



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

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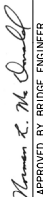
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STRUCTURAL RESISTANCE LEVEL-1 (SRL-1) REPLACES THE 50 TON STEEL PILE DESIGNATION.

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 PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES DECEMBER, 2006
		INDEX SHEET
		H30-01-06

REVISED 04-13 - THIS STANDARD RENAMED TO H30-01A-06. INDEX SHEET INFORMATION ON STANDARD 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 $\frac{1}{2}$ " 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 (50# IS $\frac{5}{8}$ 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.

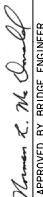
CONSTRUCTION:

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.

04-13 LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	
		STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES DECEMBER, 2006
		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" $\angle$ TO $\angle$ OF ABUTMENT BEARINGS WITH 30° SKEW RIGHT AHEAD.

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

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

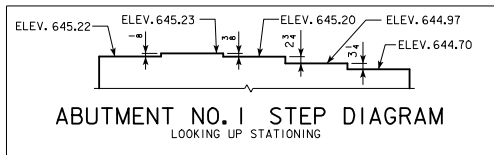
$\angle$ ABUT. BRG. = $653.29 - [(104+78.08) - (103+75.00)](0.0325) = 649.94$
 $\angle$ PIER BRG. = $653.29 - [(105+46.33) - (103+75.00)](0.0325) = 647.72$
 $\angle$ PIER BRG. = $653.29 - [(106+23.67) - (103+75.00)](0.0325) = 645.21$
 $\angle$ ABUT. BRG. = $653.29 - [(106+91.92) - (103+75.00)](0.0325)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

ELEVATIONS TOP OF SLAB FACING ALONG THE STATIONING

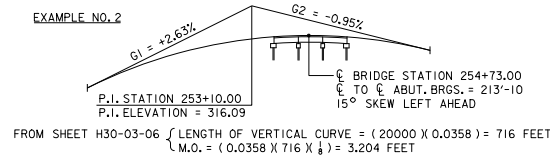
(BEAM SPACING $\times$ TAN. SK. Δ) $\times$ GRADE = (6.75' $\times$ TAN 30°)(0.0325) = 0.13'

ABUTMENT NO. 1

BEAMS	EXTERIOR	INTERIOR	CENTER	INTERIOR	EXTERIOR
PGL ELEV.	649.94	649.94	649.94	649.94	649.94
SK. Δ 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

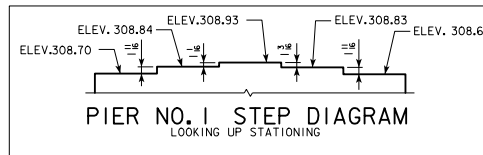
$\angle$ BRIDGE STA.	=	254+73.00	
$\pm \frac{1}{2}$ OF L2	=	38.67	
$\angle$ PIER BRGS.	=	254+34.33	255+11.67
$\pm$ LI	=	- 68.25	+ 68.25
$\angle$ ABUTMENT BRGS.	=	253+66.08	255+79.92

ELEVATIONS TOP OF SLAB FACING ALONG THE STATIONING

(BEAM SPACING $\times$ TAN. SK. Δ) = (6.75' $\times$ 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 $\frac{1}{2}$)	-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 (P) 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.

04-13
LATEST REVISION DATE

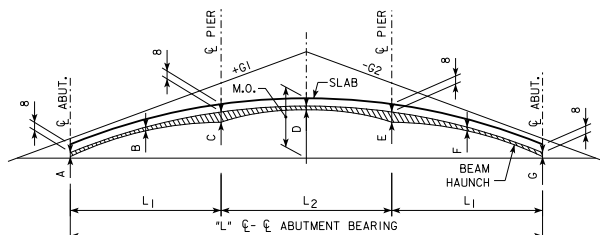
APPROVED BY BRIDGE ENGINEER
Thomas E. McQuillan

IOWA DOT Highway Division

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

GENERAL INFORMATION

H30-02-06



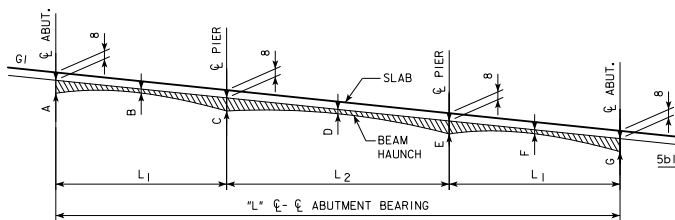
€-€ ABUT. BEG. "L"	€ ABUT.	B	€ C PIER	D	€ E PIER	F	€ ABUT.
138'-10	$\frac{15}{16}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{15}{16}$
151'-4	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{9}{16}$	$\frac{1}{2}$	$\frac{1}{2}$
163'-10	$\frac{13}{16}$	$\frac{1}{2}$	$\frac{17}{16}$	$\frac{2}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{13}{16}$
176'-4	$\frac{13}{16}$	$\frac{9}{16}$	$\frac{11}{16}$	$\frac{9}{16}$	$\frac{11}{16}$	$\frac{9}{16}$	$\frac{13}{16}$
188'-10	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{2}{2}$	$\frac{2}{2}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{1}{2}$
201'-4	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{8}$	$\frac{2}{2}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{1}{2}$
213'-10	$\frac{11}{16}$	$\frac{9}{16}$	$\frac{13}{8}$	$\frac{1}{2}$	$\frac{13}{8}$	$\frac{9}{16}$	$\frac{11}{16}$
226'-4	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
243'-0	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{15}{8}$	$\frac{1}{2}$	$\frac{15}{8}$	$\frac{1}{2}$	$\frac{1}{2}$

$$\text{LENGTH OF VERTICAL CURVE REQUIRED} = (20,000) \times (G_1 - G_2)$$

$$\text{M.O.} = \frac{(G_1 - G_2) \times \text{LENGTH OF V.C.}}{}$$

(G1-G2) IS THE ALGEBRAIC DIFFERENCE OF THE APPROACH GRADES EXPRESSED IN DECIMAL FORM. G1 NEED NOT HAVE THE SAME VALUE AS G2. MAXIMUM VALUE OF G1 OR G2 IS 5%. LENGTH OF CURVE AND M.O. ARE IN FEET.

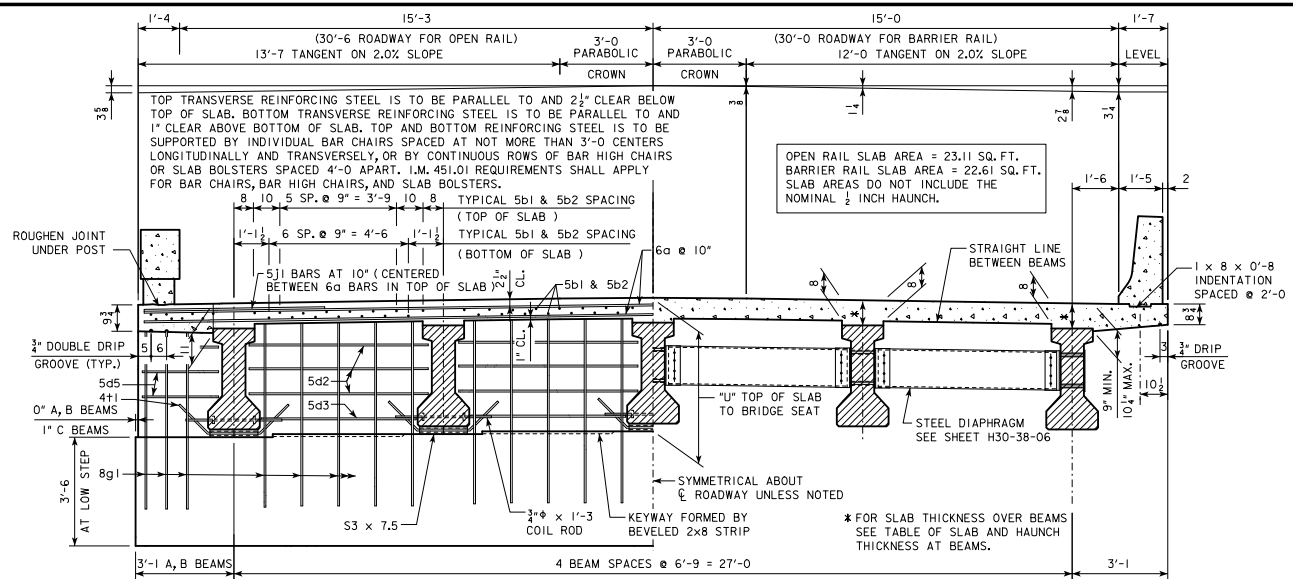
SLAB AND HAUNCH THICKNESS
AT BEAMS FOR VERTICAL CURVE



