

REVISED 05-13 - THE GENERAL NOTES AND SPECIFICATIONS MOVED TO STANDARD SHEET H30-01A-06. SRL NOTATION ADDED.

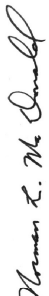
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STRUCTURAL RESISTANCE LEVEL-1 (SRL-1) REPLACES THE 50 TON STEEL PILE DESIGNATION.

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.

05-13 LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER		
		STANDARD DESIGN - 30' ROADWAY, SINGLE SPAN BRIDGE PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES APRIL, 2012	
		INDEX SHEET	H30SI-01-12

REVISED 05-13 - THIS STANDARD RENAMED TO H30SI-01A-12. INDEX SHEET INFORMATION ON STANDARD H30SI-01-12.

EXAMPLES OF BRIDGE SEAT AND STEP CALCULATIONS:

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

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

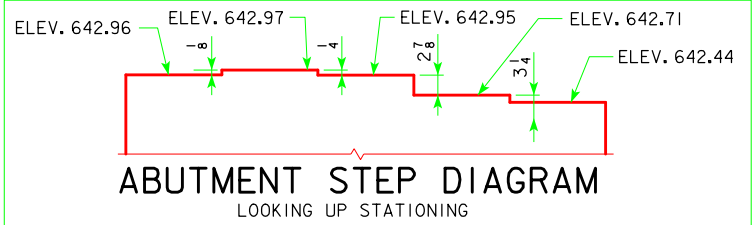
EXAMPLE NO. I
A STRAIGHT GRADE OF -3.25% WITH THE P.I. STATION OF 103+75.00 AND ELEVATION OF 653.29. THE BRIDGE LENGTH IS 80'-0' ϕ TO ϕ OF ABUTMENT BEARINGS WITH 30° SKEW RIGHT AHEAD.

STATIONS					
ϕ BRIDGE STA.	=	105+85.00			
ϕ $\frac{1}{2}$ OF SPAN LENGTH	$\pm$	40.00			
ϕ ABUT. BRGS.	=	<u>106+25.00</u>	105+45.00		

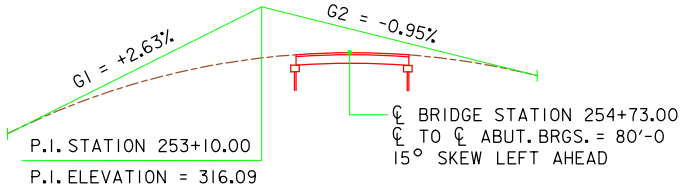
ELEVATIONS ALONG PROFILE GRADE LINE (P.G.L. ELEV.)					
ϕ ABUT. BRG. =	653.29-[(105+45.00)-(103+75.00)](0.0325) =	647.77			
ϕ ABUT. BRG. =	653.29-[(106+25.00)-(103+75.00)](0.0325) =	645.17			

ELEVATIONS TOP OF SLAB FACING ALONG THE STATIONING					
(BEAM SPACING X TAN. SK. Δ)(GRADE) =	(7.0)TAN 30°(0.0325) =	0.13'			

ABUTMENT NO. I					
BEAMS					
PGL ELEV.	647.77	647.77	647.77	647.77	647.77
SK. Δ CORRECT	+ 0.26	+ 0.13	0.00	- 0.13	- 0.26
SLAB CROWN	<u>- 0.25</u>	<u>- 0.11</u>	<u>0.00</u>	<u>- 0.11</u>	<u>- 0.25</u>
TOP SLAB ELEV.	647.78	647.79	647.77	647.53	647.26
- "U" (4'-9 $\frac{7}{8}$ ')	<u>- 4.82</u>	<u>- 4.82</u>	<u>- 4.82</u>	<u>- 4.82</u>	<u>- 4.82</u>
BR. SEAT ELEV.	642.96	642.97	642.95	642.71	642.44



EXAMPLE NO. 2

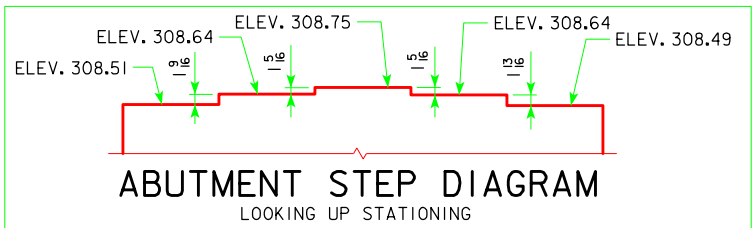


FROM SHEET H30SI-I-12	{	LENGTH OF VERTICAL CURVE = (20000)(0.0358) =	716 FEET
		M.O. = (0.0358)(716)($\frac{1}{8}$) =	3.204 FEET

STATIONS					
ϕ BRIDGE STA.	=	254+73.00		P.I. STA.	253+10.00
ϕ $\frac{1}{2}$ OF SPAN LENGTH	$\pm$	40.00	$\pm$ ($\frac{1}{2}$)(LENGTH V.C.)		<u>3+58.00</u>
ϕ ABUT. BRGS.	=	<u>255+13.00</u>	254+33.00	P.C. STA.	249+52.00
				P.T. STA.	256+68.00

ELEVATIONS TOP OF SLAB FACING ALONG THE STATIONING					
(BEAM SPACING X TAN. SK. Δ) =	(7.0)TAN 15° =	1.88'			

ABUTMENT NO. I					
BEAMS					
STATION	254+36.75	254+34.88	254+33.00	254+31.12	254+29.25
PGL ELEV.	313.55	313.54	313.54	313.54	313.53
SLAB CROWN	<u>- 0.25</u>	<u>- 0.11</u>	<u>0.00</u>	<u>- 0.11</u>	<u>- 0.25</u>
TOP SLAB ELEV.	313.30	313.43	313.54	313.43	313.28
- "U" (4'-9 $\frac{7}{16}$ ')	<u>- 4.79</u>	<u>- 4.79</u>	<u>- 4.79</u>	<u>- 4.79</u>	<u>- 4.79</u>
BR. SEAT ELEV.	308.51	308.64	308.75	308.64	308.49



GENERAL NOTES:

THE H30SI-12 BRIDGE STANDARDS, IF PROPERLY USED, PROVIDE THE STRUCTURAL PLANS NECESSARY TO CONSTRUCT SINGLE SPAN 30' ROADWAY PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES WITH LENGTHS OF 46'-8, 55'-0, 67'-6, 80'-0, 90'-0, 100'-0, AND 110'-0.

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

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 ABUTMENTS FOR THESE STANDARDS HAVE BEEN DESIGNED FOR FRICTION OR POINT BEARING PILES. IT IS NECESSARY THAT THE LENGTH OF THE ABUTMENT PILES BE DESIGNATED ON THE FRONT SHEET OF THE PLANS.

THE INTEGRAL ABUTMENTS FOR THESE H30SI STANDARDS HAVE BEEN DESIGNED FOR THE USE OF VARIOUS TYPES OF PILE 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)

STRUCTURAL RESISTANCE LEVEL-1 (SRL-1) REPLACES THE 50 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.

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 STEP DIMENSIONS. TO HELP IN OBTAINING THIS STEP INFORMATION SEE "EXAMPLES OF BRIDGE SEAT AND STEP CALCULATIONS" ON THIS SHEET.

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

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 (5# 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

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.

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) AND BARRIER RAILS SHALL BE EPOXY COATED.

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

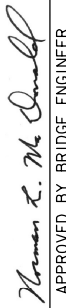
DESIGN STRESSES:

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS 5th Ed, SERIES OF 2010.
REINFORCING STEEL IN ACCORDANCE WITH LRFD AASHTO SECTION 5, GRADE 60.
CONCRETE IN ACCORDANCE WITH LRFD AASHTO SECTION 5, f'_c = 4.0 KSI.
FOR 30' STANDARD PRESTRESSED CONCRETE BEAMS, SEE SHEETS H30SI-21-12, H30SI-23-12, H30SI-25-12, AND H30SI-27-12.

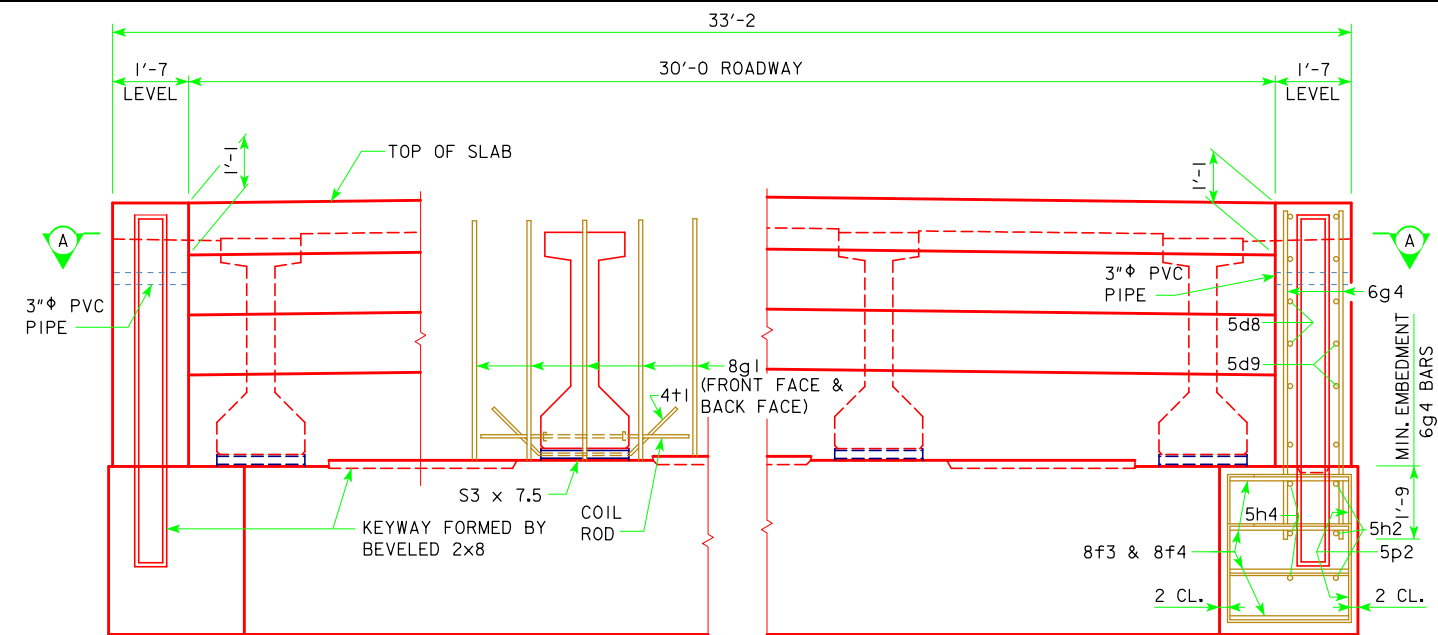
SPECIFICATIONS:

DESIGN:
AASHTO, SERIES OF 2010.

