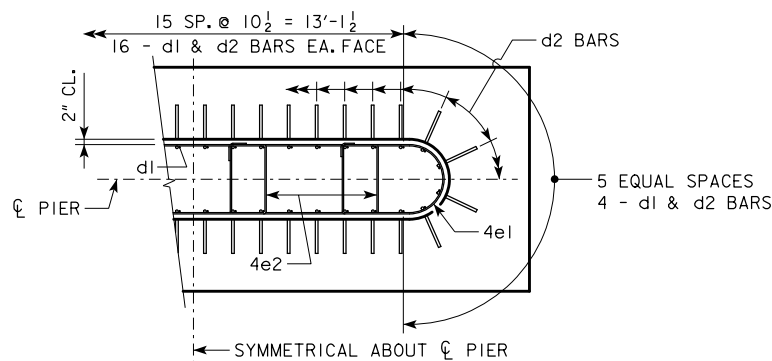
4'-0 x 10'-0 x 23'-0 FOR 17E & 18E



4'-0 x 11'-0 x 25'-0 FOR 18G & 19A

H IN FT.	CL - CL ABUT. BRG.	PILING (HP10x57)		FOOTING SIZE
		NO. & LAYOUT	LRFD P <sub>u</sub> STRENGTH I, DES. LOAD (KIPS)	
20' 25 TO 27'	201'-4	17D	135	4' x 9' x 23'
	213'-10	17D	140	
	226'-4	17D	146	
	243'-0	18D	142	
20' 28 TO 30'	201'-4	17D	138	4' x 9' x 23'
	213'-10	17D	143	
	226'-4	18D	140	
	243'-0	18D	145	
20' 31 TO 33'	201'-4	17E	139	4' x 10' x 23'
	213'-10	17E	143	
	226'-4	18E	141	
	243'-0	18E	145	
20' 34 TO 36'	201'-4	17F	141	4' x 10' x 25'
	213'-10	17F	144	
	226'-4	18F	141	
	243'-0	18F	146	
20' 37 TO 40'	201'-4	18G	138	4' x 11' x 25'
	213'-10	18G	141	
	226'-4	18G	144	
	243'-0	19A	143	

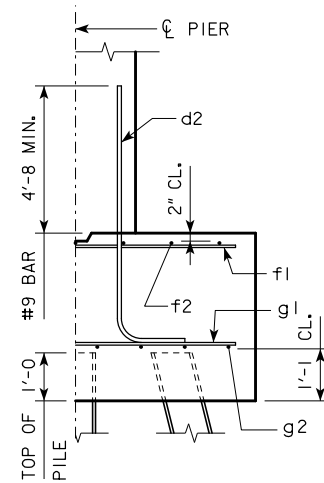
FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)				TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)		
4' x 9' x 23'	d2	40 - #9 AS SHOWN	9'-1	1235	2888	30.7
	f1	23 - #5 @ 1'-0	8'-8	208		
	f2	9 - #5 @ 1'-0	22'-8	213		
	g1	26 - #7 @ 0'-10 1/2	8'-8	461		
	g2	10 - #9 @ 0'-11	22'-8	771		
4' x 10' x 23'	d2	40 - #9 AS SHOWN	9'-1	1235	3145	34.1
	f1	23 - #5 @ 1'-0	9'-8	232		
	f2	10 - #5 @ 1'-0	22'-8	236		
	g1	26 - #8 @ 0'-10 1/2	9'-8	671		
	g2	10 - #9 @ 1'-0	22'-8	771		
4' x 10' x 25'	d2	40 - #9 AS SHOWN	9'-1	1235	3469	37.0
	f1	25 - #5 @ 1'-0	9'-8	252		
	f2	10 - #5 @ 1'-0	24'-8	257		
	g1	26 - #8 @ 0'-11 1/2	9'-8	671		
	g2	16 - #8 @ 0'-7 1/2	24'-8	1054		
4' x 11' x 25'	d2	40 - #9 AS SHOWN	9'-1	1235	3793	40.7
	f1	25 - #5 @ 1'-0	10'-8	278		
	f2	11 - #5 @ 1'-0	24'-8	283		
	g1	25 - #9 @ 1'-0	10'-8	907		
	g2	13 - #9 @ 0'-10 1/2	24'-8	1090		



d2 BAR LAYOUT

(SEE SECTION A-A ON SHEET H30-64-06.)

NOTE: P<sub>u</sub> STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



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 H30-57-06.

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

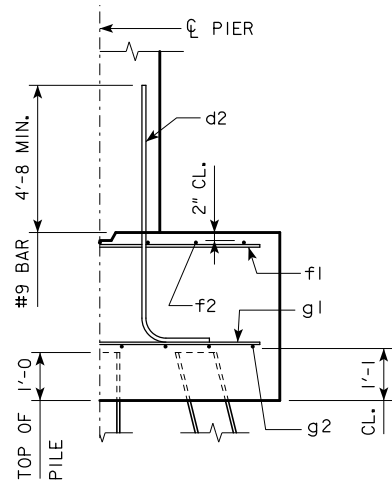
STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

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

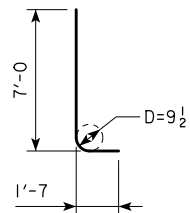
04-13 LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	 STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
		<b>TEE PIER-HP10x57 SRL-1 STEEL PILE FOOTINGS</b> 15° SKEW - H=25' to 40'	<b>H30-66-06</b>

REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.





TYPICAL SECTION

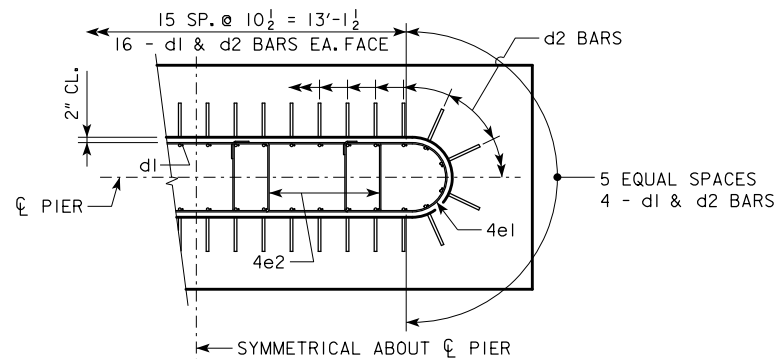


d2

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

H IN FT.	CL - CL ABUT. BRG.	PILING (HP10x57)		FOOTING SIZE
		NO. & LAYOUT	① LRFD Pu, STRENGTH I, DES. LOAD (KIPS)	
18 TO 16	201'-4	10A	210	3'-6 x 8' x 20'
	213'-10	10A	218	
	226'-4	11A	213	
	243'-0	12A	204	
21 TO 19	201'-4	10A	216	3'-6 x 8' x 20'
	213'-10	11A	210	
	226'-4	11A	219	
	243'-0	12A	209	
24 TO 22	201'-4	10B	218	3'-6 x 9' x 20'
	213'-10	11B	211	
	226'-4	12B	203	
	243'-0	12B	210	

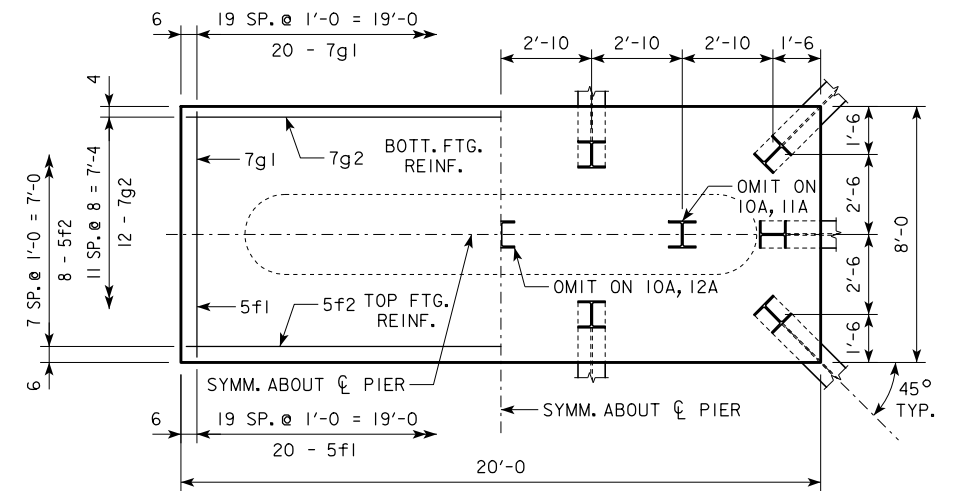
FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)				TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)		
3'-6 x 8' x 20'	d2	40 - #9 AS SHOWN	8'-7	1167	2286	20.7
	f1	20 - #5 @ 1'-0	7'-8	160		
	f2	8 - #5 @ 1'-0	19'-8	164		
	g1	20 - #7 @ 1'-0	7'-8	313		
	g2	12 - #7 @ 0'-8	19'-8	482		
3'-6 x 9' x 20'	d2	40 - #9 AS SHOWN	8'-7	1167	2501	23.3
	f1	20 - #5 @ 1'-0	8'-8	181		
	f2	9 - #5 @ 1'-0	19'-8	185		
	g1	21 - #8 @ 0'-11 1/2	8'-8	486		
	g2	12 - #7 @ 0'-9	19'-8	482		



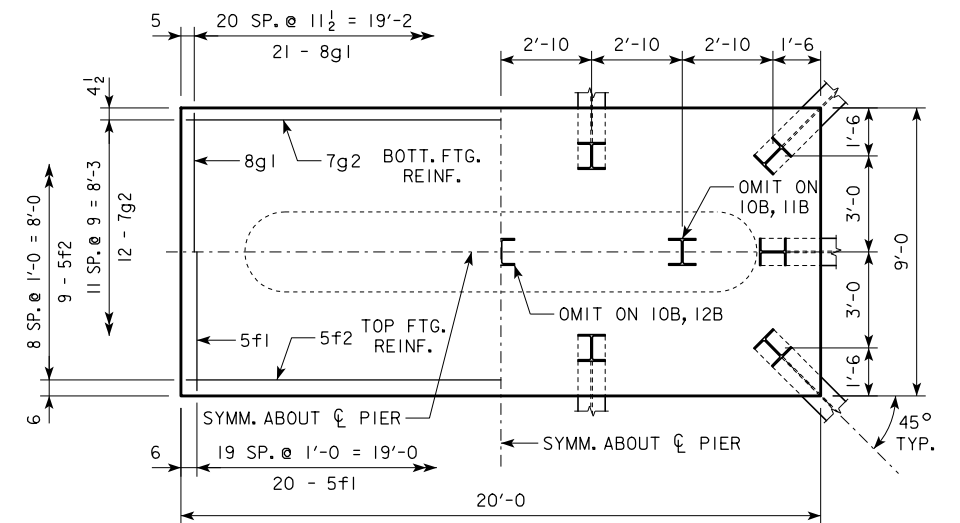
d2 BAR LAYOUT

(SEE SECTION A-A ON SHEET H30-64-06.)

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



3'-6 x 8'-0 x 20'-0 FOR 10A, 11A & 12A



3'-6 x 9'-0 x 20'-0 FOR 10B, 11B & 12B

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 H30-57-06.

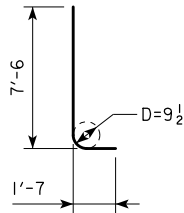
BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

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

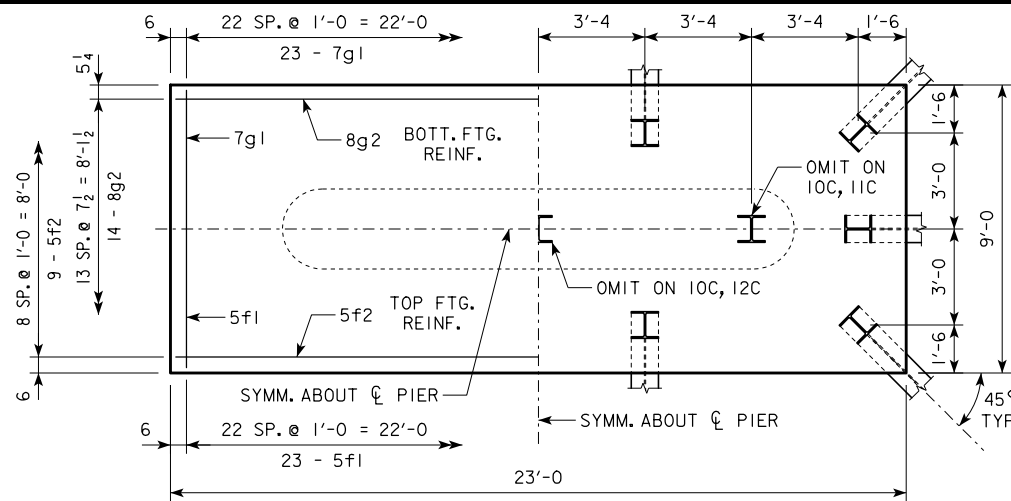
04-13 LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	 STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	<b>H30-67-06</b> 15° SKEW - H=16' to 24'
		<b>TEE PIER-HP10x57 SRL-2 STEEL PILE FOOTINGS</b>	

REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.

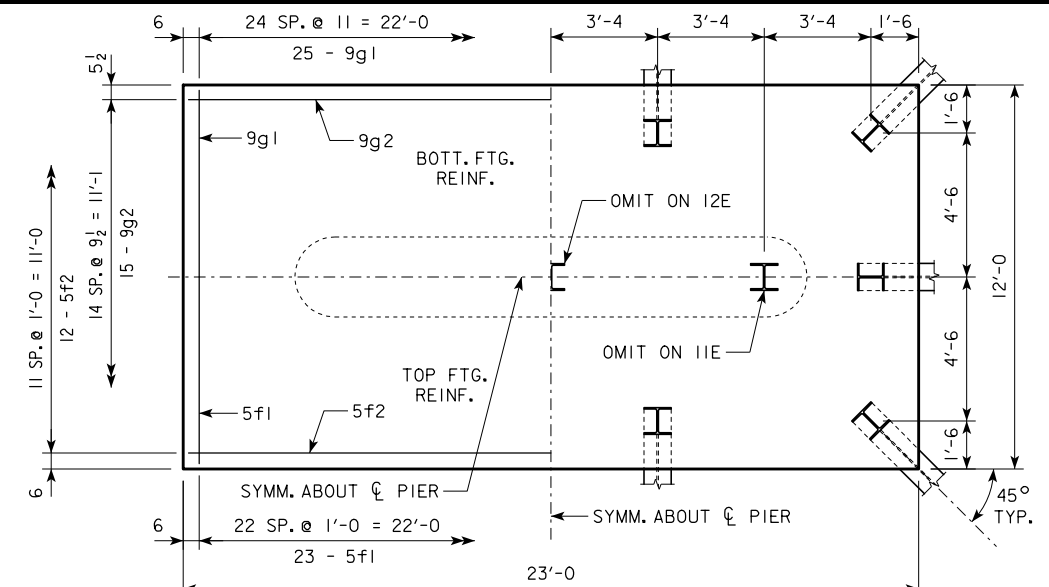


d2

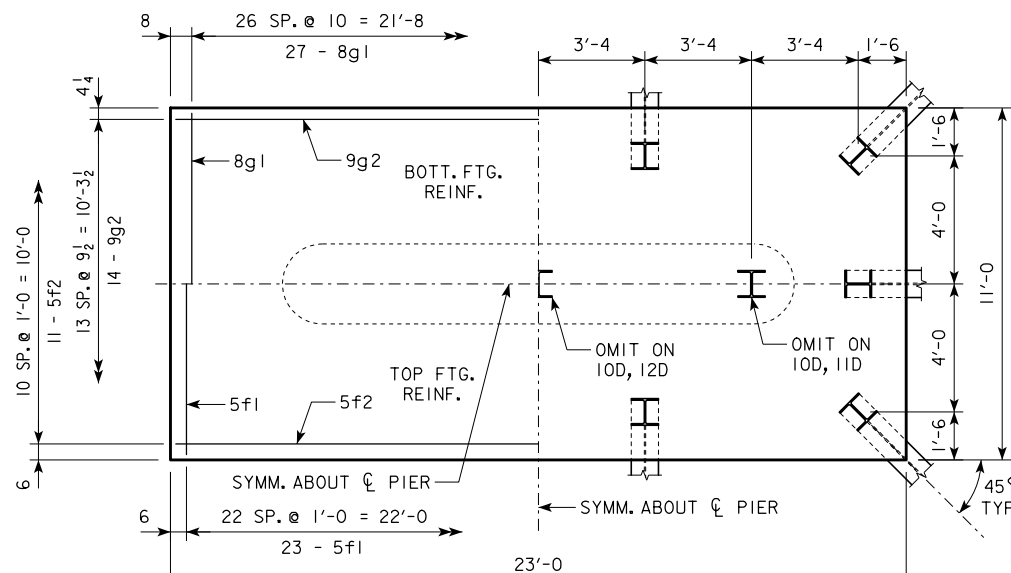
NOTE: D = PIN DIAMETER.  
DIMENSIONS ARE OUT TO OUT.



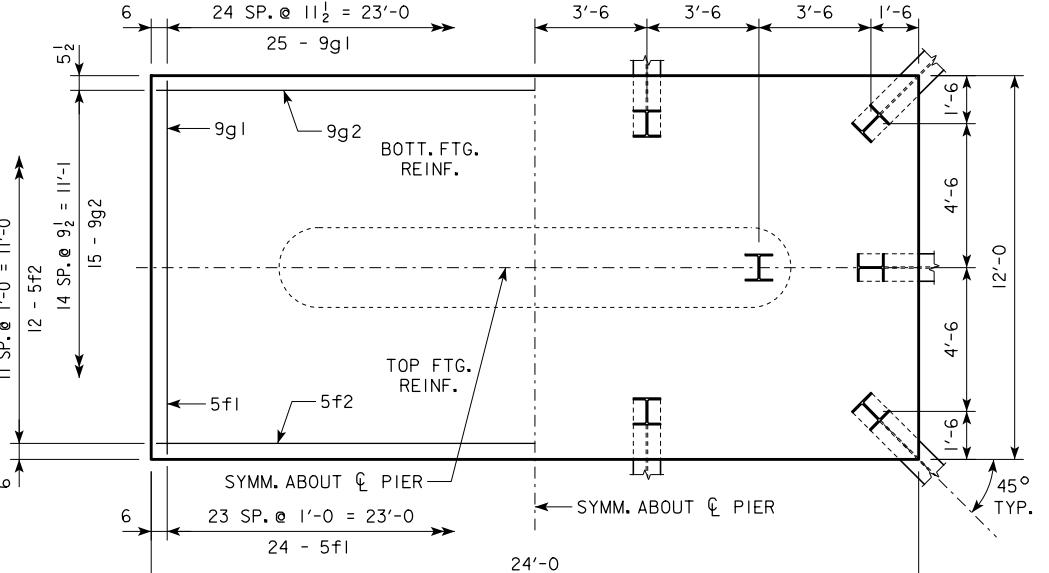
4'-0 x 9'-0 x 23'-0 FOR IOE, IIC & I2C



4'-0 x 12'-0 x 23'-0 FOR IIE & I2E



4'-0 x 11'-0 x 23'-0 FOR IOD, IID & I2D



4'-0 x 12'-0 x 24'-0 FOR I2F

H IN FT.	C - C ABUT. BRG.	PILING (HP10x57)		FOOTING SIZE
		NO. & LAYOUT	(1) LRFD P <sub>u</sub> , STRENGTH I, DES. LOAD (KIPS)	
20 25 TO 27	201'-4	IOE	219	4' x 9' x 23'
	213'-10	IIC	212	
	226'-4	I2C	204	
	243'-0	I2C	211	
20 25 TO 30	201'-4	IOD	219	4' x 11' x 23'
	213'-10	IID	211	
	226'-4	I2D	202	
	243'-0	I2D	209	
30 31 TO 33	201'-4	IIE	210	4' x 11' x 23'
	213'-10	IIE	215	
	226'-4	I2E	206	
	243'-0	I2E	213	
33 34 TO 36	201'-4	IIE	210	4' x 12' x 23'
	213'-10	IIE	217	
	226'-4	I2E	208	
	243'-0	I2E	215	
36 37 TO 40	201'-4	I2F	199	4' x 12' x 24'
	213'-10	I2F	204	
	226'-4	I2F	211	
	243'-0	I2F	218	

**FOOTING NOTES:**

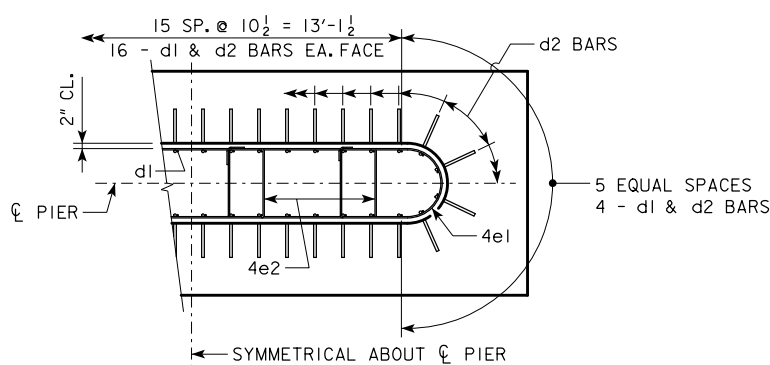
THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H30-57-06.

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

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

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

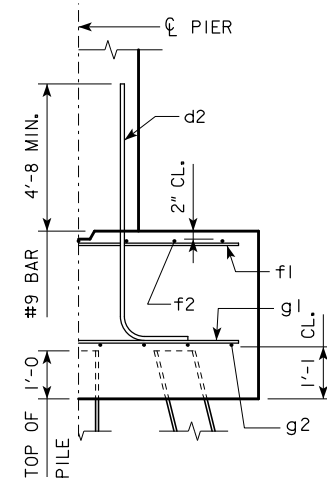
FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)				STRUCTURAL CONCRETE (CY)	
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)		
4' x 9' x 23'	d2	40 - #9 AS SHOWN	9'-1	1235	2910	30.7
	f1	23 - #5 @ 1'-0	8'-8	208		
	f2	9 - #5 @ 1'-0	22'-8	213		
	g1	23 - #7 @ 1'-0	8'-8	407		
	g2	14 - #8 @ 0'-7 1/2	22'-8	847		
4' x 11' x 23'	d2	40 - #9 AS SHOWN	9'-1	1235	3599	37.5
	f1	23 - #5 @ 1'-0	10'-8	256		
	f2	11 - #5 @ 1'-0	22'-8	260		
	g1	27 - #8 @ 0'-10	10'-8	769		
	g2	14 - #9 @ 0'-9 1/2	22'-8	1079		
4' x 12' x 23'	d2	40 - #9 AS SHOWN	9'-1	1235	3947	40.9
	f1	23 - #5 @ 1'-0	11'-8	280		
	f2	12 - #5 @ 1'-0	22'-8	284		
	g1	25 - #9 @ 0'-11	11'-8	992		
	g2	15 - #9 @ 0'-9 1/2	22'-8	1156		
4' x 12' x 24'	d2	40 - #9 AS SHOWN	9'-1	1235	4022	42.7
	f1	24 - #5 @ 1'-0	11'-8	292		
	f2	12 - #5 @ 1'-0	23'-8	296		
	g1	25 - #9 @ 0'-11 1/2	11'-8	992		
	g2	15 - #9 @ 0'-9 1/2	23'-8	1207		



**d2 BAR LAYOUT**

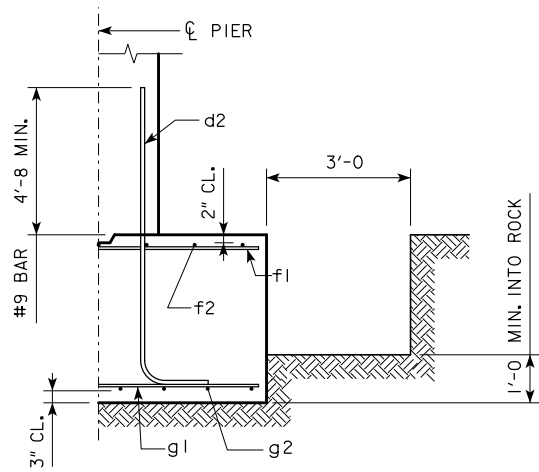
(SEE SECTION A-A ON SHEET H30-64-06.)