Є-Є ABUT. BRG. "L"	Є ABUT.	B	Є PIER	D	Є PIER	F	Є ABUT
138"-10	$\frac{1}{16}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{9}{16}$	$\frac{1}{16}$	$\frac{1}{2}$	$\frac{1}{16}$
151"-4	$\frac{7}{8}$	$\frac{9}{16}$	$\frac{1}{16}$	$\frac{9}{16}$	$\frac{1}{16}$	$\frac{9}{16}$	$\frac{7}{8}$
163"-10	$\frac{15}{16}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{9}{16}$	$\frac{1}{16}$	$\frac{1}{2}$	$\frac{15}{16}$
176"-4	$\frac{15}{16}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{9}{16}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{15}{16}$
188"-10	$\frac{1}{16}$	$\frac{9}{16}$	$\frac{2}{8}$	$\frac{1}{2}$	$\frac{2}{8}$	$\frac{9}{16}$	$\frac{1}{16}$
201"-4	$\frac{15}{16}$	$\frac{1}{16}$	$\frac{2}{8}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{15}{16}$	$\frac{15}{16}$
213"-10	$\frac{15}{16}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{2}$	$\frac{1}{16}$	$\frac{1}{2}$	$\frac{15}{16}$
226"-4	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{2}{8}$	$\frac{1}{2}$	$\frac{2}{8}$	$\frac{1}{2}$	$\frac{1}{8}$
243"-0	$\frac{2}{8}$	$\frac{1}{2}$	$\frac{2}{8}$	$\frac{1}{2}$	$\frac{2}{8}$	$\frac{1}{2}$	$\frac{2}{8}$

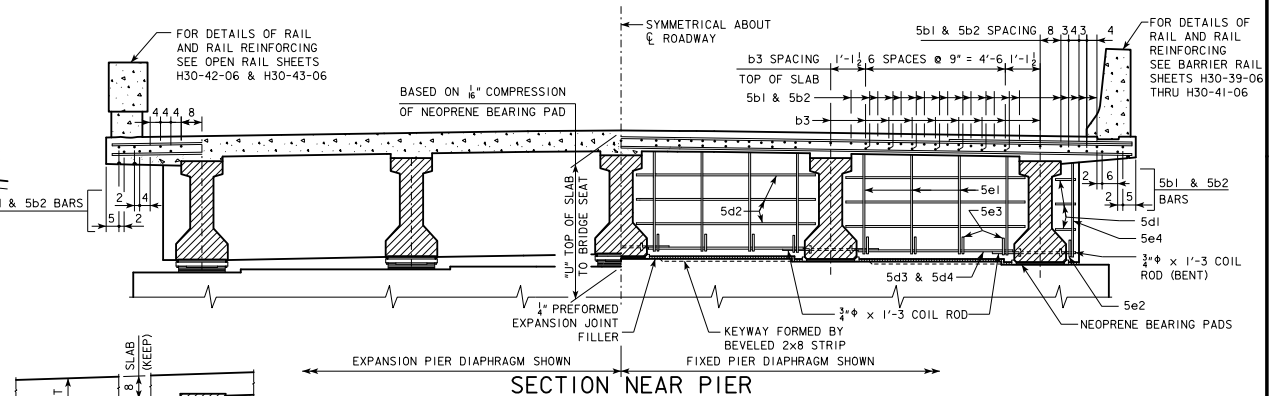
GI MAY HAVE A + OR - SIGN. THE MINIMUM NUMERICAL VALUE OF THE GRADE IS 0.3% AND THE MAXIMUM VALUE IS 5%.

SLAB AND HAUNCH THICKNESS
AT BEAMS FOR STRAIGHT GRADE



HALF SECTION NEAR ABUTMENT
(OPEN RAIL SHOWN)

HALF SECTION NEAR MID SPAN
(BARRIER RAIL SHOWN)



SLAB THICKNESS DETAILS

NOTE: THE SLAB THICKNESS (T) AT THE BEAMS, (8" SLAB PLUS HAUNCH) IS BASED ON THE ANTICIPATED BEAM CAMBER REMAINING AFTER PLACING THE SLAB, BUT IS NOT GUARANTEED FOR CONSTRUCTION. IF BEAM IS UNDER CAMBERED INCREASE THE HAUNCH THICKNESS OVER THE BEAM AT THE MIDPOINT OF THE SPANS (POINTS B, D AND F). IF THE BEAM IS OVER CAMBERED DECREASE THE HAUNCH THICKNESS OVER THE BEAM AT THE MIDPOINT OF THE SPANS (POINTS B, D AND F) TO A MAXIMUM OF $\frac{1}{2}$ " EMBEDMENT IN THE SLAB. IF MORE THAN $\frac{1}{2}$ " EMBEDMENT IS REQUIRED OR IF THE HAUNCH EXCEEDS $2\frac{1}{2}$ " THE GRADE LINE IS TO BE REVISED.

LENGTH OF S3x7.5 (ABUTMENT BEAM SEAT)	
BEAM BOTTOM FLANGE WIDTH	LENGTH OF S3 x 7.5
1'-5	1'-3½
1'-8	1'-6½

06-12
LATEST REVISION DATE

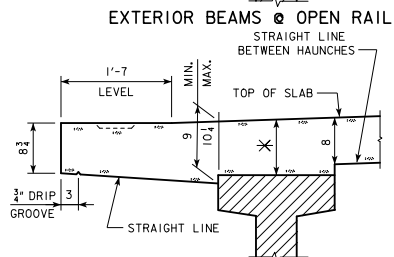
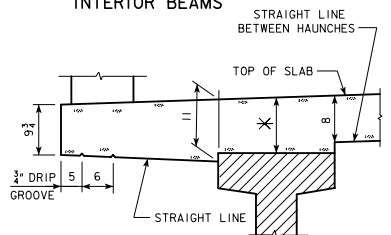
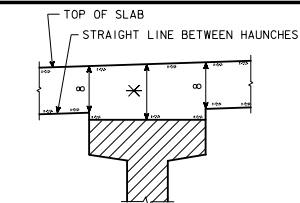
Norman L. Mc Donald
APPROVED BY BRIDGE ENGINEER



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

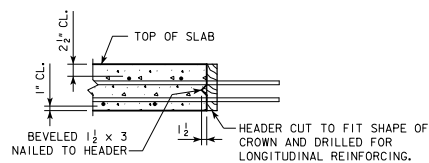
SUPERSTRUCTURE DETAILS	H30-03-06
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REVISED 06-12 - 1" MIN. REQUIREMENT ADDED TO BAR CHAIR NOTE.

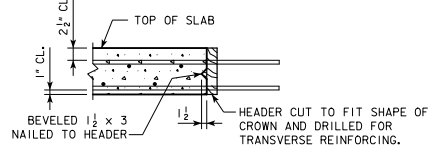


EXTERIOR BEAMS & BARRIER RAIL TYPICAL SLAB AND HAUNCH DETAIL

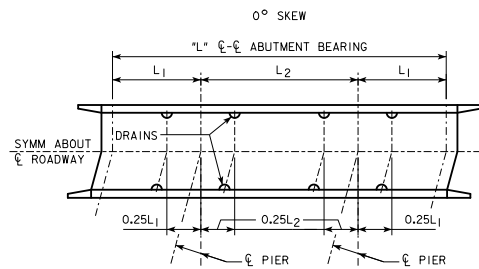
* FOR SLAB THICKNESS OVER BEAMS SEE * SLAB THICKNESS DETAILS * ON SHEET H30-03-06.



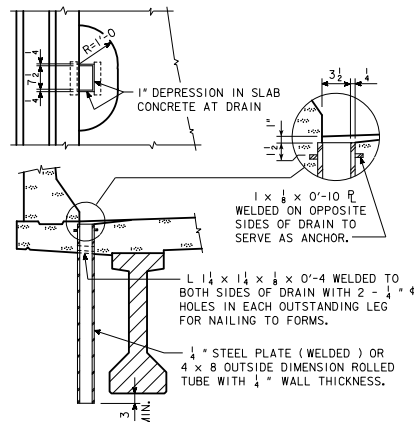
TRANSVERSE SLAB CONSTRUCTION JOINT



LONGITUDINAL SLAB CONSTRUCTION JOINT



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 1/4"	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.

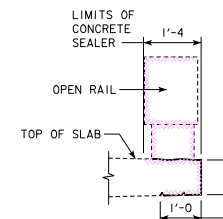
FORMS FOR THE SLAB AND RAILS ARE TO BE SUPPORTED BY THE PRESTRESSED CONCRETE BEAMS.

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) *.