CONSTRUCTION:
IOWA DEPARTMENT OF TRANSPORTATION 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.

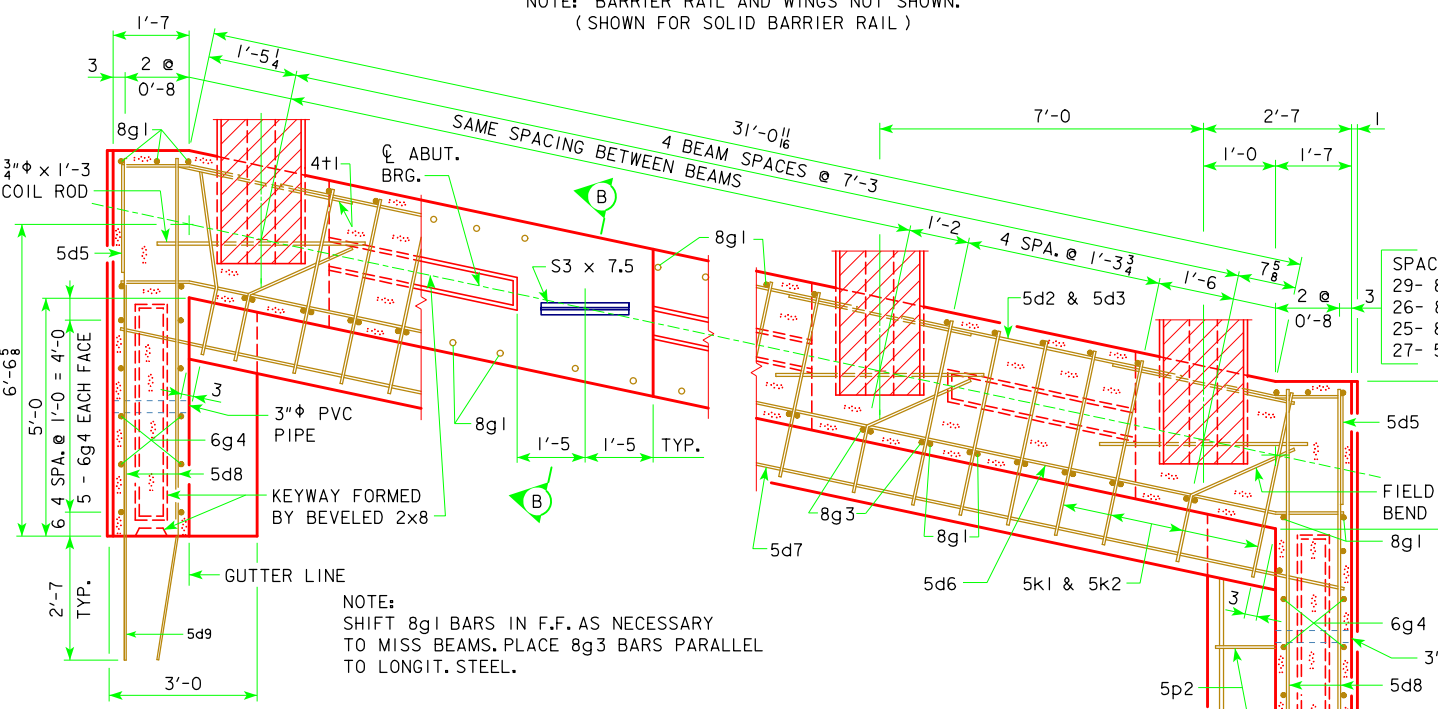
05-13 LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER		
		STANDARD DESIGN - 30' ROADWAY, SINGLE SPAN BRIDGE PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES APRIL, 2012	
		GENERAL NOTES & GENERAL INFORMATION	H30SI-01A-12

REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.



PART REAR ELEVATION AT ABUTMENT

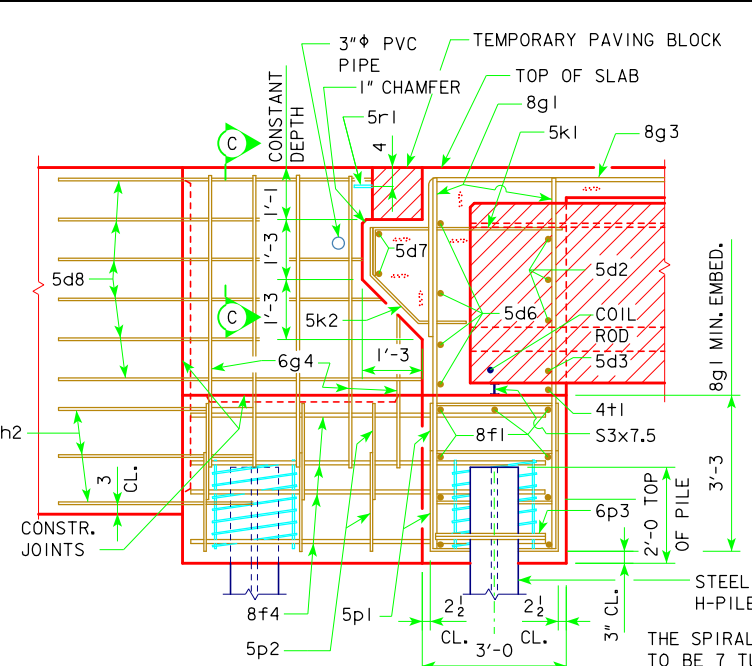
NOTE: BARRIER RAIL AND WINGS NOT SHOWN.
(SHOWN FOR SOLID BARRIER RAIL)



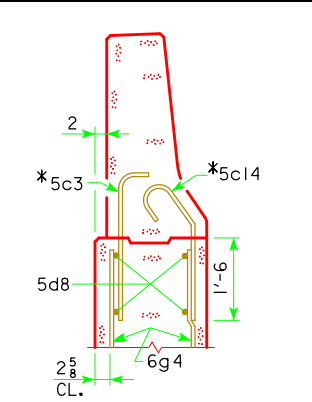
PART SECTION A-A

ABUTMENT NOTES:

- MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.
- ABUTMENT PILES SHALL BE DRIVEN TO VALUES SHOWN IN DESIGN PLANS.
- BARRIER RAIL NOT SHOWN IN DETAILS.
- IF ROCK IS CLOSER THAN 15' BELOW ABUTMENT FOOTING, SPECIAL ANALYSIS MAY BE REQUIRED.

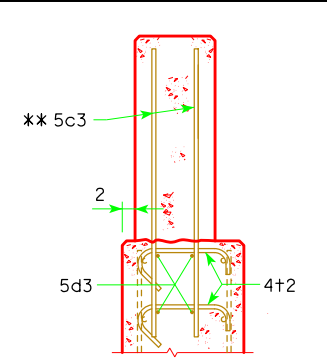


PART SECTION B - B



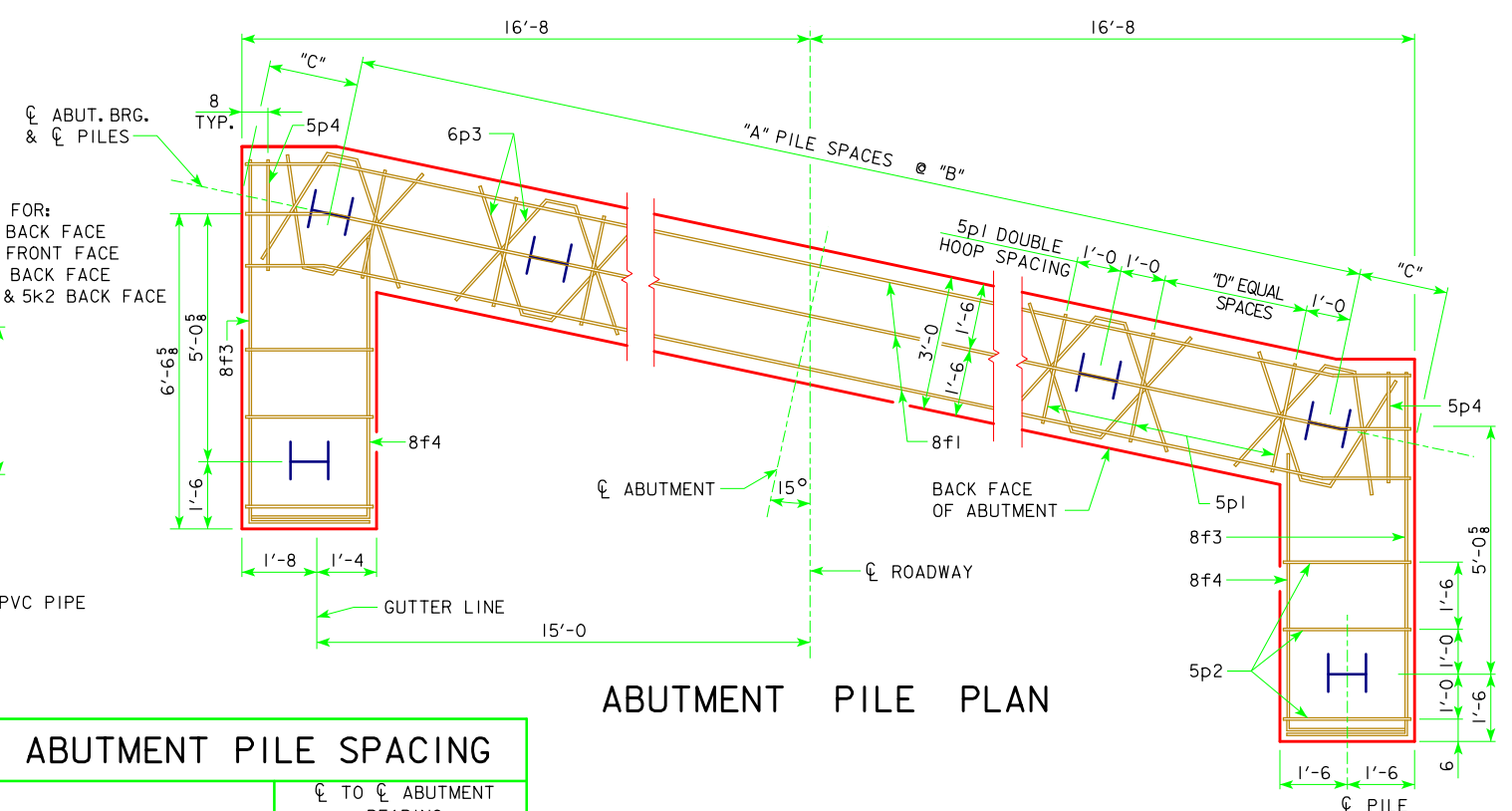
PART SECTION C-C

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



PART SECTION C-C

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



ABUTMENT PILE PLAN

ABUTMENT PILE SPACING

DIMENSION OR NO.	CL TO CL ABUTMENT BEARING			
	80'-0	90'-0	100'-0	110'-0
"A" PILE SPACES	6	7	8	8
"B" (FT - IN)	5'-2	4'-5	3'-10	3'-10
"C" (FT - IN)	1'-9 1/16	1'-9 9/16	1'-11 1/16	1'-11 1/16
"D" EQUAL SPACES	4	3	2	2
NO. OF PILES PER ABUT.	9	10	11	11
STRENGTH I DESIGN LOAD (KIPS)	138	134	126	134