(1) NOTE: P<sub>u</sub>, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



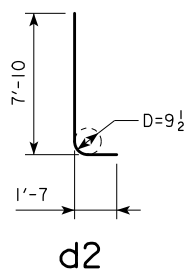
**TYPICAL SECTION**

04-13 LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	 STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	<b>TEE PIER-HP10x57 SRL-2</b> <b>STEEL PILE FOOTINGS</b> 15° SKEW - H=25' to 40'	<b>H30-68-06</b>



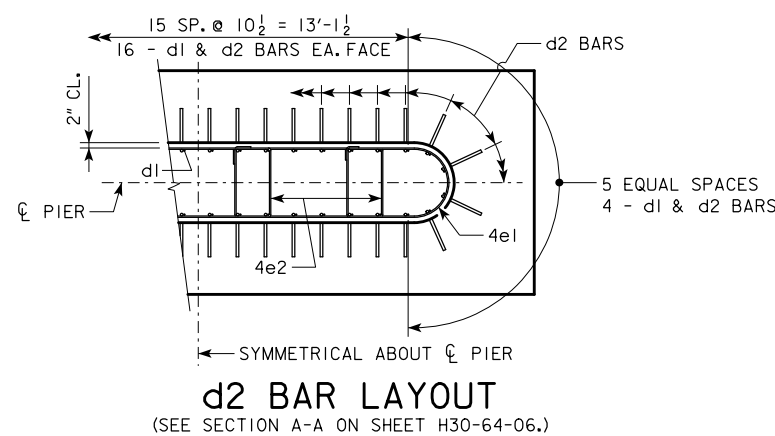
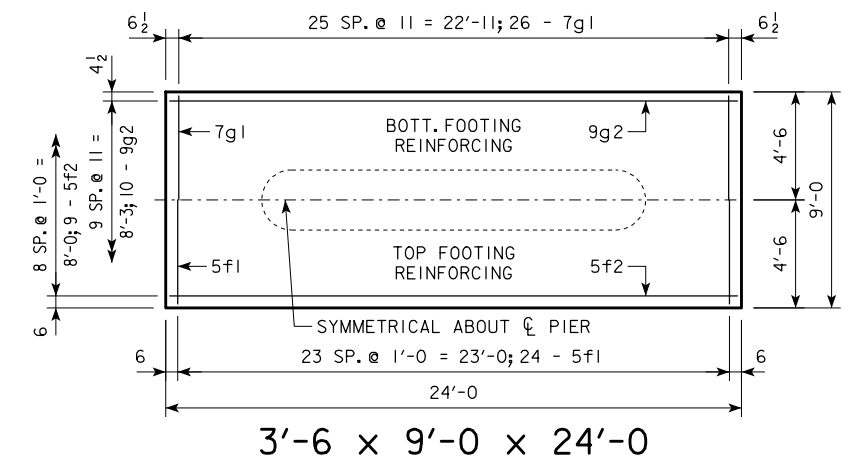
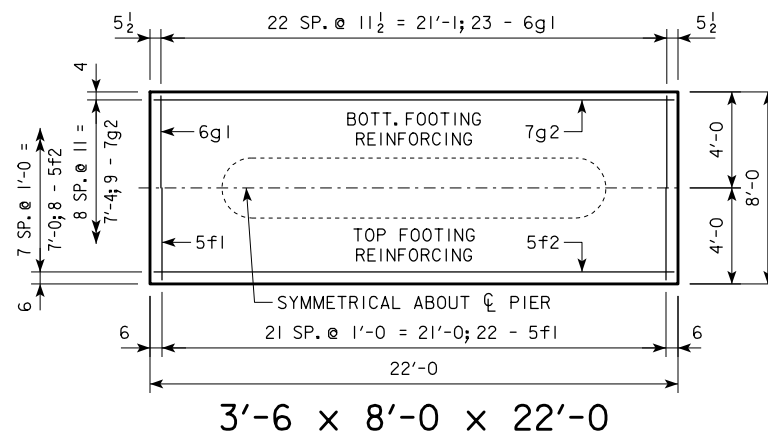
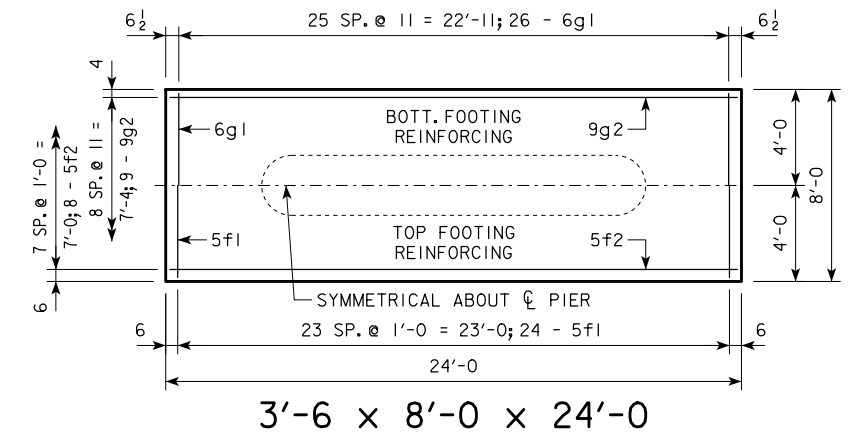
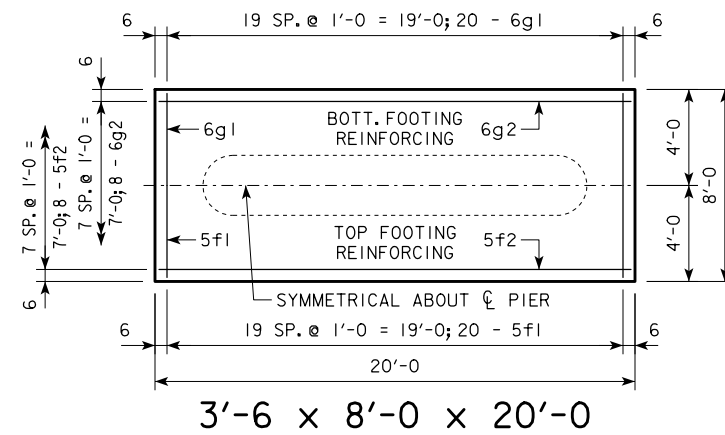
TYPICAL SECTION

H IN FT.	CL - CL ABUT. BRG.	FOOTING SIZE
16 TO 18	138'-10	3'-6 x 8' x 20'
	151'-4	
	163'-10	
	176'-4	
	188'-10	
19 TO 21	201'-4	3'-6 x 8' x 24'
	213'-10	
	226'-4	
	243'-0	
	255'-4	
22 TO 24	138'-10	3'-6 x 8' x 22'
	151'-4	
	163'-10	
	176'-4	
	188'-10	
	201'-4	3'-6 x 8' x 24'
	213'-10	
	226'-4	
	243'-0	
	255'-4	



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

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)				TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)		
3'-6 x 8' x 20'	d2	40 - #9 AS SHOWN	9'-5	1281	2071	20.7
	f1	20 - #5 @ 1'-0	7'-8	160		
	f2	8 - #5 @ 1'-0	19'-8	164		
	g1	20 - #6 @ 1'-0	7'-8	230		
	g2	8 - #6 @ 1'-0	19'-8	236		
3'-6 x 8' x 22'	d2	40 - #9 AS SHOWN	9'-5	1281	2302	22.8
	f1	22 - #5 @ 1'-0	7'-8	176		
	f2	8 - #5 @ 1'-0	21'-8	181		
	g1	23 - #6 @ 0'-11 1/2	7'-8	265		
	g2	9 - #7 @ 0'-11	21'-8	399		
3'-6 x 8' x 24'	d2	40 - #9 AS SHOWN	9'-5	1281	2693	24.9
	f1	24 - #5 @ 1'-0	7'-8	192		
	f2	8 - #5 @ 1'-0	23'-8	197		
	g1	26 - #6 @ 0'-11	7'-8	299		
	g2	9 - #9 @ 0'-11	23'-8	724		
3'-6 x 9' x 24'	d2	40 - #9 AS SHOWN	9'-5	1281	2986	28.0
	f1	24 - #5 @ 1'-0	8'-8	217		
	f2	9 - #5 @ 1'-0	23'-8	222		
	g1	26 - #7 @ 0'-11	8'-8	461		
	g2	10 - #9 @ 0'-11	23'-8	805		



FOOTING NOTES:

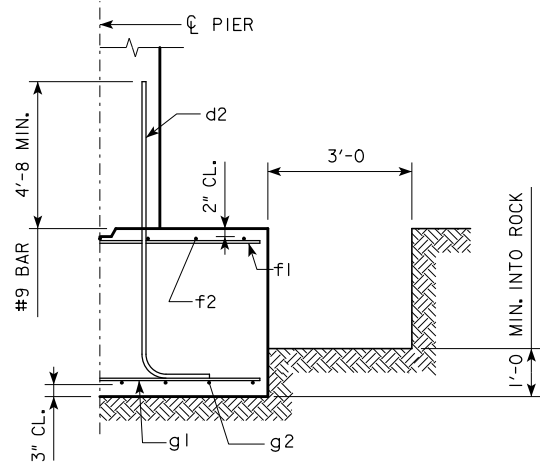
THESE SPREAD FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H30-57-06.

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 NOMINAL BEARING RESISTANCE OF 30 KIPS PER SQUARE FOOT (ALLOWABLE SERVICE LOAD BEARING VALUE OF AT LEAST 10 KIPS PER SQUARE FOOT).

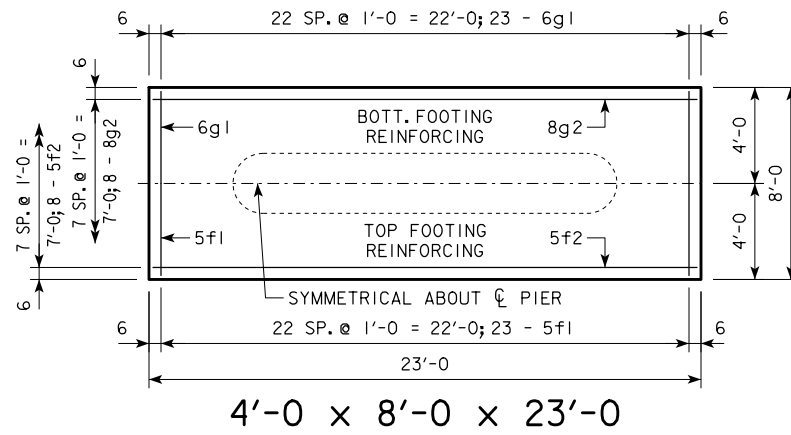
04-13 LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	 STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
		<b>TEE PIER - SPREAD FOOTINGS</b> 15° SKEW - H=16' to 24'	<b>H30-69-06</b>

REVISED 04-13 - FOOTING NOTES MODIFIED.

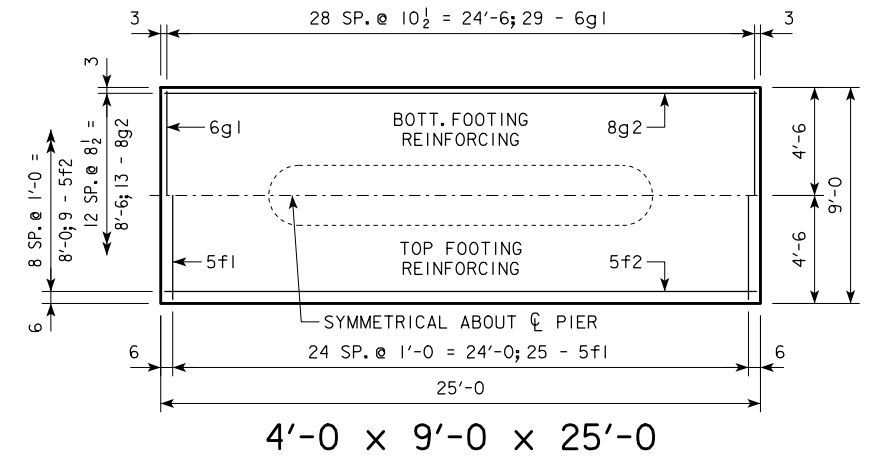
H IN FT.	CL - CL ABUT. BRG.	FOOTING SIZE
25 TO 27	138'-10	4' x 8' x 23'
	151'-4	
	163'-10	
	176'-4	
	188'-10	
28 TO 30	201'-4	4' x 8' x 25'
	213'-10	
	226'-4	
	243'-0	
	255'-6	
31 TO 33	138'-10	4' x 9' x 25'
	151'-4	
	163'-10	
	176'-4	
	188'-10	
34 TO 36	201'-4	4' x 9' x 25'
	213'-10	
	226'-4	
	243'-0	
	255'-6	
37 TO 40	138'-10	4' x 9' x 27'
	151'-4	
	163'-10	
	176'-4	
	188'-10	



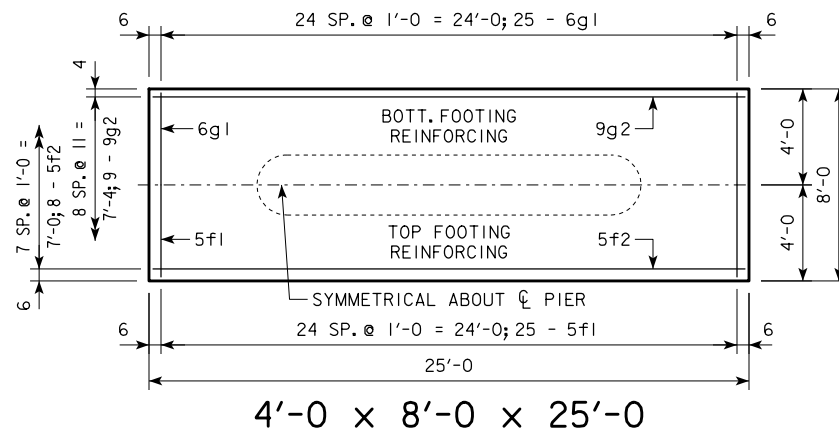
TYPICAL SECTION



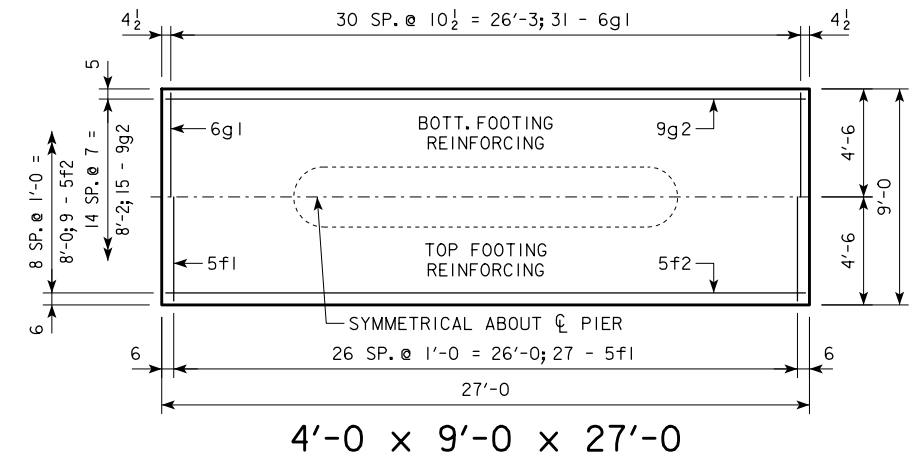
4'-0 x 8'-0 x 23'-0



4'-0 x 9'-0 x 25'-0

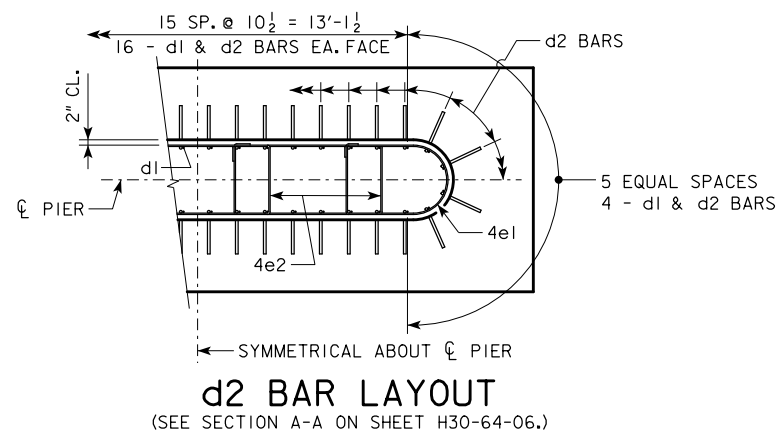


4'-0 x 8'-0 x 25'-0

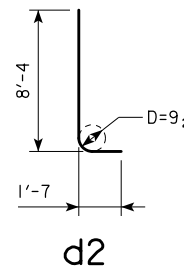


4'-0 x 9'-0 x 27'-0

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)				TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)		
4' x 8' x 23'	d2	40 - #9 AS SHOWN	9'-11	1349	2471	27.3
	f1	23 - #5 @ 1'-0	7'-8	184		
	f2	8 - #5 @ 1'-0	22'-8	189		
	g1	23 - #6 @ 1'-0	7'-8	265		
4' x 8' x 25'	g2	8 - #8 @ 1'-0	22'-8	484	2798	29.6
	d2	40 - #9 AS SHOWN	9'-11	1349		
	f1	25 - #5 @ 1'-0	7'-8	200		
	f2	8 - #5 @ 1'-0	24'-8	206		
	g1	25 - #6 @ 1'-0	7'-8	288		
4' x 9' x 25'	g2	9 - #9 @ 0'-11	24'-8	755	3041	33.3
	d2	40 - #9 AS SHOWN	9'-11	1349		
	f1	25 - #5 @ 1'-0	8'-8	226		
	f2	9 - #5 @ 1'-0	24'-8	232		
	g1	29 - #6 @ 0'-10 1/2	8'-8	378		
4' x 9' x 27'	g2	13 - #8 @ 0'-8 1/2	24'-8	856	3607	36.0
	d2	40 - #9 AS SHOWN	9'-11	1349		
	f1	27 - #5 @ 1'-0	8'-8	244		
	f2	9 - #5 @ 1'-0	26'-8	250		
	g1	31 - #6 @ 0'-10 1/2	8'-8	404		
	g2	15 - #9 @ 0'-7	26'-8	1360		



d2 BAR LAYOUT  
(SEE SECTION A-A ON SHEET H30-64-06.)



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 H30-57-06.

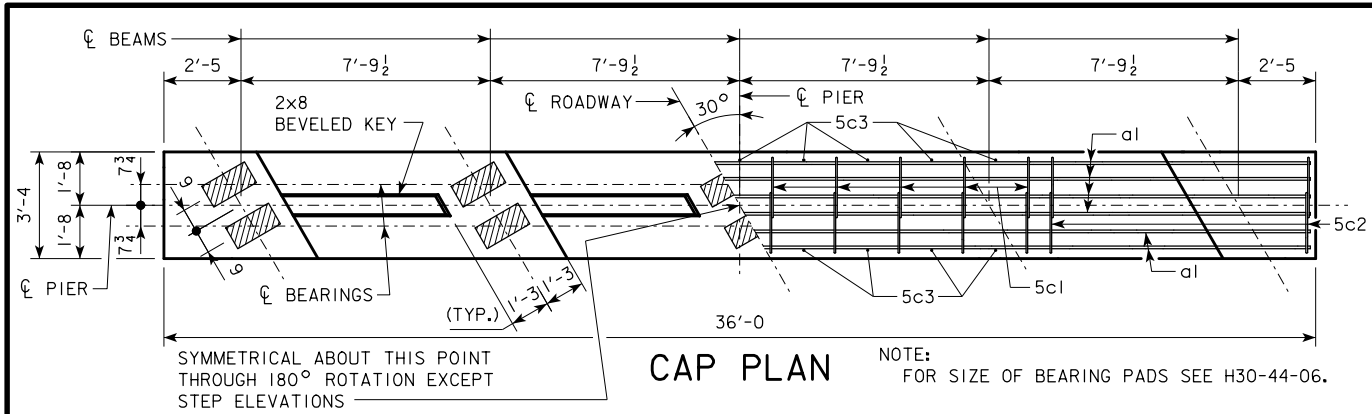
THESE SPREAD FOOTINGS SHALL EXTEND AT LEAST 12 INCHES INTO SUITABLE FOUNDATION ROCK AND THE LAST 12 INCHES OF ROCK EXCAVATION SHALL BE TO NEAT LINES OF MASONRY. THE FOUNDATION ROCK SHALL HAVE A MINIMUM LRFD NOMINAL BEARING RESISTANCE OF 30 KIPS PER SQUARE FOOT (ALLOWABLE SERVICE LOAD BEARING VALUE OF AT LEAST 10 KIPS PER SQUARE FOOT).

04-13 LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	 STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
		<b>TEE PIER - SPREAD FOOTINGS</b> 15° SKEW - H=25' to 40'	
		<b>H30-70-06</b>	

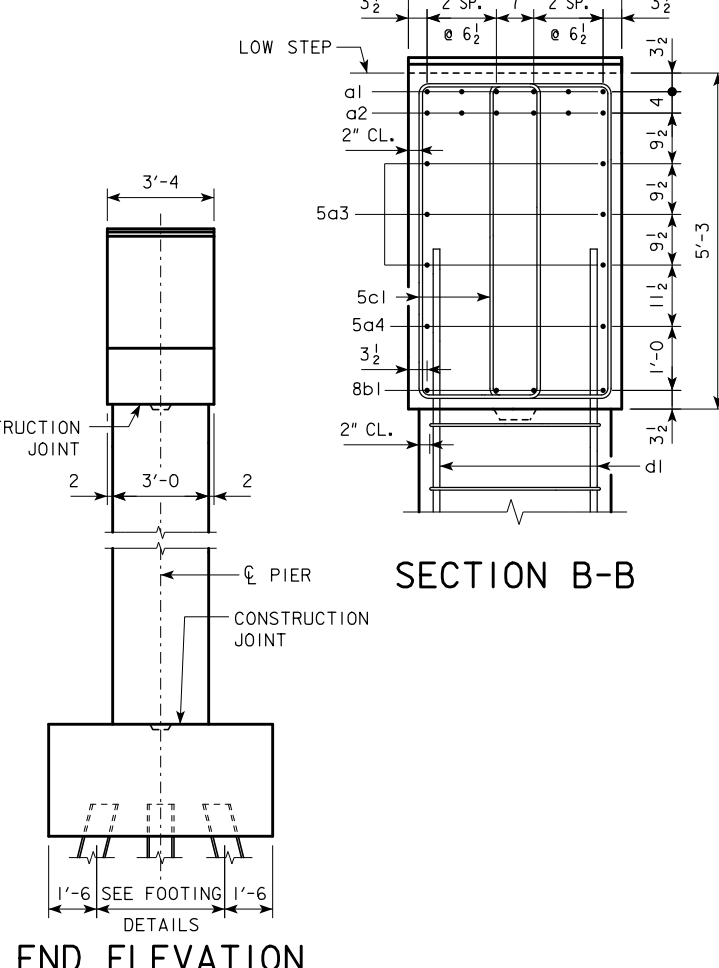
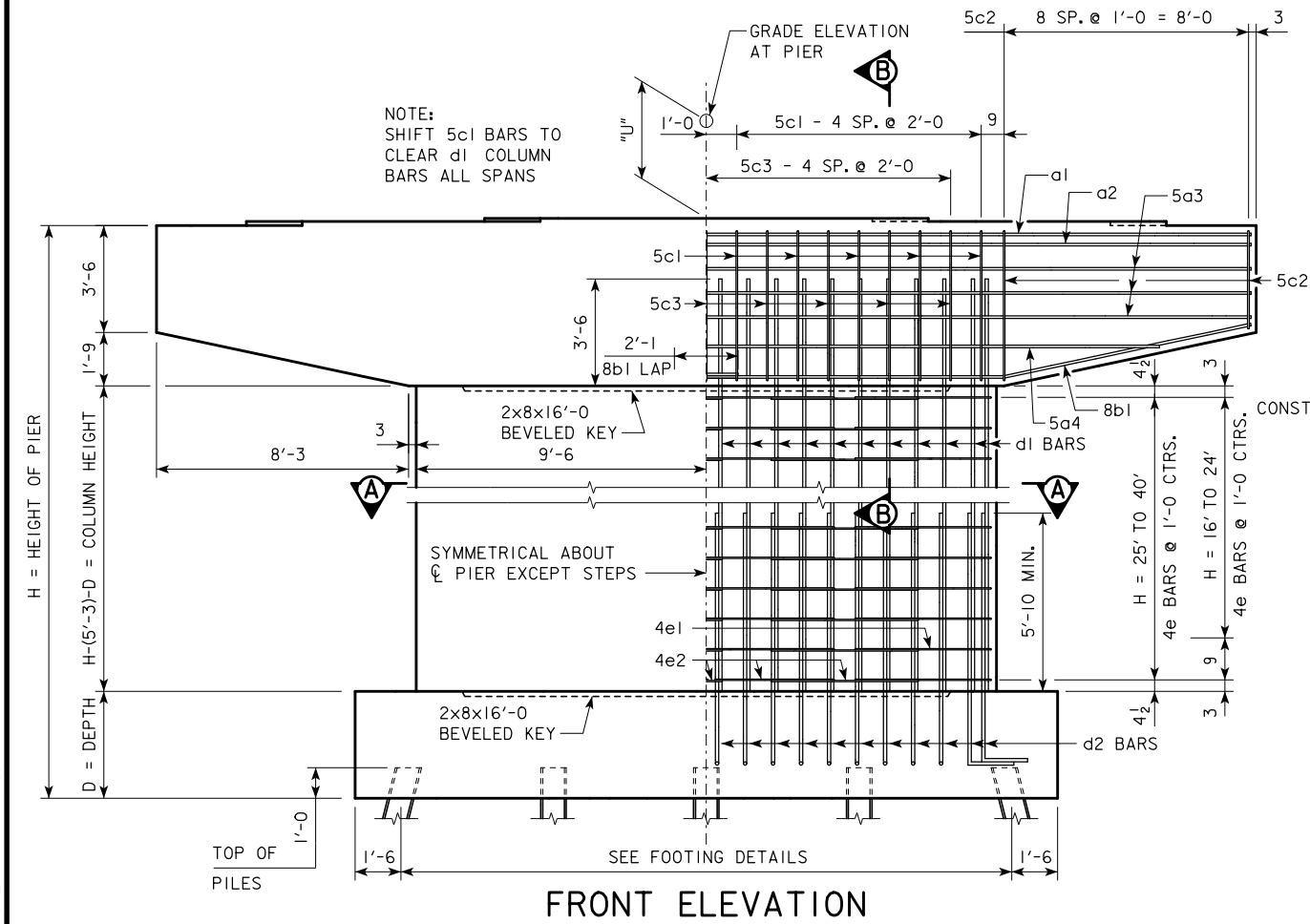
REVISED 04-13 - FOOTING NOTES MODIFIED.



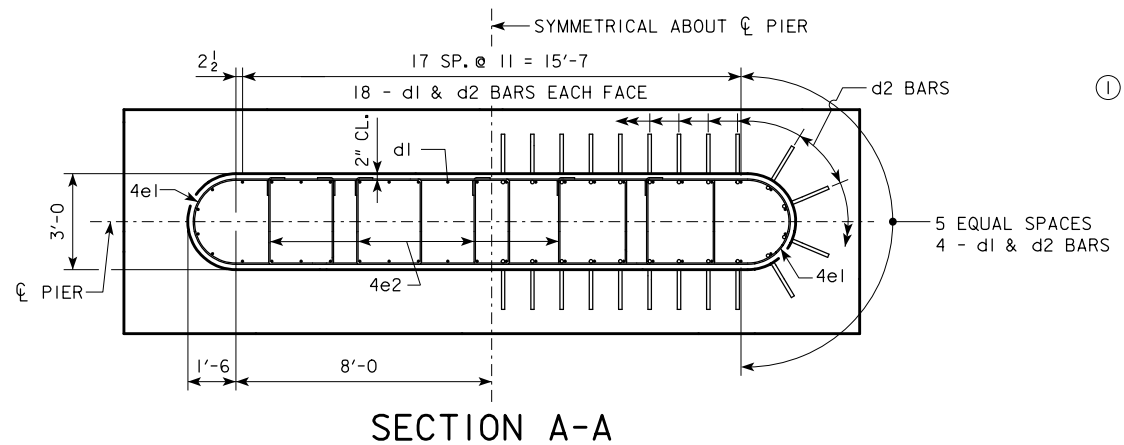
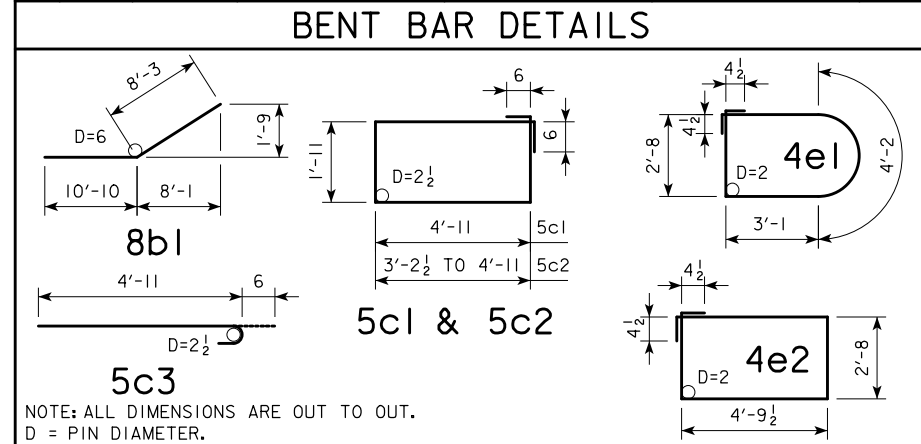
REVISED 07-10 - SHEET WAS REVISED TO MEET LRFD SPECIFICATIONS.