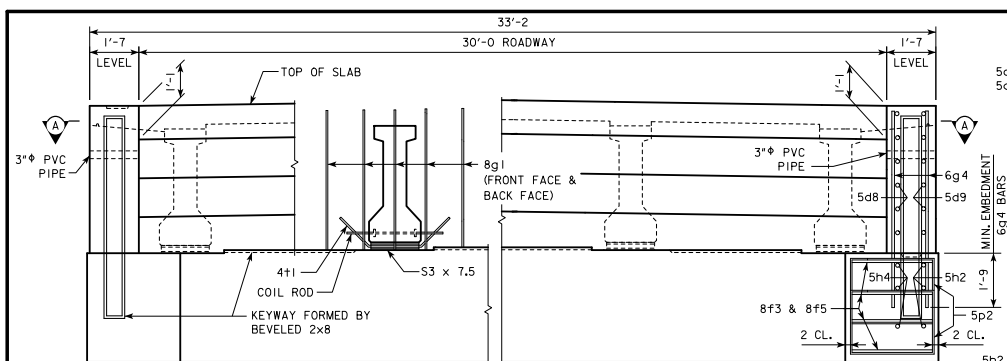


CONCRETE SEALER LIMITS FOR OPEN RAILS

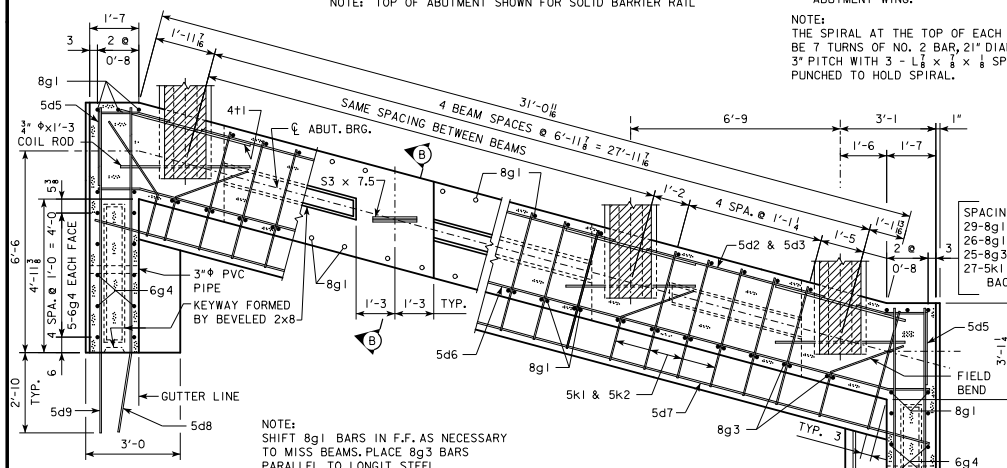
CONCRETE SEALER SHALL BE APPLIED TO BOTH SIDES OF BRIDGE SLAB ON THE TOP, EDGE OF SLAB AND UNDER THE SLAB. THE CONCRETE SEALER SHALL ALSO BE APPLIED TO THE OPEN RAIL ON THE TOP, TRAFFIC FACE SIDE, BOTTOM OF RAIL, AND ON ALL SIDES OF THE OPEN RAIL POSTS.

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.

06-12 LATEST REVISION DATE	<i>Thomas E. McQuillan</i> APPROVED BY BRIDGE ENGINEER	Highway Division	
		STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES	
		PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES	
		DECEMBER, 2006	
SUPERSTRUCTURE DETAILS		H30-04-06	



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

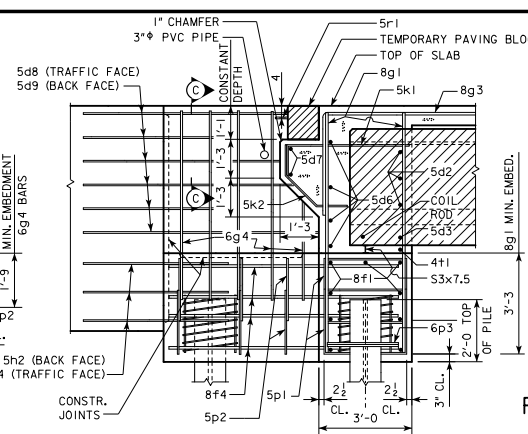


NOTE: SHIFT 8g1 BARS IN F.F. AS NECESSARY TO MISS BEAMS, PLACE 8g3 BARS PARALLEL TO LONGIT. STEEL.

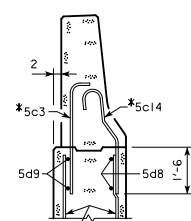
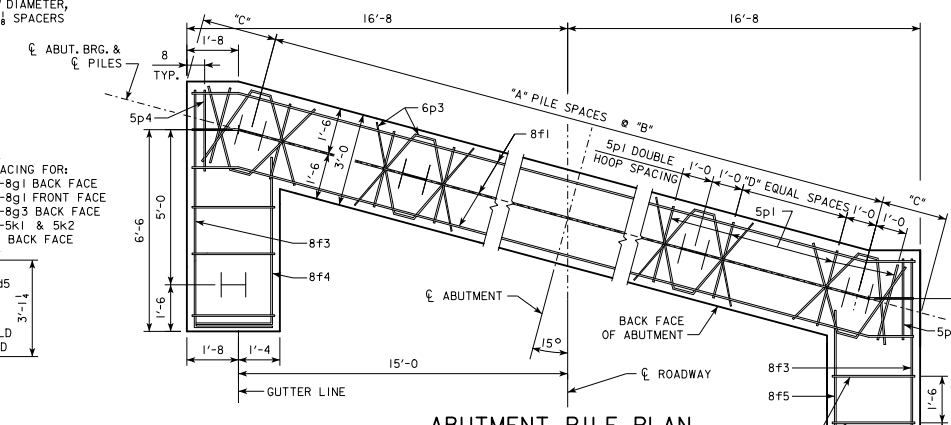
PART SECTION A-A

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 3/8"	2'-6 1/8"	2'-6 1/8"	2'-6 1/8"
	"D" EQUAL SPACES	4	3	3	3
	NO. OF PILES PER ABUT.	8	9	9	9
P _u STRENGTH I DESIGN LOAD (KIPS)		144	127	131	139

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



PART SECTION B-B



PART SECTION C-C

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

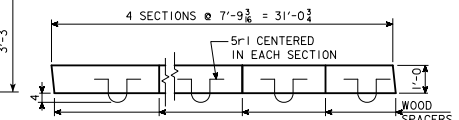
ABUTMENT NOTES:

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.

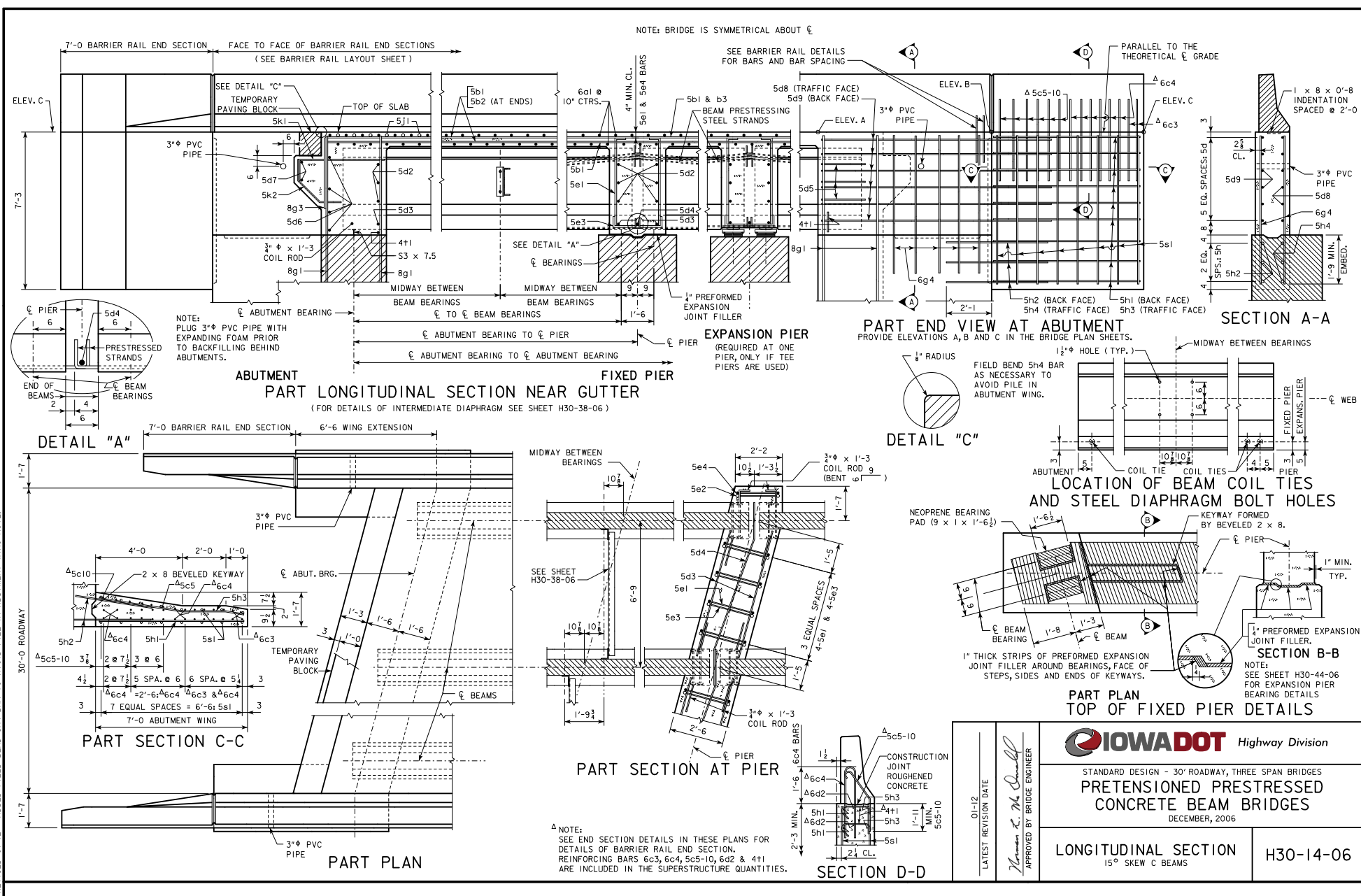
IF ROCK IS CLOSER THAN 15' BELOW ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.