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

05-13
LATEST REVISION DATE

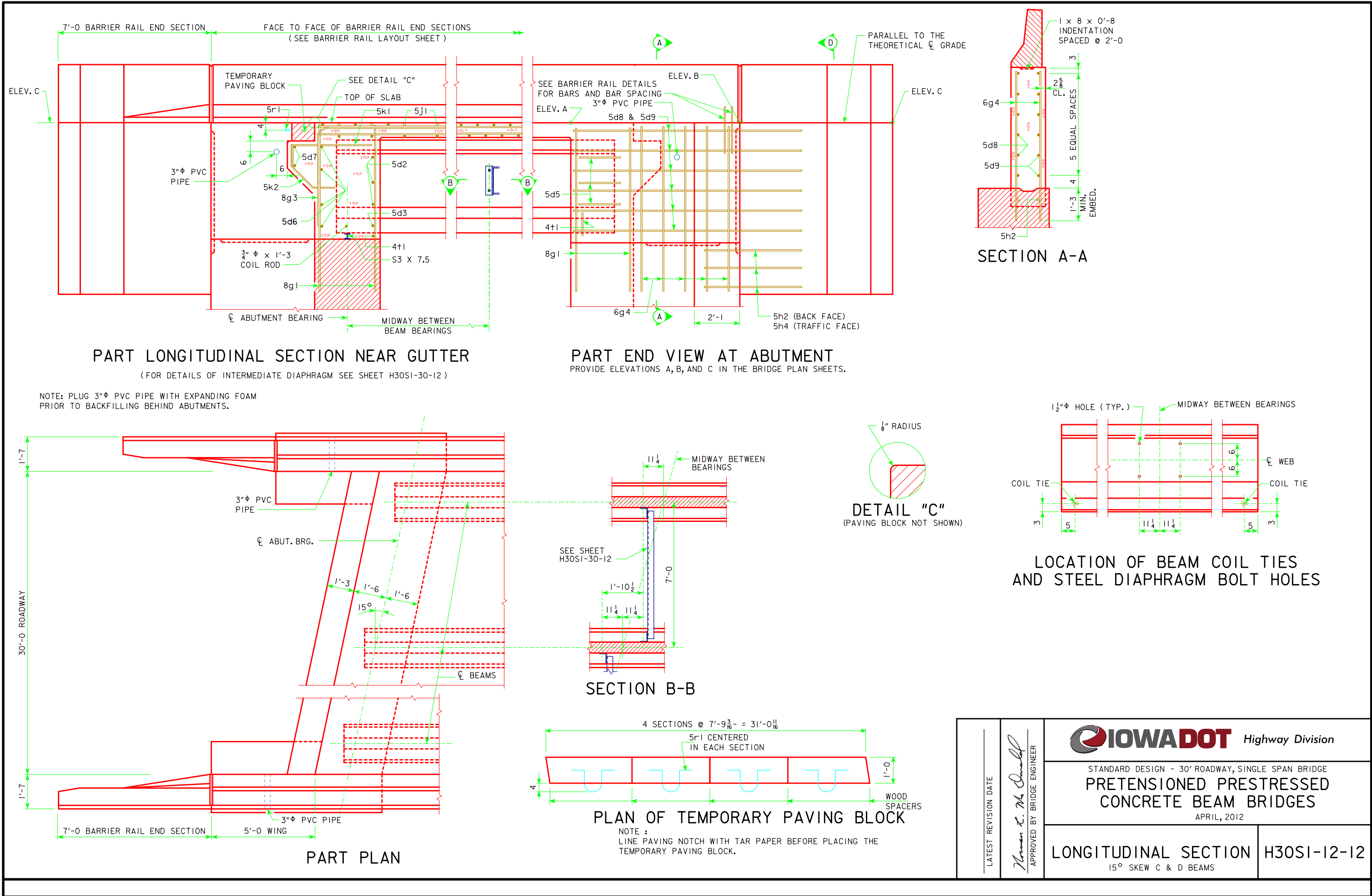
Thomas L. McQuillan
APPROVED BY BRIDGE ENGINEER

Highway Division

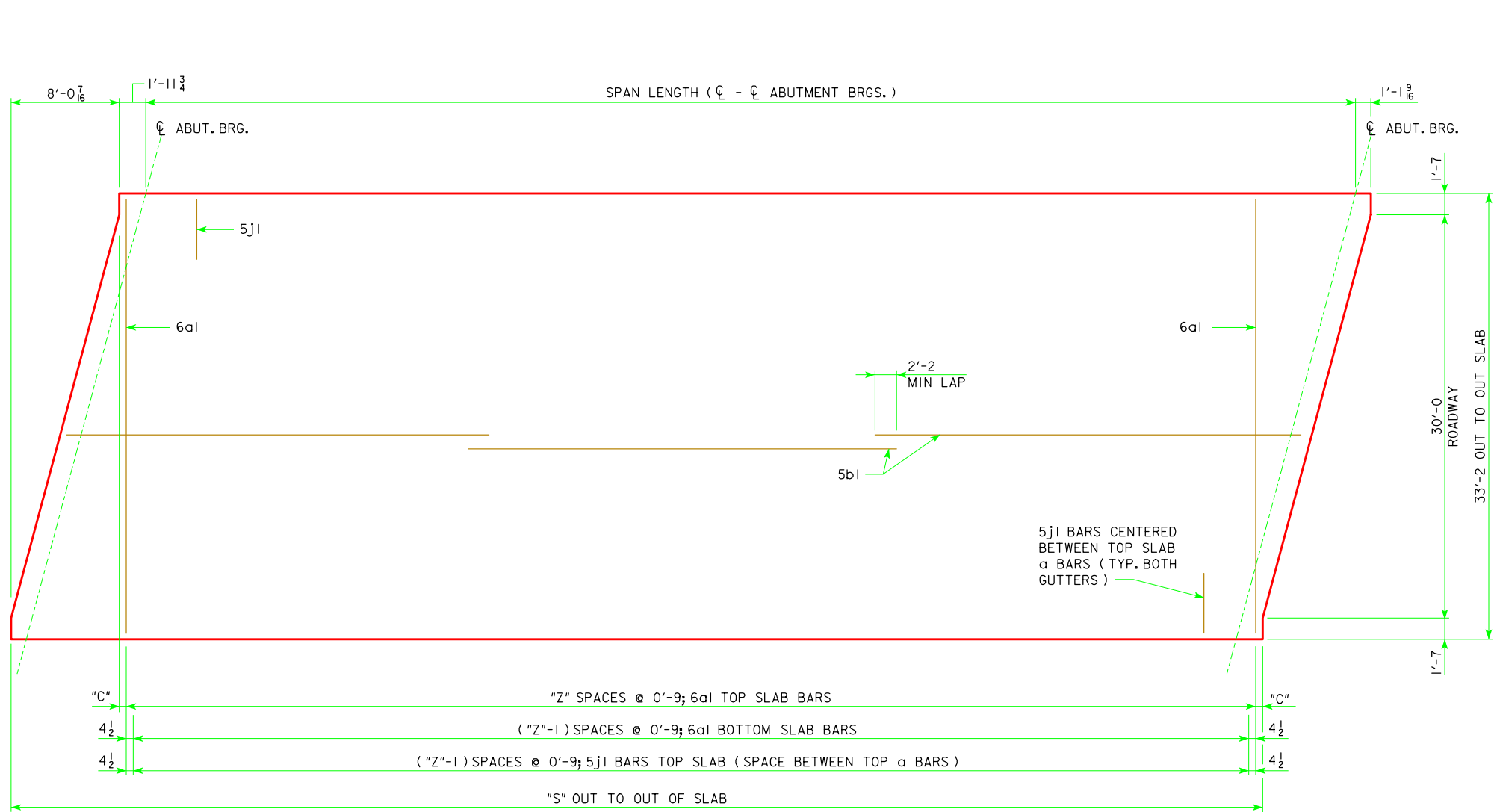
STANDARD DESIGN - 30' ROADWAY, SINGLE SPAN BRIDGE
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES
APRIL, 2012

ABUTMENT DETAILS
15° SKEW C & D BEAMS

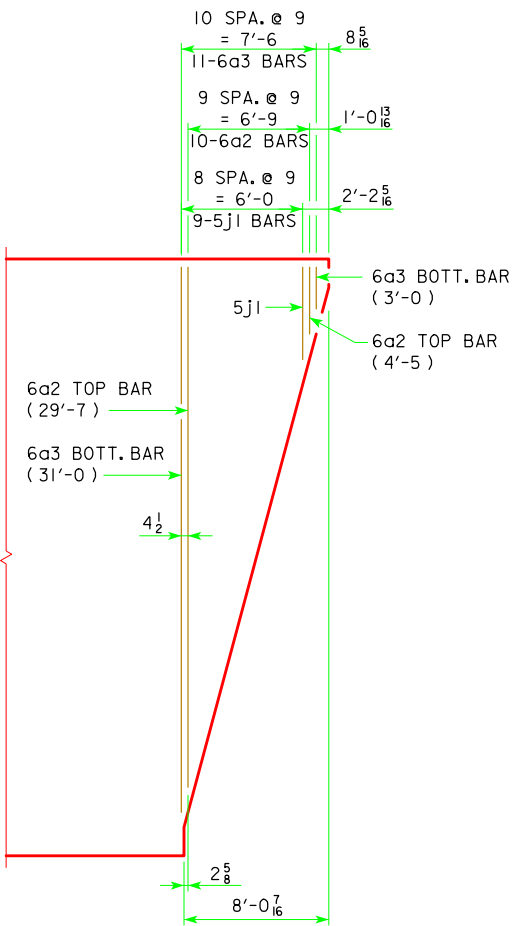
H30SI-10-12



REVISED 05-13 - REVISION FOR LRFD PILE DESIGN.