		CAP																					
REINFORCING STEEL		138'-10		151'-4		163'-10		176'-4		188'-10		201'-4		213'-10		226'-4		243'-0					
BAR	LENGTH	SHAPE	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT	NO.	SIZE	WEIGHT			
a1	35'-8		6	8	571	6	8	571	6	8	571	6	8	571	6	8	571	6	9	728	6	9	728
a2	35'-8		6	7	437	6	7	437	6	7	437	6	7	437	6	8	571	6	8	571	6	8	571
5a3	35'-8		6	5	223	6	5	223	6	5	223	6	5	223	6	5	223	6	5	223	6	5	223
5a4	29'-10		2	5	62	2	5	62	2	5	62	2	5	62	2	5	62	2	5	62	2	5	62
8b1	19'-1		8	8	408	8	8	408	8	8	408	8	8	408	8	8	408	8	8	408	8	8	408
5c1	14'-8		20	5	306	20	5	306	20	5	306	20	5	306	20	5	306	20	5	306	20	5	306
5c2	VARIABLES		36	5	487	36	5	487	36	5	487	36	5	487	36	5	487	36	5	487	36	5	487
5c3	5'-5		18	5	102	18	5	102	18	5	102	18	5	102	18	5	102	18	5	102	18	5	102
TOTAL (LB.)		2596		2596		2596		2596		2596		2730		2730		2887		2887					
STRUCTURAL CONCRETE (CY)		22.3		22.3		22.3		22.3		22.3		22.3		22.3		22.3		22.3					



		COLUMN																				
REINFORCING STEEL		138'-10		151'-4		163'-10		176'-4		188'-10		201'-4		213'-10		226'-4		243'-0				
H IN FEET	COLUMN HEIGHT	STRUCTURAL CONCRETE (CY)	d1 BAR		4e1 BAR		4e2 BAR		TOTAL WEIGHT (LB.)													
			NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT	NO.	SIZE	LENGTH	WEIGHT
16	7'-3	14.8	44	10	10'-9	2035	16	4	13'-9	147	32	4	15'-8	335	2517							
17	8'-3	16.8	44	10	11'-9	2215	18	4	13'-9	165	36	4	15'-8	377	2767							
18	9'-3	18.9	44	10	12'-9	2414	20	4	13'-9	184	40	4	15'-8	419	3017							
19	10'-3	20.9	44	10	13'-9	2603	22	4	13'-9	202	44	4	15'-8	460	3265							
20	11'-3	22.9	44	10	14'-9	2793	24	4	13'-9	220	48	4	15'-8	502	3515							
21	12'-3	25.0	44	10	15'-9	2982	26	4	13'-9	239	52	4	15'-8	544	3765							
22	13'-3	27.0	44	10	16'-9	3171	28	4	13'-9	257	56	4	15'-8	586	4014							
23	14'-3	29.1	44	10	17'-9	3361	30	4	13'-9	276	60	4	15'-8	628	4265							
24	15'-3	31.1	44	10	18'-9	3550	32	4	13'-9	294	64	4	15'-8	670	4514							
25	15'-9	32.1	44	10	19'-3	3645	32	4	13'-9	294	64	4	15'-8	670	4609							
26	16'-9	34.2	44	10	20'-3	3834	34	4	13'-9	312	68	4	15'-8	712	4858							
27	17'-9	36.2	44	10	21'-3	4023	36	4	13'-9	331	72	4	15'-8	754	5108							
28	18'-9	38.2	44	10	22'-3	4213	38	4	13'-9	349	76	4	15'-8	795	5357							
29	19'-9	40.3	44	10	23'-3	4402	40	4	13'-9	367	80	4	15'-8	837	5606							
30	20'-9	42.3	44	10	24'-3	4591	42	4	13'-9	386	84	4	15'-8	879	5856							
31	21'-9	44.4	44	10	25'-3	4781	44	4	13'-9	404	88	4	15'-8	921	6106							
32	22'-9	46.4	44	10	26'-3	4970	46	4	13'-9	423	92	4	15'-8	963	6356							
33	23'-9	48.4	44	10	27'-3	5159	48	4	13'-9	441	96	4	15'-8	1005	6605							
34	24'-9	50.5	44	10	28'-3	5349	50	4	13'-9	459	100	4	15'-8	1047	6855							
35	25'-9	52.5	44	10	29'-3	5538	52	4	13'-9	478	104	4	15'-8	1088	7104							
36	26'-9	54.6	44	10	30'-3	5727	54	4	13'-9	496	108	4	15'-8	1130	7353							
37	27'-9	56.6	44	10	31'-3	5917	56	4	13'-9	514	112	4	15'-8	1172	7603							
38	28'-9	58.6	44	10	32'-3	6106	58	4	13'-9	533	116	4	15'-8	1214	7853							
39	29'-9	60.7	44	10	33'-3	6295	60	4	13'-9	551	120	4	15'-8	1256	8102							
40	30'-9	62.7	44	10	34'-3	6485	62	4	13'-9	569	124	4	15'-8	1298	8352							



SEE SHEET H30-24-06 FOR STEP REINFORCING STEEL QUANTITY AND DETAILS.

**PIER NOTES:**

- SEE "TEE PIER NOTES" ON H30-02-06 FOR NOTES REGARDING APPLICATION OF THESE PIER STANDARDS.
- MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN.
- ELIMINATE 2x8 BEVELED KEYWAY ON TOP OF CAP FOR EXPANSION PIERS.
- SEE SHEET H30-22-06 FOR "U" DIMENSION.

07-10  
LATEST REVISION DATE

*Thomas L. Mc Donald*  
APPROVED BY BRIDGE ENGINEER

**IOWADOT Highway Division**

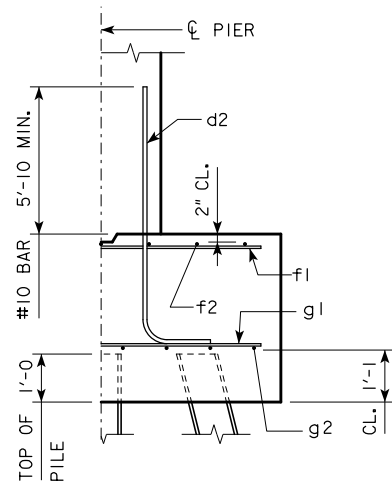
STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES

**PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES**

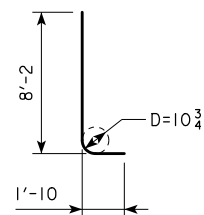
DECEMBER, 2006

**TEE PIER CAP AND COLUMN**  
30° SKEW

**H30-71-06**



TYPICAL SECTION

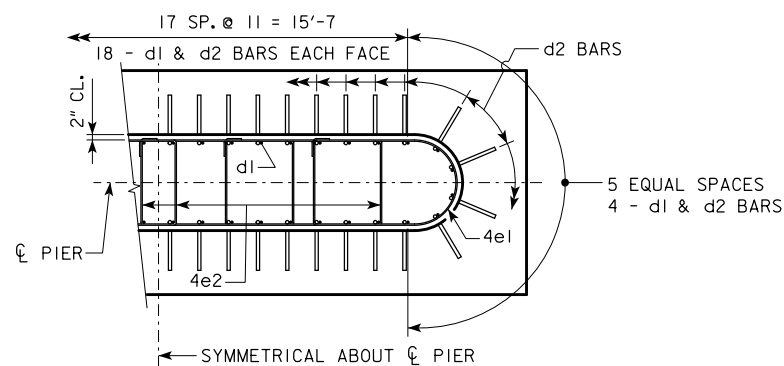


d2

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

H IN FT.	CL - CL ABUT. BRG.	PILING (HP10x57)		FOOTING SIZE
		NO. & LAYOUT	① LRFD P <sub>u</sub> , STRENGTH I, DES. LOAD (KIPS)	
18 TO 16	201'-4	16A	142	3'-6 x 8' x 23'
	213'-10	16A	147	
	226'-4	18A	141	
	243'-0	18A	146	
21 TO 19	201'-4	17A	136	3'-6 x 9' x 23'
	213'-10	17A	141	
	226'-4	18B	139	
	243'-0	18B	144	
24 TO 22	201'-4	17A	141	3'-6 x 9' x 23'
	213'-10	17A	145	
	226'-4	18B	143	
	243'-0	19A	142	

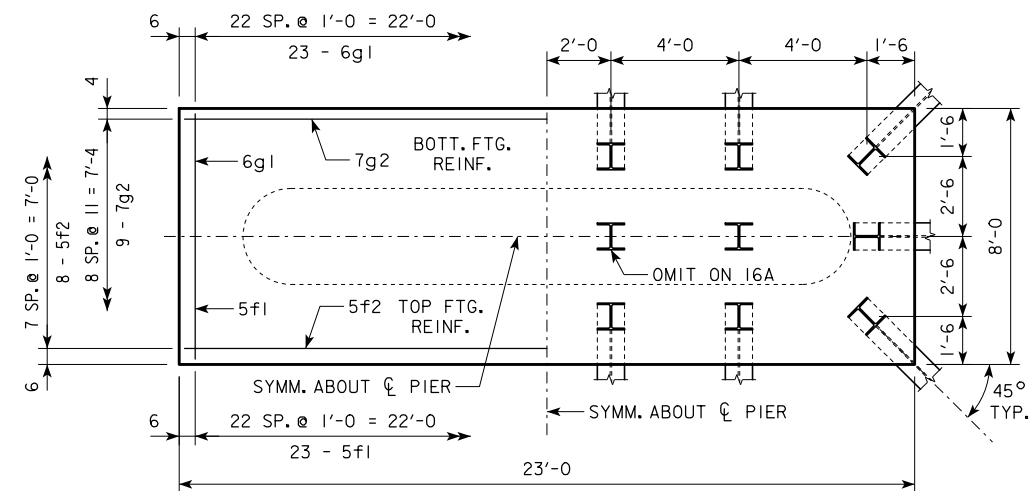
FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)				STRUCTURAL CONCRETE (CY)	
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)		
3'-6 x 8' x 23'	d2	44 - #10 AS SHOWN	10'-0	1893	2948	23.9
	f1	23 - #5 @ 1'-0	7'-8	184		
	f2	8 - #5 @ 1'-0	22'-8	189		
	g1	23 - #6 @ 1'-0	7'-8	265		
	g2	9 - #7 @ 0'-11	22'-8	417		
3'-6 x 9' x 23'	d2	44 - #10 AS SHOWN	10'-0	1893	3209	26.8
	f1	23 - #5 @ 1'-0	8'-8	208		
	f2	9 - #5 @ 1'-0	22'-8	213		
	g1	27 - #7 @ 0'-10	8'-8	478		
	g2	9 - #7 @ 1'-0	22'-8	417		



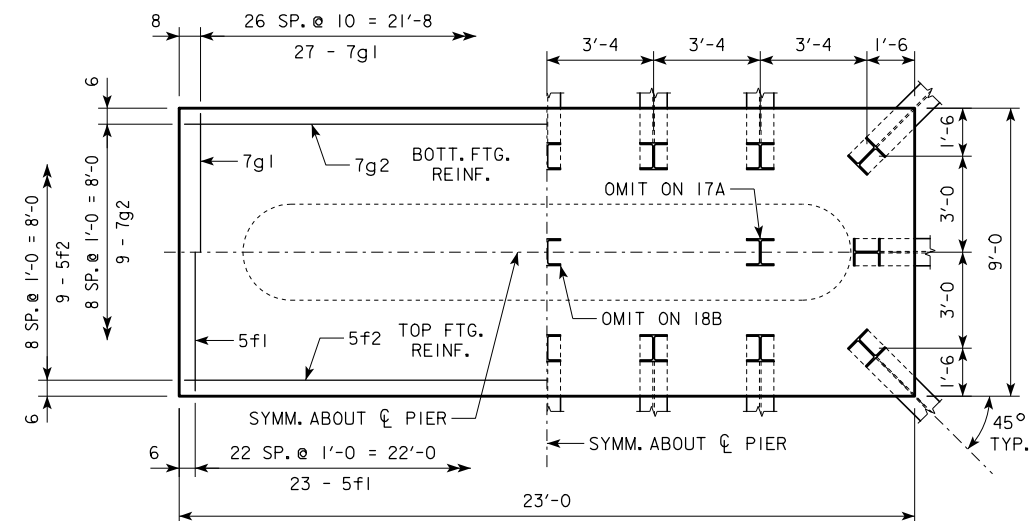
d2 LAYOUT

(SEE SECTION A-A ON SHEET H30-71-06.)

① NOTE: P<sub>u</sub>, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE  
USED IN THE FIELD FOR DRIVING PILES.



3'-6 x 8'-0 x 23'-0 FOR 16A & 18A



3'-6 x 9'-0 x 23'-0 FOR 17A, 18B & 19A

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 H30-57-06.

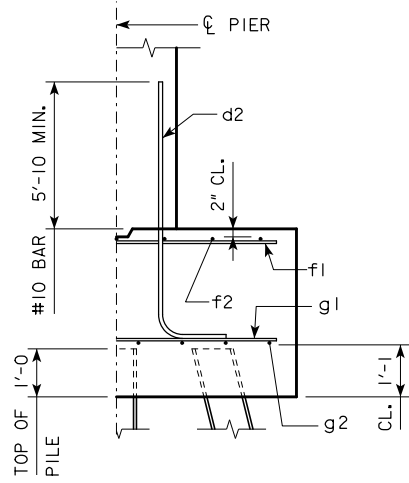
BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

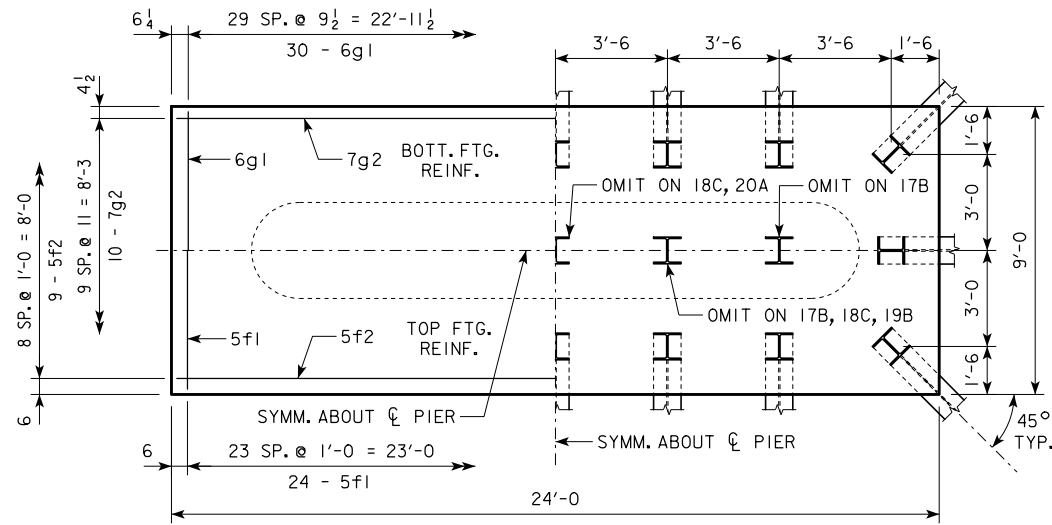
PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

04-13 LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	 STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
		<b>TEE PIER-HP10x57 SRL-1 STEEL PILE FOOTINGS</b> 30° SKEW - H=16' to 24'	<b>H30-72-06</b>

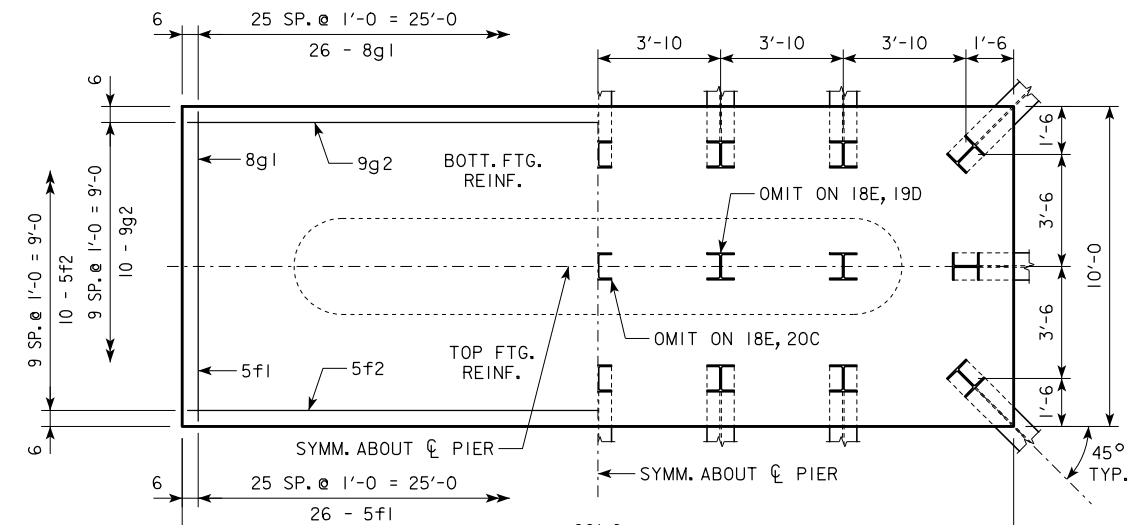
REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.



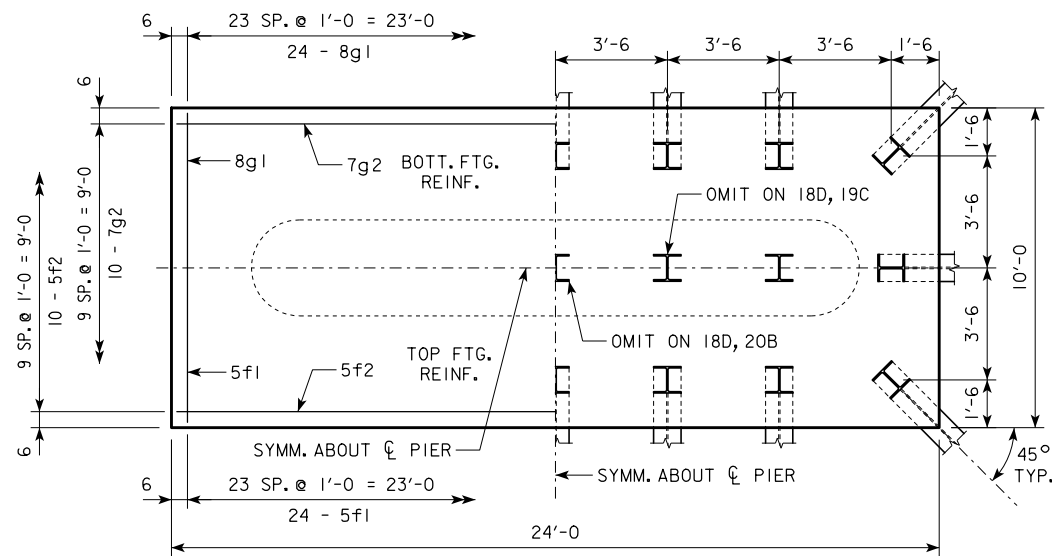
TYPICAL SECTION



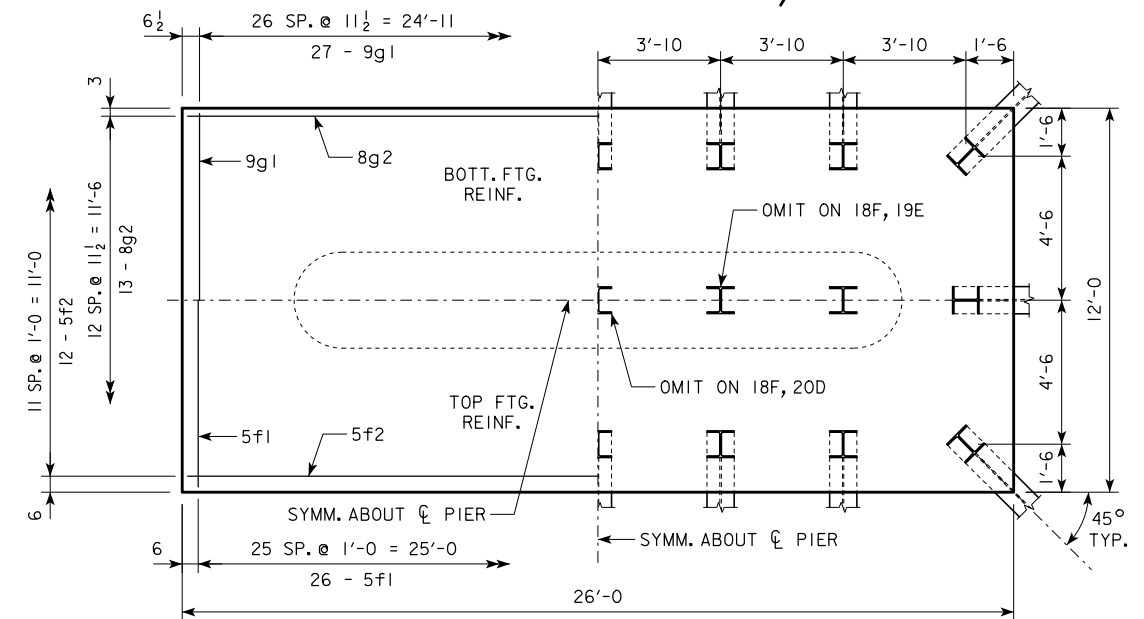
4'-0 x 9'-0 x 24'-0 FOR 17B, 18C, 19B & 20A



4'-0 x 10'-0 x 26'-0 FOR 18E, 19D & 20C



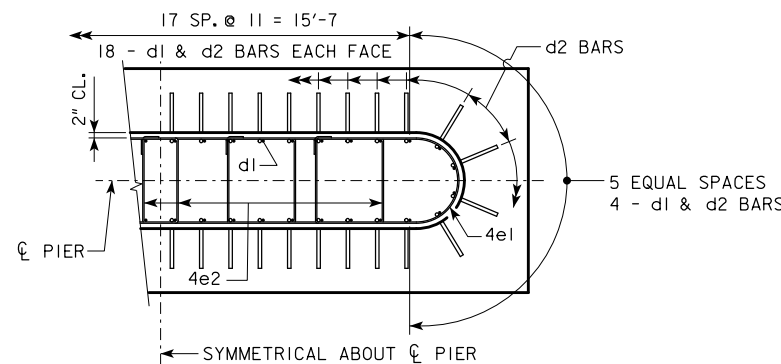
4'-0 x 10'-0 x 24'-0 FOR 18D, 19C & 20B



4'-0 x 12'-0 x 26'-0 FOR 18F, 19E & 20D

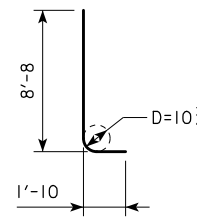
H IN FT.	CL - CL ABUT. BRG.	PILING (HP10x57)		FOOTING SIZE
		NO. & LAYOUT	LRFD PU, STRENGTH I, DES. LOAD (KIPS)	
201'-4 TO 213'-10	201'-4	17B	144	4' x 9' x 24'
	213'-10	18C	140	
	226'-4	18C	145	
	243'-0	19B	145	
201'-4 TO 213'-10	201'-4	18C	139	4' x 9' x 24'
	213'-10	18C	143	
	226'-4	19B	144	
	243'-0	20A	143	
201'-4 TO 213'-10	201'-4	18D	141	4' x 10' x 24'
	213'-10	18D	145	
	226'-4	19C	145	
	243'-0	20B	144	
201'-4 TO 213'-10	201'-4	18E	142	4' x 10' x 26'
	213'-10	18E	146	
	226'-4	19D	146	
	243'-0	20C	145	
201'-4 TO 213'-10	201'-4	18F	145	4' x 12' x 26'
	213'-10	19E	145	
	226'-4	20D	143	
	243'-0	20D	147	

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)				TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)		
4' x 9' x 24'	d2	44 - #10 AS SHOWN	10'-6	1988	3302	32.0
	f1	24 - #5 @ 1'-0	8'-8	217		
	f2	9 - #5 @ 1'-0	23'-8	222		
	g1	30 - #6 @ 0'-9 1/2	8'-8	391		
	g2	10 - #7 @ 0'-11	23'-8	484		
4' x 10' x 24'	d2	44 - #10 AS SHOWN	10'-6	1988	3580	35.6
	f1	24 - #5 @ 1'-0	9'-8	242		
	f2	10 - #5 @ 1'-0	23'-8	247		
	g1	24 - #8 @ 1'-0	9'-8	619		
	g2	10 - #7 @ 1'-0	23'-8	484		
4' x 10' x 26'	d2	44 - #10 AS SHOWN	10'-6	1988	4062	38.5
	f1	26 - #5 @ 1'-0	9'-8	262		
	f2	10 - #5 @ 1'-0	25'-8	268		
	g1	26 - #8 @ 1'-0	9'-8	671		
	g2	10 - #9 @ 1'-0	25'-8	873		
4' x 12' x 26'	d2	44 - #10 AS SHOWN	10'-6	1988	4587	46.2
	f1	26 - #5 @ 1'-0	11'-8	316		
	f2	12 - #5 @ 1'-0	25'-8	321		
	g1	27 - #9 @ 0'-11 1/2	11'-8	1071		
	g2	13 - #8 @ 0'-11 1/2	25'-8	891		



d2 LAYOUT (SEE SECTION A-A ON SHEET H30-71-06.)

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



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

FOOTING NOTES:

THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H30-57-06.

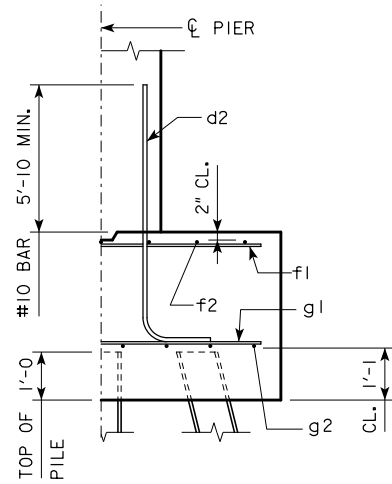
BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

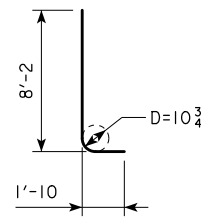
PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

04-13 LATEST REVISION DATE		STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES
		<b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006
 APPROVED BY BRIDGE ENGINEER	TEE PIER-HP10x57 SRL-1	H30-73-06
	STEEL PILE FOOTINGS	

REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.



TYPICAL SECTION

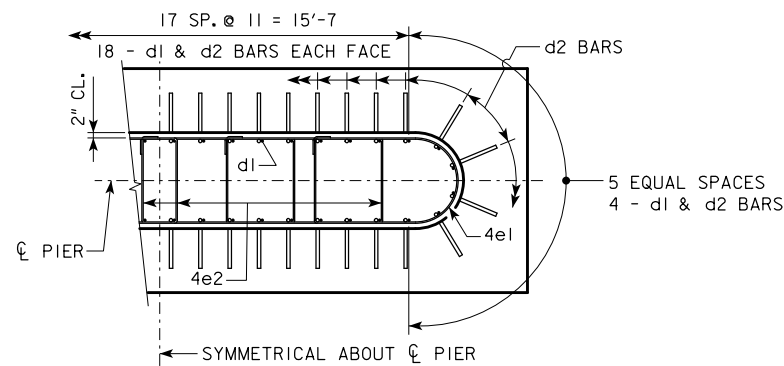


d2

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

H IN FT.	CL - CL ABUT. BRG.	PILING (HP10x57)		FOOTING SIZE
		NO. & LAYOUT	① LRFD P <sub>u</sub> , STRENGTH I, DES. LOAD (KIPS)	
18 TO 16	201'-4	10A	215	3'-6 x 8' x 23'
	213'-10	11A	209	
	226'-4	11A	217	
	243'-0	12A	207	
21	201'-4	11A	208	3'-6 x 8' x 23'
	213'-10	11A	216	
	226'-4	12A	207	
	243'-0	12A	214	
24 TO 22	201'-4	11B	212	3'-6 x 9' x 23'
	213'-10	11B	219	
	226'-4	12B	210	
	243'-0	12B	217	

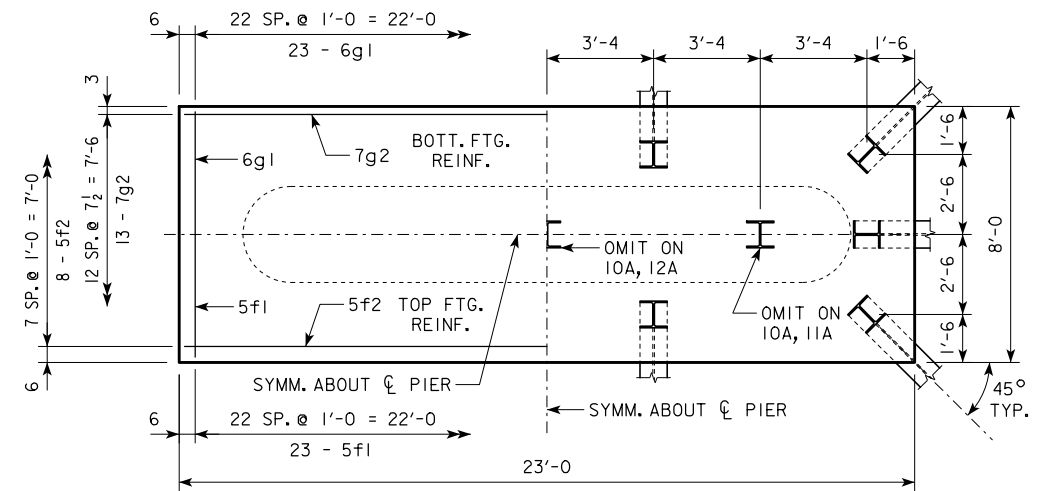
FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)					STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	
3'-6 x 8' x 23'	d2	44 - #10 AS SHOWN	10'-0	1893	3133	23.9
	f1	23 - #5 @ 1'-0	7'-8	184		
	f2	8 - #5 @ 1'-0	22'-8	189		
	g1	23 - #6 @ 1'-0	7'-8	265		
	g2	13 - #7 @ 0'-7 1/2	22'-8	602		
3'-6 x 9' x 23'	d2	44 - #10 AS SHOWN	10'-0	1893	3323	26.8
	f1	23 - #5 @ 1'-0	8'-8	208		
	f2	9 - #5 @ 1'-0	22'-8	213		
	g1	23 - #7 @ 1'-0	8'-8	407		
	g2	13 - #7 @ 0'-8 1/2	22'-8	602		



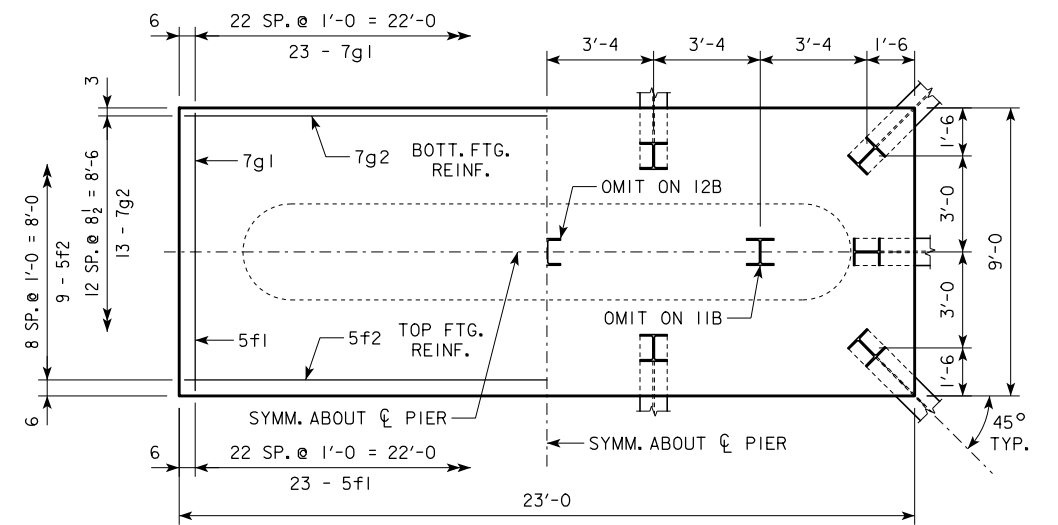
d2 LAYOUT

(SEE SECTION A-A ON SHEET H30-71-06.)