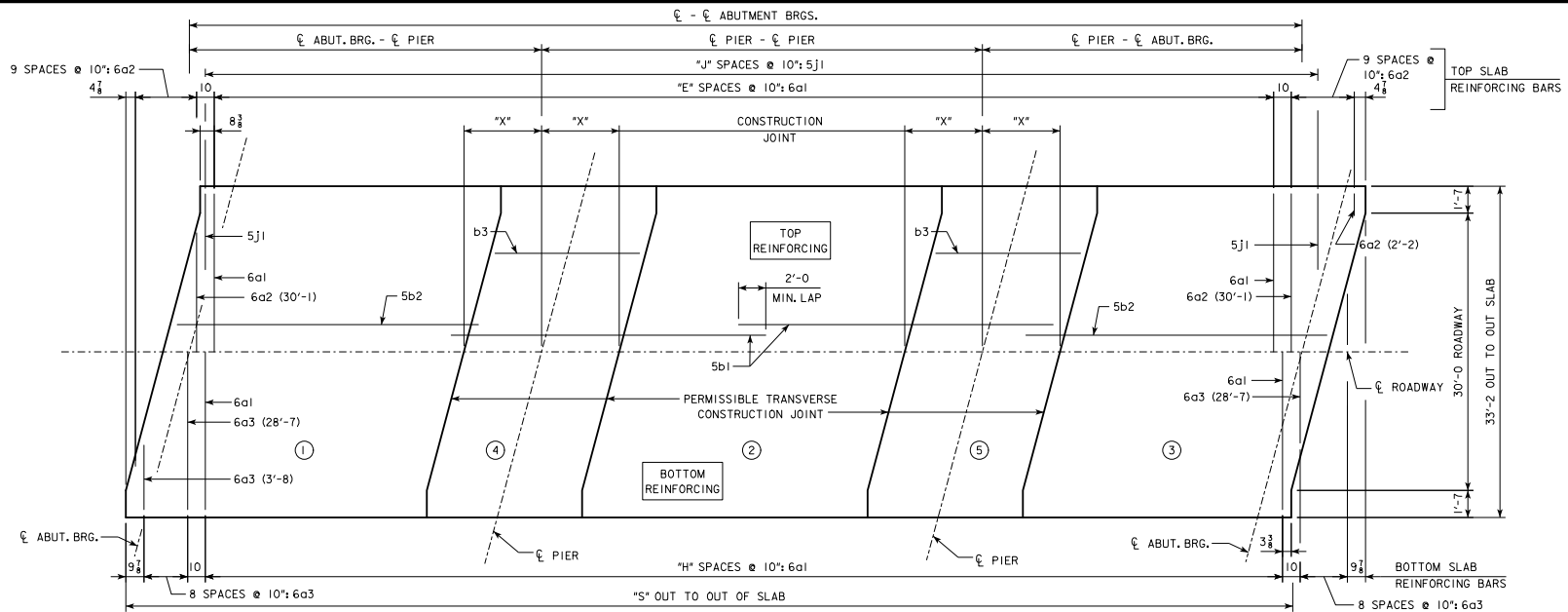


PLAN OF TEMPORARY PAVING BLOCK

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

04-13 LATEST REVISION DATE <i>Steven L. McQuinn</i> APPROVED BY BRIDGE ENGINEER	IOWADOT Highway Division STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES DECEMBER, 2006	
	ABUTMENT DETAILS 15° SKEW C BEAMS	H30-12-06





ESTIMATED QUANTITIES (SUPERSTRUCTURE PLUS INTEGRAL ABUTMENTS)		℄-℄ 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.	172.3	183.0	200.9	211.8	222.7	244.4	255.1	266.4	281.2
	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	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)		℄-℄ 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		℄-℄ ABUT. BRG.	138'-10	151'-4	163'-10	176'-4	188'-10	201'-4	213'-10	226'-4	243'-0
VERTICAL	TOP OF SLAB TO ABUT. CONSTR. JT. AT C.L. ABUT. BRG.	"U"	3'-7 1/8	3'-7 1/8	4'-2 1/8	4'-2 1/8	4'-3	4'-8 1/8	4'-8 1/8	4'-9 1/8	4'-9 1/8
CURVE	TOP OF SLAB TO PIER TOP AT C.L. PIER*	"U"	3'-6 1/8	3'-6 1/8	4'-1 1/8	4'-1 1/8	4'-1 1/8	4'-7 1/8	4'-7 1/8	4'-7 1/8	4'-7 1/8
STRAIGHT	TOP OF SLAB TO ABUT. CONSTR. JT. AT C.L. ABUT. BRG.	"U"	3'-8 1/8	3'-7 1/8	4'-2 1/8	4'-2 1/8	4'-3 1/8	4'-8 1/8	4'-8 1/8	4'-9 1/8	4'-10
GRADE	TOP OF SLAB TO PIER TOP AT C.L. PIER*	"U"	3'-6 1/8	3'-6 1/8	4'-1 1/8	4'-1 1/8	4'-2 1/8	4'-7 1/8	4'-7 1/8	4'-8 1/8	4'-8 1/8
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 1/4	154'-5 1/4	166'-11 1/4	179'-5 1/4	191'-11 1/4	204'-5 1/4	216'-11 1/4	229'-5 1/4	246'-1 1/4
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 1/8 INCH DEFLECTION OF THE 1 INCH NEOPRENE BEARING PAD. AT EXPANSION PIER LOCATIONS ADD 3/8 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 07-15	APPROVED BY BRIDGE ENGINEER <i>Thomas E. McQuillan</i>		
		STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES	
		PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES DECEMBER, 2006	
		SUPERSTRUCTURE DETAILS 15° SKEW	H30-15-06

EPOXY COATED REINFORCING

BENT BAR DETAILS									
NOTE: ALL DIMENSIONS ARE OUT TO OUT. D= PIN DIAMETER									
LATEST REVISION DATE									
APPROVED BY BRIDGE ENGINEER									
IOWADOT Highway Division									
STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES									
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES									
DECEMBER, 2006									
DECK & ABUTMENT REINF.									
15° SKEW									
H30-16-06									

05-11
LATEST REVISION DATE

Norman L. Mc Donald
APPROVED BY BRIDGE ENGINEER



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

DECK & ABUTMENT REINF.	H30-16-06
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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

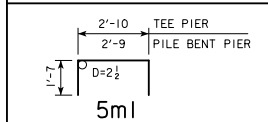
G = GRADE (%)

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 (%)

BENT BAR DETAILS



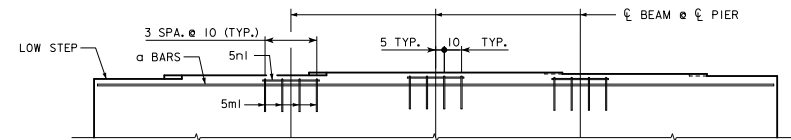
NOTE: ALL DIMENSIONS ARE OUT TO OUT.
D = PIN DIAMETER.

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.

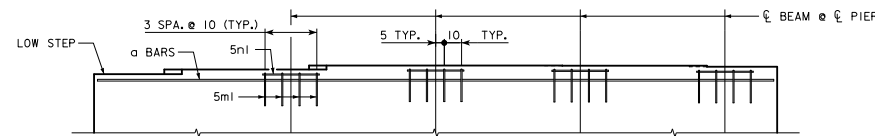
ADDITIONAL CONCRETE VOLUME PER SUBSTRUCTURE UNIT (C.Y.)