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



END OF SLAB REINFORCING
(TYPICAL EACH END OF DECK)

GENERAL DATA								
SPAN LENGTH (¢ - ¢ ABUTMENT BRGS.)		46'-8	55'-0	67'-6	80'-0	90'-0	100'-0	110'-0
LOCATION OF EXTREME 6a1 TOP BAR FROM END OF SLAB	"C"	2 ⁷ / ₈	3 ³ / ₈	6 ³ / ₈	4 ⁷ / ₈	6 ³ / ₈	3 ³ / ₈	4 ⁷ / ₈
NO. OF SPACES FOR 6a1 TOP BARS	"Z"	55	66	82	99	112	126	139
OUT TO OUT OF SLAB	"S"	49'-9 ¹ / ₄	58'-1 ¹ / ₄	70'-7 ¹ / ₄	83'-1 ¹ / ₄	93'-1 ¹ / ₄	103'-1 ¹ / ₄	113'-1 ¹ / ₄
VERTICAL CURVE TOP OF SLAB TO ABUTMENT TOP AT ¢ ABUTMENT BEARING	"U"	3'-8 ¹ / ₈	3'-8 ¹ / ₂	4'-3 ⁷ / ₈	4'-9 ⁷ / ₁₆	5'-6 ³ / ₁₆	5'-6 ¹¹ / ₁₆	5'-7 ⁵ / ₁₆
STRAIGHT GRADE TOP OF SLAB TO ABUTMENT TOP AT ¢ ABUTMENT BEARING	"U"	3'-8 ⁵ / ₁₆	3'-8 ³ / ₄	4'-4 ³ / ₁₆	4'-9 ¹⁵ / ₁₆	5'-6 ¹³ / ₁₆	5'-7 ⁷ / ₁₆	5'-8 ¹ / ₄
SERVICE D.L. ABUTMENT REACTION (D.L. + F.W.S.) SERVICE LOADS	KIPS	301.8	328.9	392.9	506.9	579.8	620.9	662.0
SERVICE L.L. ABUTMENT REACTION (HL-93) NO IMPACT SERVICE LOADS	KIPS	152.8	162.4	175.0	186.0	194.4	202.2	209.8

05-13 LATEST REVISION DATE	<i>Therese L. McQuillan</i> APPROVED BY BRIDGE ENGINEER		
		STANDARD DESIGN - 30' ROADWAY, SINGLE SPAN BRIDGE PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES APRIL, 2012	
		SUPERSTRUCTURE 15° SKEW	H30SI-13-12

REVISED 09-14 - CORRECTED THE BARRIER RAIL REINFORCING STEEL QUANTITIES FOR ALL THE BRIDGE LENGTHS.

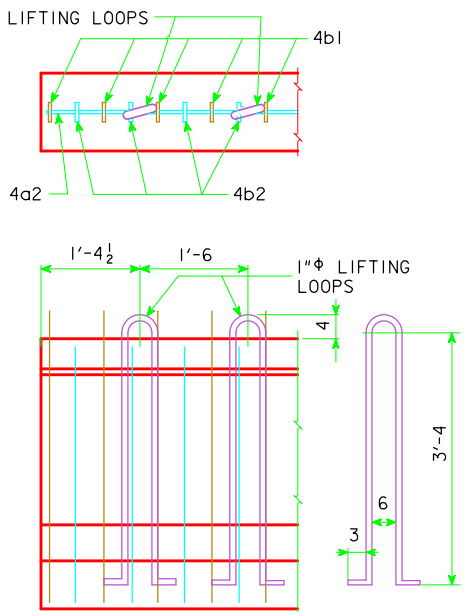
CONCRETE PLACEMENT QUANTITIES (SUPERSTRUCTURE PLUS INTEGRAL ABUTMENTS)										ESTIMATED QUANTITIES (SUPERSTRUCTURE PLUS INTEGRAL ABUTMENTS)										46'-8	55'-0	67'-6	80'-0	90'-0	100'-0	110'-0
SLAB, AND		WITH BARRIER RAIL	CU.YD.	70.1	77.4	92.3	112.5	128.4	137.7	146.8	NO. OF STEEL H-PILES FOR TWO ABUTS. (HP10X57)		NO.	10	10	12	18	20	22	22						
ABUT. DIAPHRAGM		WITH OPEN RAIL	CU.YD.	71.6	79.1	94.4	114.9	131.2	140.7	150.2	STRUCTURAL CONCRETE, (BRIDGE)		WITH BARRIER RAIL	CU.YD.	106.4	113.7	129	157.8	174.5	183.8	192.9					
PAVING BLOCKS			CU.YD.	2.5	2.5	2.5	2.5	2.5	2.5	2.5			WITH OPEN RAIL	CU.YD.	107.9	115.4	131.1	160.2	177.3	186.8	196.3					
ABUTMENT WINGS			CU.YD.	7.2	7.2	7.6	8.4	9.2	9.2	9.2	CONCRETE RAIL (BARRIER OR OPEN)		L.F.	127.5	144.2	169.2	214.2	234.2	254.2	274.2						
ABUTMENT FOOTINGS			CU.YD.	27.6	27.6	27.6	35.3	35.3	35.3	35.3	REINFORCING STEEL		WITH BARRIER RAIL	LBS.	25,123	27,436	30,964	37,828	40,880	43,640	46,447					
													WITH OPEN RAIL	LBS.	25,448	27,798	31,473	38,851	42,129	44,874	47,625					
											STRUCTURAL STEEL		WITH BARRIER RAIL	LBS.	1532	1526	1570	1610	1695	1695	1695					
													WITH OPEN RAIL	LBS.	1242	1235	1235	1235	1265	1265	1265					

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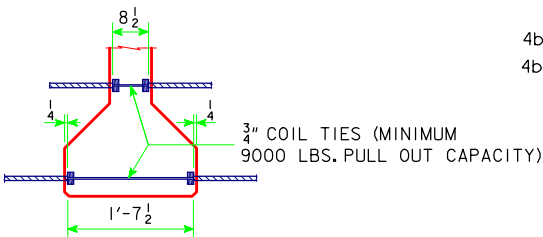
ENGINEER

		Highway Division
STANDARD DESIGN - 30' ROADWAY, SINGLE SPAN BRIDGE PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES APRIL, 2012		
CK & ABUTMENT REINF. 15° SKEW	H30S1-14-12	



LIFTING LOOP DETAIL

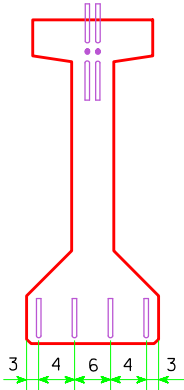
ALTERNATE TYPES MAY BE SUBSTITUTED WITH THE APPROVAL OF THE ENGINEER. LIFTING LOOPS ARE TO BE STRUCTURAL GRADE.



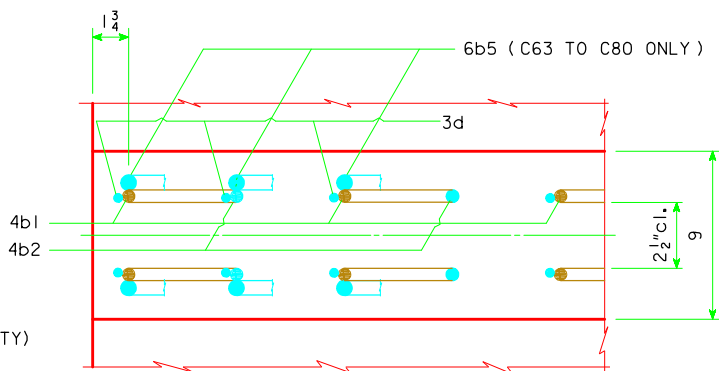
COIL TIE DETAIL

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

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

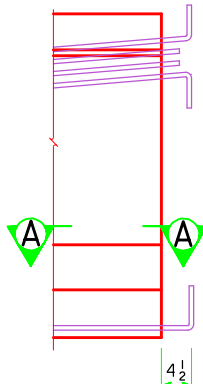


STRAND PROJECTION AT BEAM ENDS WHEN EMBEDDED IN CONCRETE END DIAPHRAGMS



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

THE TOP STRAIGHT STRANDS OF BEAMS C30 THROUGH 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

C BEAM DATA

BEAM	SPAN LENGTH ℓ _s BEARING	OVERALL BEAM LENGTH (L)	STRAND SIZE DIA. (inches)	NO. OF STRANDS		TOTAL INITIAL PRESTRESS KIPS ^③	HOLD DOWN FORCE-KIPS	CAMBER (in.)				DEFLECTION (in.) Δ _D				WEIGHT (TONS)				CONCRETE (C. Y.)	REINFORCING STEEL-(lb)
				STRAIGHT	DEFLECTED			AT RELEASE		AFTER LOSSES		IMMEDIATE ^① (ELASTIC) Δ _E		TIME ^② (PLASTIC) Δ _T							
												STEEL DIAPH.		STEEL DIAPH.							
C80	80'-0	81'-0	0.60	16	6	936	21	1.64		2.90		1.16	0.29					23.8		11.76	1191

① DEFLECTIONS AT MID-SPAN DUE TO WEIGHT OF SLAB AND DIAPHRAGM.

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

TOTAL BEAM DEFLECTIONS AT ℓ_s OF SPAN, Δ_D, DUE TO WEIGHT OF SLAB AND DIAPHRAGMS FOR DETAILING PURPOSE:
(A) Δ_D = Δ_E + Δ_T FOR SIMPLE SPAN.

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

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 2007:
REINFORCING STEEL IN ACCORDANCE WITH SECTION 5, GRADE 60.
CONCRETE IN ACCORDANCE WITH SECTION 5.
MINIMUM CONCRETE f'_c (AT 28 DAYS) SHALL BE 6,000 psi.
MINIMUM f'_{ci} AT RELEASE SHALL BE 5,000 psi.

PRESTRESSING STEEL IN ACCORDANCE WITH SECTION 5, f'_s = 270,000 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 2007, WITH MINOR MODIFICATIONS.

BEAM NOTES:

THESE BEAMS ARE DESIGNED FOR AASHTO HL-93 LIVE LOADS AS WITH AN ALLOWANCE OF 20 LB. PER SQUARE FOOT OF ROADWAY FOR FUTURE WEARING SURFACE.