① NOTE: P<sub>u</sub>, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE  
USED IN THE FIELD FOR DRIVING PILES.



3'-6 x 8'-0 x 23'-0 FOR 10A, 11A & 12A



3'-6 x 9'-0 x 23'-0 FOR 11B & 12B

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 H30-57-06.

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

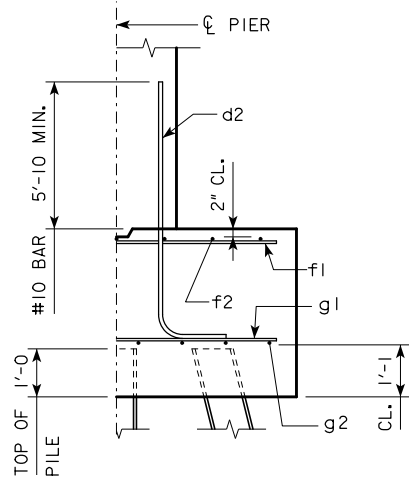
STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

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

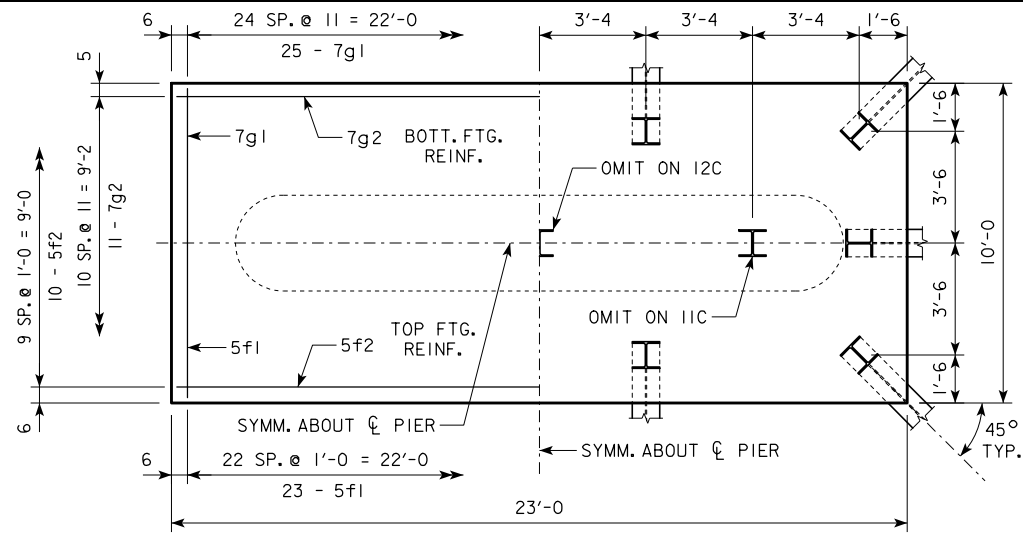
04-13 LATEST REVISION DATE  <i>Thomas L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
	<b>TEE PIER-HP10x57 SRL-2 STEEL PILE FOOTINGS</b> 30° SKEW - H=16' to 24'	<b>H30-74-06</b>

REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.

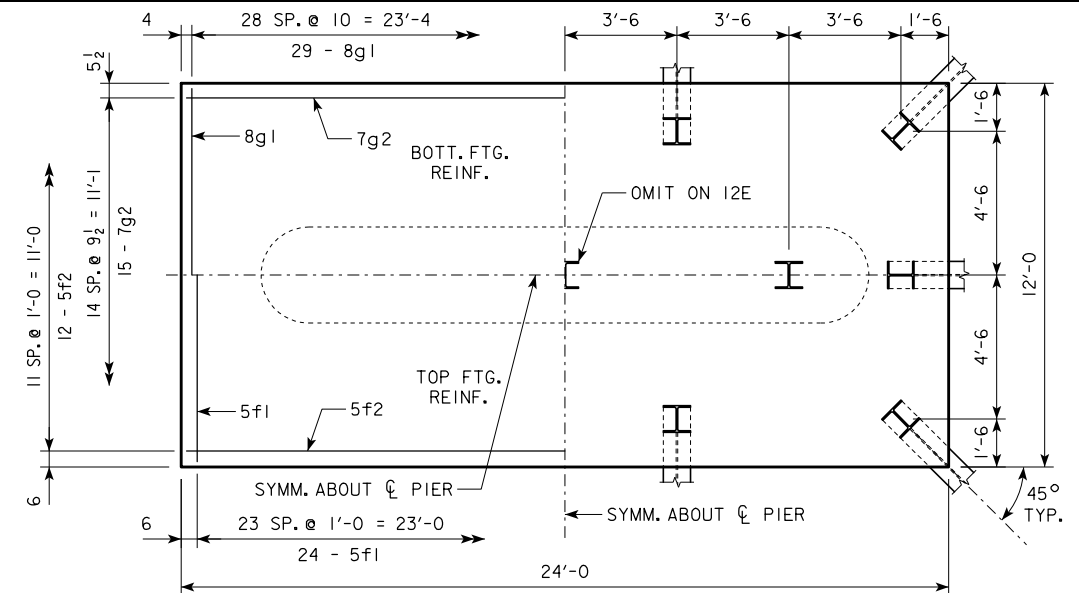




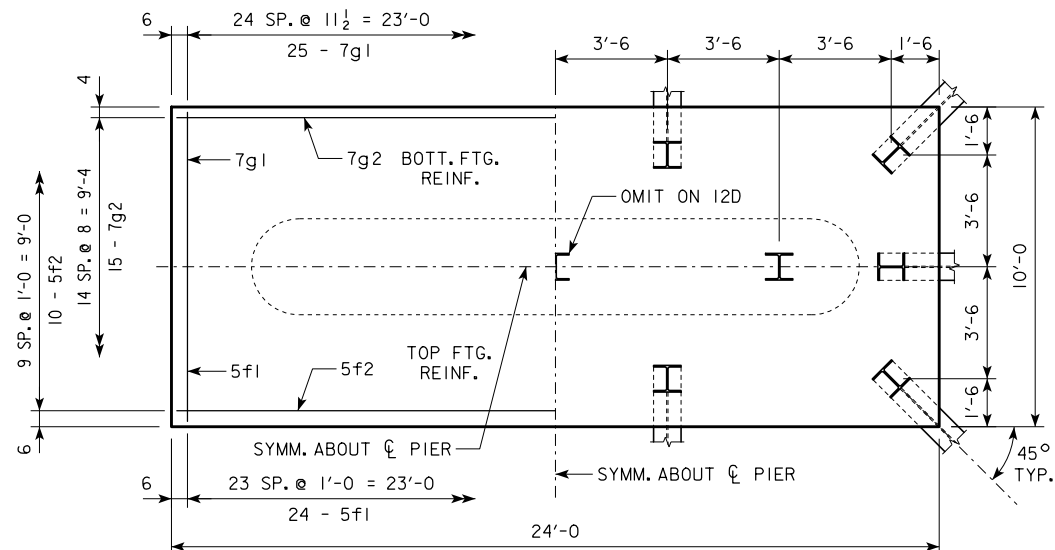
TYPICAL SECTION



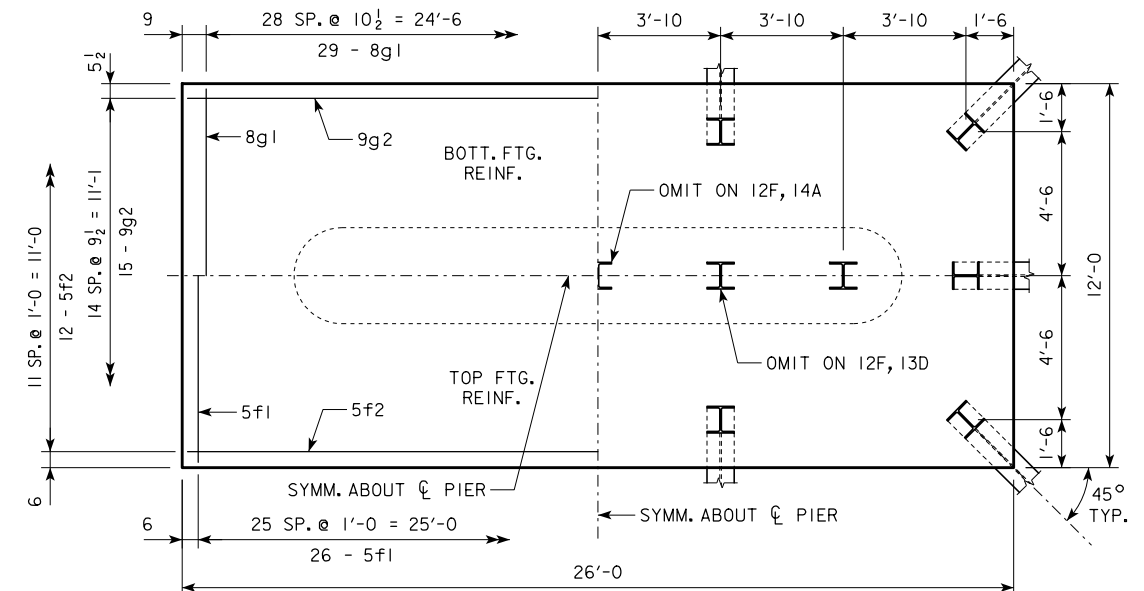
4'-0 x 10'-0 x 23'-0 FOR 11C, 12C & 13A



4'-0 x 12'-0 x 24'-0 FOR 12E & 13C



4'-0 x 10'-0 x 24'-0 FOR 12D & 13B



4'-0 x 12'-0 x 26'-0 FOR 12F, 13D & 14A

H IN FT.	CL - CL ABUT. BRG.	PILING (HP10x57)		FOOTING SIZE
		NO. & LAYOUT	LRFD PU, STRENGTH I, DES. LOAD (KIPS)	
201'-4 TO 213'-10	226'-4	11C	215	4' x 10' x 23'
		12C	205	
		12C	213	
		13A	208	
201'-4 TO 213'-10	226'-4	12C	203	4' x 10' x 23'
		12C	210	
		12C	218	
		13A	213	
201'-4 TO 213'-10	226'-4	12D	207	4' x 10' x 24'
		12D	214	
		13B	210	
		13B	217	
201'-4 TO 213'-10	226'-4	12E	208	4' x 12' x 24'
		12E	215	
		13C	210	
		13C	217	
201'-4 TO 213'-10	226'-4	12F	213	4' x 12' x 26'
		12F	219	
		13D	214	
		14A	208	

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)				TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)		
4' x 10' x 23'	d2	44 - #10 AS SHOWN	10'-6	1988	3460	34.1
	f1	23 - #5 @ 1'-0	9'-8	232		
	f2	10 - #5 @ 1'-0	22'-8	236		
	g1	25 - #7 @ 0'-11	9'-8	494		
	g2	11 - #7 @ 0'-11	22'-8	510		
4' x 10' x 24'	d2	44 - #10 AS SHOWN	10'-6	1988	3697	35.6
	f1	24 - #5 @ 1'-0	9'-8	242		
	f2	10 - #5 @ 1'-0	23'-8	247		
	g1	25 - #7 @ 0'-11 1/2	9'-8	494		
	g2	15 - #7 @ 0'-8	23'-8	726		
4' x 12' x 24'	d2	44 - #10 AS SHOWN	10'-6	1988	4205	42.7
	f1	24 - #5 @ 1'-0	11'-8	292		
	f2	12 - #5 @ 1'-0	23'-8	296		
	g1	29 - #8 @ 0'-10	11'-8	903		
	g2	15 - #7 @ 0'-9 1/2	23'-8	726		
4' x 12' x 26'	d2	44 - #10 AS SHOWN	10'-6	1988	4837	46.2
	f1	26 - #5 @ 1'-0	11'-8	316		
	f2	12 - #5 @ 1'-0	25'-8	321		
	g1	29 - #8 @ 0'-10 1/2	11'-8	903		
	g2	15 - #9 @ 0'-9 1/2	25'-8	1309		

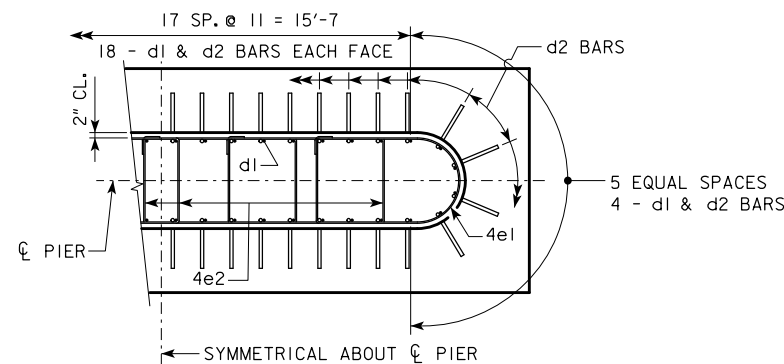
FOOTING NOTES:

THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H30-57-06.

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

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

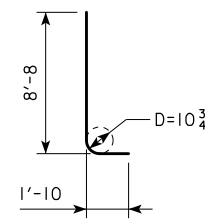
PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.



d2 LAYOUT

(SEE SECTION A-A ON SHEET H30-71-06.)

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

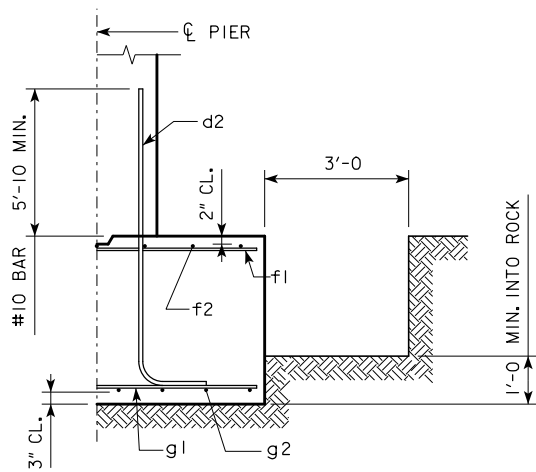


d2

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

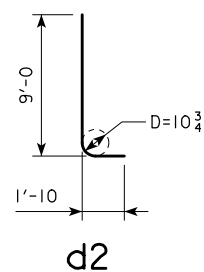
04-13 LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	 STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
		<b>TEE PIER-HP10x57 SRL-2 STEEL PILE FOOTINGS</b> 30° SKEW - H=25' to 40'	<b>H30-75-06</b>

REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.

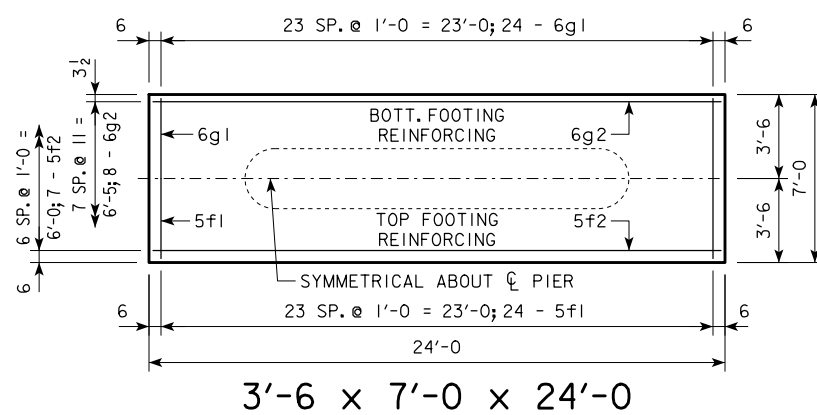


TYPICAL SECTION

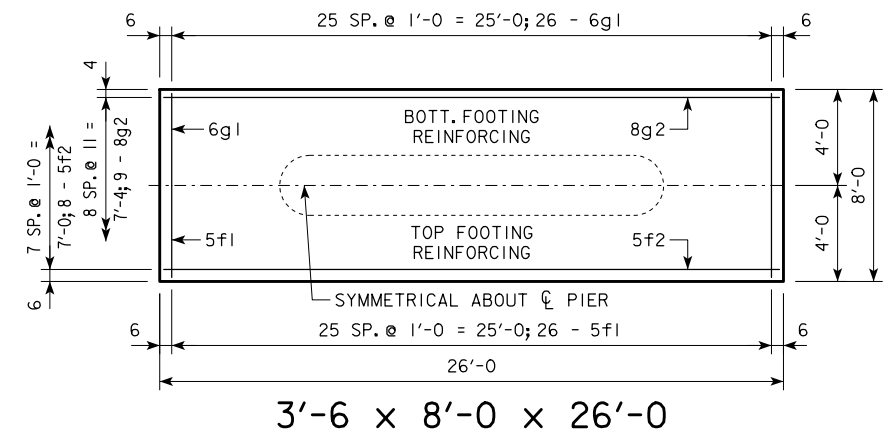
H IN FT.	CL - CL ABUT. BRG.	FOOTING SIZE
16 TO 18	138'-10	3'-6 x 7' x 24'
	151'-4	
	163'-10	3'-6 x 8' x 24'
	176'-4	
	188'-10	
19 TO 21	201'-4	3'-6 x 8' x 26'
	213'-10	
	226'-4	3'-6 x 9' x 26'
	243'-0	
	22 TO 24	
151'-4		
163'-10	3'-6 x 8' x 24'	
176'-4		
188'-10		
201'-4	3'-6 x 8' x 26'	
213'-10		
226'-4	3'-6 x 9' x 26'	
243'-0		



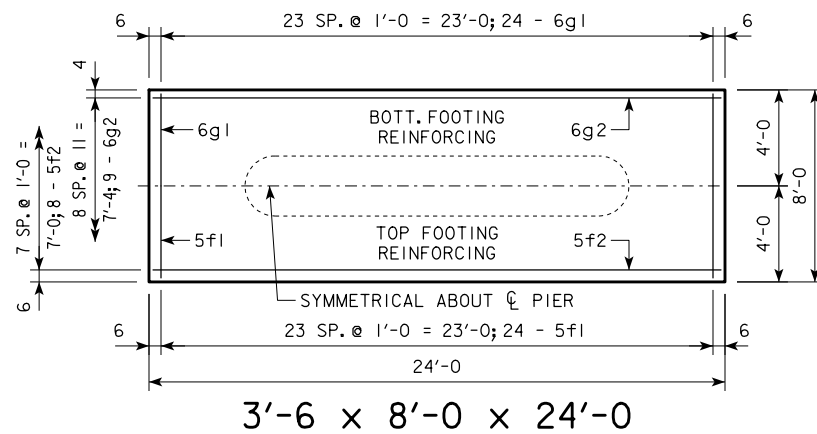
NOTE: D = PIN DIAMETER. DIMENSIONS ARE OUT TO OUT.



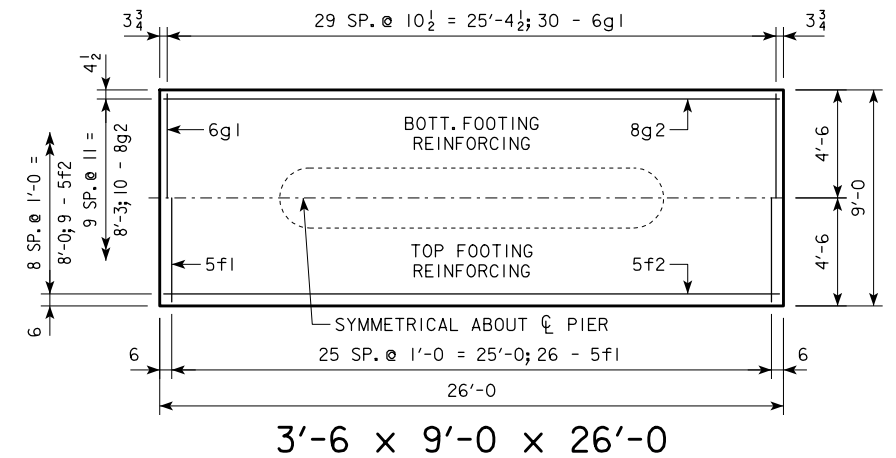
3'-6 x 7'-0 x 24'-0



3'-6 x 8'-0 x 26'-0

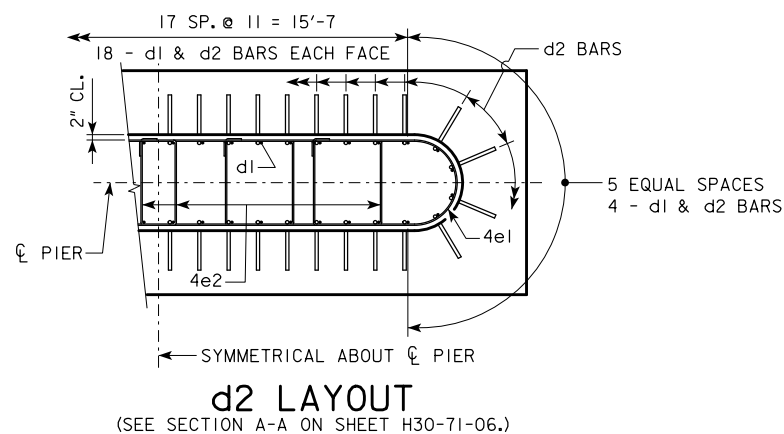


3'-6 x 8'-0 x 24'-0



3'-6 x 9'-0 x 26'-0

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)				TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)		
3'-6 x 7' x 24'	d2	44 - #10 AS SHOWN	10'-10	2051	2915	21.8
	f1	24 - #5 @ 1'-0	6'-8	167		
	f2	7 - #5 @ 1'-0	23'-8	173		
	g1	24 - #6 @ 1'-0	6'-8	240		
	g2	8 - #6 @ 0'-11	23'-8	284		
3'-6 x 8' x 24'	d2	44 - #10 AS SHOWN	10'-10	2051	3036	24.9
	f1	24 - #5 @ 1'-0	7'-8	192		
	f2	8 - #5 @ 1'-0	23'-8	197		
	g1	24 - #6 @ 1'-0	7'-8	276		
	g2	9 - #6 @ 0'-11	23'-8	320		
3'-6 x 8' x 26'	d2	44 - #10 AS SHOWN	10'-10	2051	3389	27.0
	f1	26 - #5 @ 1'-0	7'-8	208		
	f2	8 - #5 @ 1'-0	25'-8	214		
	g1	26 - #6 @ 1'-0	7'-8	299		
	g2	9 - #8 @ 0'-11	25'-8	617		
3'-6 x 9' x 26'	d2	44 - #10 AS SHOWN	10'-10	2051	3603	30.3
	f1	26 - #5 @ 1'-0	8'-8	235		
	f2	9 - #5 @ 1'-0	25'-8	241		
	g1	30 - #6 @ 0'-10 1/2	8'-8	391		
	g2	10 - #8 @ 0'-11	25'-8	685		



d2 LAYOUT (SEE SECTION A-A ON SHEET H30-71-06.)

FOOTING NOTES:

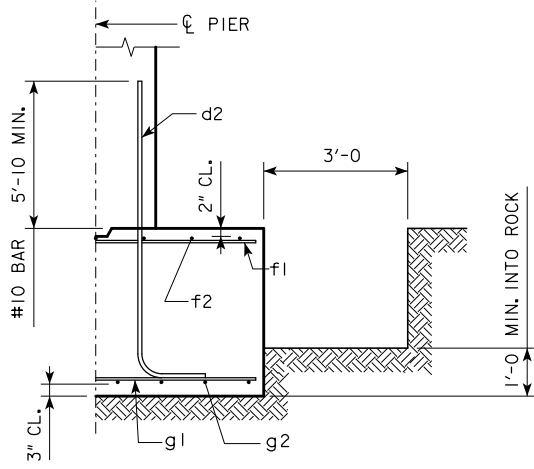
THESE SPREAD FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H30-5T-06.

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 NOMINAL BEARING RESISTANCE OF 30 KIPS PER SQUARE FOOT (ALLOWABLE SERVICE LOAD BEARING VALUE OF AT LEAST 10 KIPS PER SQUARE FOOT).

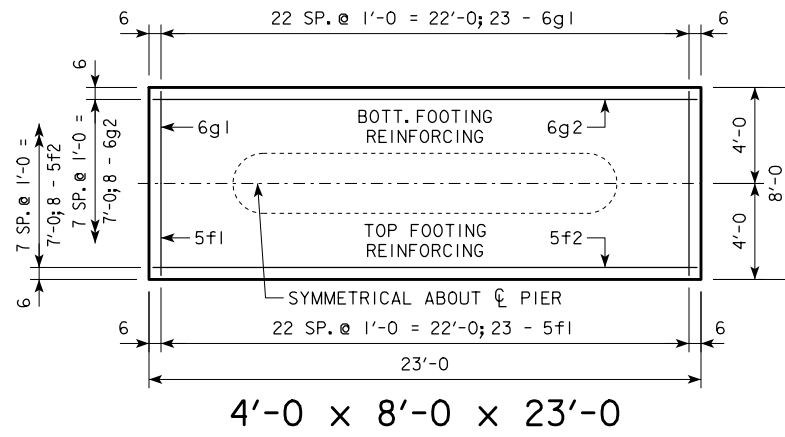
04-13 LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	 STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
		<b>TEE PIER - SPREAD FOOTINGS</b>	
		H30-76-06 30° SKEW - H=16' to 24'	

REVISED 04-13 - FOOTING NOTES MODIFIED.