	ROADWAY GRADE AT SUBSTRUCTURE UNIT				
	1%	2%	3%	4%	5%
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



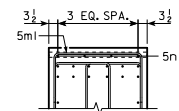
PART ELEVATION VIEW OF PIER CAP

GRADE (G): G ≤ 1.9%



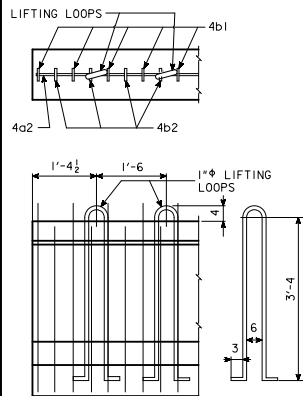
PART ELEVATION VIEW OF PIER CAP

GRADE (G): 1.9% < G ≤ 5.0%



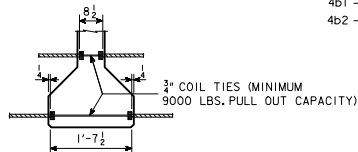
TYPICAL SECTION

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



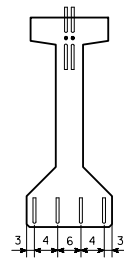
LIFTING LOOP DETAIL

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

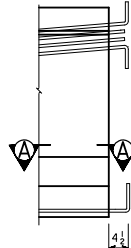


COIL TIE DETAIL

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

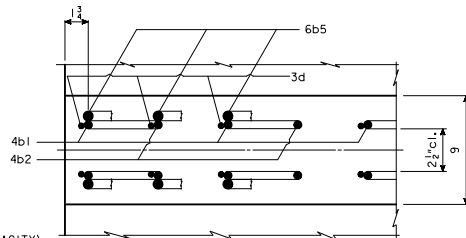


THE TOP STRAIGHT STRANDS OF BEAMS C63 AND C67 ARE TO BE CUT WITH 1'-0" PROJECTIONS AND SHOP BENT UP. THE TOP AND BOTTOM DEFLECTED STRANDS OF BEAMS C71 THROUGH C80 ARE TO BE CUT WITH 1'-0" PROJECTIONS AND SHOP BENT UP OR DOWN AS SHOWN. THE REMAINING TOP STRANDS ARE TO BE CUT WITH 0'-3" PROJECTIONS. FOUR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



TYPICAL AT BOTH BEAM ENDS

STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS



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.

REINFORCING BAR LIST											
BEAM		C63		C67		C71		C75		C80	
SPAN		63'-4"		67'-6"		71'-8"		75'-10"		80'-0"	
BAR	SHAPE	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
6a1						4	37'-8"	4	39'-9"	4	41'-10"
4a2		2	5'-0"	2	5'-0"	2	5'-0"	2	5'-0"	2	5'-0"
8a3										2	40'-0"
Δ 4b1		46	8'-10"	48	8'-10"	54	8'-10"	58	8'-10"	60	8'-10"
4b2		12	7'-2"	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"	16	3'-9"
3c1		46	1'-8"	48	1'-8"	54	1'-8"	58	1'-8"	60	1'-8"
* 3d		116	3'-0"	120	3'-0"	132	3'-0"	140	3'-0"	144	3'-0"
3e		26	1'-10"	26	1'-10"	26	1'-10"	26	1'-10"	26	1'-10"

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

C BEAM DATA

BEAM	SPAN LENGTH ℓ ₀ BEARING	OVERALL BEAM LENGTH (L)	STRAND SIZE DIA. (inches)	NO. OF STRANDS		③ TOTAL INITIAL PRESTRESS KIPS	HOLD DOWN FORCE-KIPS	CAMBER (in.)		DEFLECTION (in.) Δ ₀				PERMISSIBLE SPACING		WEIGHT (TONS)	CONCRETE (C. Y.)	REINFORCING STEEL-(ID)
				STRAIGHT	DEFLECTED			AT RELEASE	AFTER LOSSES	IMMEDIATE① (ELASTIC) Δ ₁		TIME (PLASTIC) Δ ₂		HL93 LOADING				
										CONC.	STEEL DIAPH.	CONC.	STEEL DIAPH.					
															CONC.			
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 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, Δ₀, DUE TO WEIGHT OF SLAB AND DIAPHRAGMS FOR DETAILING PURPOSE:

(A) Δ₀ = Δ₁ + Δ₂ FOR SIMPLE SPAN.

(B) Δ₀ = Δ₁ + 1/2 Δ₂ FOR END SPANS OF CONTINUOUS BRIDGE.

(C) Δ₀ = Δ₁ + 1/4 Δ₂ 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 6,000 psi. MINIMUM f'_c AT RELEASE SHALL BE 5,000 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.

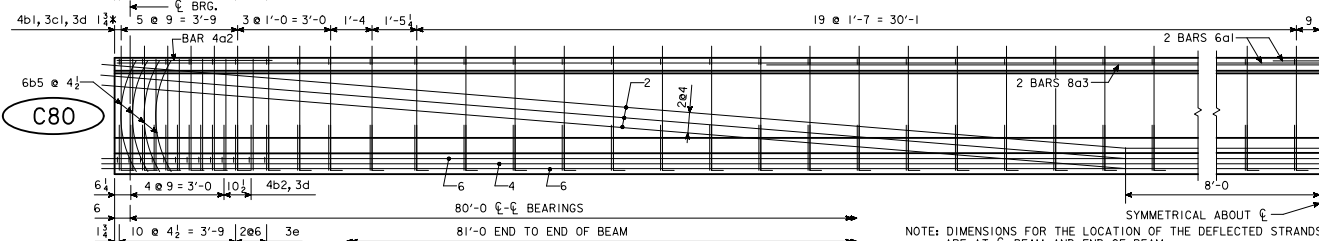
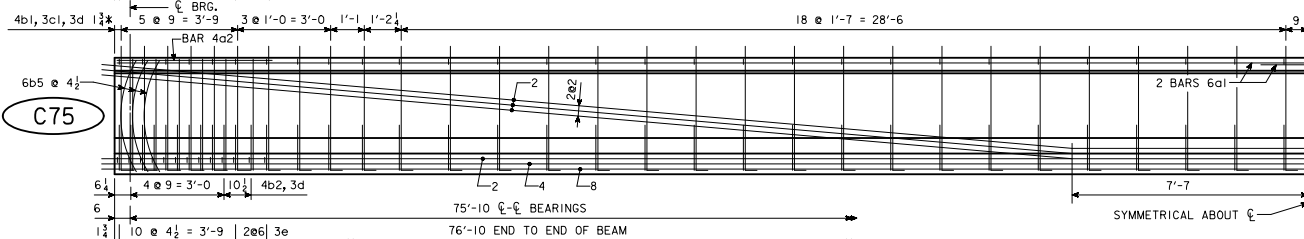
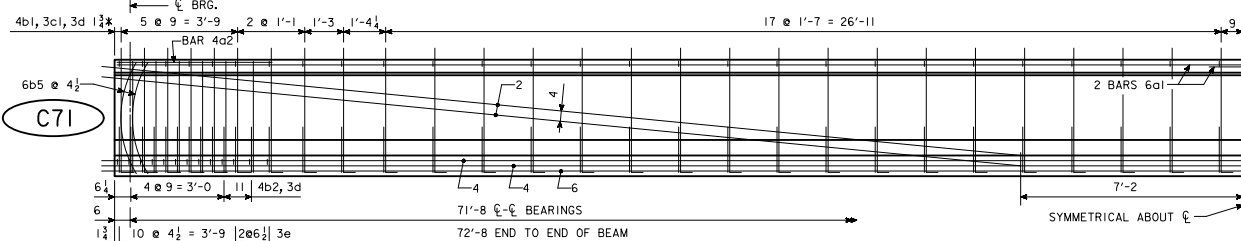
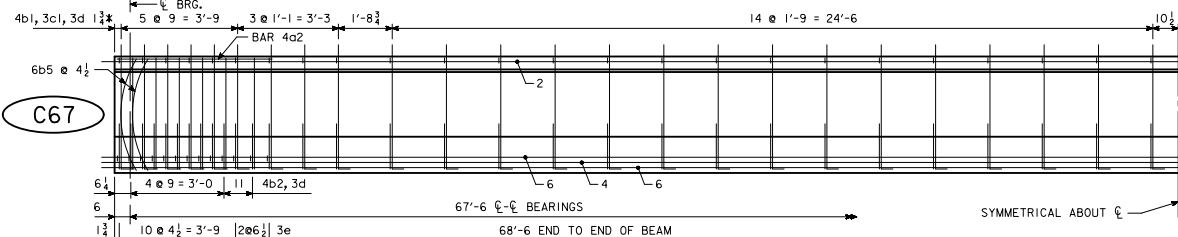
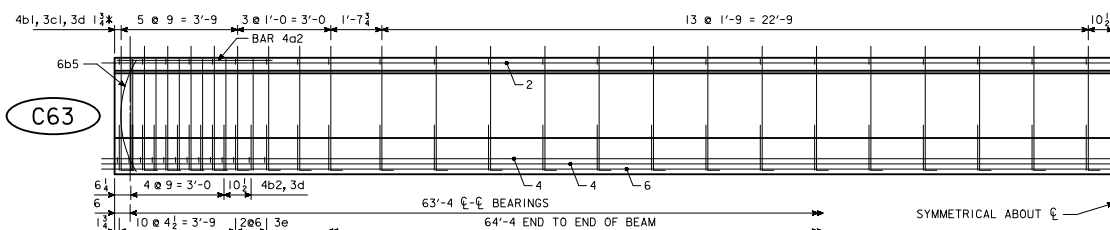
THE PORTIONS OF THE PRESTRESS BEAMS THAT ARE TO BE EMBEDDED IN THE ABUTMENT AND PIER DIAPHRAGMS SHALL BE ROUGHENED FOR A DISTANCE OF 10' FROM THE BEAM END BY SANDBLASTING OR OTHER APPROVED METHODS TO PROVIDE SUITABLE BOND BETWEEN THE BEAM AND THE DIAPHRAGM IN ACCORDANCE WITH ARTICLE 2403.14 OF THE SPECIFICATIONS.