ALL PPC BEAMS SHALL USE HIGH PERFORMANCE CONCRETE (HPC) IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. 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 1M570.

BEARINGS SHALL BE AS DETAILED ON OTHER DESIGN SHEETS.

BEAMS SHALL BE AT LEAST 28 DAYS OLD BEFORE THE SLAB IS PLACED EXCEPT AS OTHERWISE APPROVED BY THE ENGINEER.

THE PORTIONS OF THE PRESTRESS BEAMS THAT ARE TO BE EMBEDDED IN THE ABUTMENT 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 2403.03, I, OF THE STANDARD SPECIFICATIONS.

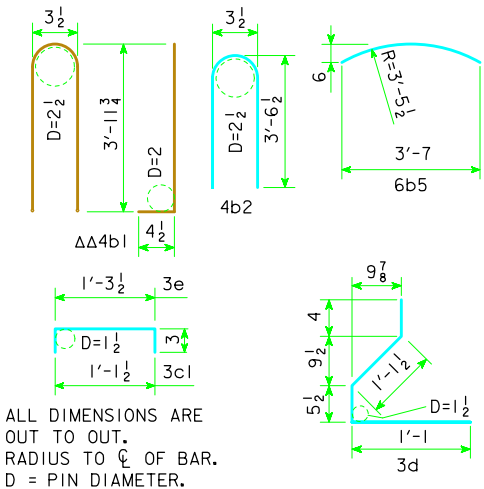
ALL BEAMS ARE TO BE INCREASED IN LENGTH TO COMPENSATE FOR ELASTIC SHORTENING, CREEP AND SHRINKAGE.

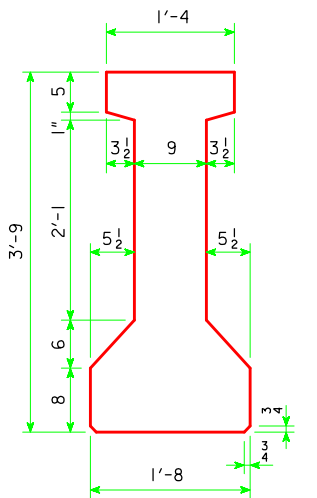
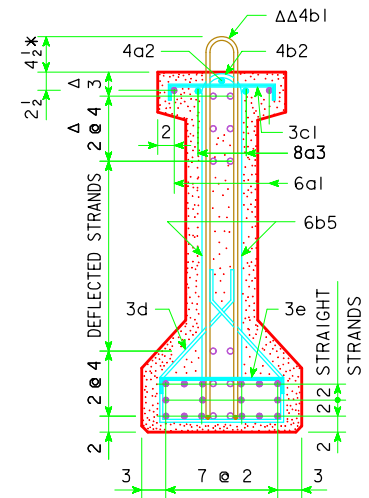
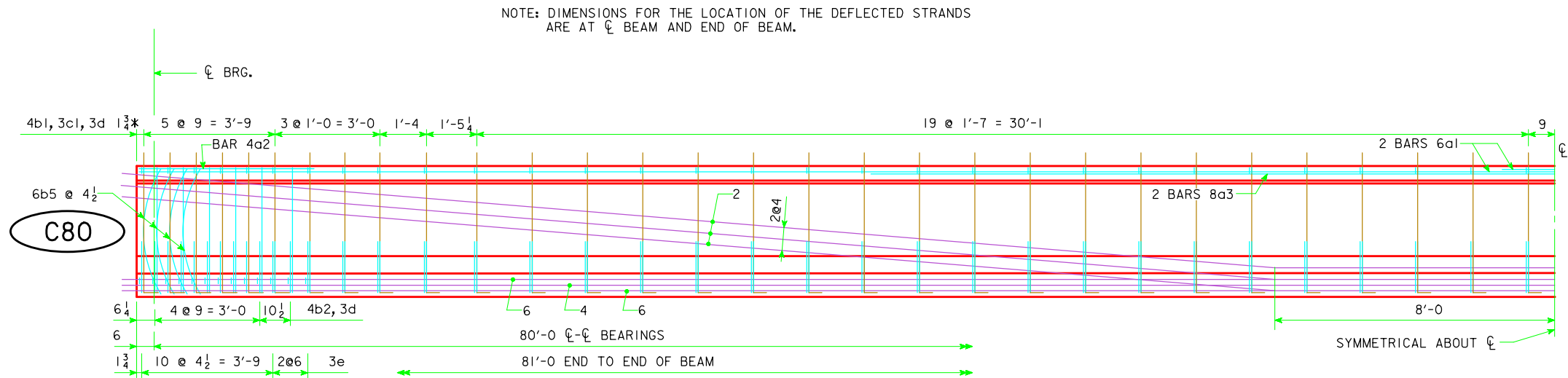
HOLES MUST BE CAST IN THE WEB TO ACCOMMODATE THE STEEL DIAPHRAGM ATTACHMENTS AS DETAILED ON THE STEEL DIAPHRAGM DETAIL SHEET.

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.

REINFORCING BAR LIST

BEAM	SPAN	C80	BAR SHAPE	NO.	LENGTH
ΔΔ	80'-0		6a1	4	41'-10
			4a2	2	5'-0
			8a3	2	40'-0
			4b1	60	8'-10
			4b2	12	7'-2
			6b5	16	3'-9
			3c1	60	1'-8
**			3d	144	3'-0
			3e	26	1'-10





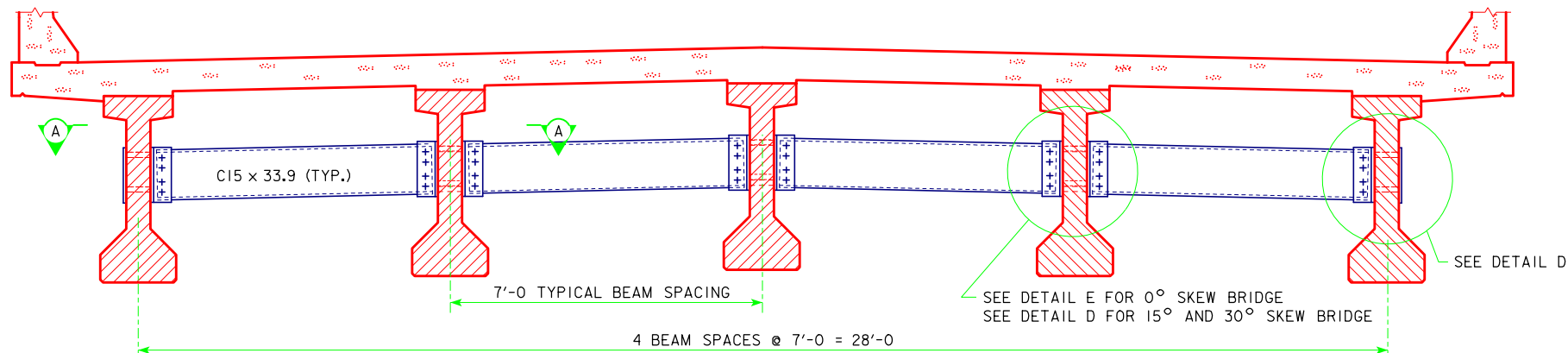
"C" BEAM
CROSS SECTION

A = 564.5 in²
Y_b = 20.23 in
I = 116,354 in⁴

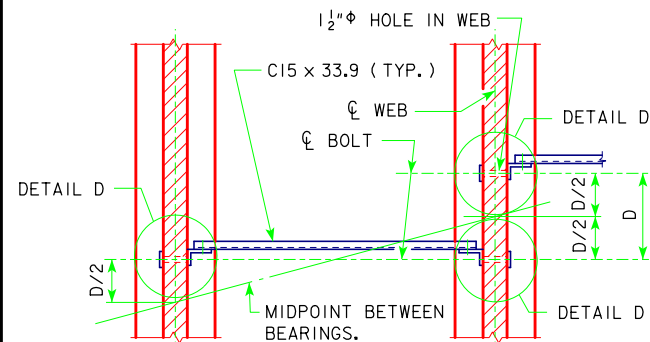
NOTE: BARS 6b5 AND 3d ARE TO BE PLACED IN PAIRS.

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

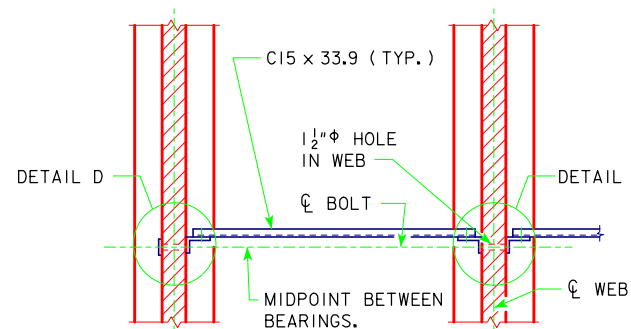
LATEST REVISION DATE	<i>Harmon L. Mc Donald</i> APPROVED BY BRIDGE ENGINEER	IOWA DOT Highway Division	
		STANDARD DESIGN - 30' ROADWAY, SINGLE SPAN BRIDGE PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES APRIL, 2012	
		C80 BEAM DETAILS	H30SI-26-12



SECTION SHOWING INTERMEDIATE DIAPHRAGM



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



SECTION A-A
FOR 0° SKEW BRIDGES

INTERMEDIATE DIAPHRAGM STRUCTURAL STEEL

ONE CONNECTION DETAIL "E"

2 - 7/8" ϕ x LENGTH H.S. BOLTS WITH NUTS AND WASHERS		
WEB THICKNESS	LENGTH OF H.S. BOLTS	WEIGHT PER DETAIL "E"
6"	9"	4.30 LBS.
7"	10"	4.66 LBS.
9"	12"	5.34 LBS.

2 - L 6 x 4 x 1/2 x 1'-3 1/4 = 41.2 LBS.

ONE CONNECTION DETAIL "D"

2 - 7/8" ϕ x LENGTH H.T.S. BOLTS WITH NUTS AND WASHERS		
WEB THICKNESS	LENGTH OF H.S. BOLTS	WEIGHT PER DETAIL "D"
6"	9"	4.30 LBS.
7"	10"	4.66 LBS.
9"	12"	5.34 LBS.

1 - BACKING PLATE 4 x 3/8 x 1'-3 1/4 = 6.5 LBS.

1 - L 6 x 4 x 1/2 x 1'-3 1/4 = 20.6 LBS.