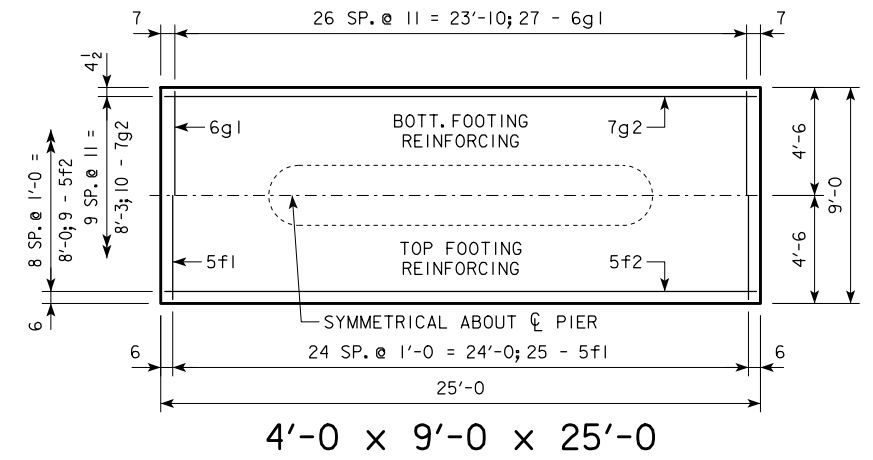
H IN FT.	CL - CL ABUT. BRG.	FOOTING SIZE
25 TO 27	138'-10 151'-4	4' x 8' x 23'
	163'-10 176'-4	4' x 8' x 25'
	201'-4 213'-10	4' x 9' x 25'
	226'-4 243'-0	4' x 9' x 27'
	28 TO 30	138'-10 151'-4
163'-10 176'-4		4' x 8' x 25'
188'-10 201'-4		4' x 9' x 25'
213'-10 226'-4		4' x 9' x 27'
243'-0		4' x 9' x 27'
31 TO 33	138'-10 151'-4	4' x 8' x 25'
	163'-10 176'-4	4' x 8' x 25'
	188'-10 201'-4	4' x 9' x 25'
	213'-10 226'-4	4' x 9' x 27'
	243'-0	4' x 9' x 27'
34 TO 36	138'-10 151'-4	4' x 8' x 25'
	163'-10 176'-4	4' x 9' x 25'
	188'-10 201'-4	4' x 9' x 25'
	213'-10 226'-4	4' x 9' x 27'
	243'-0	4' x 10' x 27'
37 TO 40	138'-10 151'-4	4' x 9' x 25'
	163'-10 176'-4	4' x 9' x 27'
	188'-10 201'-4	4' x 9' x 27'
	213'-10 226'-4	4' x 10' x 27'
	243'-0	4' x 10' x 27'



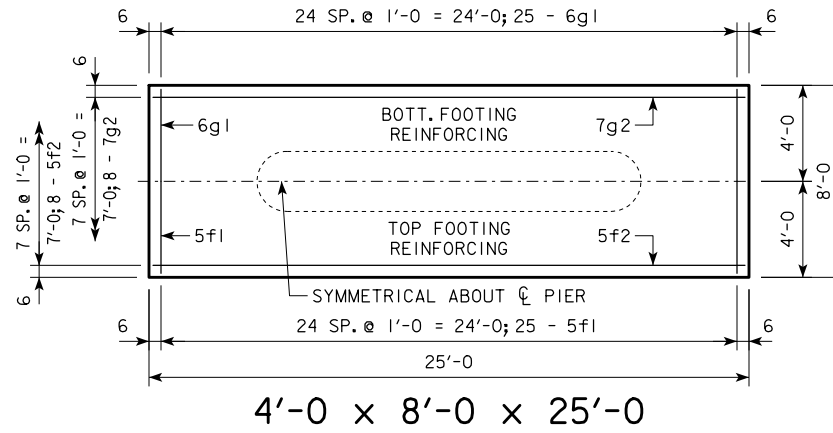
TYPICAL SECTION



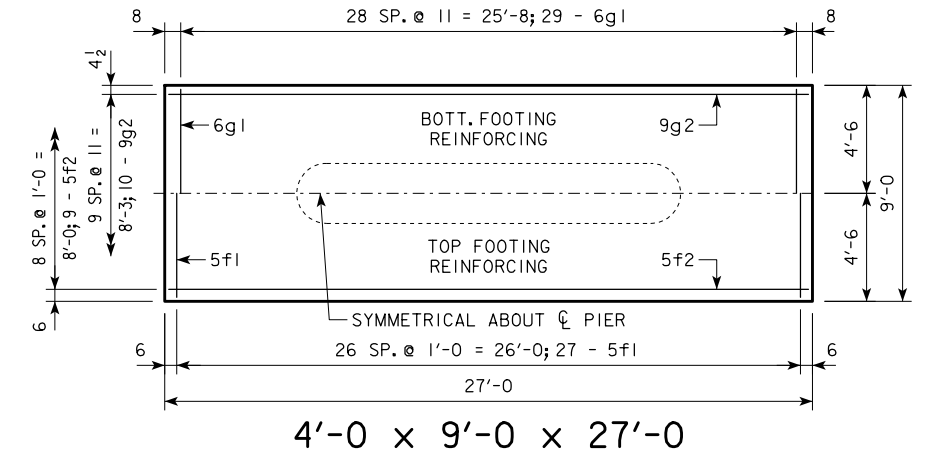
4'-0 x 8'-0 x 23'-0



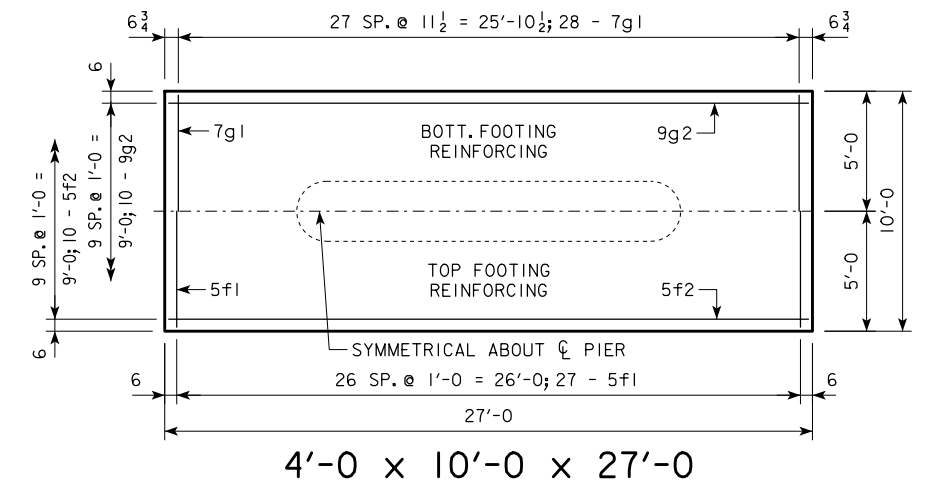
4'-0 x 9'-0 x 25'-0



4'-0 x 8'-0 x 25'-0



4'-0 x 9'-0 x 27'-0

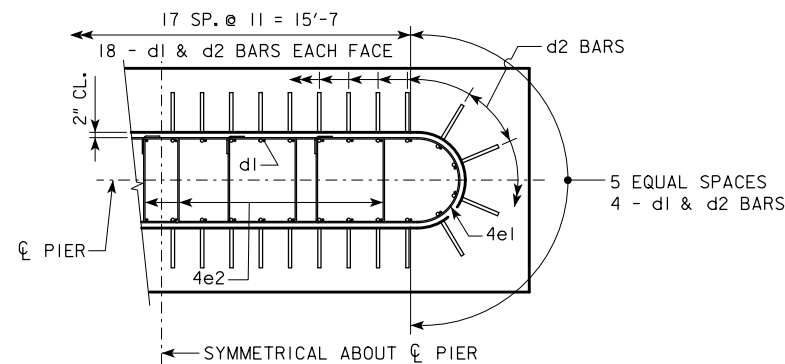


4'-0 x 10'-0 x 27'-0

FOOTING NOTES:

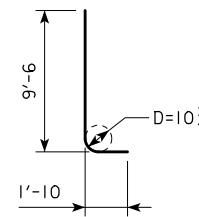
THESE SPREAD FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H30-57-06.

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 NOMINAL BEARING RESISTANCE OF 30 KIPS PER SQUARE FOOT (ALLOWABLE SERVICE LOAD BEARING VALUE OF AT LEAST 10 KIPS PER SQUARE FOOT).



d2 LAYOUT

(SEE SECTION A-A ON SHEET H30-71-06.)



d2

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

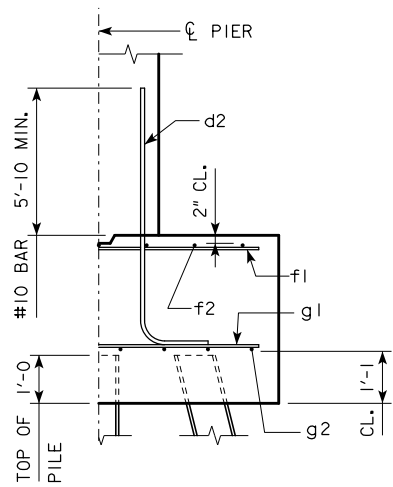
FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)				TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)		
4' x 8' x 23'	d2	44 - #10 AS SHOWN	11'-4	2146	3056	27.3
	f1	23 - #5 @ 1'-0	7'-8	184		
	f2	8 - #5 @ 1'-0	22'-8	189		
	g1	23 - #6 @ 1'-0	7'-8	265		
4' x 8' x 25'	d2	44 - #10 AS SHOWN	11'-4	2146	3243	29.6
	f1	25 - #5 @ 1'-0	7'-8	200		
	f2	8 - #5 @ 1'-0	24'-8	206		
	g1	25 - #6 @ 1'-0	7'-8	288		
4' x 9' x 25'	d2	44 - #10 AS SHOWN	11'-4	2146	3459	33.3
	f1	25 - #5 @ 1'-0	8'-8	226		
	f2	9 - #5 @ 1'-0	24'-8	232		
	g1	27 - #6 @ 0'-11	8'-8	351		
4' x 9' x 27'	d2	44 - #10 AS SHOWN	11'-4	2146	3925	36.0
	f1	27 - #5 @ 1'-0	8'-8	244		
	f2	9 - #5 @ 1'-0	26'-8	250		
	g1	29 - #6 @ 0'-11	8'-8	378		
4' x 10' x 27'	d2	44 - #10 AS SHOWN	11'-4	2146	4156	40.0
	f1	27 - #5 @ 1'-0	9'-8	272		
	f2	10 - #5 @ 1'-0	26'-8	278		
	g1	28 - #7 @ 0'-11 1/2	9'-8	553		
		g2	10 - #9 @ 1'-0	26'-8	907	

04-13 LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	 STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
		<b>TEE PIER - SPREAD FOOTINGS</b> 30° SKEW - H=25' to 40'	
		<b>H30-77-06</b>	

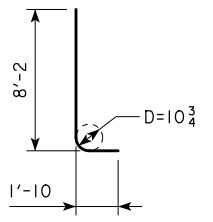
REVISED 04-13 - FOOTING NOTES MODIFIED.





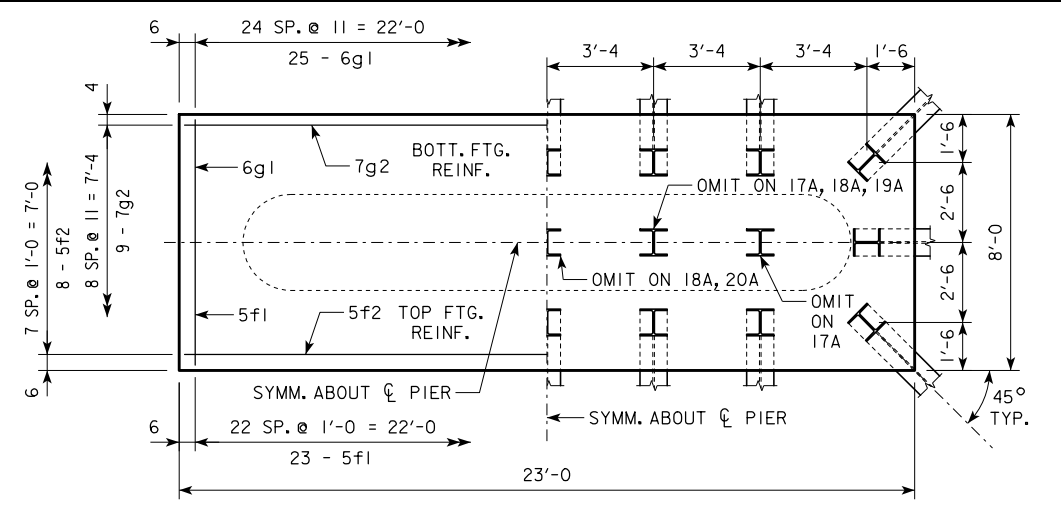


TYPICAL SECTION

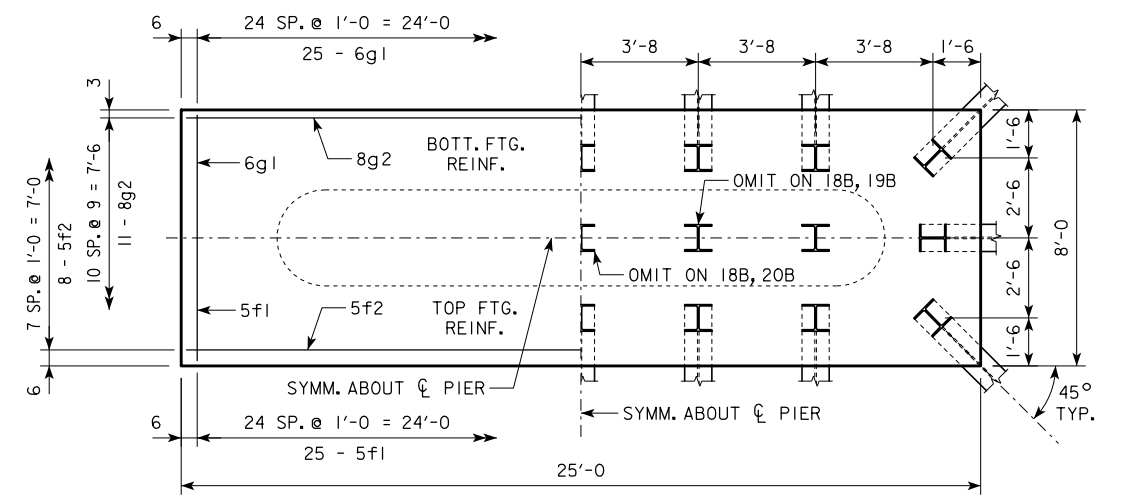


d2

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



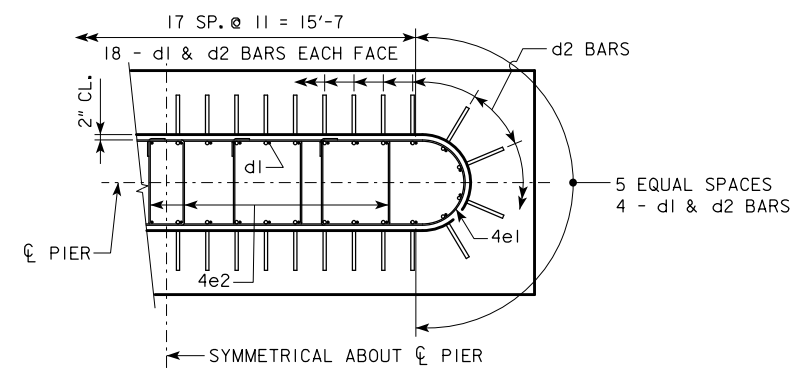
3'-6 x 8'-0 x 23'-0 FOR 17A, 18A, 19A & 20A



3'-6 x 8'-0 x 25'-0 FOR 18B, 19B & 20B

H IN FT.	CL - CL ABUT. BRG.	PILING (HP10x57)		FOOTING SIZE
		NO. & LAYOUT	① LRFD P <sub>u</sub> , STRENGTH I, DES. LOAD (KIPS)	
18 TO 16	201'-4	17A	141	3'-6 x 8' x 23'
	213'-10	17A	146	
	226'-4	18A	143	
	243'-0	19A	143	
21 TO 19	201'-4	17A	145	3'-6 x 8' x 23'
	213'-10	18A	141	
	226'-4	19A	142	
	243'-0	20A	142	
24 TO 22	201'-4	18B	138	3'-6 x 8' x 25'
	213'-10	18B	143	
	226'-4	19B	143	
	243'-0	20B	143	

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)					STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	
3'-6 x 8' x 23'	d2	44 - #10 AS SHOWN	10'-0	1893	2971	23.9
	f1	23 - #5 @ 1'-0	7'-8	184		
	f2	8 - #5 @ 1'-0	22'-8	189		
	g1	25 - #6 @ 0'-11	7'-8	288		
	g2	9 - #7 @ 0'-11	22'-8	417		
3'-6 x 8' x 25'	d2	44 - #10 AS SHOWN	10'-0	1893	3311	25.9
	f1	25 - #5 @ 1'-0	7'-8	200		
	f2	8 - #5 @ 1'-0	24'-8	206		
	g1	25 - #6 @ 1'-0	7'-8	288		
	g2	11 - #8 @ 0'-9	24'-8	724		



d2 LAYOUT

(SEE SECTION A-A ON SHEET H30-78-06.)

① NOTE: P<sub>u</sub>, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

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 H30-57-06.

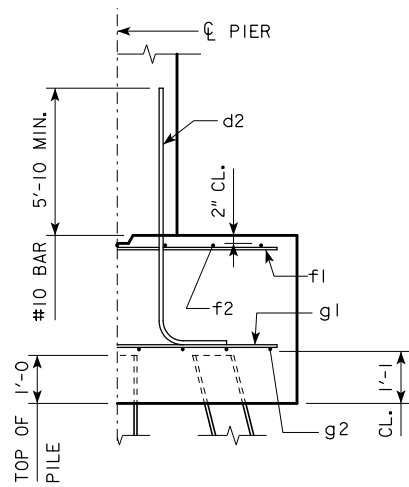
BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

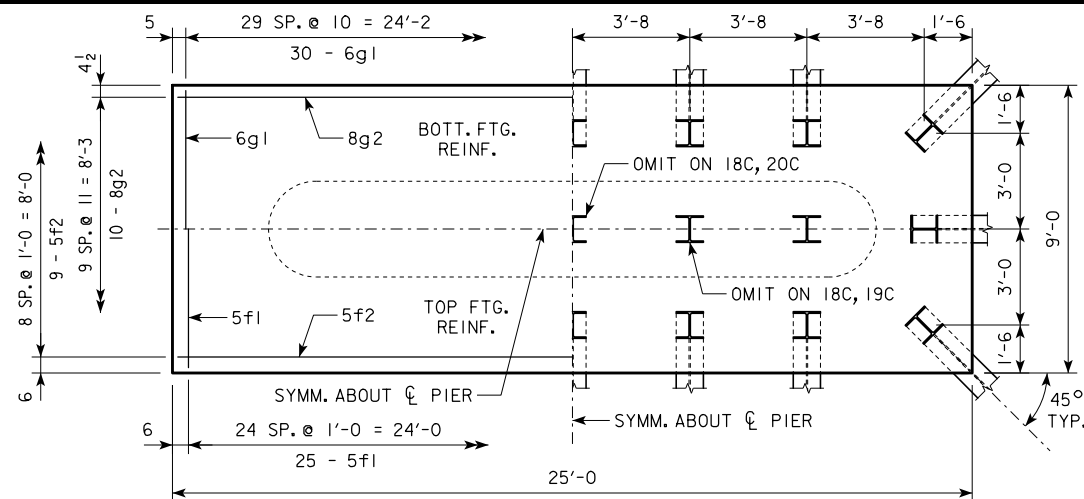
PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

04-13 LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	 STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
		<b>TEE PIER-HP10x57 SRL-1 STEEL PILE FOOTINGS</b> 45° SKEW - H=16' to 24'	<b>H30-79-06</b>

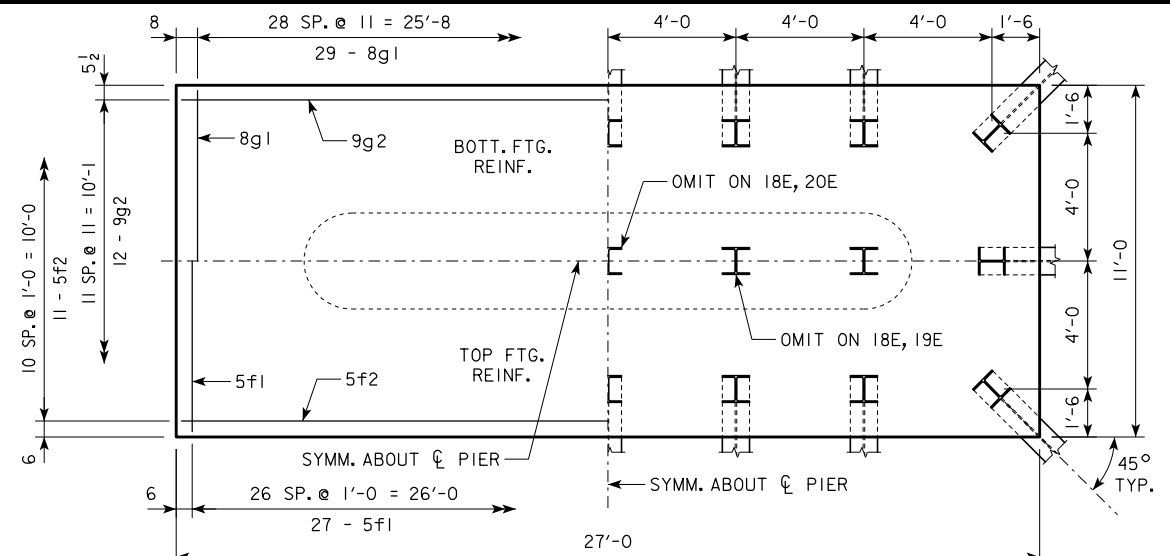
REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.



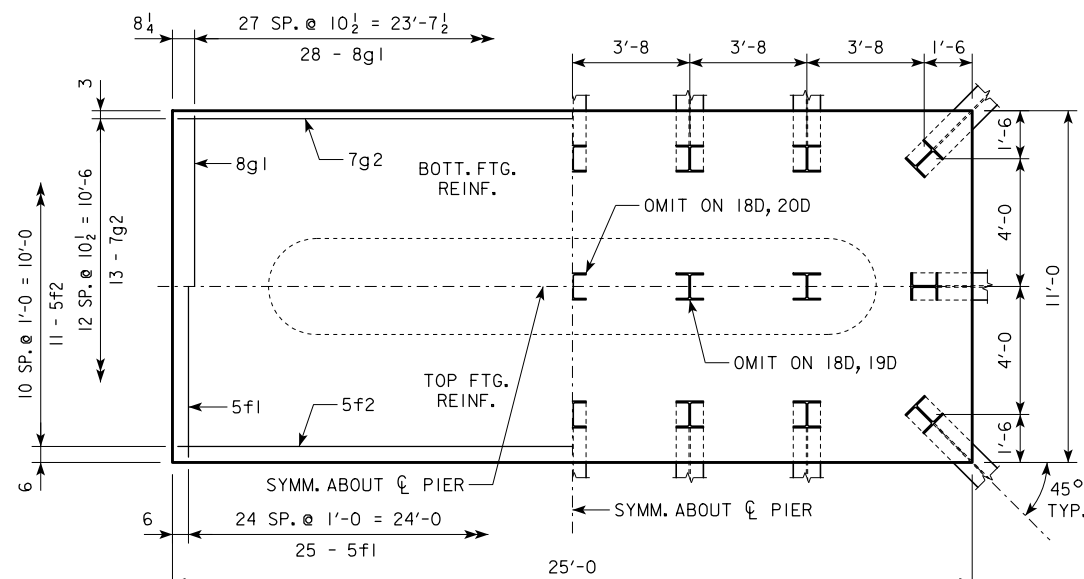
TYPICAL SECTION



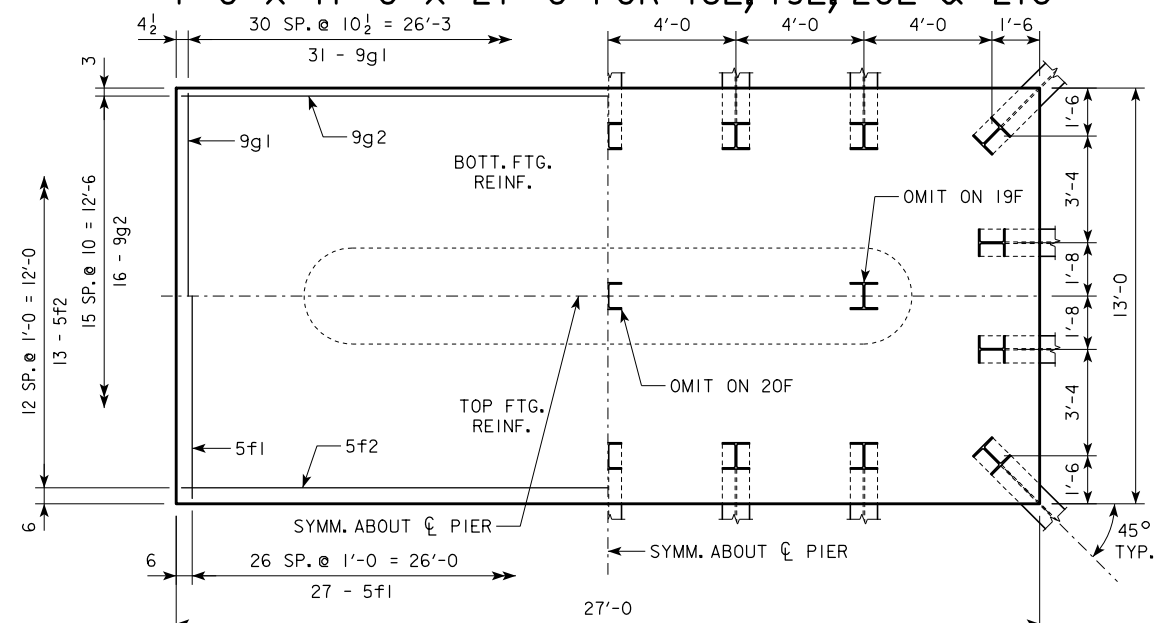
4'-0 x 9'-0 x 25'-0 FOR 18C, 19C, 20C & 21A



4'-0 x 11'-0 x 27'-0 FOR 18E, 19E, 20E & 21C



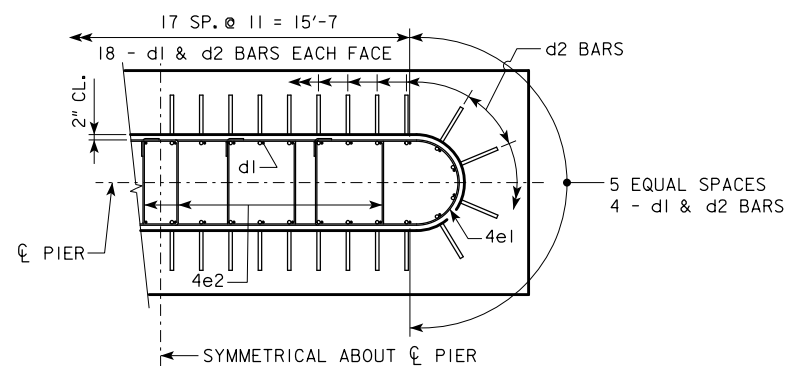
4'-0 x 11'-0 x 25'-0 FOR 18D, 19D, 20D & 21B



4'-0 x 13'-0 x 27'-0 FOR 19F, 20F & 21D

H IN FT.	PILING (HP10x57)		FOOTING SIZE
	CL. - CL. ABUT. BRG.	NO. & LAYOUT	
201'-4 TO 213'-10	18C	140	4' x 9' x 25'
	18C	145	
	19C	146	
	20C	145	
201'-4 TO 213'-10	18C	144	4' x 9' x 25'
	19C	143	
	20C	143	
	21A	144	
201'-4 TO 213'-10	18D	145	4' x 11' x 25'
	19D	145	
	20D	144	
	21B	144	
201'-4 TO 213'-10	18E	147	4' x 11' x 27'
	19E	146	
	20E	145	
	21C	145	
201'-4 TO 213'-10	19F	140	4' x 13' x 27'
	19F	145	
	20F	142	
	21D	141	

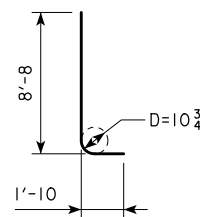
FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)				TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)		
4' x 9' x 25'	d2	44 - #10 AS SHOWN	10'-6	1988	3496	33.3
	f1	25 - #5 @ 1'-0	8'-8	226		
	f2	9 - #5 @ 1'-0	24'-8	232		
	g1	30 - #6 @ 0'-10	8'-8	391		
	g2	10 - #8 @ 0'-11	24'-8	659		
4' x 11' x 25'	d2	44 - #10 AS SHOWN	10'-6	1988	4001	40.7
	f1	25 - #5 @ 1'-0	10'-8	278		
	f2	11 - #5 @ 1'-0	24'-8	283		
	g1	28 - #8 @ 0'-10 1/2	10'-8	797		
	g2	13 - #7 @ 0'-10 1/2	24'-8	655		
4' x 11' x 27'	d2	44 - #10 AS SHOWN	10'-6	1988	4508	44.0
	f1	27 - #5 @ 1'-0	10'-8	300		
	f2	11 - #5 @ 1'-0	26'-8	306		
	g1	29 - #8 @ 0'-11	10'-8	826		
	g2	12 - #9 @ 0'-11	26'-8	1088		
4' x 13' x 27'	d2	44 - #10 AS SHOWN	10'-6	1988	5493	52.0
	f1	27 - #5 @ 1'-0	12'-8	357		
	f2	13 - #5 @ 1'-0	26'-8	362		
	g1	31 - #9 @ 0'-10 1/2	12'-8	1335		
	g2	16 - #9 @ 0'-10	26'-8	1451		



d2 LAYOUT

(SEE SECTION A-A ON SHEET H30-78-06.)