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.

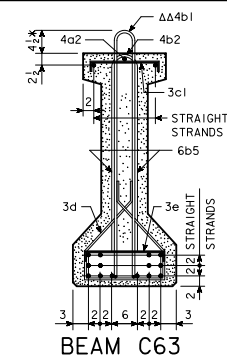
IF SOLE PLATE IS REQUIRED FOR BEARING, SOLE PLATE IS TO BE SET IN FORMS WHEN BEAM IS CAST AND FORMED OUT BELOW TO EXCLUDE CONCRETE AS DETAILED ON THE BEARING SHEET.

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

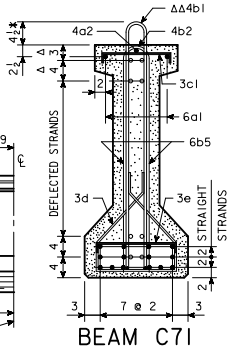
LATEST REVISION DATE 07-10	 APPROVED BY BRIDGE ENGINEER		
		STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES DECEMBER, 2006	
		C BEAM DETAILS	H30-36-06



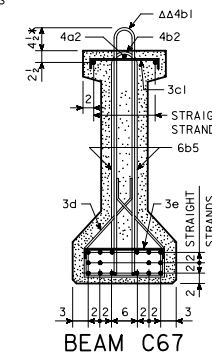
NOTE: DIMENSIONS FOR THE LOCATION OF THE DEFLECTED STRANDS
ARE AT ϕ BEAM AND END OF BEAM.



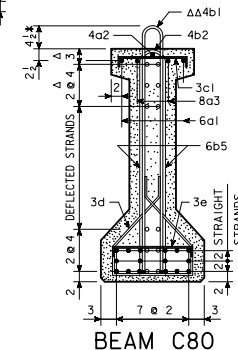
BEAM C63



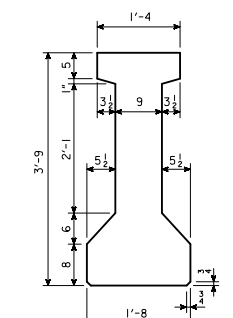
BEAM C71



BEAM C67



BEAM C80

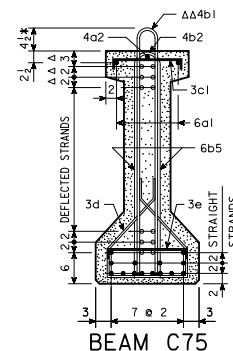


"C" BEAM
CROSS SECTION

$$A = 564.5 \text{ in}^2$$

$$Y_b = 20.23 \text{ in}$$

1 - 116,554 III



BEAM C75

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

* KEEP
Δ DIMENSIONS AT END OF BEAM
ΔΔ EPOXY COATED BARS

07-10
LATEST REVISION DATE

Norman L. Mc Donald
APPROVED BY BRIDGE ENGINEER



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

DECEMBER, 2006

C BEAM DETAILS

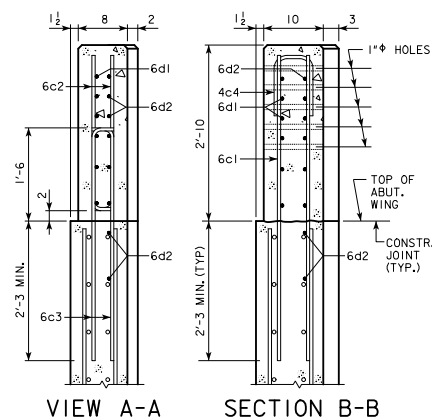
H30-37-06

TABLE OF OPEN RAIL DIMENSIONS AND NUMBERS

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

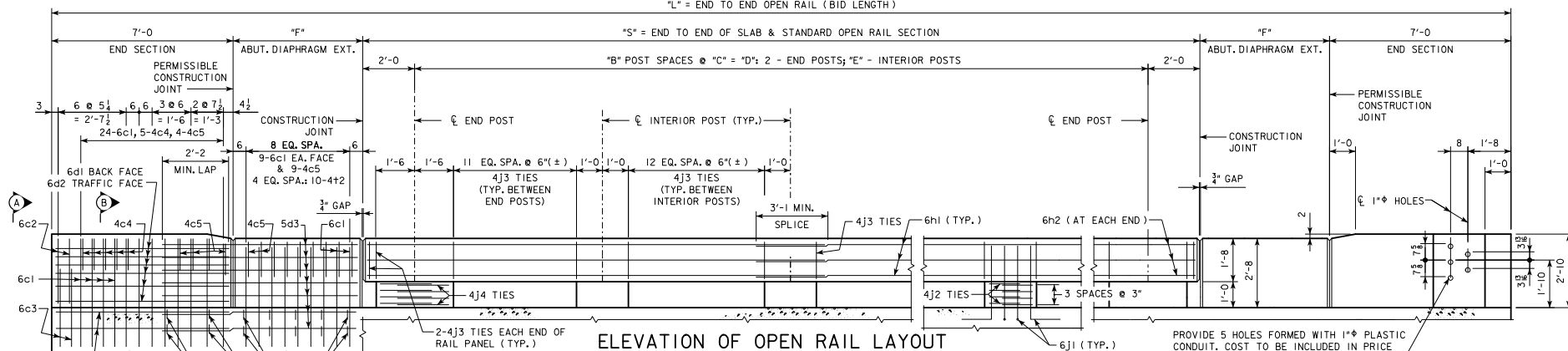
E-E ABUT. BRG		201'-4				213'-10				226'-4				243'-0				E-E ABUT. BRG	
SKEW		0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	0°	15°	30°	45°	SKEW	
DIMENSION OR NUMBER	L (FT.-IN.)	228'-4	228'-4	228'-4	228'-4	240'-10	240'-10	240'-10	240'-10	253'-4	253'-4	253'-4	253'-4	270'-0	270'-0	270'-0	270'-0	L (FT.-IN.)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



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

"S" = END TO END OF SLAB & STANDARD OPEN RAIL SECTION

"B" POST SPACES @ "C" = "D": 2 - END POSTS; "E" - INTERIOR POSTS



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.

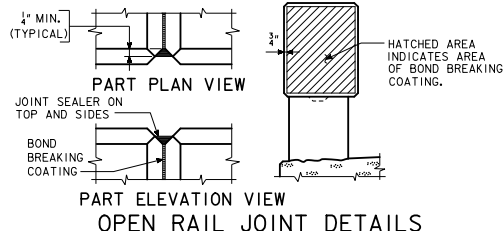
THE CONCRETE OPEN RAIL IS TO BE BID ON A LINEAL FOOT BASIS MEASURED FROM END TO END OF RAIL. THE NUMBER OF LINEAL FEET OF OPEN RAIL INSTALLED WILL BE PAID FOR AT THE CONTRACT PRICE PER LINEAL FOOT. PRICE BID FOR "CONCRETE OPEN RAILING, TL-4" SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL, EXCLUDING 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 G 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.

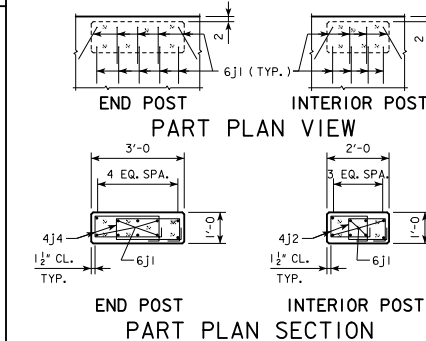


LATEST REVISION DATE 07-10 APPROVED BY BRIDGE ENGINEER <i>Thomas E. McQuill</i>	IOWADOT Highway Division STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES DECEMBER, 2006	
	OPEN RAIL, TL-4 DETAILS SHEET 1 OF 2	
	H30-42-06	

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

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

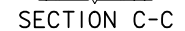
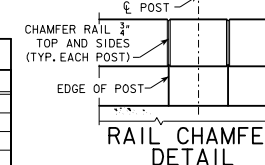
* TRAFFIC FACE 5d3 BARS MAY REQUIRE FIELD CUTTING OR BENDING FOR HIGHER SKEW BRIDGES.



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	35.5	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	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	0.4
OPEN RAIL-INTERIOR POSTS	2 x "E" @ 0.07 CU. YDS.	2.4	2.5	2.8	3.1	3.2	3.5	3.6	3.9	4.2
TOTAL (C.Y.)		27.5	29.6	31.8	34.0	36.0	40.2	42.2	44.4	47.3

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

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



OPTIONAL
1" x 4"
BEVELED
(TYP.)