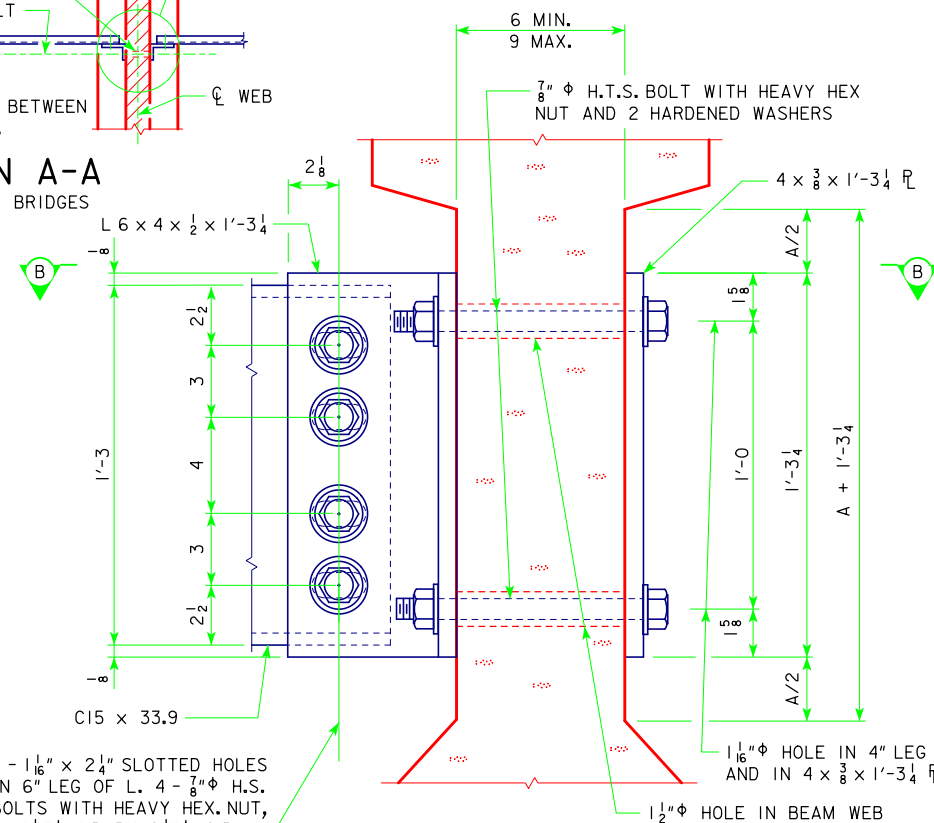
ONE C15 x 33.9 DIAPHRAGM

WEB THICKNESS	7'-0"	
	* LENGTH	UNIT WEIGHT (LBS.)
6"	6'-2 5/8"	210.8
7"	6'-1 5/8"	208.0
9"	5'-11 5/8"	202.4

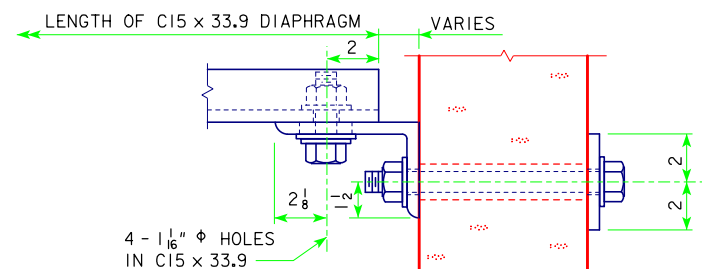
DIAPHRAGM CONNECTION BOLTS

8 - 7/8" ϕ x 0'-2 3/4 H.S. BOLTS WITH NUTS AND WASHERS, PER UNIT DIAPHRAGM
10.3 LBS.

* THE LENGTH OF THE C15 x 33.9 SHOWN IN THE TABLE IS BASED ON A VARIABLE CLEARANCE OF 1 1/16" TO 2 1/16" BETWEEN THE FACE OF BEAM WEB AND END OF C15 x 33.9.

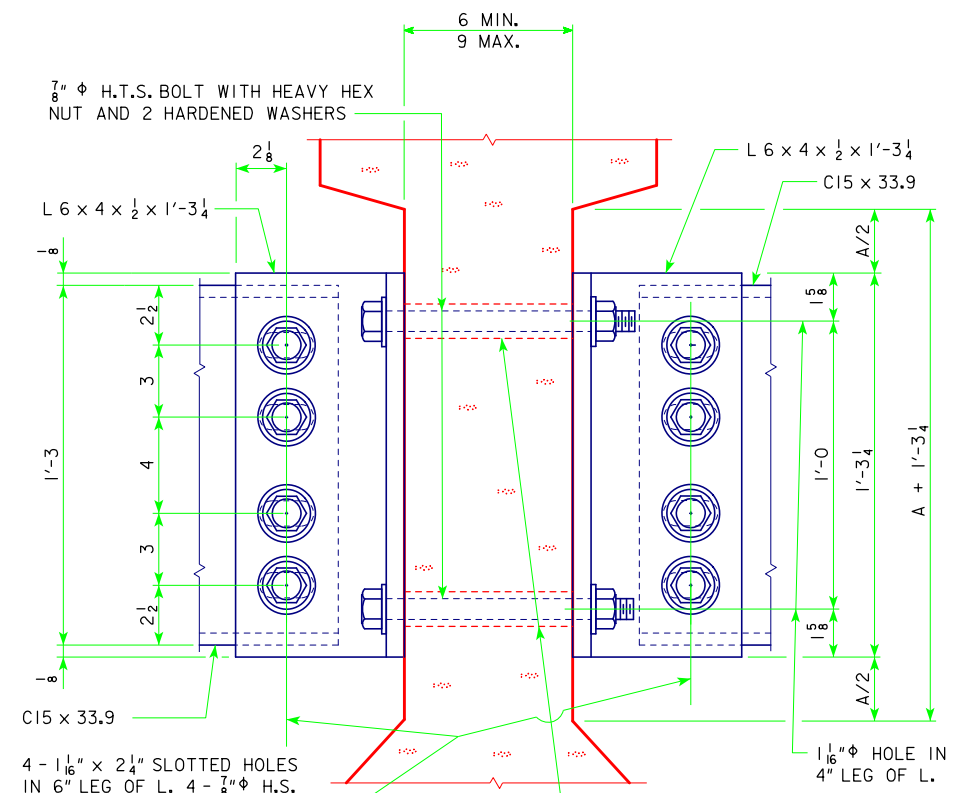


DETAIL D



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 7/8
D	2'-7 1/2	8 1/8



DETAIL E

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 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.

LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

Harmon L. McDaniel

STANDARD DESIGN - 30' ROADWAY, SINGLE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

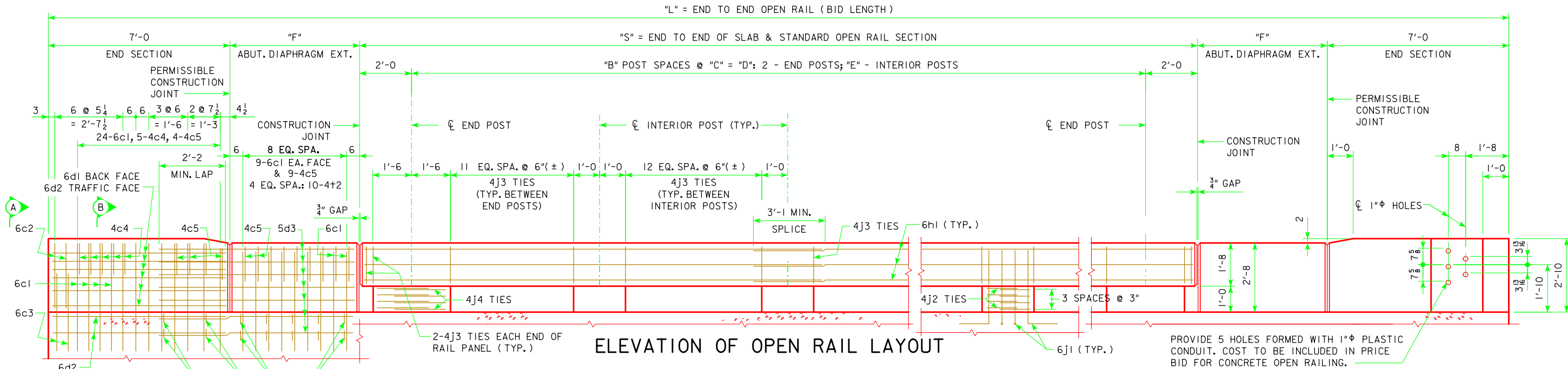
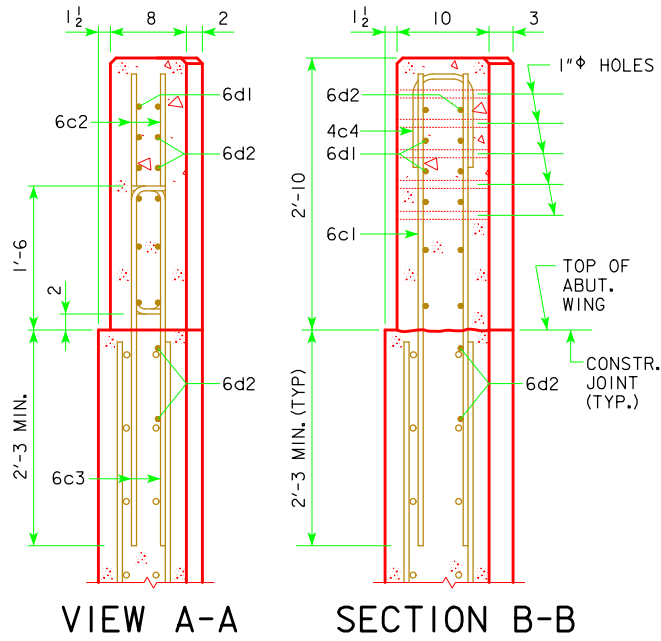
APRIL, 2012

INTERMEDIATE STEEL
DIAPHRAGMS

H30SI-30-12

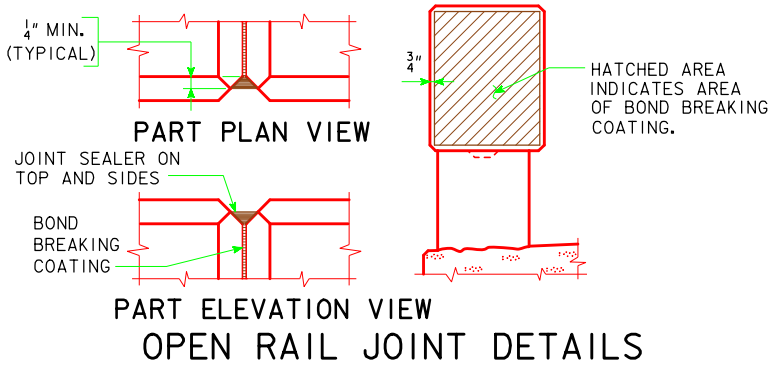
TABLE OF OPEN RAIL DIMENSIONS AND NUMBERS