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



d2

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

FOOTING NOTES:

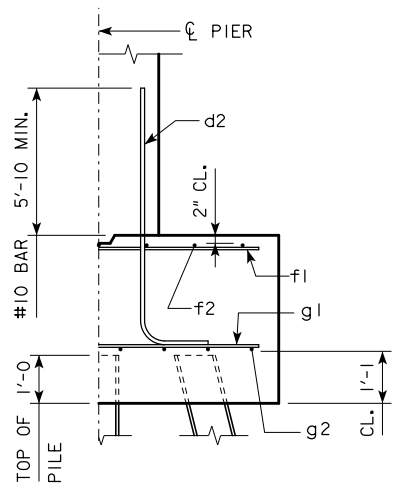
THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H30-57-06.

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

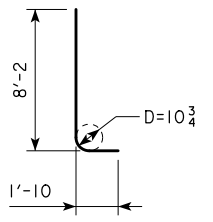
STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

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

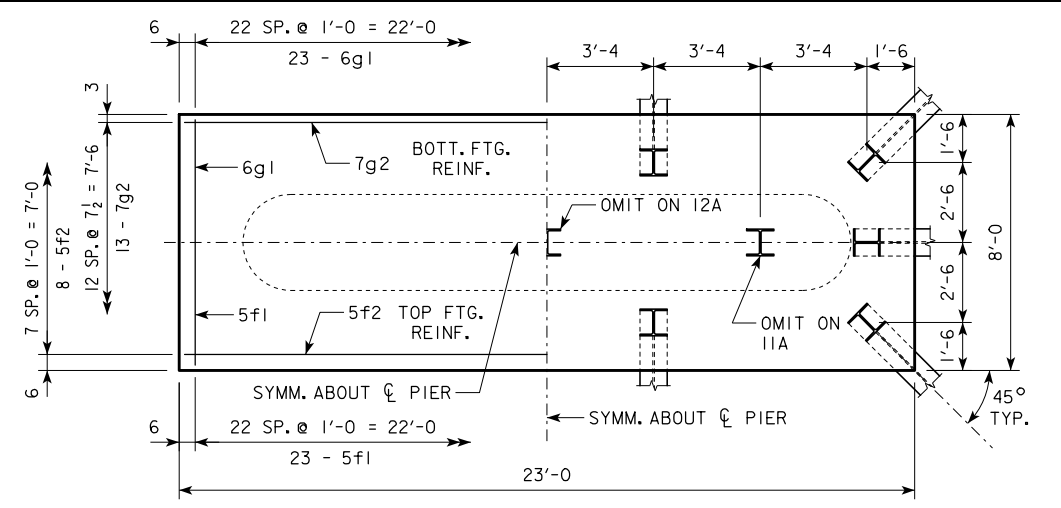
04-13 LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	 STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	<b>TEE PIER-HP10x57 SRL-1 STEEL PILE FOOTINGS</b> 45° SKEW - H=25' to 40'	<b>H30-80-06</b>



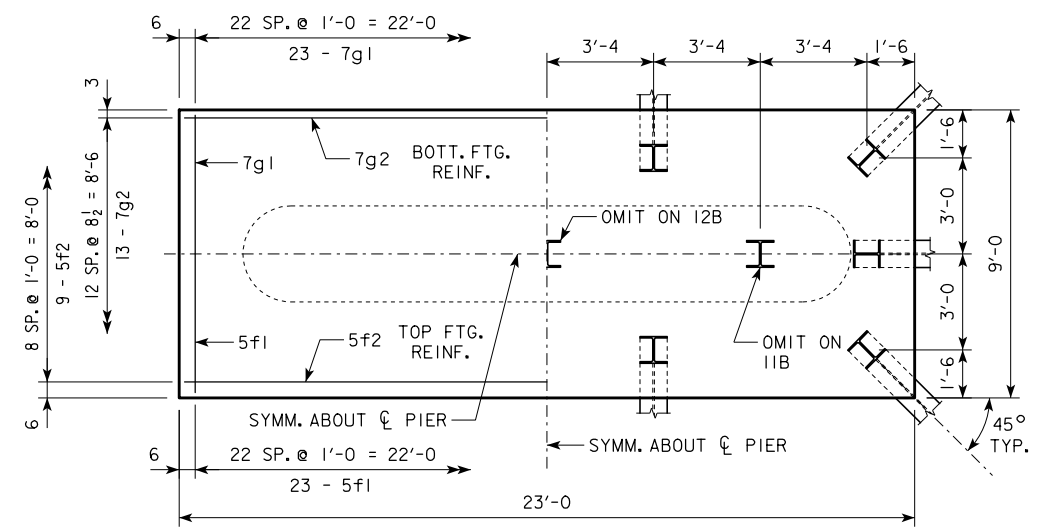
TYPICAL SECTION



**d2**  
NOTE: D = PIN DIAMETER.  
DIMENSIONS ARE OUT TO OUT.



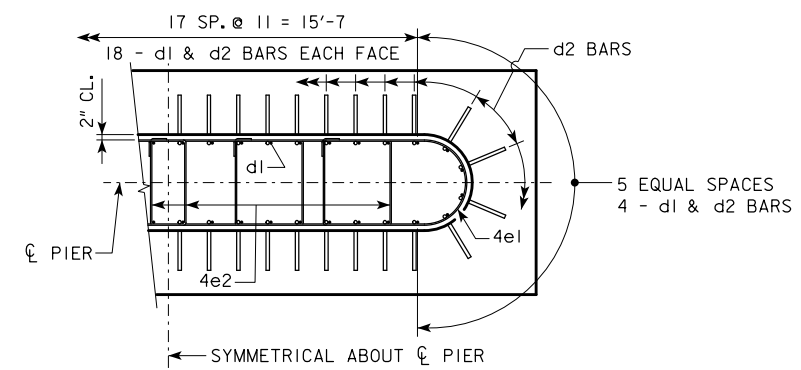
3'-6 x 8'-0 x 23'-0 FOR IIA & I2A



3'-6 x 9'-0 x 23'-0 FOR IIB, I2B & I3A

H IN FT.	CL - CL ABUT. BRG.	PILING (HP10x57)		FOOTING SIZE	
		NO. & LAYOUT	① LRFD P <sub>u</sub> , STRENGTH I, DES. LOAD (KIPS)		
18	201'-4	I1A	210	3'-6 x 8' x 23'	
	213'-10	I1A	217		
	226'-4	I2A	208		
16	243'-0	I2A	215		
	201'-4	I1B	214		3'-6 x 9' x 23'
	213'-10	I2B	203		
226'-4	I2B	212			
243'-0	I2B	219			
19	201'-4	I2B	202	3'-6 x 9' x 23'	
	213'-10	I2B	209		
	226'-4	I2B	217		
	243'-0	I3A	213		
	22	243'-0	I3A		213

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)					STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)	TOTAL WEIGHT (LB.)	
3'-6 x 8' x 23'	d2	44 - #10 AS SHOWN	10'-0	1893	3133	23.9
	f1	23 - #5 @ 1'-0	7'-8	184		
	f2	8 - #5 @ 1'-0	22'-8	189		
	g1	23 - #6 1'-0	7'-8	265		
	g2	13 - #7 @ 0'-7 1/2	22'-8	602		
3'-6 x 9' x 23'	d2	44 - #10 AS SHOWN	10'-0	1893	3323	26.8
	f1	23 - #5 @ 1'-0	8'-8	208		
	f2	9 - #5 @ 1'-0	22'-8	213		
	g1	23 - #7 @ 1'-0	8'-8	407		
	g2	13 - #7 @ 0'-8 1/2	22'-8	602		



**d2 LAYOUT**

(SEE SECTION A-A ON SHEET H30-78-06.)

① NOTE: P<sub>u</sub>, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.

**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 H30-57-06.

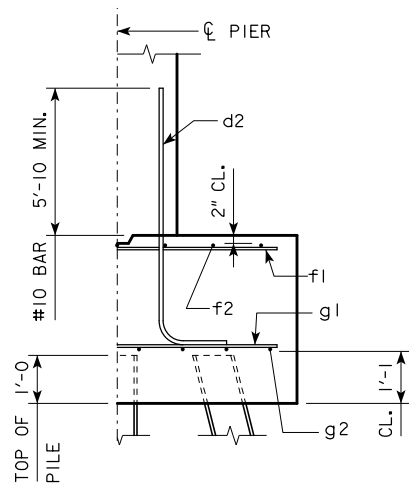
BATTER PILES IN EXTERIOR ROWS 1:4 IN THE DIRECTION SHOWN.

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

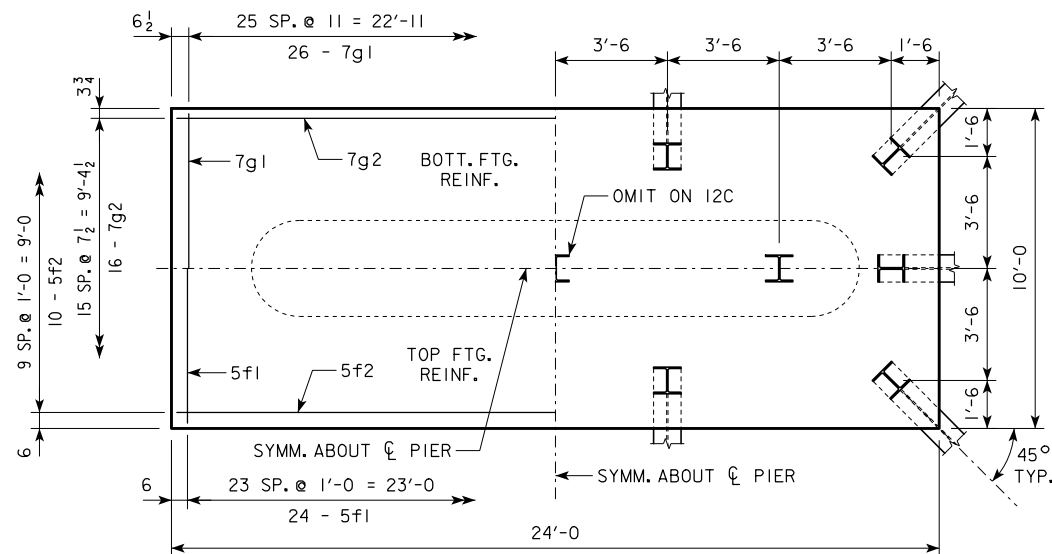
PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

LATEST REVISION DATE 04-13  APPROVED BY BRIDGE ENGINEER <i>Thomas L. McDaniel</i>		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
	<b>TEE PIER-HP10x57 SRL-2 STEEL PILE FOOTINGS</b> 45° SKEW - H=16' to 24'	<b>H30-81-06</b>

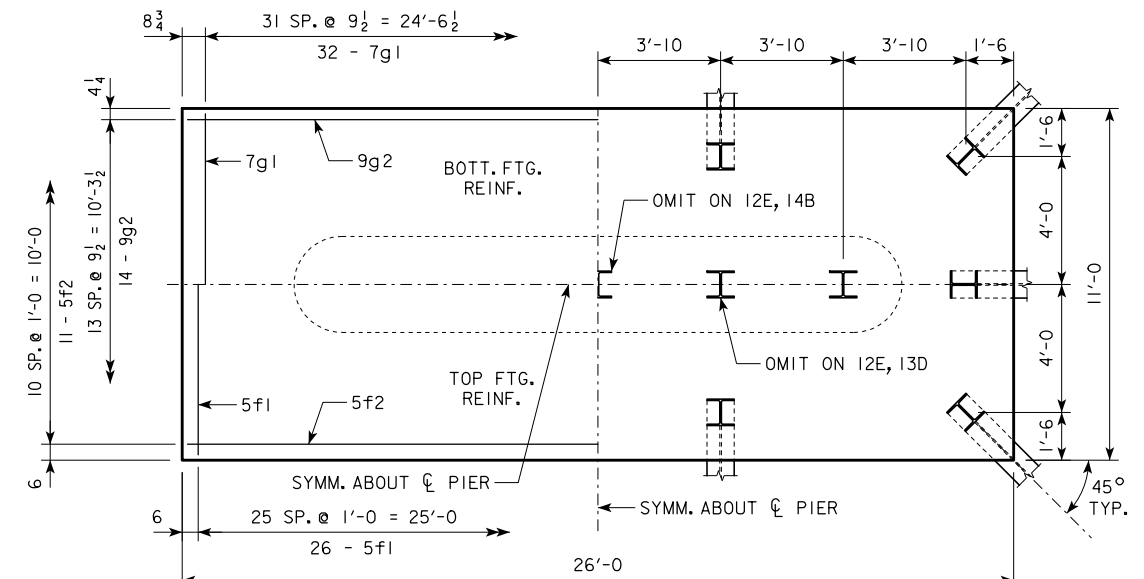
REVISED 04-13 - REVISION FOR LRFD PILE DESIGN.



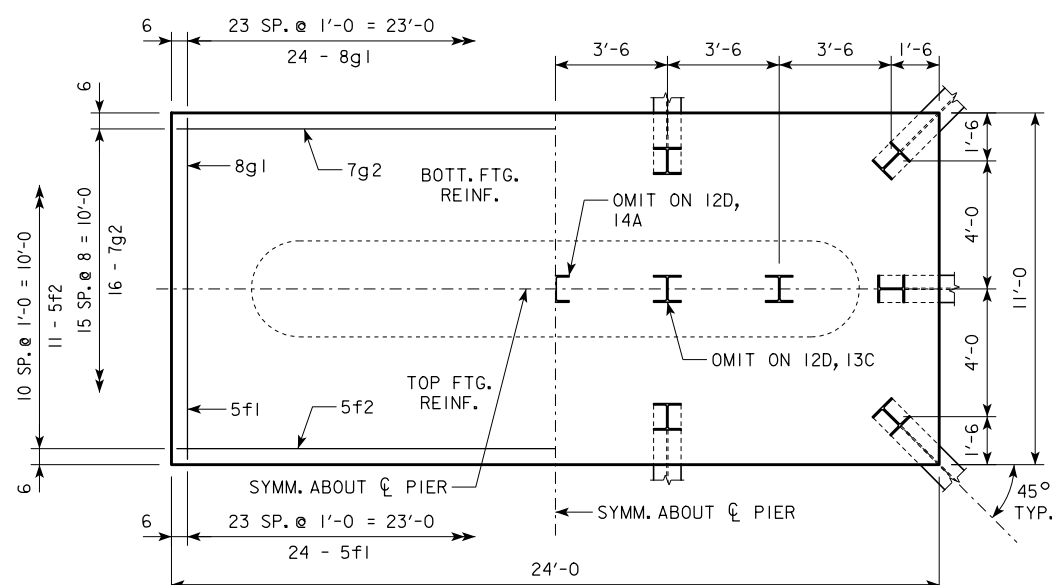
TYPICAL SECTION



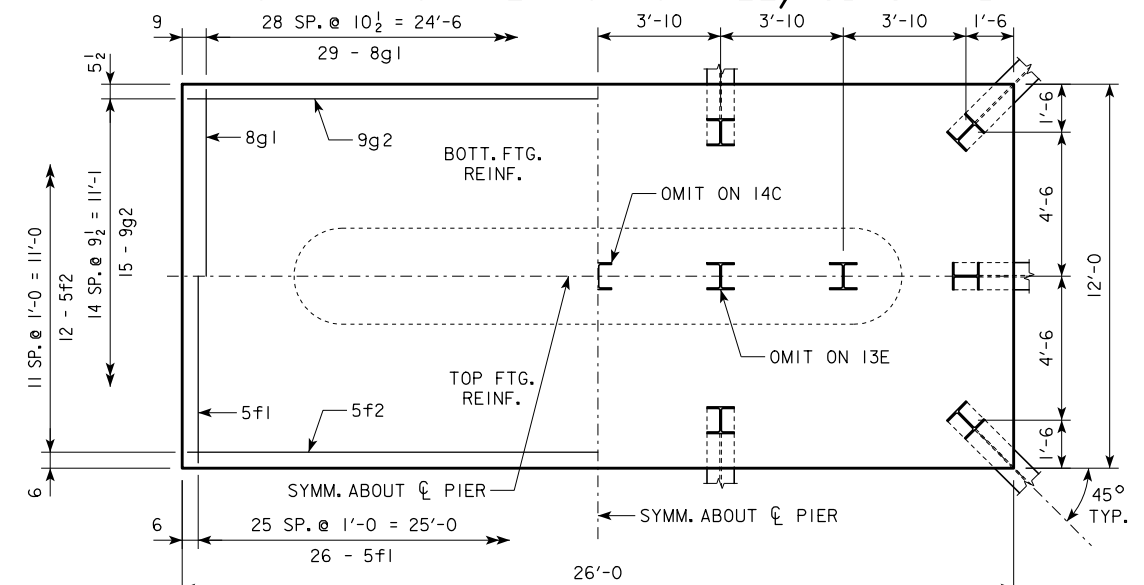
4'-0 x 10'-0 x 24'-0 FOR I2C & I3B



4'-0 x 11'-0 x 26'-0 FOR I2E, I3D & I4B



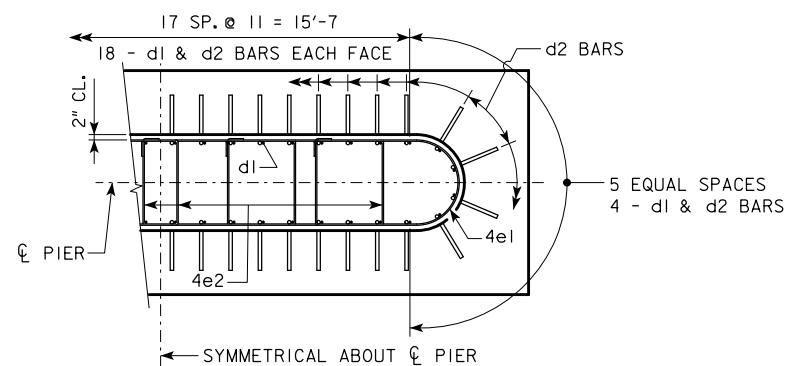
4'-0 x 11'-0 x 24'-0 FOR I2D, I3C & I4A



4'-0 x 12'-0 x 26'-0 FOR I3E & I4C

H IN FT.	CL - CL ABUT. BRG.	PILING (HP10x57)		FOOTING SIZE
		NO. & LAYOUT	① LRFD P <sub>u</sub> , STRENGTH I, DES. LOAD (KIPS)	
201'-4 TO 213'-10	201'-4	I2C	205	4' x 10' x 24'
	213'-10	I2C	211	
	226'-4	I2C	220	
	243'-0	I3B	215	
201'-4 TO 213'-10	201'-4	I2D	208	4' x 11' x 24'
	213'-10	I2D	215	
	226'-4	I3C	211	
	243'-0	I3C	219	
201'-4 TO 213'-10	201'-4	I2E	217	4' x 11' x 26'
	213'-10	I3D	212	
	226'-4	I4B	209	
	243'-0	I4B	215	
201'-4 TO 213'-10	201'-4	I3E	210	4' x 12' x 26'
	213'-10	I3E	217	
	226'-4	I4C	213	
	243'-0	I4C	219	

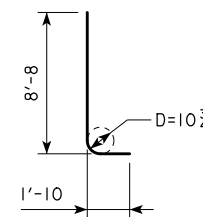
FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)				TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)		
4' x 10' x 24'	d2	44 - #10 AS SHOWN	10'-6	1988	3765	35.6
	f1	24 - #5 @ 1'-0	9'-8	242		
	f2	10 - #5 @ 1'-0	23'-8	247		
	g1	26 - #7 @ 0'-11	9'-8	514		
	g2	16 - #7 @ 0'-7 1/2	23'-8	774		
4' x 11' x 24'	d2	44 - #10 AS SHOWN	10'-6	1988	3985	39.1
	f1	24 - #5 @ 1'-0	10'-8	267		
	f2	11 - #5 @ 1'-0	23'-8	272		
	g1	24 - #8 @ 1'-0	10'-8	684		
	g2	16 - #7 @ 0'-8	23'-8	774		
4' x 11' x 26'	d2	44 - #10 AS SHOWN	10'-6	1988	4491	42.4
	f1	26 - #5 @ 1'-0	10'-8	289		
	f2	11 - #5 @ 1'-0	25'-8	294		
	g1	32 - #7 @ 0'-9 1/2	10'-8	698		
	g2	14 - #9 @ 0'-9 1/2	25'-8	1222		
4' x 12' x 26'	d2	44 - #10 AS SHOWN	10'-6	1988	4837	46.2
	f1	26 - #5 @ 1'-0	11'-8	316		
	f2	12 - #5 @ 1'-0	25'-8	321		
	g1	29 - #8 @ 0'-10 1/2	11'-8	903		
	g2	15 - #9 @ 0'-9 1/2	25'-8	1309		



d2 LAYOUT

(SEE SECTION A-A ON SHEET H30-78-06.)

① NOTE: P<sub>u</sub>, STRENGTH I DESIGN LOAD (KIPS) IS NOT THE VALUE USED IN THE FIELD FOR DRIVING PILES.



d2

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

FOOTING NOTES:  
THESE FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H30-57-06.

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

STEEL PILING USED AS POINT BEARING SHALL HAVE A MINIMUM DISTANCE OF APPROXIMATELY 10 FEET FROM BOTTOM OF FOOTING TO TOP OF BEARING ROCK. THE PILE LAYOUTS ARE SUCH THAT THE DISTANCE CENTER TO CENTER OF ADJACENT PILING SHALL NOT EXCEED 8'-0.

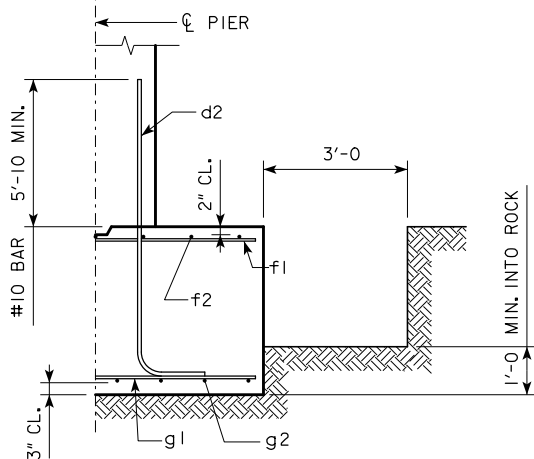
PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.

04-13 LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	 STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	<b>H30-82-06</b> 45° SKEW - H=25' to 40'
		<b>TEE PIER-HP10x57 SRL-2 STEEL PILE FOOTINGS</b>	

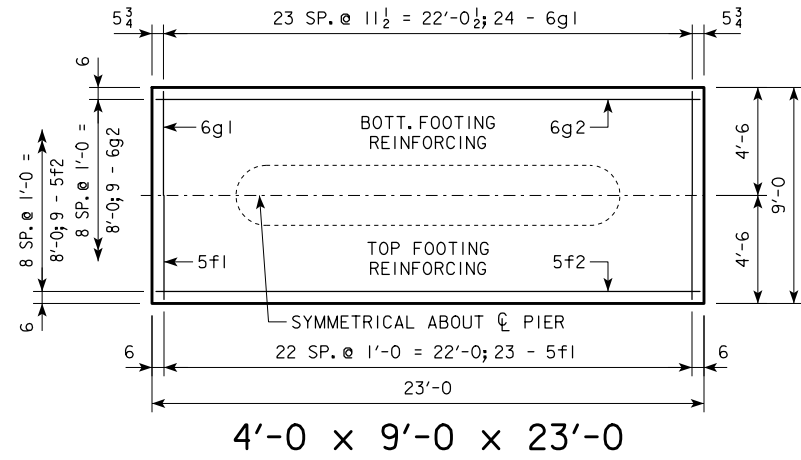




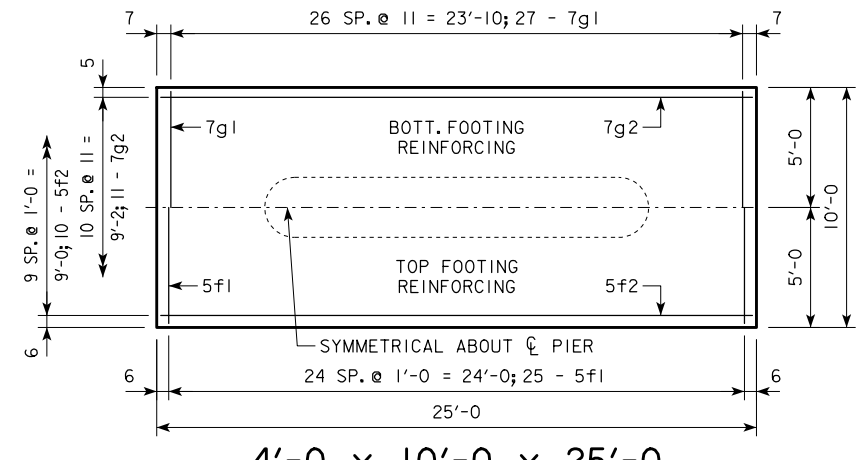
H IN	CL - CL ABUT. BRG.	FOOTING SIZE
25 TO 27	138'-10	4' x 9' x 23'
	151'-4	
	163'-10	
	176'-4	
	188'-10	
28 TO 30	201'-4	4' x 9' x 25'
	213'-10	
	226'-4	
	243'-0	
	255'-4	
31 TO 33	138'-10	4' x 9' x 23'
	151'-4	
	163'-10	
	176'-4	
	188'-10	
34 TO 36	201'-4	4' x 9' x 25'
	213'-10	
	226'-4	
	243'-0	
	255'-4	
37 TO 40	138'-10	4' x 10' x 25'
	151'-4	
	163'-10	
	176'-4	
	188'-10	
	201'-4	4' x 10' x 27'
	213'-10	
	226'-4	
	243'-0	
	255'-4	