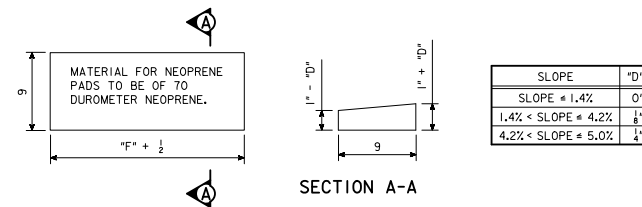
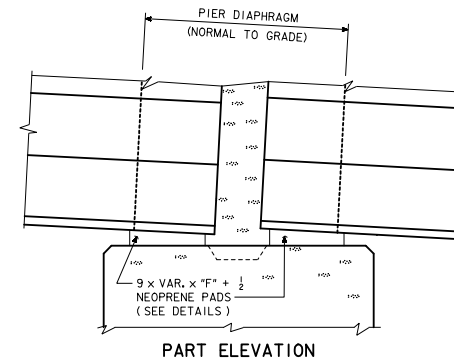
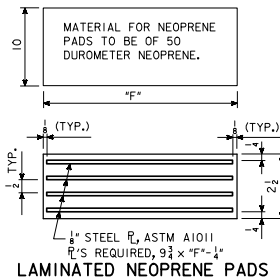
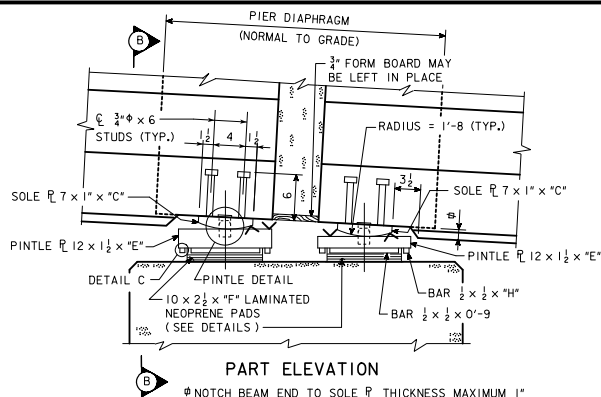
05-11

Norman L. Mc Donald



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

OPEN RAIL, TL-4 DETAILS H30-43-06
SHEET 2 OF 2



PLAN OF NEOPRENE PAD

$$\text{SLOPE}_{\text{SPAN 1}} = 100\% \left| \frac{\text{P/G ELEV. @ NEAR ABUT.} - \text{P/G ELEV. @ PIER 1}}{\text{SPAN 1 LENGTH}} \right|$$

$$\text{SLOPE}_{\text{SPAN 2}} = 100\% \left| \frac{\text{P/G ELEV. @ PIER 1} - \text{P/G ELEV. @ PIER 2}}{\text{SPAN 2 LENGTH}} \right|$$

$$\text{SLOPE}_{\text{SPAN 3}} = 100\% \left| \frac{\text{P/G ELEV. @ PIER 2} - \text{P/G ELEV. @ FAR ABUT.}}{\text{SPAN 3 LENGTH}} \right|$$

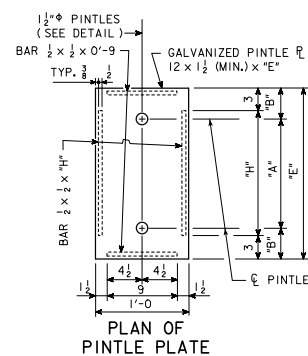
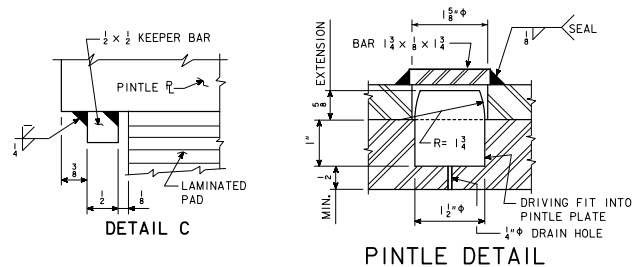
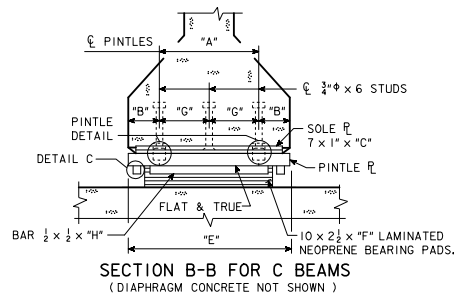
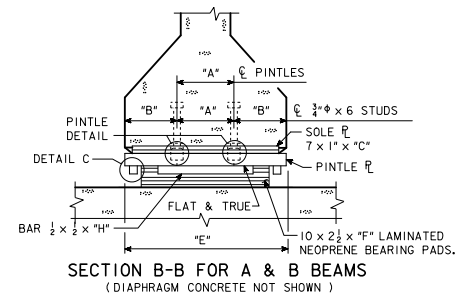
SLOPE CALCULATION FORMULA

FIXED PIER

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".

**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

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"
"G"		0'-6"
"H"	0'-11"	1'-2"

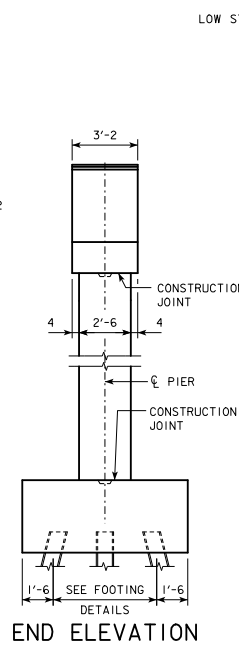
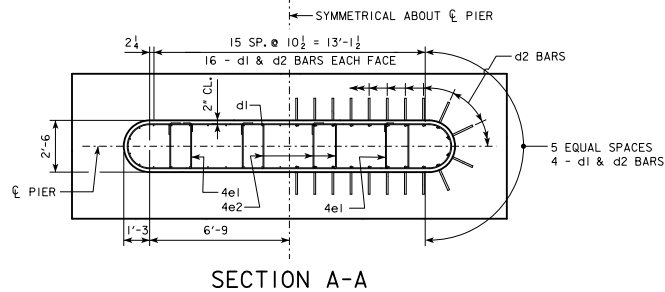
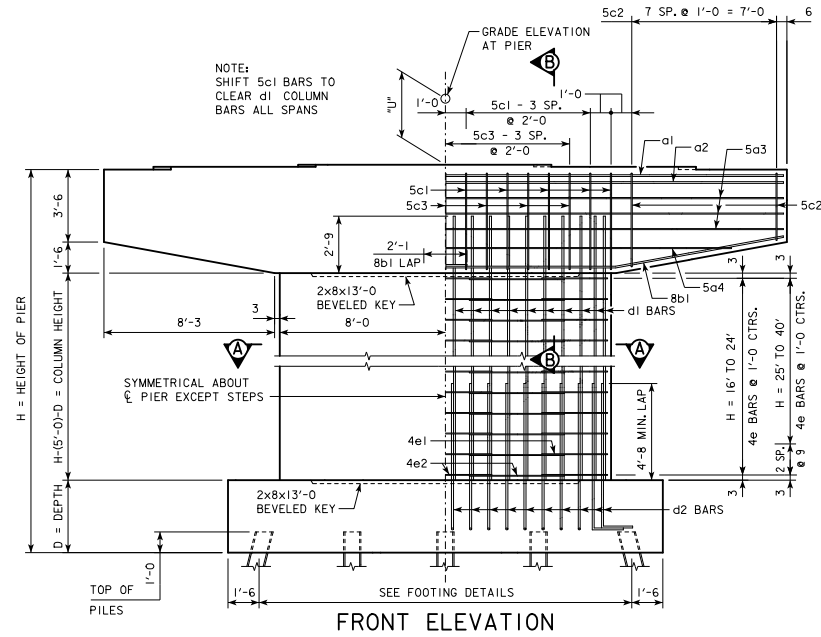
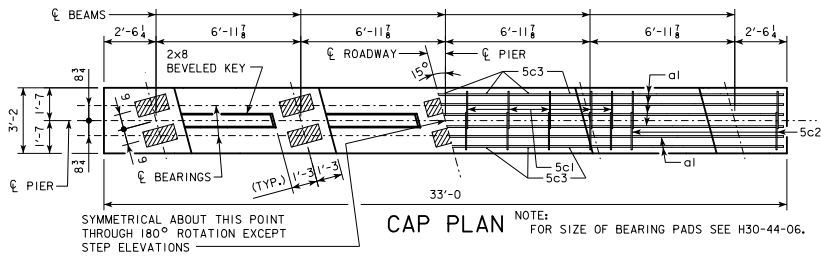
09-12
LATEST REVISION DATE
Thomas E. McQuillan
APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

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

PIER BEARING DETAILS

H30-44-06



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.