CL-CL ABUT. BRG.		46'-8			55'-0			67'-6			80'-0			90'-0			100'-0			110'-0			CL-CL ABUT. BRG.
SKEW		0°	15°	30°	0°	15°	30°	0°	15°	30°	0°	15°	30°	0°	15°	30°	0°	15°	30°	0°	15°	30°	SKEW
DIMENSION OR NUMBER	L (FT.-IN.)	63'-8	63'-9 1/4	64'-1 5/8	72'-0	72'-1 1/4	72'-5 5/8	84'-6	84'-7 1/4	84'-11 5/8	107'-0	107'-1 1/4	107'-5 5/8	117'-0	117'-1 1/4	117'-5 5/8	127'-0	127'-1 1/4	127'-5 5/8	137'-0	137'-1 1/4	137'-5 5/8	L (FT.-IN.)
	S (FT.-IN.)	49'-8	49'-9 1/4	50'-1 5/8	58'-0	58'-1 1/4	58'-5 5/8	70'-6	70'-7 1/4	70'-11 5/8	83'-0	83'-1 1/4	83'-5 5/8	93'-0	93'-1 1/4	93'-5 5/8	103'-0	103'-1 1/4	103'-5 5/8	113'-0	113'-1 1/4	113'-5 5/8	S (FT.-IN.)
	B	6	6	6	7	7	7	9	9	9	10	10	10	12	12	12	13	13	13	14	14	14	B
	C (FT.-IN.)	7'-7 3/8	7'-7 1/2	7'-8 1/4	7'-8 5/8	7'-8 3/4	7'-9 3/8	7'-4 5/8	7'-4 3/4	7'-5 1/4	7'-10 3/4	7'-10 7/8	7'-11 3/8	7'-5	7'-5 1/8	7'-5 1/2	7'-7 3/8	7'-7 1/2	7'-7 3/4	7'-9 3/8	7'-9 1/2	7'-9 7/8	C (FT.-IN.)
	D (FT.-IN.)	45'-8	45'-9 1/4	46'-1 5/8	54'-0	54'-1 1/4	54'-5 5/8	66'-6	66'-7 1/4	66'-11 5/8	79'-0	79'-1 1/4	79'-5 5/8	89'-0	89'-1 1/4	89'-5 5/8	99'-0	99'-1 1/4	99'-5 5/8	109'-0	109'-1 1/4	109'-5 5/8	D (FT.-IN.)
	E	5	5	5	6	6	6	8	8	8	9	9	9	11	11	11	12	12	12	13	13	13	E
	F (FT.-IN.)	0	0	0	0	0	0	0	0	0	5'-0	5'-0	5'-0	5'-0	5'-0	5'-0	5'-0	5'-0	5'-0	5'-0	5'-0	5'-0	F (FT.-IN.)



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.
- 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.



LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWADOT Highway Division

STANDARD DESIGN - 30' ROADWAY, SINGLE SPAN BRIDGE

PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES

APRIL, 2012

OPEN RAIL, TL-4 DETAILS

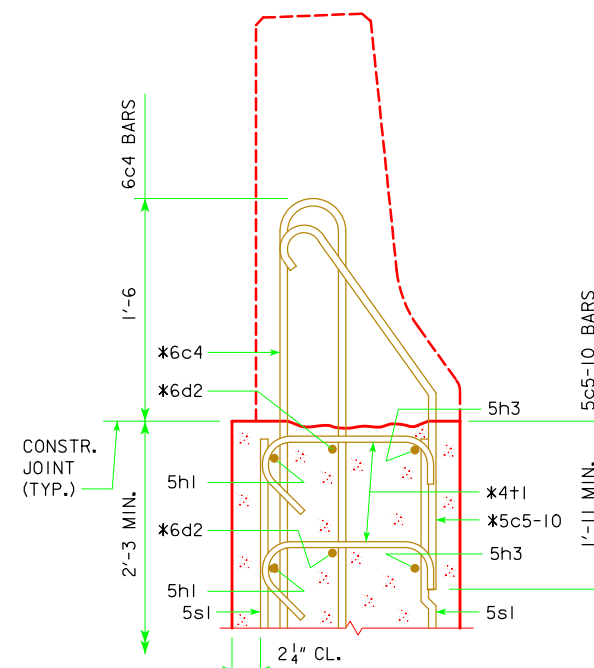
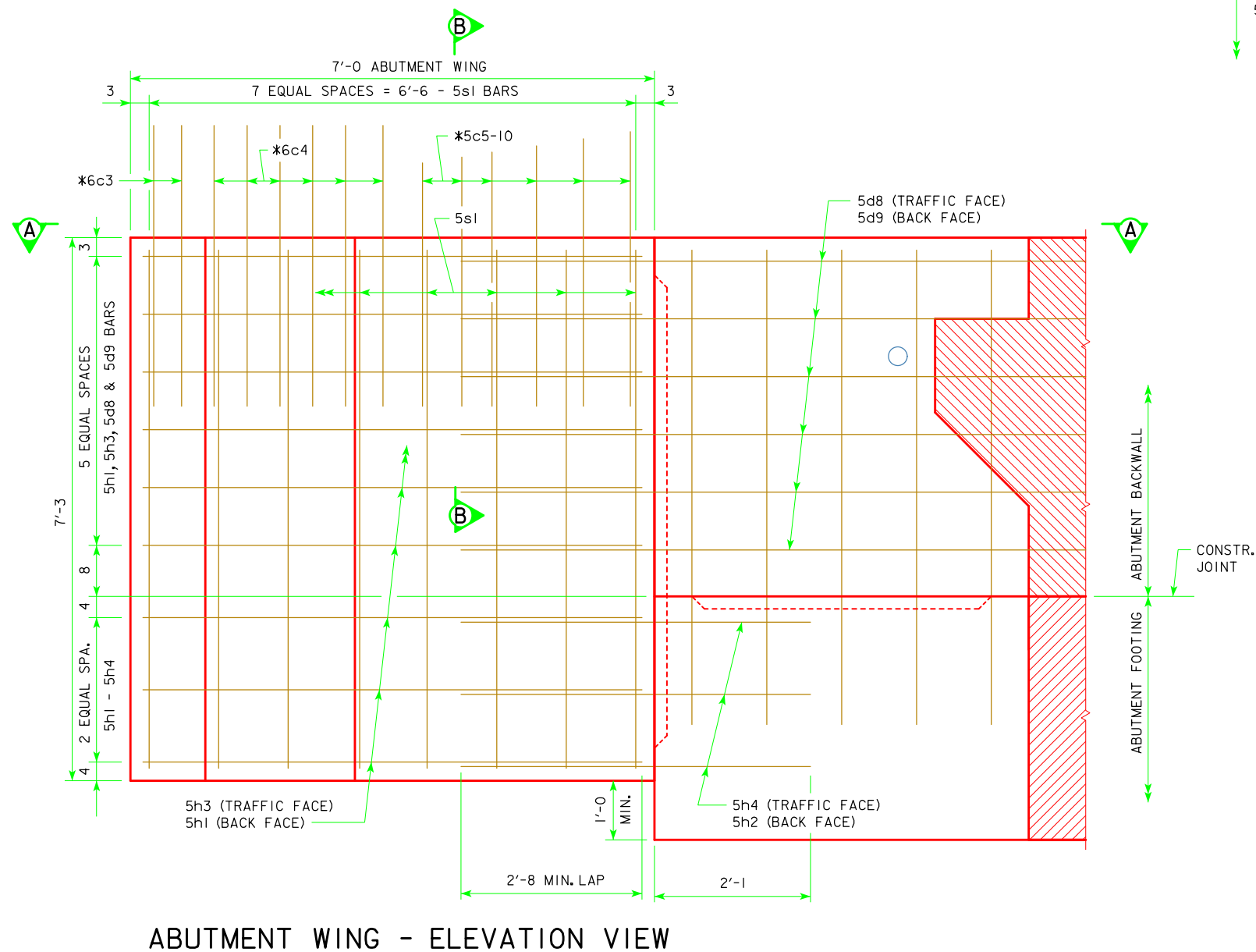
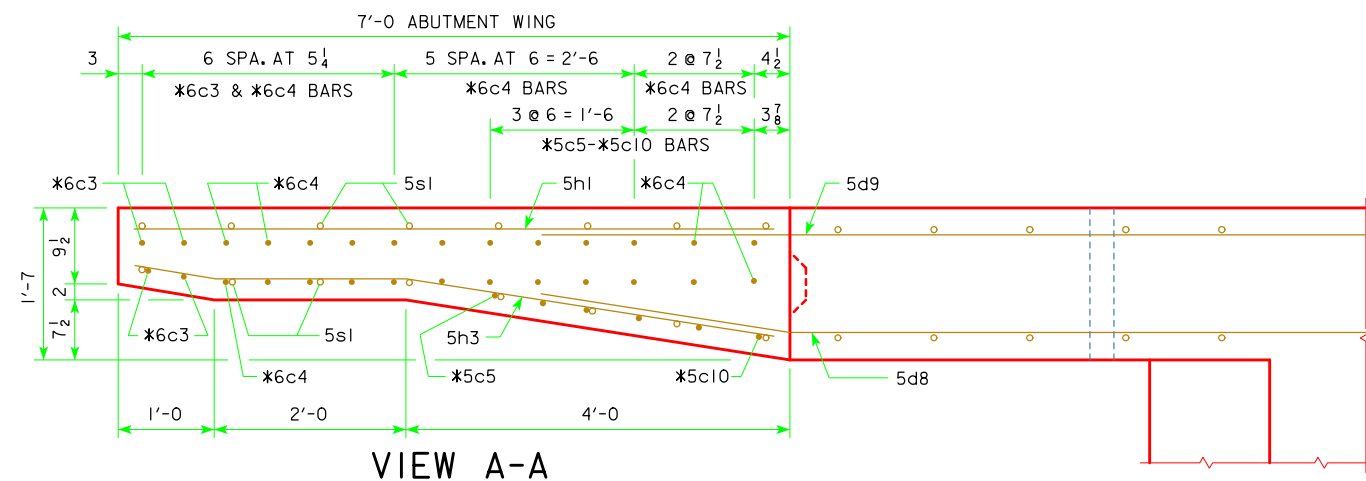
H30SI-34-12