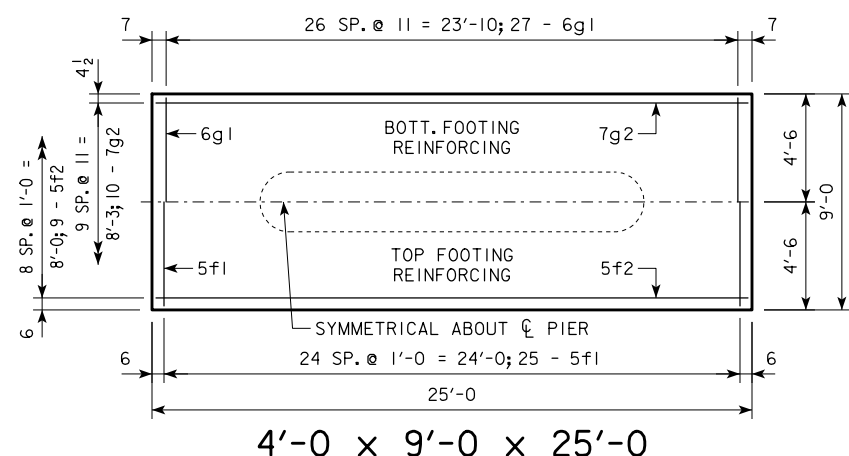
TYPICAL SECTION



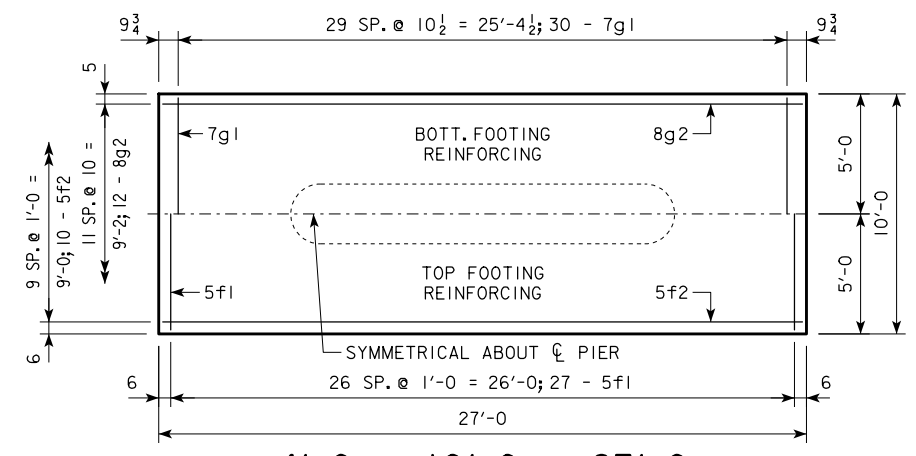
4'-0 x 9'-0 x 23'-0



4'-0 x 10'-0 x 25'-0

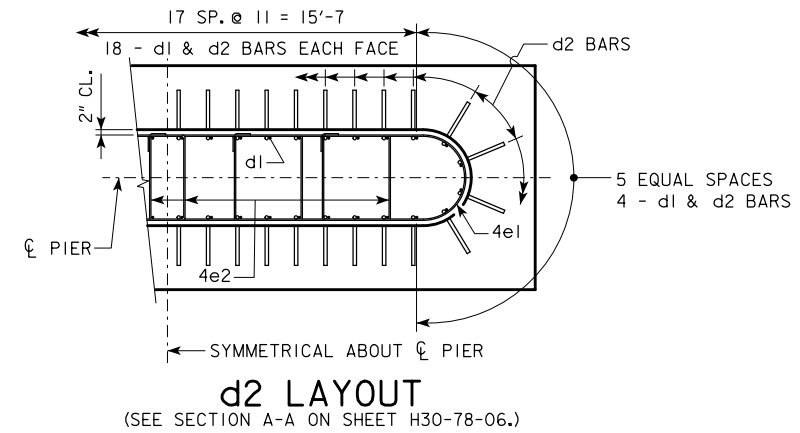


4'-0 x 9'-0 x 25'-0



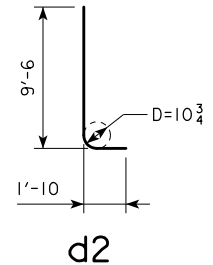
4'-0 x 10'-0 x 27'-0

FOOTING SIZE	REINFORCING STEEL (ONE FOOTING)				TOTAL WEIGHT (LB.)	STRUCTURAL CONCRETE (CY)
	BAR	NO., SIZE & SPACING	LENGTH	WEIGHT (LB.)		
4' x 9' x 23'	d2	44 - #10 AS SHOWN	11'-4	2146	3185	30.7
	f1	23 - #5 @ 1'-0	8'-8	208		
	f2	9 - #5 @ 1'-0	22'-8	213		
	g1	24 - #6 @ 0'-11 1/2	8'-8	312		
	g2	9 - #6 @ 1'-0	22'-8	306		
4' x 9' x 25'	d2	44 - #10 AS SHOWN	11'-4	2146	3459	33.3
	f1	25 - #5 @ 1'-0	8'-8	226		
	f2	9 - #5 @ 1'-0	24'-8	232		
	g1	27 - #6 @ 0'-11	8'-8	351		
	g2	10 - #7 @ 0'-11	24'-8	504		
4' x 10' x 25'	d2	44 - #10 AS SHOWN	11'-4	2146	3743	37.0
	f1	25 - #5 @ 1'-0	9'-8	252		
	f2	10 - #5 @ 1'-0	24'-8	257		
	g1	27 - #7 @ 0'-11	9'-8	533		
	g2	11 - #7 @ 0'-11	24'-8	555		
4' x 10' x 27'	d2	44 - #10 AS SHOWN	11'-4	2146	4143	40.0
	f1	27 - #5 @ 1'-0	9'-8	272		
	f2	10 - #5 @ 1'-0	26'-8	278		
	g1	30 - #7 @ 0'-10 1/2	9'-8	593		
	g2	12 - #8 @ 0'-10	26'-8	854		



d2 LAYOUT

(SEE SECTION A-A ON SHEET H30-78-06.)



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

FOOTING NOTES:

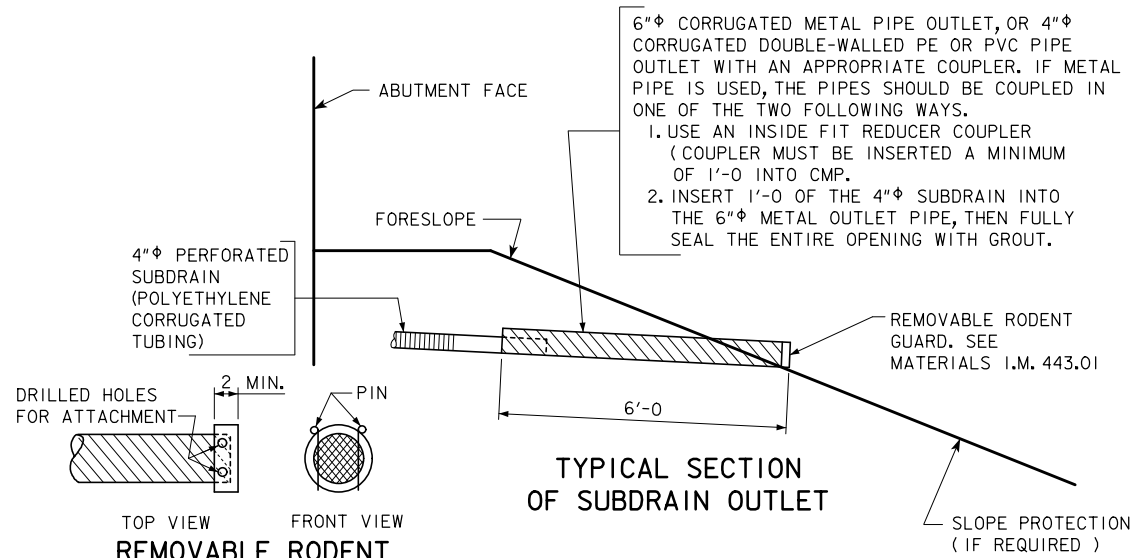
THESE SPREAD FOOTINGS ARE DESIGNED AND DETAILED TO BE USED WITH THE CAP AND COLUMN DETAILS OF THE TEE PIERS AS SHOWN ON SHEET H30-57-06.

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 NOMINAL BEARING RESISTANCE OF 30 KIPS PER SQUARE FOOT (ALLOWABLE SERVICE LOAD BEARING VALUE OF AT LEAST 10 KIPS PER SQUARE FOOT).

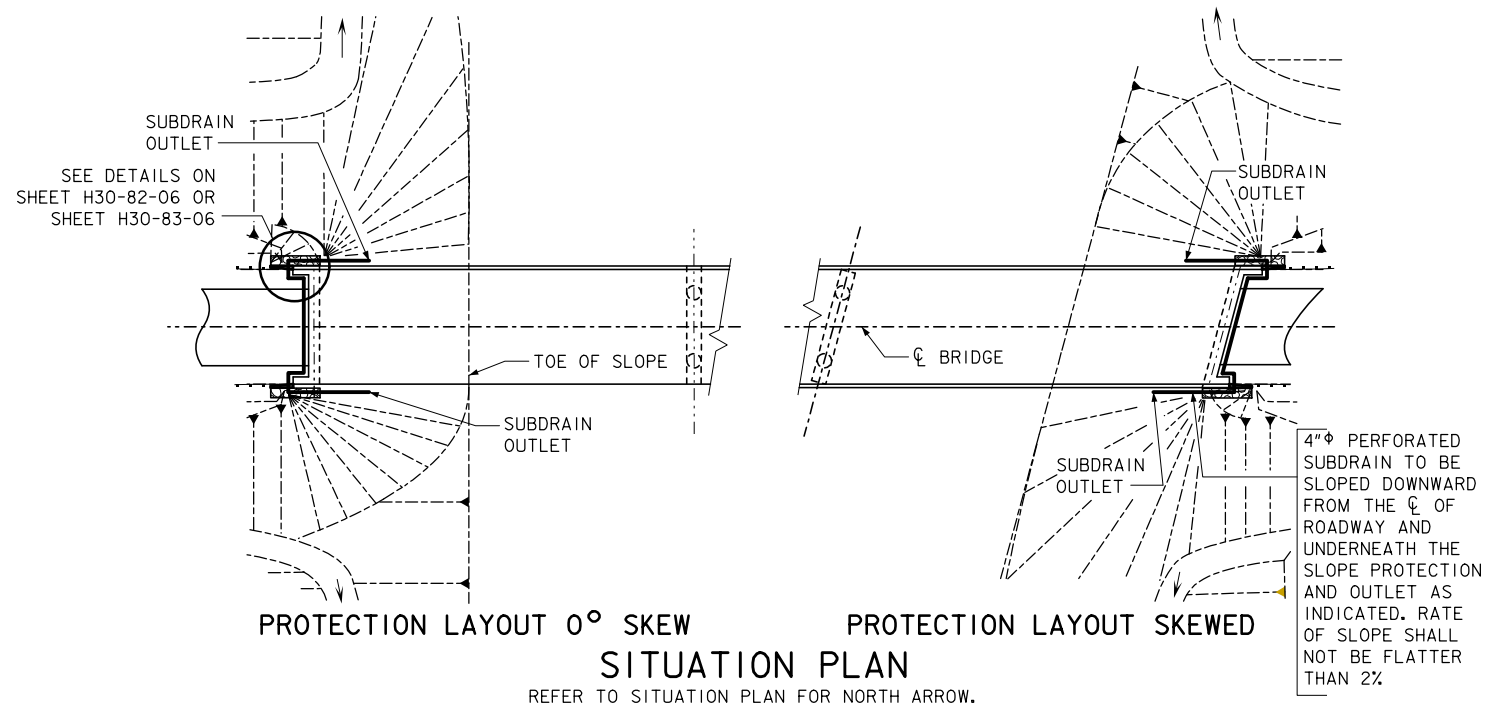
04-13 LATEST REVISION DATE  <i>Harmon L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER	
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006
	<b>TEE PIER - SPREAD FOOTINGS</b> 45° SKEW - H=25' to 40'

H30-84-06

REVISED 04-13 - FOOTING NOTES MODIFIED.



OUTLET DETAILS

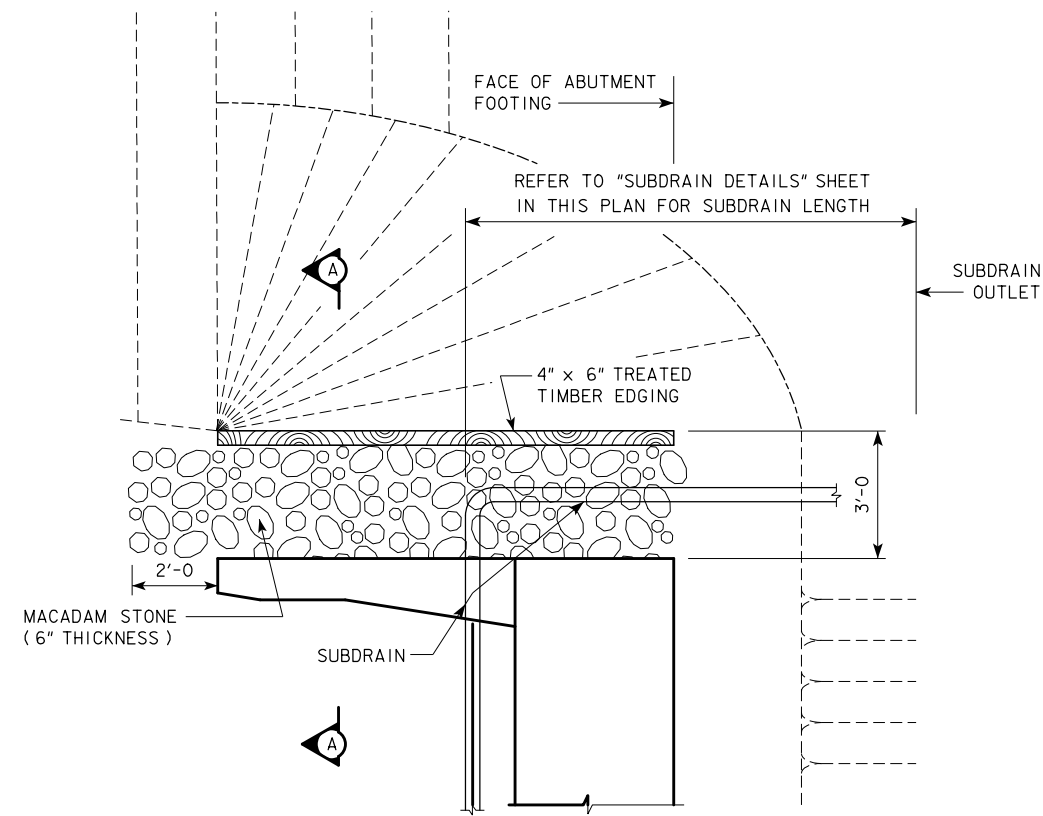


NOTE:  
 SEE ABUTMENT BACKFILL DETAILS SHEET FOR DETAILS NOT SHOWN ON THIS SHEET WHICH ARE PERTINENT TO THIS STRUCTURE.

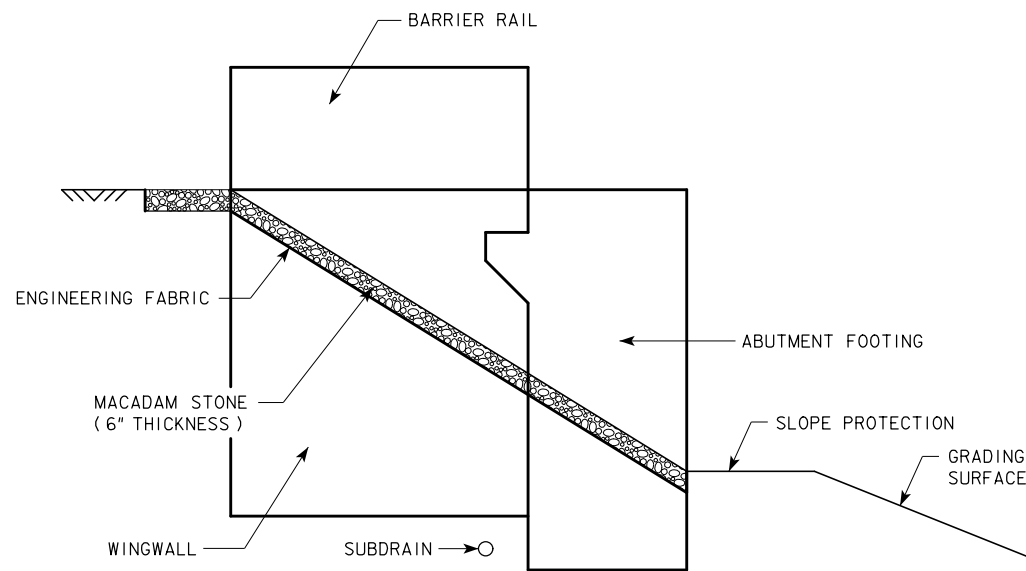
07-10 LATEST REVISION DATE  <i>Thomas L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
	SUBDRAIN DETAILS	H30-85-06

REVISED 07-10 - REMOVED THE GRANULAR BACKFILL DETAIL.

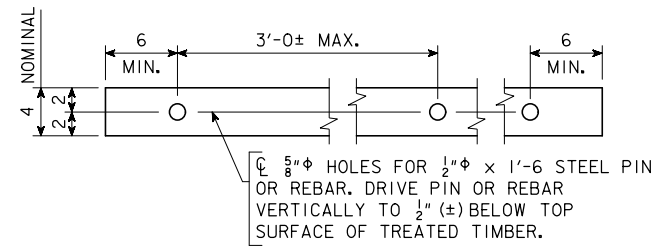
REVISED 09-14 - CHANGED THE AREA OF THE MACADAM STONE AREA TO 2'-0" IN FRONT OF THE BRIDGE WING.



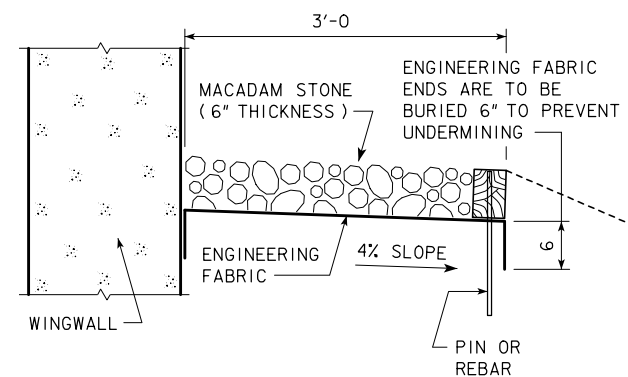
TOP VIEW OF WING ARMORING



PROFILE VIEW OF WING ARMORING  
(SHOWN FOR INTEGRAL ABUTMENT)



4" x 6" TREATED TIMBER  
EDGING DETAILS



SECTION A-A

**SUBDRAIN NOTES:**

SEE H30-85-06 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 4" IN DIAMETER AND MEET THE REQUIREMENTS OF SECTION 4143.01 B 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 BERMS. THE DIMENSIONS 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 (BRIDGE)". NO EXTRA PAYMENT WILL BE MADE.

**MACADAM STONE WING ARMORING NOTES:**

MACADAM STONE SHALL BE PLACED ALONG THE SIDE OF THE WING AND ABUTMENT FOOTING. THIS IS TYPICAL AT EACH CORNER OF THE BRIDGE UNLESS OTHERWISE NOTED IN THE PLANS. THE MACADAM STONE AT THESE LOCATIONS SHALL BE UNDERLAYED WITH ENGINEERING FABRIC MEETING THE REQUIREMENTS OF 4196.01 C.

THE BRIDGE BERM FORESLOPE SHALL BE COMPACTED AND SHAPED AS SHOWN ON THESE PLANS, THE SITUATION PLAN AND AS DIRECTED BY THE ENGINEER. THE BERM FORESLOPE SHALL BE FIRM WHEN THE ENGINEERING FABRIC AND MACADAM STONE ARE PLACED.

THE ENGINEERING FABRIC SHALL MEET THE REQUIREMENTS OF 4196.01 C. IF THE ENGINEERING FABRIC IS LAPPED THE LAPS SHALL BE A MINIMUM OF ONE FOOT IN LENGTH, SHINGLE FASHION WITH UP SLOPE LAP PIECE ON TOP AND STAPLED FOR CONTINUITY.

THE MACADAM STONE SHALL MEET THE REQUIREMENTS OF 4122.02, COARSE MATERIAL (NO CHOKE STONE IS ALLOWED).

WOOD PRESERVATIVE TREATMENT FOR THE TIMBER EDGING SHALL MEET THE REQUIREMENTS FOR GUARDRAIL POSTS, SAWED FOUR SIDES, AS SPECIFIED IN 4161.

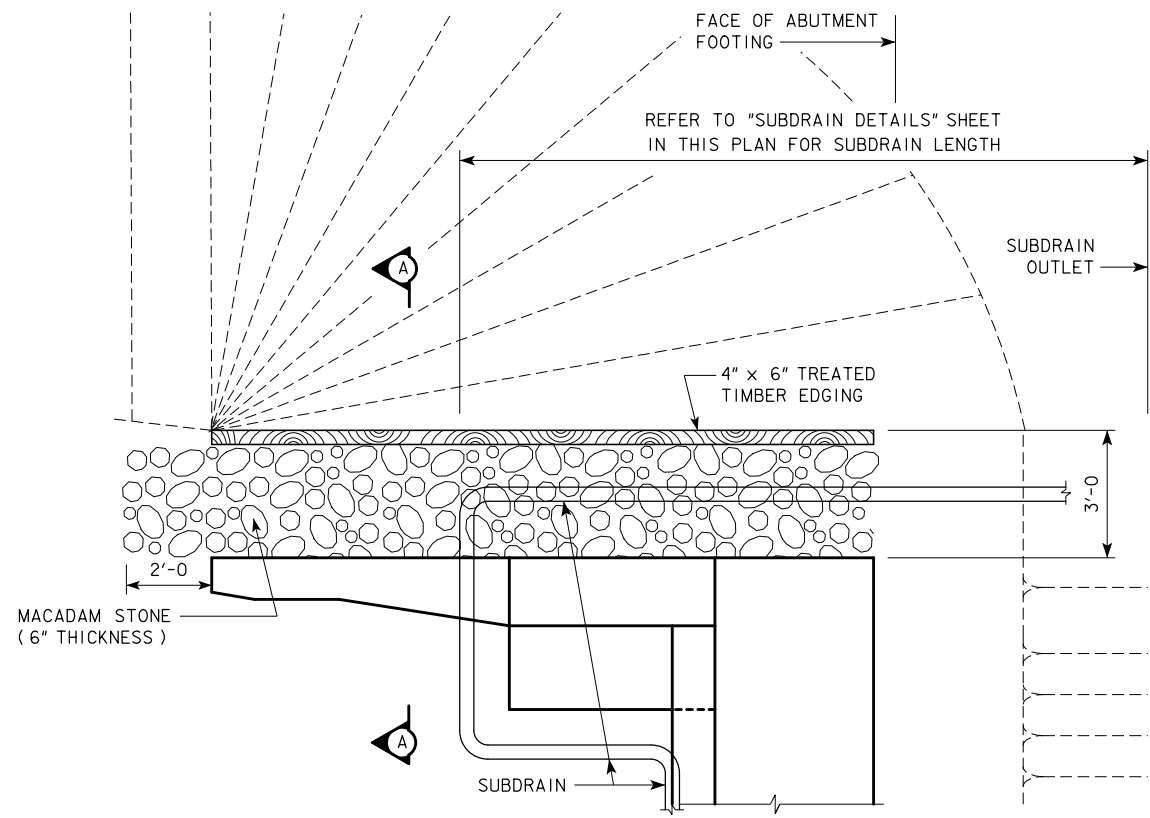
THE MACADAM STONE SHALL BE DEPOSITED, SPREAD, CONSOLIDATED AND SHAPED BY MECHANICAL OR HAND METHODS THAT WILL PROVIDE UNIFORM DEPTH AND DENSITY AND PROVIDE UNIFORM SURFACE APPEARANCE.

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

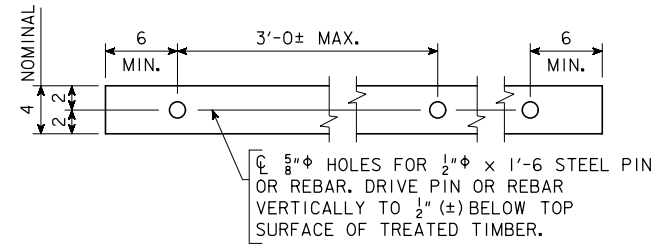
09-14 LATEST REVISION DATE  <i>Thomas L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
	<b>WING ARMORING DETAILS</b> A & B BEAMS	<b>H30-86-06</b>



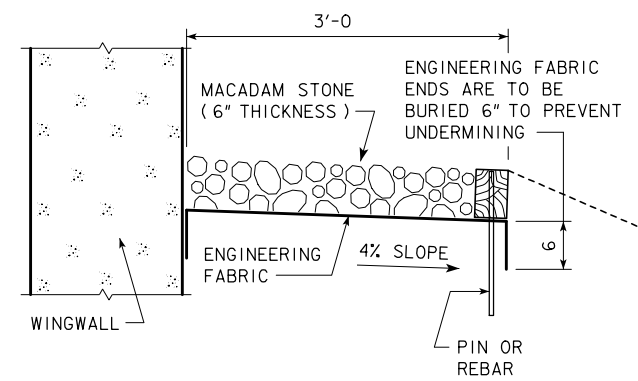
REVISED 09-14 - CHANGED THE AREA OF THE MACADAM STONE AREA TO 2'-0" IN FRONT OF THE BRIDGE WING.



TOP VIEW OF WING ARMORING WITH WING EXTENSION



4" x 6" TREATED TIMBER EDGING DETAILS



SECTION A-A

**SUBDRAIN NOTES:**

SEE H30-85-06 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 4" IN DIAMETER AND MEET THE REQUIREMENTS OF SECTION 4143.01 B 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 BERMS. THE DIMENSIONS 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 (BRIDGE)". NO EXTRA PAYMENT WILL BE MADE.

**MACADAM STONE WING ARMORING NOTES:**

MACADAM STONE SHALL BE PLACED ALONG THE SIDE OF THE WING AND ABUTMENT FOOTING. THIS IS TYPICAL AT EACH CORNER OF THE BRIDGE UNLESS OTHERWISE NOTED IN THE PLANS. THE MACADAM STONE AT THESE LOCATIONS SHALL BE UNDERLAYED WITH ENGINEERING FABRIC MEETING THE REQUIREMENTS OF 4196.01 C.

THE BRIDGE BERM FORESLOPE SHALL BE COMPACTED AND SHAPED AS SHOWN ON THESE PLANS, THE SITUATION PLAN AND AS DIRECTED BY THE ENGINEER. THE BERM FORESLOPE SHALL BE FIRM WHEN THE ENGINEERING FABRIC AND MACADAM STONE ARE PLACED.

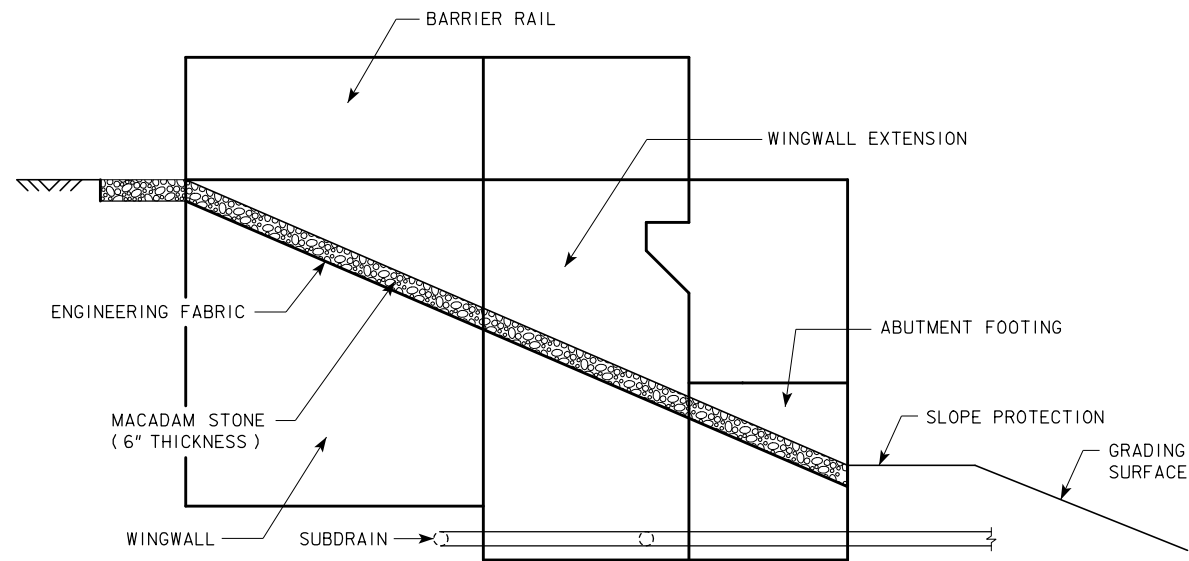
THE ENGINEERING FABRIC SHALL MEET THE REQUIREMENTS OF 4196.01 C. IF THE ENGINEERING FABRIC IS LAPPED THE LAPS SHALL BE A MINIMUM OF ONE FOOT IN LENGTH, SHINGLE FASHION WITH UP SLOPE LAP PIECE ON TOP AND STAPLED FOR CONTINUITY.