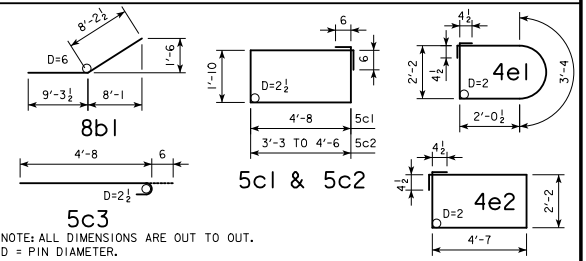
CAP

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

COLUMN

H IN FEET	COLUMN HEIGHT	STRUCTURAL CONCRETE (CY)	REINFORCING STEEL												TOTAL WEIGHT (LB.)
			d1 BAR				4e1 BAR				4e2 BAR				
			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



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

IOWADOT Highway Division

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

**TEE PIER
CAP AND COLUMN**
15° SKEW

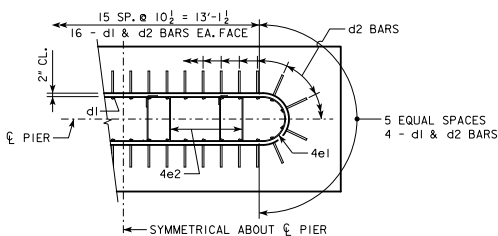
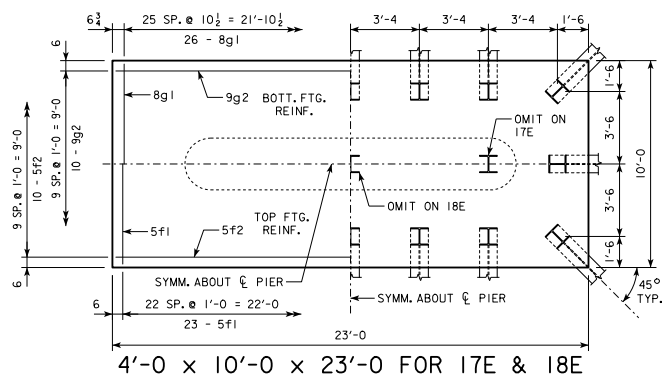
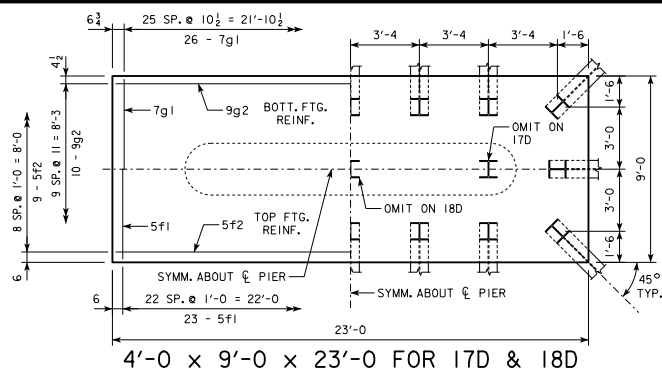
H30-64-06



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

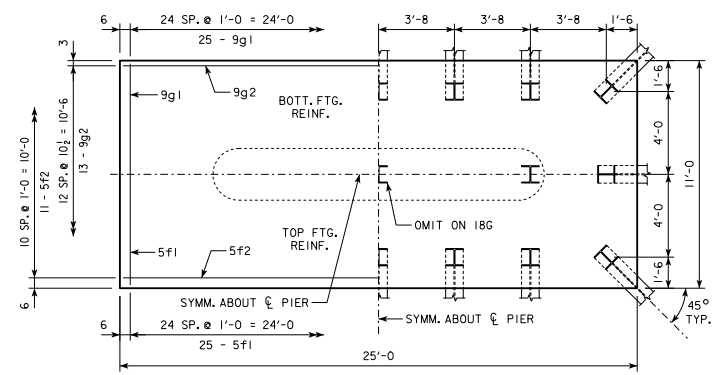
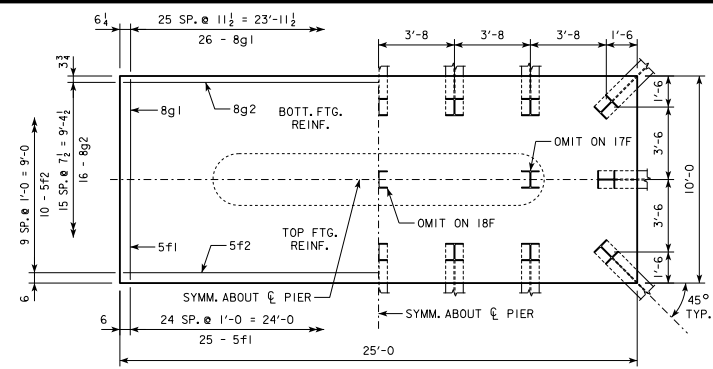
H IN FT.	E - E ABUT. BRG.	PILING (Ø10x57)		FOOTING SIZE
		NO. & LAYOUT	① LRFD PU, STRENGTH I, DES. LOAD (KIPS)	
20' to 21'	201'-4	17D	135	4' x 9' x 23'
	213'-10	17D	140	
	226'-4	17D	146	
	243'-0	18D	142	
22' to 23'	201'-4	17D	138	4' x 9' x 23'
	213'-10	17D	143	
	226'-4	18D	140	
	243'-0	18D	145	
24' to 25'	201'-4	17E	139	4' x 10' x 23'
	213'-10	17E	143	
	226'-4	18E	141	
	243'-0	18E	145	
26' to 27'	201'-4	17F	141	4' x 10' x 25'
	213'-10	17F	144	
	226'-4	18F	141	
	243'-0	18F	146	
28' to 29'	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 - #8 @ 0'-10 1/2"	8'-8"	461		
	g2	10 - #9 @ 1'-0"	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		



(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.



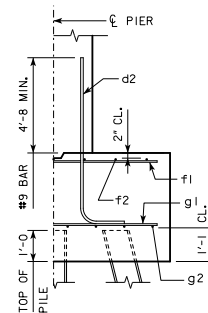
FOOTING NOTES:

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".

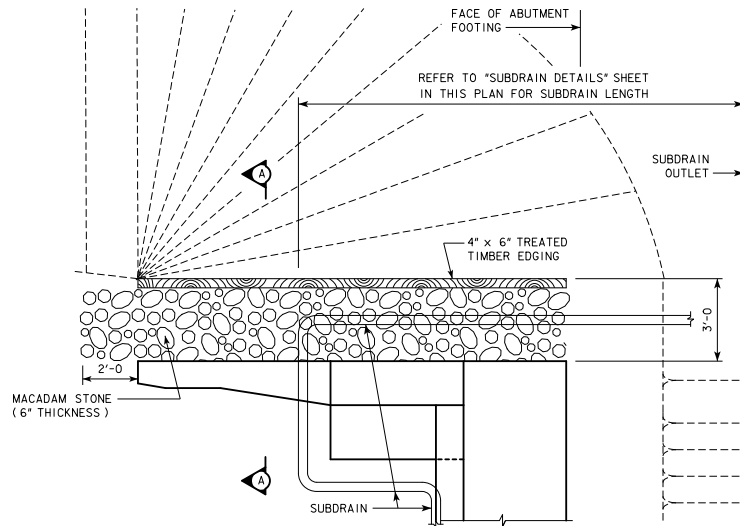
PIER PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.



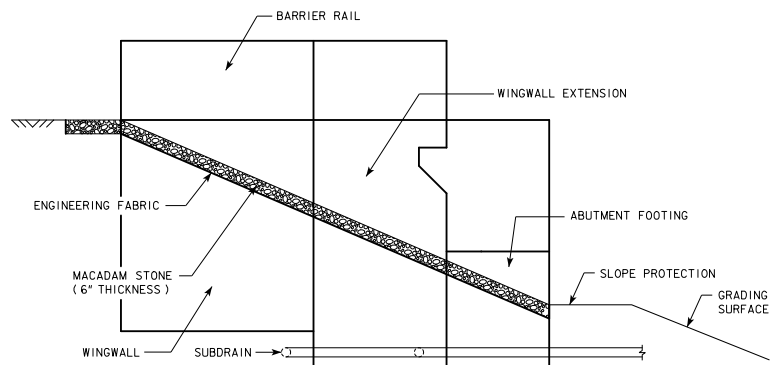
TYPICAL SECTION

04-13 LATEST REVISION DATE <i>Norman E. McQuinn</i> APPROVED BY BRIDGE ENGINEER	 IOWA DOT Highway Division	
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES DECEMBER, 2006	
	TEE PIER-HP10x57 SRL-I STEEL PILE FOOTINGS 15° SKEW - H=25' to 40'	H30-66-06

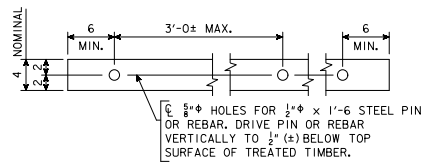
REVISED 09-14 - CHANGED THE AREA OF THE MACADAM STONE AREA TO 2'-0" IN FRONT OF THE BRIDGE WING.



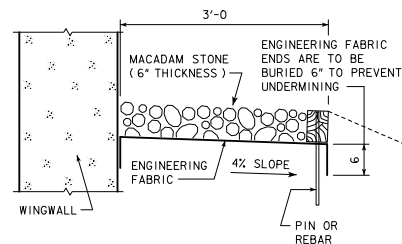
TOP VIEW OF WING ARMORING WITH WING EXTENSION



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



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 PEECE 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 E. McQuillan</i> APPROVED BY BRIDGE ENGINEER		
	STANDARD DESIGN - 30' ROADWAY, THREE SPAN BRIDGES PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES DECEMBER, 2006	
	WING ARMORING DETAILS C BEAMS	H30-87-06