SHEET 1 OF 2

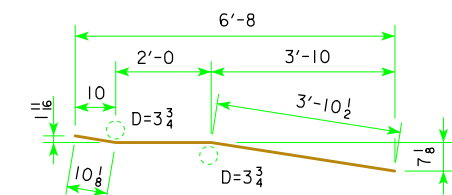
REINFORCING STEEL-TWO OPEN RAILS

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

BRIDGE LENGTH			46'-8			55'-0			67'-6			80'-0			90'-0			100'-0			110'-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
6c1	VERTICAL, END SECTION & ABUT. DIAPH. EXT.		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
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
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
4c5	VERT. HOOPS, END SEC. & ABUT. DIAPH. EXT.		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
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
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	26'-6	955	24	30'-8	1,106	24	36'-11	1,331	36	29'-10	1,613	36	33'-2	1,793	36	36'-6	1,974	36	39'-10	2,154
6j1	VERTICAL DOWELS, OPEN RAIL		120	4'-0	721	136	4'-0	818	168	4'-0	1009	184	4'-0	1105	216	4'-0	1298	232	4'-0	1394	248	4'-0	1490
4j2	HOOP, INTERIOR POST		80	4'-9	254	96	4'-9	305	128	4'-9	406	144	4'-9	457	176	4'-9	558	192	4'-9	609	208	4'-9	660
4j3	HOOP, OPEN RAIL		160	5'-5	579	186	5'-5	673	238	5'-5	861	264	5'-5	955	316	5'-5	1143	342	5'-5	1237	368	5'-5	1332
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
4t1	WING FOOTING TIE BARS		16	VARIES	19	16	VARIES	19	16	VARIES	19	16	VARIES	19	16	VARIES	19	16	VARIES	19	16	VARIES	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)					4179	4572			5277			6816			7478			7900			8322		



REINFORCING BAR LIST - ONE ABUT. WING					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5h1	HORIZONTAL BACK FACE		9	6'-8	63
5h3	HORIZONTAL TRAFFIC FACE		9	6'-9	63
5s1	VERTICAL BOTH FACES		16	6'-11	115
TOTAL (LBS.)					241



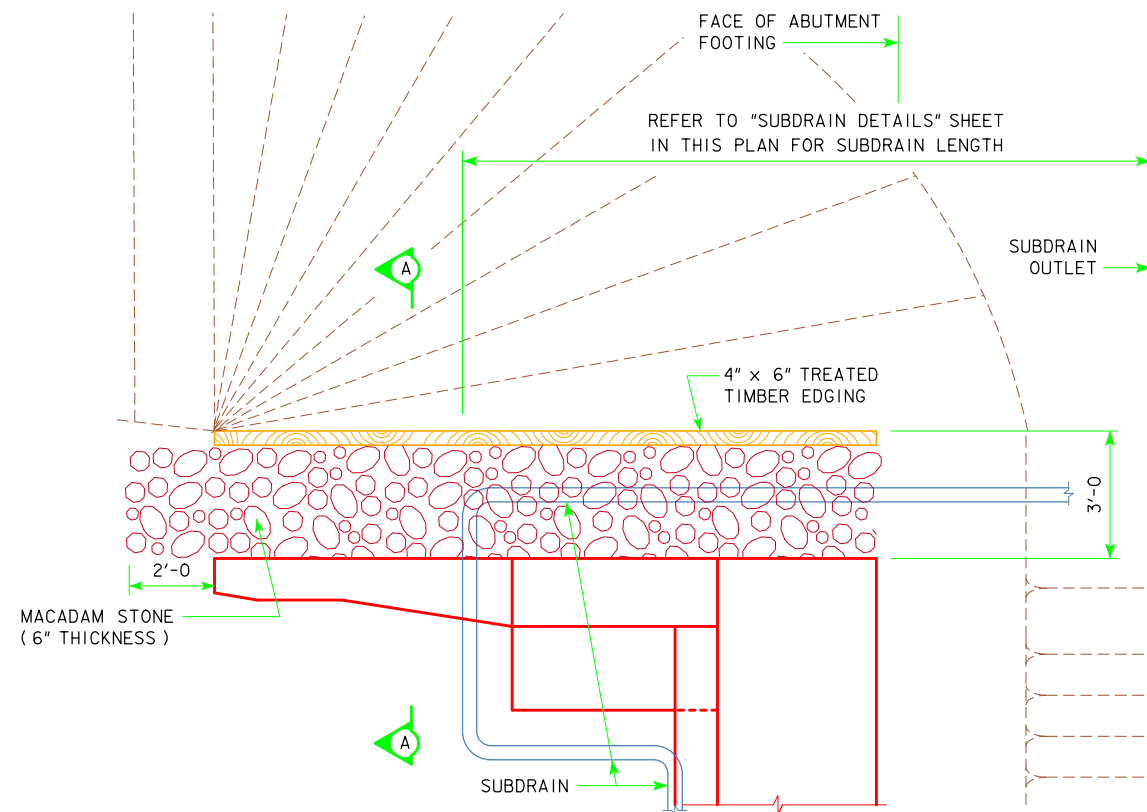
CONCRETE PLACEMENT SUMMARY	
CONCRETE	TOTAL
ONE ABUTMENT WING	2.1
TOTAL (CU. YDS.)	2.1

NOTE:

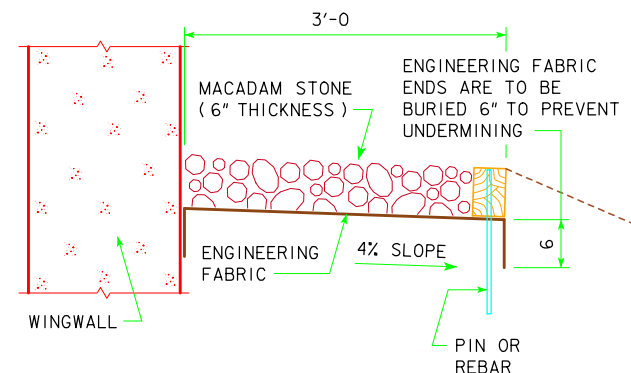
REINFORCING STEEL QUANTITY AND CONCRETE QUANTITY ARE TO BE
ADDED TO THE SUPERSTRUCTURE QUANTITIES SHOWN ELSEWHERE IN
THESE PLANS.

LATEST REVISION DATE	<i>Norman L. McQuinn</i>	APPROVED BY BRIDGE ENGINEER	 Highway Division
STANDARD DESIGN - 30' ROADWAY, SINGLE SPAN BRIDGE			
PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES			
APRIL, 2012			
WING DETAILS			H30SI-38-12

REVISED 09-14 - THE MACADAM STONE AREA WAS MODIFIED TO EXTEND 2 FEET IN FRONT OF THE BRIDGE WING.



TOP VIEW OF WING ARMORING WITH WING EXTENSION



SECTION A-A

SUBDRAIN NOTES:

SEE H30SI-40-12 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.

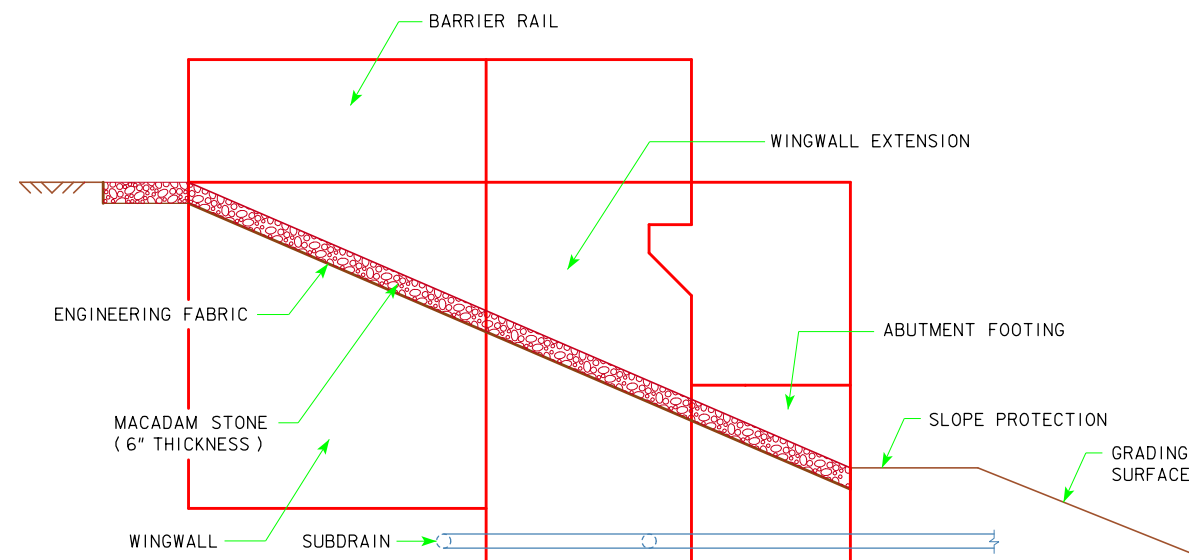
THE BRIDGE BERM SLOPE SHALL BE COMPACTED AND SHAPED AS SHOWN ON THESE PLANS, THE SITUATION PLAN, AND AS DIRECTED BY THE ENGINEER. THE BERM SLOPE SHALL BE FIRM WHEN THE ENGINEERING FABRIC AND MACADAM STONE ARE PLACED.

THE ENGINEERING FABRIC SHALL BE IN ACCORDANCE WITH 4196.01, B, 3, OF THE STANDARD SPECIFICATIONS. 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.

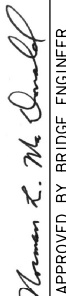
THE MACADAM STONE SHALL MEET THE REQUIREMENTS OF THE CURRENT STANDARD SPECIFICATIONS.

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

PAYMENT FOR THE BRIDGE WING ARMORING WILL BE BID PER SQUARE YARD. COST WILL INCLUDE ENGINEERING FABRIC, MACADAM STONE, EXCAVATION, SHAPING, AND COMPACTION TO DIMENSIONS SHOWN IN THESE PLANS. BID ITEM SHALL BE "BRIDGE WING ARMORING - MACADAM STONE".



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

09-14 LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER		
		STANDARD DESIGN - 30' ROADWAY, SINGLE SPAN BRIDGE PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGES APRIL, 2012	
		WING ARMORING DETAILS C & D BEAMS	H30SI-42-12