THE MACADAM STONE SHALL MEET THE REQUIREMENTS OF 4122.02, COARSE MATERIAL (NO CHOKE STONE IS ALLOWED).

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.

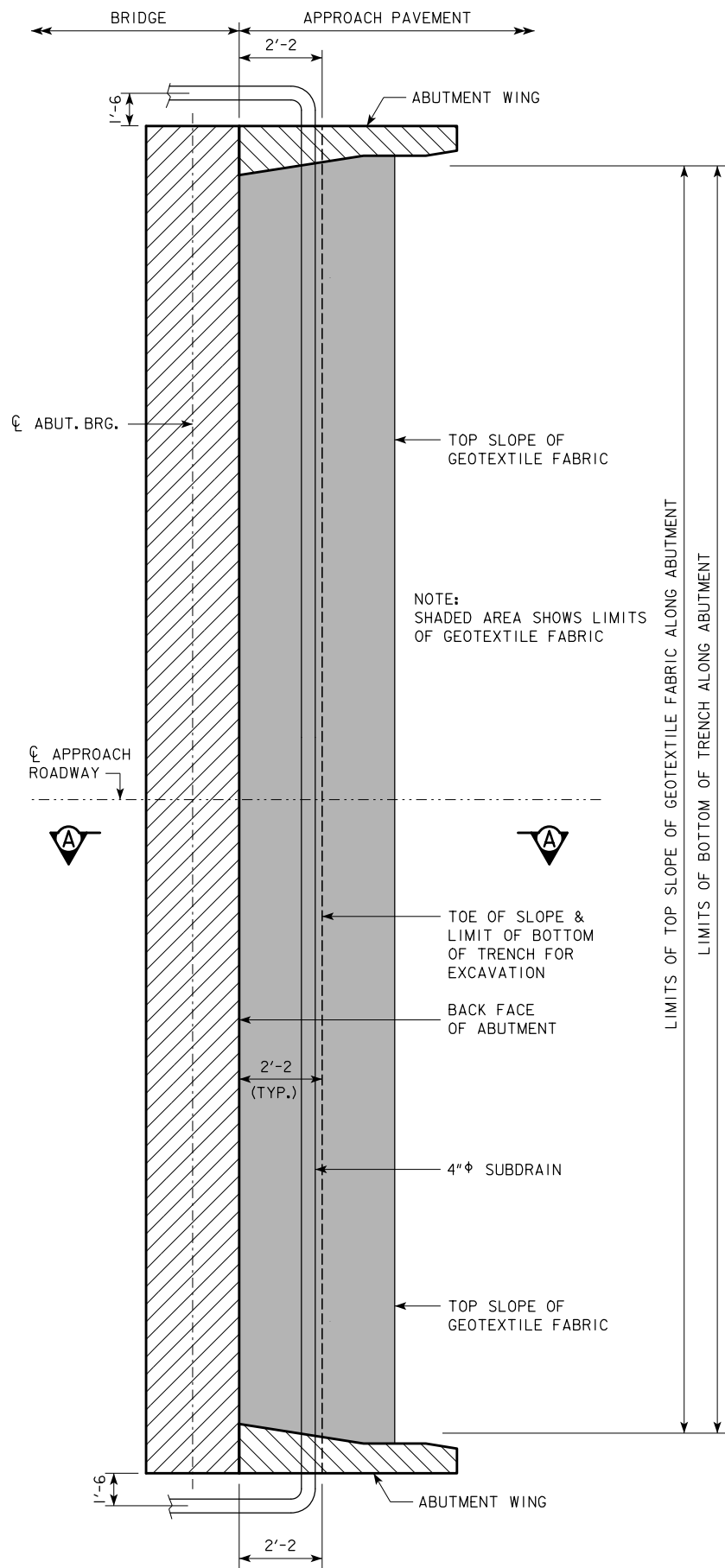
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PROFILE VIEW OF WING ARMORING WITH WING EXTENSION  
(SHOWN FOR INTEGRAL ABUTMENT WITH WING EXTENSIONS)

09-14 LATEST REVISION DATE  <i>Thomas L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
	<b>WING ARMORING DETAILS</b> C BEAMS	<b>H30-87-06</b>

REVISED 09-14 - THE TECHNICAL DATA INFORMATION TABLE WAS REMOVED AND A NOTE ADDED TO REFER TO THE STANDARDS SPECIFICATIONS FOR THIS INFORMATION.



**ABUTMENT PLAN WITHOUT WING EXTENSIONS**

**ABUTMENT BACKFILL PROCESS:**

THE BASE OF THE EXCAVATION SUBGRADE BEHIND THE ABUTMENT IS TO BE GRADED WITH A 4% SLOPE AWAY FROM THE ABUTMENT FOOTING AND A 2% CROSS SLOPE IN THE DIRECTION OF THE SUBDRAIN OUTLET. THIS EXCAVATION 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 UP THE ABUTMENT BACKWALL, ABUTMENT WING WALLS, AND EXCAVATION FACE TO A HEIGHT THAT WILL BE APPROXIMATELY 1 TO 2 FOOT 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 LATH FOLDED IN THE FABRIC AND SECURED TO THE CONCRETE WITH SHALLOW CONCRETE NAILS. THE FABRIC PLACED AGAINST THE EXCAVATION FACE SHALL BE PINNED.

WHEN THE FABRIC IS IN PLACE, THE SUBDRAIN SHALL BE INSTALLED DIRECTLY ON THE FABRIC AT THE TOE OF THE REAR EXCAVATION SLOPE. A SLOT WILL NEED TO BE CUT IN THE FABRIC AT THE POINT WHERE THE SUBDRAIN EXITS THE FABRIC NEAR THE END OF THE ABUTMENT WING WALL.

POROUS BACKFILL IS THEN PLACED AND LEVELED, NO COMPACTION 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 FLOODED, AND COMPACTED WITH VIBRATORY COMPACTION TO ENSURE FULL CONSOLIDATION. LIMIT THE LOOSE LIFTS TO NO MORE THAN 2 FEET OF THICKNESS.

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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.

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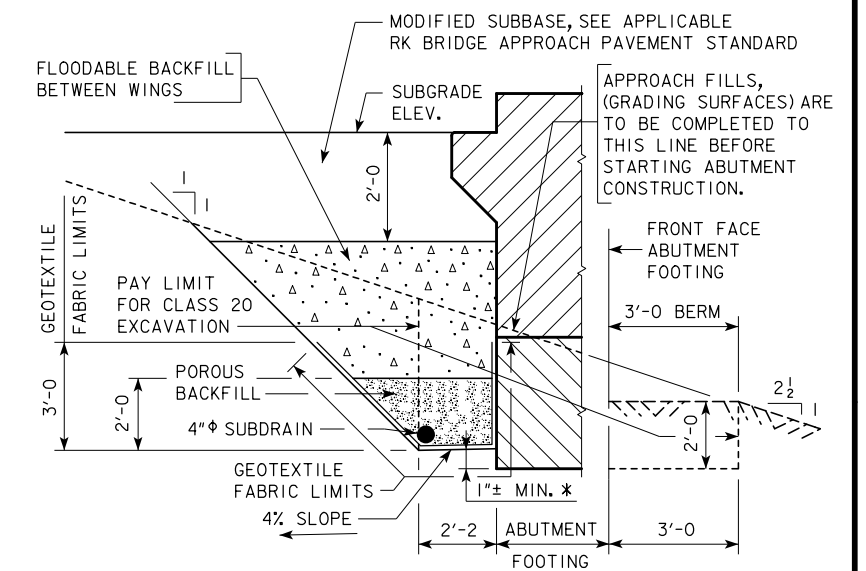
NOTE:  
SEE SUBDRAIN DETAILS SHEET FOR DETAILS NOT SHOWN ON THIS SHEET WHICH ARE PERTINENT TO THIS STRUCTURE.

**NOTE:**

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

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THE GEOTEXTILE FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 6 OF THE STANDARD SPECIFICATIONS. IF THE ENGINEERING FABRIC IS LAPPED THE LAPS SHALL BE A MINIMUM OF ONE FOOT IN LENGTH, SHINGLE FASHION WITH UP SLOPE LAP PIECE ON TOP AND STAPLED FOR CONTINUITY.



**SECTION A-A  
BACKFILL DETAILS**

NOTE: GEOTEXTILE FABRIC WILL BE ATTACHED TO FACE OF ABUTMENT FOOTING AND WINGS.

\* DIMENSION VARIES DUE TO 2% SUBDRAIN SLOPE.

09-14 LATEST REVISION DATE  <i>Harmon L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
	<b>ABUTMENT BACKFILL DETAILS</b> A & B BEAMS - 0° SKEW	<b>H30-88-06</b>

REVISED 09-14 - THE TECHNICAL DATA INFORMATION TABLE WAS REMOVED AND A NOTE ADDED TO REFER TO THE STANDARDS SPECIFICATIONS FOR THIS INFORMATION.

"W" DIMENSION	
SKEW	DIMENSION
15°	2'-2 <sup>7</sup> / <sub>8</sub>
30°	2'-6
45°	3'-0 <sup>3</sup> / <sub>4</sub>

### ABUTMENT BACKFILL PROCESS:

THE BASE OF THE EXCAVATION SUBGRADE BEHIND THE ABUTMENT IS TO BE GRADED WITH A 4% SLOPE AWAY FROM THE ABUTMENT FOOTING AND A 2% CROSS SLOPE IN THE DIRECTION OF THE SUBDRAIN OUTLET. THIS EXCAVATION SHAPING IS TO BE DONE PRIOR TO BEGINNING INSTALLATION OF THE GEOTEXTILE AND BACKFILL MATERIAL.

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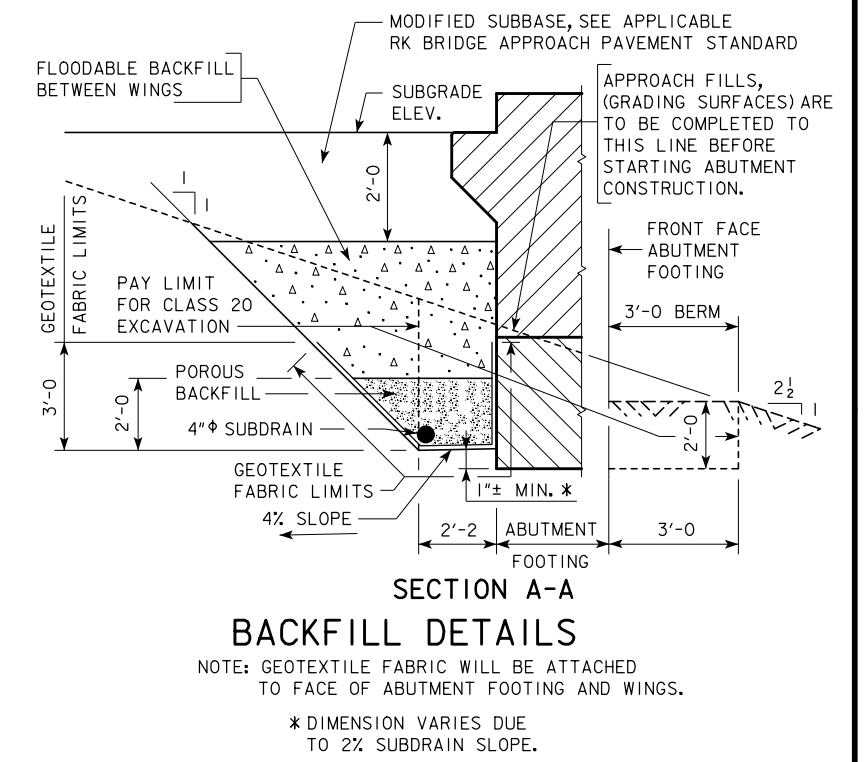
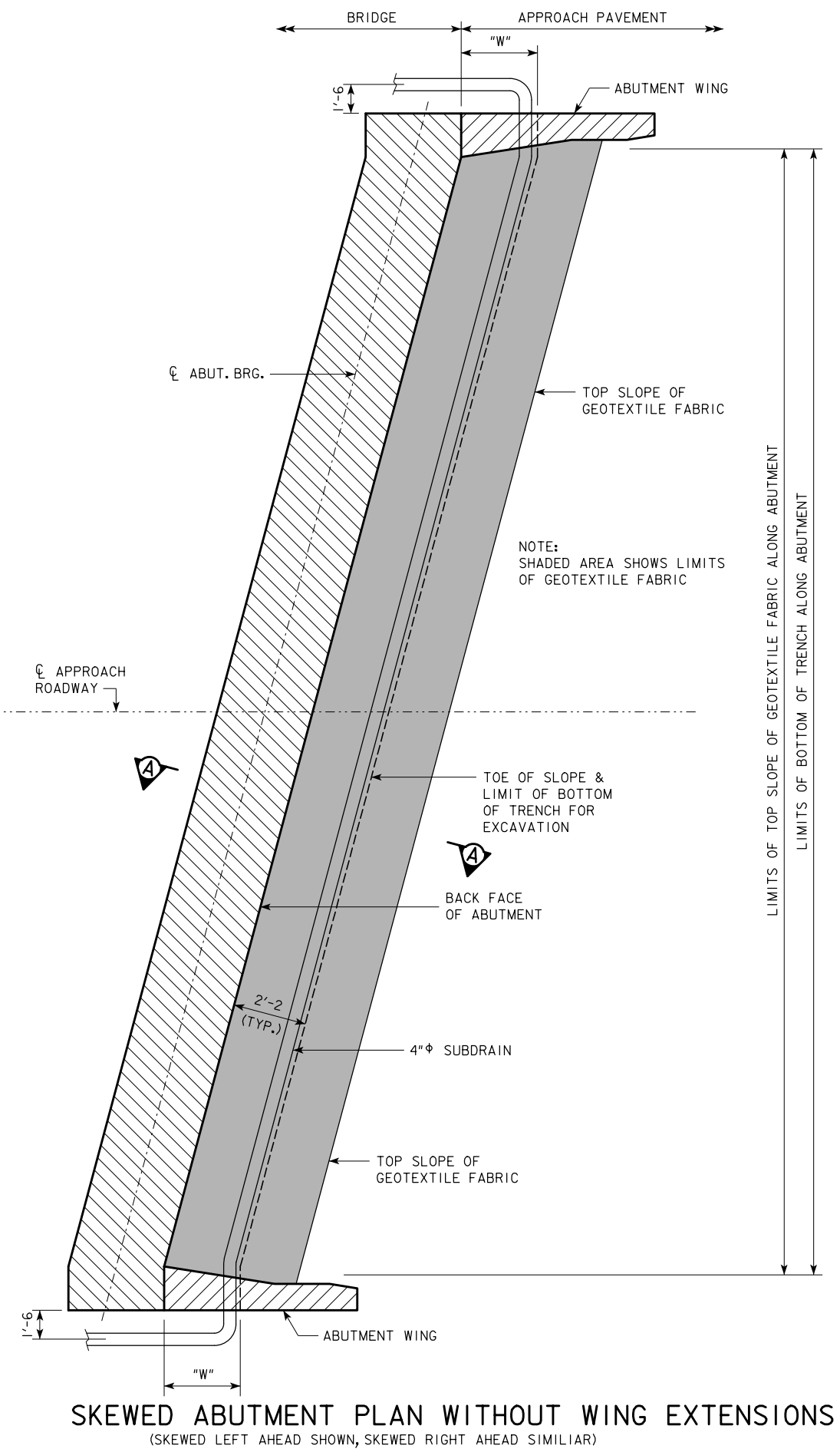
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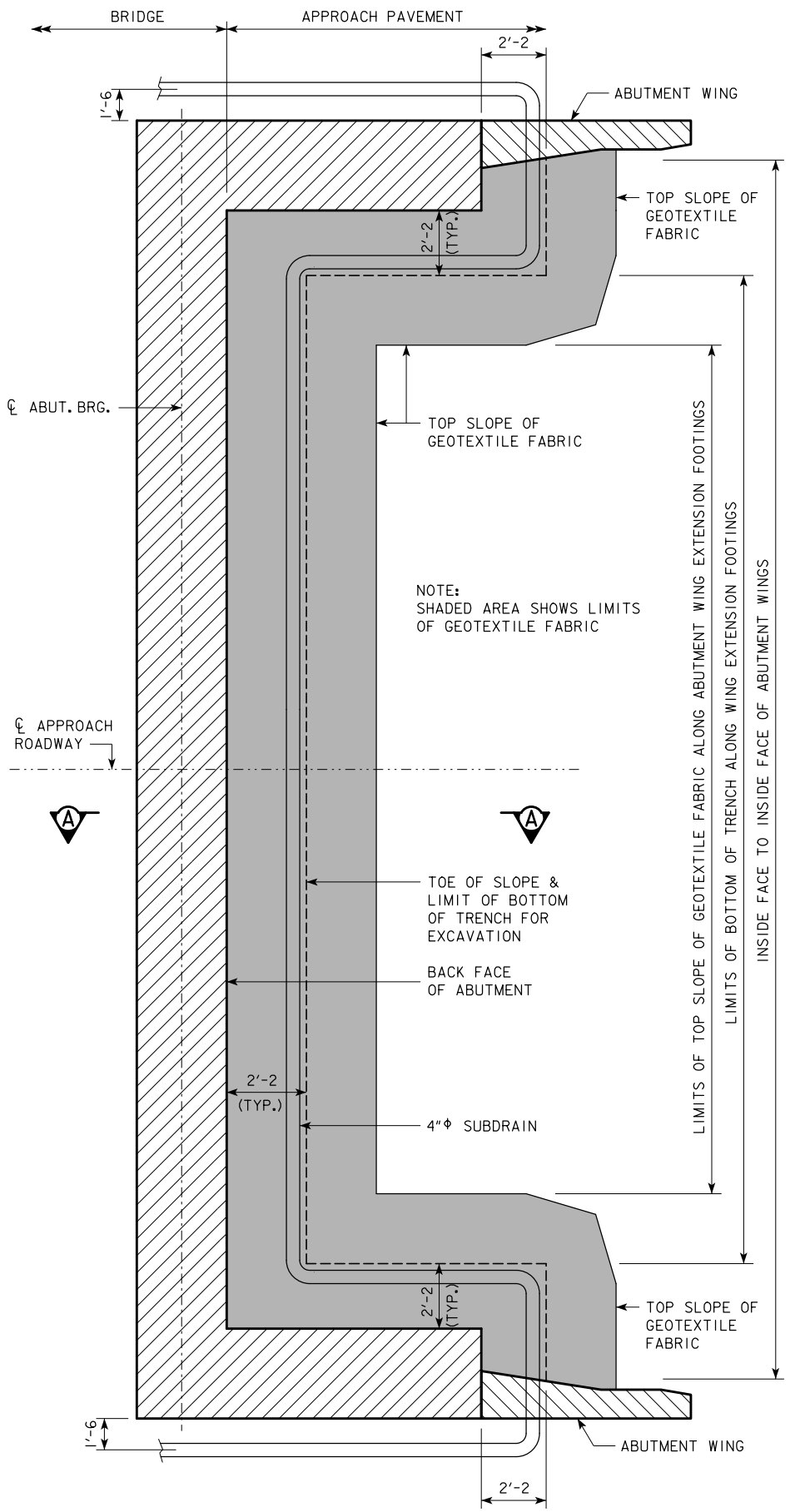
**SKewed ABUTMENT PLAN WITHOUT WING EXTENSIONS**  
(SKEWED LEFT AHEAD SHOWN, SKEWED RIGHT AHEAD SIMILAR)

### SECTION A-A BACKFILL DETAILS

NOTE: GEOTEXTILE FABRIC WILL BE ATTACHED TO FACE OF ABUTMENT FOOTING AND WINGS.  
\* DIMENSION VARIES DUE TO 2% SUBDRAIN SLOPE.

LATEST REVISION DATE 09-14  Approved by <i>Thomas L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
	<b>ABUTMENT BACKFILL DETAILS</b> A & B BEAMS - SKEWED	<b>H30-89-06</b>

REVISED 09-14 - THE TECHNICAL DATA INFORMATION TABLE WAS REMOVED AND A NOTE ADDED TO REFER TO THE STANDARDS SPECIFICATIONS FOR THIS INFORMATION.



**ABUTMENT PLAN WITH WING EXTENSIONS**

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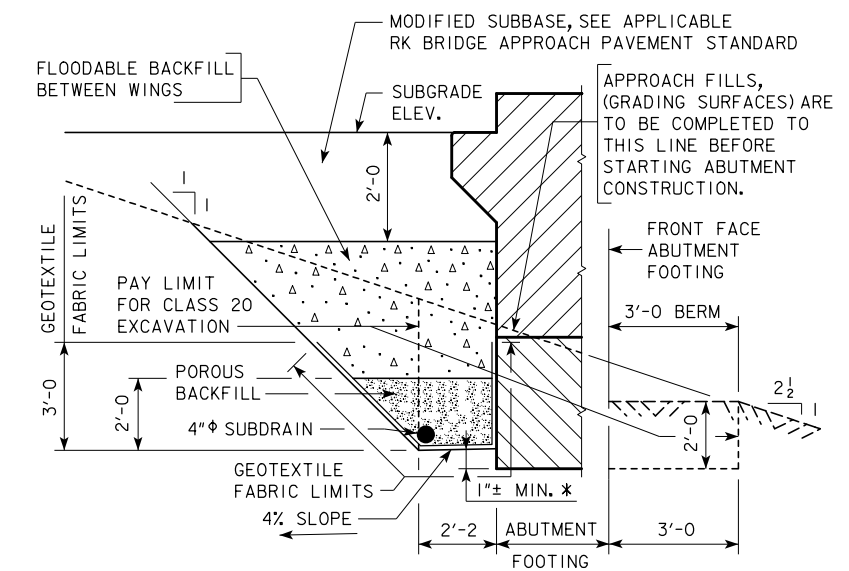
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**SECTION A-A  
BACKFILL DETAILS**

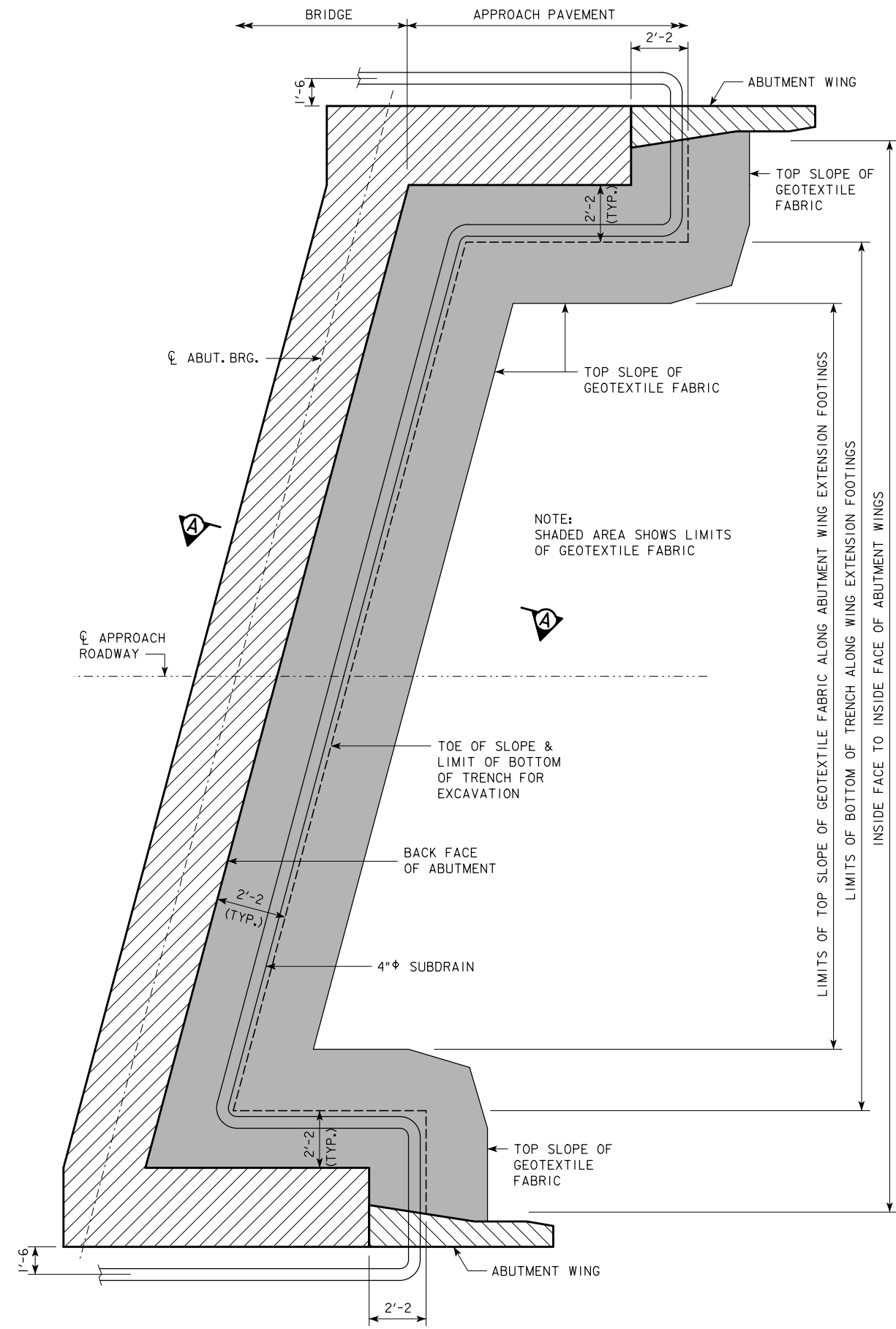
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09-14 LATEST REVISION DATE  <i>Harmon L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES <b>PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES</b> DECEMBER, 2006	
	<b>ABUTMENT BACKFILL DETAILS</b> C BEAMS - 0° SKEW	<b>H30-90-06</b>



REVISED 09-14 - THE TECHNICAL DATA INFORMATION TABLE WAS REMOVED AND A NOTE ADDED TO REFER TO THE STANDARDS SPECIFICATIONS FOR THIS INFORMATION.



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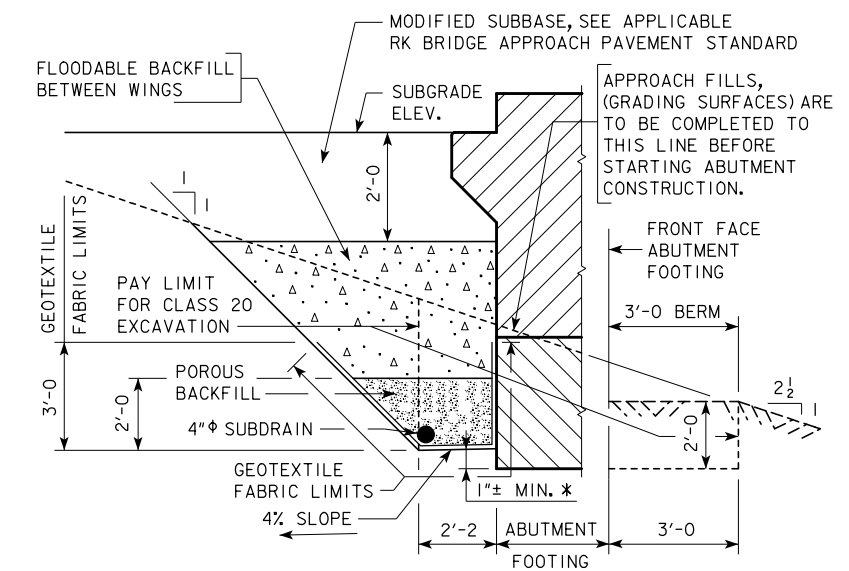
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**SECTION A-A  
BACKFILL DETAILS**

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**SKewed Abutment Plan with Wing Extensions**  
(SKewed LEFT AHEAD SHOWN, SKewed RIGHT AHEAD SIMILIAR)

09-14 LATEST REVISION DATE  <i>Harmon L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER		
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	<b>ABUTMENT BACKFILL DETAILS</b> C BEAMS - SKEWED	<b>H30-91-06</b>